Behavioural factors in the financial decisions of young Mozambicans

J.H. Mota, A.C. Moreira* and A.J. Cossa

Department of Economics, Management and Industrial Engineering, University of Aveiro,
Campus Universitário de Santiago, 3810-193 Aveiro, Portugal

*To whom all correspondence should be addressed
amoreira@ua.pt

This paper seeks to analyse how behavioural factors influence the financial decisions of young Mozambican investors. The standard theory of finance assumes investors make rational financial decisions, seeking to minimise risk and maximise their expected utility. However, several studies have been conducted criticizing the assumption that investors are rational, opening the way to behavioural finance theory. According to the behavioural finance approach, financial decisions made by individuals are not based on rational thinking and their risk taking behaviour depends on their beliefs or feelings. Our analysis reveals that young Mozambicans are risk averse towards certain gains and risk lovers when faced with certain losses; they are excessively optimistic about the future; they use the information available as an anchor for their estimates; and they are so overconfident that they believe estimates in uncertain situations to be more accurate than they really are.

Introduction

There are two fundamental streams driving the various factors that influence financial decision making of individuals: traditional finance theory and the behavioural finance approach.

The traditional theory, which highlights the efficiency of markets, assumes that individuals are rational in making financial decisions, as they seek to maximise utility. To this end, individuals base their decisions on two factors – return and risk – seeking to maximise their yield and minimise the risk, which makes their expectations homogeneous.

The assumptions of the traditional theory have been called into question, as rationality and homogeneity of investors have been criticised. Several authors refute these assumptions, arguing that when making financial decisions some individuals are not rational at all, as risk taking behaviour depends on their beliefs or feelings. According to the behavioural finance approach, behavioural factors influence individuals in making financial decisions. As a result, financial markets cannot be efficient.

Although there are studies on behavioural finance in several countries (such as Brazil, India and the USA) in Mozambique there is no record of a detailed study of the applicability of the assumptions behind behavioural finance theory.

Thus, this article seeks to analyse how behavioural factors influence financial decisions of young Mozambican investors. Effectively, we seek to understand whether financial decisions taken by young Mozambicans are influenced by behavioural factors such as, overconfidence, loss aversion, excessive optimism, and anchoring and adjustment bias. This study targets young Mozambicans between the ages of 18 and 40. The following financial investments are analysed: investment in higher education, the creation of a new venture, the purchase or the construction of a house, and the opening of a savings account.

Another important factor that underpinned the study was Mozambique's low level of development – most of the behavioural finance studies carried out to date have looked at developed countries. Thus, as Mozambique is an underdeveloped country with a low level of education, behavioural factors may have a different influence on financial decisions *vis-à-vis* the level of economic endowment of other, developed countries. Therefore, this study looks at how the assumptions of behavioural finance apply to young adults in Mozambique. The understanding resulting from this work can help in the drive to reduce the influence of behavioural biases in financial decision making.

The article has five sections. This introduction, corresponding to the first section, is followed by a literature review covering traditional and behavioural finance theories. The third section presents the methodology used. In the fourth section the results are presented and, finally, the last section presents some conclusions and limitations of the study.

Related literature

The way individuals make their financial decisions has been subject to ongoing research in the finance field. A complete explanation of investment patterns requires a correct understanding of the beliefs and preferences of the investors. The majority of research regarding this issue makes broad assumptions that these beliefs and preferences are fully rational. Individuals are endowed with a rationality that allows them to consider all the information available. From this they develop unbiased forecasts about future events which allow them to make the best financial decisions. This means that investors can consider the efficient market

hypothesis to hold, with asset prices instantaneously reflecting all publicly available information reflecting fundamental values; there is no possibility of arbitrage; and investors seek to maximise returns while minimising risk (Fama, 1970; Jensen, 1978; Brealey, Myers & Allen, 2007).

The behavioural finance approach replaces the traditional rationality assumptions, asserting that individuals are influenced by behavioural factors. The assumption that individuals have a homogeneous attitude towards risk is also refuted because beliefs and feelings can shape how each person behaves towards risk.

Behavioural finance

When individuals are faced with decision making problems they seek to consider the alternatives with a view to making the best possible decision. Several approaches have been made describing the process that individuals follow for decision making. However, there is no universally accepted theory.

According to Stoner and Freeman (1995), decision making is the process of identifying a specific problem and selecting a course of action to resolve it. Under this perspective, programmed and un-programmed decisions are completely different, as the former are normally taken in order to solve routine problems whilst the latter are based on an unstructured process to solve non-routine problems. Initially it was believed that this process was completely rational, in which all alternatives were closely scrutinised. However, the idea of rationality was questioned as it was noticed that individuals make the most logical decisions they can, given their limited capabilities and information and influences from non-financial factors not directly related to the process (Serrano, 2001; Stoner & Freeman, 1995). Thus, the behavioural finance field emerged as a way of accounting for these limitations, incorporating behavioural factors that aim to better explain the way individuals make financial decisions.

Behavioural finance attempts to bridge gaps in the assumptions of the standard theory of finance, pointing out that in the process of financial decision making individuals have bounded rationality, as they are unable to analyse all the variables involved to make optimal decisions. On the other hand, they are influenced by psychological factors (i.e. there are strong emotional or human components that influence financial decision making).

The assumptions of the standard theory of finance were first questioned by Simon (1955), stating that our rationality is limited and our actions are constrained by mental and external constraints which undermine our rationality.

It was the idea of constraints limiting the rationality of individuals that gave rise to behavioural finance, which was subsequently developed in later studies (Kahneman & Tversky, 1979; De Bondt & Thaler, 1985; 1987; Shleifer & Summers, 1990; Barberis, Huang & Santos, 2001). The

results of these studies have brought new ways of explaining the factors that influence individuals when making financial decisions, linking their risk preferences to their beliefs or feelings.

Behavioural finance can be defined as the study of how humans interpret information and how they act in the process of deciding on investments (Lintner, 1998). Behavioural finance can also be defined as a branch of finance which seeks to revise and improve the traditional financial model by incorporating evidence of investor irrationality. This field of study seeks to identify how economic agents are affected by psychological factors, emotions and cognitive errors which may lead to changes in their behaviour that differ significantly from what is expected under the full rationality paradigm defended by standard theory (Halfeld & Torres, 2001; Lobão, 2012).

In behavioural finance, biases may exist that can alter the rationality of individuals when making financial decisions. Thus, the focus of this branch of finance is on cognitive illusions – as reflected in the behaviour of decision-makers – and the ways these illusions can interfere in the workings of the financial markets (Silva, Lagioia, Maciel & Rodrigues, 2009).

Prospect theory

Kahneman and Tversky (1979) criticised the expected utility theory as a descriptive model of decision making under risk, and developed an alternative: prospect theory. They stated that, under uncertainty, decisions systematically deviate from the substantive rationality assumed by the dominant economic model.

Prospect theory is the basis for any model that seeks to understand the price of assets, investor behaviour and their preferences regarding how they assess risk. In this theory, Kahneman and Tversky (1979) found that individuals tend to simplify the process of decision making, which is not strictly rational. With limited time and in an attempt to simplify and make the task more flexible, "decision makers" use "mental shortcuts" or heuristic rules (Silva *et al.*, 2009). Individuals tend to view extremely improbable events as impossible and extremely probable as certain. They weigh the probabilities in a nonlinear way, as if underestimating them (Fong, 2013; Lobão, 2012).

Kahneman and Tversky's (1979) study sought to understand whether cognitive and psychological factors influence investors' attitudes in making decisions with and without risk. Thus, they presented problems to individuals based on benefits, profits, losses, risk, and the probability of winning or losing in decision making processes. They concluded that most individuals are risk averse when faced with a situation of achieving certain gains, but have a propensity to assume the existence of risk when it comes to losses. They highlight three important phenomena in prospect theory: *(i)* the certain effect, where individuals overvalue the results that are taken for granted, compared with the outcomes that are merely

probable; *(ii)* the reflection effect, when decisions are taken with prospects involving losses. This implies that risk aversion in a positive domain is replaced by risk taking in a negative domain; *(iii)* the isolation effect, where individuals, in order to simplify the choice between alternatives, do not normally consider the components that are common to different choices, and focus on the components that differentiate them.

Emotional and cognitive biases

Behavioural finance has introduced innovation into the way of thinking in the finance field, incorporating emotional and cognitive factors to explain what influences individuals in making financial decisions. In this part of the research, some of these emotional and cognitive biases are presented, showing in what circumstances, and in what direction, they may lead to financial decisions which differ from those predicted by rational models.

Loss aversion

Kahneman and Tversky (1979) argue that loss aversion is an emotional deviation which reflects the fact that individuals feel a stronger desire to avoid losses than to achieve gains.

According to Barberis *et al.* (2001), investors have a greater sensitivity to reductions in the value of their investments than to increases, and this behaviour depends on previous investments. When former investments have yielded positive returns, investors tend to be less risk averse because these returns can absorb new potential losses. Inversely, when investors have had losses in previous investments, they become more sensitive and risk averse. Loss aversion leads people to consider losses more sharply than gains, of the same magnitude.

This approach embodies the assumptions that underpin prospect theory (Barkley-Levenson, Van Leijenhorst & Galván, 2013; Kahneman & Tversky, 1979; Vendrik & Woltjer, 2007). Understanding this bias allows several techniques to be used to overcome/minimise its effects.

Loss aversion is one of the most significant biases in financial decision making. Individuals with more knowledge and investment experience tend to be less loss averse. This means that loss aversion can be mitigated with experience (Berejikian & Early, 2013; Bokhari & Geltner, 2011).

Summarizing, it appears that individuals tend to prefer risky situations when they face potential losses, but are conservative in situations of potential gains. Therefore, loss aversion leads to cuts in potential gains, and to a sub optimisation of returns. This deviation leads investors to move away from their main objectives, which is to reduce risk and maximise profits.

Excessive optimism

The excessive optimism bias refers to the systematic tendency to be confident that events will be more favourable than forecasts dictate, formed in the light of the rational models paradigm. This bias leads individuals to overestimate the likelihood of positive events and underestimate the likelihood of adverse ones (Lobão, 2012; Shefrin, 2007).

Daniel, Hirshleifer and Subrahmanyam (1998) created a model distinguishing between two types of investors. Informed investors are subject to bias from overconfidence and optimism, while uninformed investors are subject to judgment bias. Lovallo and Kahneman (2003) argue that optimism generates more enthusiasm than realism, creating difficulties for investors in adjusting to reality.

Weinstein (1980) concluded that individuals believe they have a greater likelihood of a positive event occurring to them, than to others, and the opposite occurs with negative events.

Lovallo and Kahneman (2003), analysing students, athletes and investors, found that people are often optimistic, exaggerating on their own talents, believing they are above average in their positive aspects and skills, and clearly underestimating negative events. As a consequence, excessive optimism can lead to an unrealistic view of the future.

Excessive optimism may influence financial decision making: *(i)* an exaggerated optimistic view affects those realities which are closest to the individual, and therefore investors tend to be more optimistic about the performance of the sector where they work; *(ii)* excessive optimism may be reflected in the excessively favourable outlook regarding the economic performance of the place where the optimistic investor lives, leading to overinvestment in their geographical area; *(iii)* excessive optimism may lead individuals to believe that bad investments will only affect someone else, making them less critical in their choices (Lobão, 2012).

Concluding, excessive optimism refers to a bias meaning that people overestimate potential gains and underestimate losses. This bias may make it impossible for individuals to minimise losses and maximise gains, undermining the goals of their financial decisions.

Anchoring and adjustment bias

Anchoring manifests itself when a scale of values is established based on recent observations. This bias can lead individuals to expect gains in their financial activities, perpetuating practices used in the past, and making forecasting errors. Individuals construct their estimates from an initial value – an anchor – based on information they have access to, adjusting it to get a final answer. In most cases the adjustments made to the anchor are not big enough, which leads to decisions that deviate from rational models. This means that decisions made in similar contexts may be quite

different due to the presence of the different reference values available to decision makers (Leung & Tsang, 2013; Lima, 2003; Shefrin, 2007).

Anchoring is a cognitive bias that consists of assigning too much importance to the anchor information in decision making. For decision making, individuals base their choices on a reference point, and make successive adjustments to reflect additional information until reaching the final estimate. Typically, estimates that depart from the anchor are insufficient and final estimates turn out to be too influenced by this information. It is at this point, where the adjustment bias can be observed, that the insufficiency of the adjustments made to the anchor become visible. When the initial information contains relevant data to support decision making, their use may be rational. But evidence from studies shows that even irrelevant information can influence decision making. Even knowing that it is irrelevant, individuals rarely ignore the information (Leung & Tsang, 2013; Lobão, 2012; Tversky & Kahneman, 1974).

According to Smith, Windschitl, and Bruchmann (2013), the higher the level of knowledge the lower the anchoring effect. When individuals make their estimates they normally start with an arbitrary value, which they then tend to tweak along the decision process. The main problem is that sometimes they do not make sufficient adjustments and end up anchoring on initial estimates, believing that their estimates have to be close to the anchor, leading to systematic errors.

Overconfidence

Overconfidence induces individuals to make mistakes, thinking and believing that their understanding is always above average (Shefrin, 2007). The overconfident investor thinks that he/she is better than they actually are and knows more than they actually do. This does not necessarily imply that the individual is ignorant or incompetent. Individuals who exhibit overconfidence in their own abilities do not take into account the uncertainty that exists in the decision making process. Overconfidence results from the fact that people use their initial estimates as an anchor, which causes a bias in their estimates of confidence intervals (Tversky & Kahneman, 1974). The adjustments to the initial anchors are insufficient, leading to confidence intervals which are too small.

Overconfidence bias is very visible in behavioural finance studies (Abbes, 2013; Menkhoff, Schmeling & Schmidt, 2013; Palomino & Sadrieh, 2011). Such bias can occur in two stages: *(i)* overconfidence in predictions, when individuals think they can predict the future better than they actually can, using a confidence interval too close around the estimate; *(ii)* overconfidence in assessing problems, when individuals overestimate their capabilities, accuracy or quality of the available information. This is a behavioural characteristic present in most of the world's population.

Overconfidence is associated with positive characteristics such as a greater willingness to take risks and a higher resistance against adversity. The greater the relevant information individuals have the greater the excess of confidence (Lobão, 2012).

This bias affects individuals regardless of their level of experience and knowledge – learning and experience does not translate into a reduction of this bias. When the results are favourable, individuals tend to attribute the merit to themselves, which increases overconfidence, but when the results are unfavourable, they attribute the demerit to external factors. This position hinders learning because the individual does not establish the link between poor results and their (lack of) competence and overconfidence tends to be higher in individuals with more knowledge, experience and age (Menkhoff *et al.*, 2013).

Felipe and Campos (2008) showed an example of cognitive impairment (disposition effect, anchoring with insufficient adjustment and overconfidence) as 99.12% of their respondents showed an overconfidence bias. Moreover, the study revealed that 24.1% of responses to the questions were correct.

Abreu and Mendes (2012) investigated how the power of positive association between the frequency of transactions and obtaining information depends on the information resources used by investors and overconfidence. Their results show that overconfident investors, who consider themselves better than average, transact assets more frequently.

Methodology

This section presents the research objectives and describes the methodology chosen. This is a deductive study (Baptista & Sousa, 2011), which uses a questionnaire survey applied to 402 young Mozambicans (people aged between 18 and 40 years old) assessing how behavioural factors influence the financial decision making process.

Looking at the financial literature a gap in the behavioural finance studies is revealed. In response to this, this study seeks to analyse the behavioural factors that influence the financial decisions of young Mozambicans. Specifically, this study seeks to understand if behavioural factors, such as overconfidence, loss aversion, excessive optimism, and adjustment bias and anchoring, influence the process of financial decision making. On the other hand, we compared the results obtained in this study with those originally conducted by Tversky and Kahneman (1974) and Kahneman and Tversky (1979) as the basis for formulating the assumptions of behavioural finance theory.

To meet the objectives of this study we decided to employ a quantitative descriptive research technique using a survey; this data collection technique is particularly useful for investigating individual behaviour, as in this case (Baptista & Sousa, 2011).

This study seeks to analyse the financial decision making process of young Mozambicans, focusing on the influence

played by psychological factors. The target population includes Mozambicans aged between 18 and 40, of both sexes, with at least high-school education. Accordingly, university lecturers were contacted across Mozambique to help in the process of publicising the survey in Mozambican universities via the Internet. Before sending out the questionnaire, it was presented to two academics and pre-tested on young Mozambican students. The questionnaire was placed in an online platform and made accessible to all lecturers and respondents. For the treatment of the data, we used the SPSS and Excel software packages.

We used a non-probabilistic, convenience sample due to the great difficulty in obtaining random contacts for this research. The difficulties of internet access in Mozambique, as well as budget and temporal constraints were other factors that influenced the decision to use a convenience sample. Data collection took place between March and April 2013.

The questionnaires returned were vetted before being included in the analysis. All those with some kind of error that precluded their use (such as a lack of responses in some of the items or multiple responses) were discarded. Accordingly, the sample consisted of 402 individuals who willingly completed the digital survey; this can be considered a very good result taking into account the environmental and budgetary constraints.

Given that this study has been designed to test the applicability of the assumptions underlying the theory of behavioural finance in Mozambique, the questionnaire was adjusted to reflect the local idiomatic and semantic context. Where currency units were used, reference was made to the national currency, the Metical (Mt). Moreover, the language used also avoided technical and statistical jargon that could possibly be misinterpreted. Furthermore, the survey was pre-tested and validated before being placed online.

The survey is divided into four parts. The first part, providing identification information and profiling the respondents as investors, records information such as age, gender, education level, region of residence, and a characterisation of the type of investment made. These data served to define their profile in making financial decisions. Respondents were also classified into two different groups: those who have previously made financial decisions and those who have not. In this study, we consider the following to represent financial decisions: investment in higher education, buying or building a home, creating a business, and opening a savings account. The second part is related to the first behavioural factor, loss aversion, in which closed questions are used to assess loss aversion amongst Mozambicans. For this purpose, five questions were used, each with two alternatives. The third part is related to the second behavioural factor, excessive optimism, employing eight questions with a five-point Likert scale to assess the respondents' opinion regarding excessive optimism. In a bid to keep the questionnaire from getting too long, the fourth part looked jointly at two factors, overconfidence, and anchoring and adjustment bias. This combination aims to tie together the respondents' estimates to test the anchoring and adjustment effect, and overconfidence. In order not to distort the analysis, we use the same scales used by Tversky and Kahneman (1974) and Kahneman and Tversky (1979), as they have already been tested, and provide proven reliability. Three questions were introduced in this part, using 2012 as the reference year: the average life expectancy in Mozambique (which is 52 years); the number of countries in Africa (which is 54); and the Mozambican public sector wage increase (which averaged 9%) (Mozambique, 2012).

In the analysis of overconfidence, the answers to the questions were grouped into one of three intervals: a *correct estimate*, which includes the correct answer to the question asked, an *underestimate*, which includes the set of intervals below the interval that containing the correct answer, and finally an *overestimate*, which includes the set of intervals above the interval containing the correct answer. The probabilities used to assess overconfidence in individuals were aggregated into three groups: the *conservatives*, who indicate levels of confidence below 50%, the *confident*, who indicate levels of confidence between 50% and 79%, and the *fearless*, who indicate a confidence level above 80%.

Presentation and discussion of results

This part presents and discusses the survey data in order to understand the influence of the factors under study in the decision making process. Firstly, the financial profile of the respondents is presented in order to perceive the nature of the decisions they make or they would take. Secondly, we present the biases found in all the factors under study, in order to understand how they influence the financial decision making process of young Mozambicans.

Respondents profiles

Table 1 illustrates the distribution of the sample using the following variables: age, gender, level of education, and area of residence. Clearly, the highest concentration is in the age group between 26 and 30 years, and the smallest is in the age group between 18 and 20 years. Looking at gender, females are clearly underrepresented (28.1% of all respondents).
In terms of education, 69.2% of the sample has a bachelor degree, with the highest concentration in the age groups 26-30. Those with high-school education are the second largest group of respondents (17.7%). Finally, 77.9% of respondents live in the south of the country.

Table 1: Sample distribution by gender, age, educational level and region of residence

Gender, Level of Education, Region of Residence		Age group (years)				Total
		18 a 20	21 a 25	26 a 30	31 a 40	
Gender	Female	5.3%	35.4%	38.1%	21.2%	**113**
	Male	1.4%	17.3%	44.6%	36.7%	**289**
Educational Level	Secondary	9.9%	40.8%	31.0%	18.3%	**71**
	Bachelor	1.1%	20.9%	46.4%	31.7%	**278**
	Master	0.0%	5.7%	39.6%	54.7%	**53**
Region of Residence	North	2.6%	17.9%	41.0%	38.5%	**39**
	Centre	0.0%	20.0%	50.0%	30.0%	**50**
	South	2.9%	23.3%	41.9%	31.9%	**313**
Total	**Count**	**10**	**90**	**172**	**130**	**402**
	% of Total	**2.5%**	**22.4%**	**42.8%**	**32.3%**	**100.0%**

Respondents' financial decision making

Table 2 shows the breakdown of respondents into two groups depending on whether they had or had not previously taken financial decisions (78.6% and 21.4% respectively), with age playing a major role in differentiating between the two groups. Gender is also a factor here, with the percentage of males who have already made financial decisions slightly higher than the percentage of females.

Data in Table 3 is based on the respondents who have already taken financial decisions (i.e. 316 respondents). Unsurprisingly, investment decisions involving higher education (46.8%) are most common while the creation of his/her own business (34.5%) is the least common.

Table 2: Financial decision making

Age group and Gender		Financial Decision		Total
		Yes	No	
Age Group	18 to 20	20.0%	80.0%	10
	21 to 25	67.8%	32.2%	90
	26 to 30	86.0%	14.0%	172
	31 to 40	80.8%	19.2%	130
Gender	Female	72.6%	27.4%	113
	Male	81.0%	19.0%	289
Total	Count	316	86	402
	% of Total	78.6%	21.4%	100.0%

Table 3: Type and time gap since financial decision was taken

Type of Financial Decision	Less than 1 year	between 1 and 2 years	between 2 and 5 years	More than 5 years	Total
Higher education	9.4%	19.4%	43.5%	27.6%	170
Buying or building a home	12.8%	25.0%	39.9%	22.3%	148
Creating a business	10.5%	29.3%	36.8%	23.3%	133
Opening a savings account	13.8%	26.6%	36.7%	22.9%	109
Total Count	43	82	119	72	316
% of Total	13.6%	25.9%	37.7%	22.8%	100.0%

Table 4: Sources of information used for decision making

Type of Financial Decision	Press	Financial analysts	Financial booklets	Friends	Total
Higher education	38.2%	24.1%	38.2%	74.7%	170
Buying or building a home	29.1%	29.7%	44.6%	74.3%	148
Creating a business	25.6%	29.3%	48.1%	72.9%	133
Opening a savings account	39.4%	25.7%	35.8%	75.2%	109
Total Count	88	69	119	241	316
% of Total	27.8%	21.8%	37.7%	76.3%	100.0%

As shown in Table 4, informal sources of information are the most common feature of Mozambican investors, who rely more on friends and acquaintances when they wish to make financial decisions than financial analysts.

Loss aversion

Table 5 illustrates the responses obtained in testing loss aversion. The expected values in alternatives A and B, of Question 1 are 850.00 Mt and 800.00 Mt, respectively. In

Question 2, the alternatives A and B have an expected value of 240.00 Mt and 250.00 Mt, respectively. In contrast, the alternatives in Question 3 have the same expected value. Following a rational choice, individuals must choose alternatives that maximise the value; in this case, alternative A to Question 1, alternative B to Question 2, and either alternative for Question 3. However, the results contradict this hypothesis. In Questions 1 and 2, 68.4% and 77.8% of respondents, respectively, chose the alternative that gave them a certain prospect instead of involving themselves in

risky prospects with larger expected values. In Question 3, 65.5% of respondents chose the alternative that offered an assurance of salvation. This choice is due to the way the question was placed, emphasizing certain benefits, i.e., the certainty that 200 people will be saved.

As presented in Table 5, Mozambicans are risk averse. In Questions 1 and 2, only 31.6% and 22.2% of the respondents acted rationally, seeking to maximise the value. In Question 3, only 34.5% of Mozambicans are risk takers. This demonstrates the certainty effect proposed by the Kahneman and Tversky's (1979) prospect theory.

As noted above, Questions 1, 2 and 3 were drafted emphasizing gains and Questions 4 and 5 emphasizing losses. The expected utility of alternatives A and B in Question 4 is the loss of 750.00 Mt in both cases. For Question 5, the expected utility is the same for both answers (i.e. to save 200 people).

In Questions 4 and 5, 64.2% and 60.4% of respondents avoided the alternatives that involve certain losses. They preferred those that have some probability of gain. With the expectation of limiting the losses, they showed increased behaviour as risk takers, with the expectation of limiting the losses. Clearly, respondents show that the risk aversion feeling when gains were involved was replaced by a risk taker feeling when losses are involved, providing evidence that decisions depend on how the alternatives are presented, and supporting the assertions of Kahneman and Tversky (1979).

Table 5: Loss aversion results

Questions	Alternatives	Kahneman & Tversky	Araujo & Silva	This study
(1) Which of the two investments is better for you?	A. A prospect of 1,000.00 Mt with a probability of 85% and a null prospect with 15% of probability	-	48%	31.6%
	B. Having a certain prospect of 800.00Mt	-	52%	68.4%
(2) Choose from:	A. Having a certain prospect of 240.00Mt	84%	46%	77.8%
	B. A prospect of 1,000.00 Mt with a probability of 25% and a null prospect with 75% of probability	16%	54%	22.2%
(3) Imagine that a new disease has reached the city where you live. A group of scientists is working to contain the epidemic. They expect that at least 600 people would die from the disease. Which of the following two solutions would you choose?	A. If the solution "A" is applied, 200 people will be saved	72%	48%	65.5%
	B. If solution "B" is applied, there is a of probability 33.3% that 600 people will be saved and a probability of 66.6% that no one be saved	28%	52%	34.5%
(4) Choose from:	A. Having a certain loss of 750.00Mt	13%	21%	35.8%
	B. A probability of 75% of losing 1,000.00Mt and a probability of 25% of losing nothing	87%	79%	64.2%
(5) Imagine that a new disease has reached the city where you live. A group of scientists is working to contain the epidemic. They expect that at least 600 people would die from the disease. Which of the following two solutions would you choose?	A. If the solution "A" is applied, 400 people will die	22%	32%	39.6%
	B. If solution "B" is applied, there is a of probability 33.3% that no one will die and a probability of 66.6% that 600 people will be saved	78%	68%	60.4%

We found that the results obtained in this study are closer to those obtained in the United States (Kahneman and Tversky, 1984) than to those in Brazil (Araujo and Silva, 2007).

The results for Questions 2 and 3 obtained by Kahneman and Tversky (1984) are more conservative than those found in the present study. In turn, the results obtained in Brazil by Araujo and Silva (2007) show that the Brazilians prefer risk taking behaviour to the certainty effect. The analysis of Questions 4 and 5 of Table 5 shows that Mozambicans exhibit far less risk taking than Americans and Brazilians, with Americans being the least reluctant to accept losses. Clearly, there are behavioural differences in the three studies, with Mozambicans exhibiting the least risk taking (regarding loss acceptance).

Finally, Question 1 reiterates the behavioural difference regarding risk between Mozambicans and Brazilians. Here, only 31.6% of Mozambicans sought to maximise gain, making the rational choice when faced with a certain prospect, compared with 48% of Brazilians.

Excessive optimism

Table 6 shows that respondents attribute high scores to Questions 1, 2, 4, 5, and 8, confirming that they are overly optimistic. Contrariwise, high scores to Questions 3, 6, and 7 show that respondents' answers reflect an optimist bias.

Table 6: Excessive optimism

Optimism	Totally disagree	Disagree	Neither disagree nor agree	Agree	Totally agree
(1) In times of uncertainty, usually I hope it happens the best	4.1%	6.0%	15.8%	38.9%	35.1%
(2) Given a problem, I'm very calm in the solution of the decision making process	2.5%	5.7%	12.7%	40.2%	38.9%
(3) If there is a probability of a negative event to occur, I think it will occur	15.5%	36.1%	29.7%	13.9%	4.7%
(4) I'm always optimistic about my future	0.9%	3.2%	12.3%	33.5%	50.0%
(5) People trust me	0.9%	3.2%	30.1%	49.1%	16.8%
(6) I almost never expect that events happen as I wish	24.4%	39.9%	16.5%	15.8%	3.5%
(7) I rarely expect positive events happening to me	43.4%	35.1%	7.3%	8.5%	5.7%
(8) Generally I believe more positive events occur to me than negative ones	2.2%	3.5%	9.5%	45.3%	39.6%

Generally speaking, young Mozambicans overestimate the likelihood of favourable events and underestimate the likelihood of unfavourable ones. As such, it can be said that they focus solely on the problem, passionately assessing the issues using an intrinsic perspective rather than an extrinsic one.

This study is in line with those of both Weinstein (1980) and Lovallo and Kahneman (2003). Thus, Mozambican investors surveyed in this study reveal an overconfidence bias. This might lead them to disregard hard negative evidence from feasibility analyses, leading to an unrealistic view of the future.

Anchoring and adjustment bias

To ascertain the existence of the anchoring effect, this part of the survey was divided into three groups. The first group was designed to test for a low-anchor (lower than the correct value) in the questions; the second tested for a high-anchor (higher than the correct value) in the questions; while the final group tested the calibration (i.e. where no anchor was given and respondents had the freedom to make their estimates without being influenced). In the first two categories, after responding if the anchor value given was larger or smaller than it actually was, respondents were asked to place their estimates, providing an opportunity to detect adjustment bias.

Based on Table 7, it is clear that respondents generally based their estimates on the reference values provided in the statement. In Question 1 respondents were asked to state the average life expectancy in Mozambique. The low- and high-anchors for this question were respectively 43 and 65 years old. The average responses were very approximate, regardless of the anchor value. For the remaining three questions, it is clear that respondents tend to anchor themselves when making their estimates, as the estimates' mean values are close to the anchors.

Table 7: Low- and high-anchor estimates

	Questions	Valid		
		Larger	Lower	Average
Low-anchor	(1) Is the average life expectancy in Mozambique larger or lower than 43 years?	36.9%	63.1%	43.81
	(2) Is the number of countries of the African continent larger or lower than 51?	76.7%	23.3%	52.08
	(3) Was the salary increase in the public sector in Mozambique in 2012 larger or lower than 6%%?	69.9%	30.1%	7.93
High-anchor	(1) Is the average life expectancy in Mozambique is larger or lower than 65 years?	5.5%	94.5%	43.87
	(2) Is the number of countries of the African continent larger or lower than 64?	17.3%	82.7%	57.52
	(3) Was the salary increase in the public sector in Mozambique in 2012 larger or lower than 11%?	22.7%	77.3%	10.76
Calibration	(1) What is the average life expectancy in Mozambique?			41.34
	(2) How many countries are in the African continent?			53.45
	(3) What was the percentage increase (%) of the public sector pay in Mozambique in 2012?			7.86

The results of the estimates shown in Table 7 allow us to assess whether the anchor values were higher or lower than the actual values given by the respondents. In the case of the low-anchor, all reference values were lower than those provided by the respondents. In turn, in the case of the high-anchor, the reference values were always higher than those provided by the respondents. While based on the anchors provided, it appears that respondents' answers agreed independent of the anchor given, only failing in the question on the average life expectancy, where, for the low-anchor, 63.1% estimated it to be lower than the real value.

It is clear that estimates by investors are associated with the anchors available in the problem under analysis, and as they

get more information they seek to improve their decisions. However, on the same questions, with different anchors, investors made different estimates. These respondents attributed greater importance to the information provided, disregarding its intrinsic validity.

Overconfidence

Table 8 presents the percentages for each of the responses, per question. The *fearless* group is overconfident that their estimates are right. On the other hand, the *conservative* and the *confident* have relatively similar results. However, taking into account the confidence level, the type of anchor and the accuracy of the respondents' answers to the four questions, it can be seen that there are clear differences among them. It is therefore important to analyse each question, looking at the type of anchor and type of overconfidence, to determine how those that are overconfident made their estimates in this Mozambique study.

The answers to the average life expectancy question are shown in Table 9. The overall conclusion is that on average, Mozambicans have *fearless* overconfidence (77.5%).

Respondents who belong to the *correct estimate* groups (low-anchor, high-anchor and calibration) are much more pragmatic than those who belong to the *underestimate*

groups, regardless of subgroup. Also, those responding to high-anchor and calibration questions that belong to the *overestimate* groups are much more pragmatic than those responding to low-anchor question that also belong to the *overestimate* group.

Table 8: Distribution of overconfident respondents by type of question

Question	Type of overconfidents		
	conservative	confident	fearless
1	7.0%	15.5%	77.5%
2	12.3%	9.5%	78.2%
3	19.0%	19.3%	61.7%
Total	17.7%	16.8%	65.6%

Clearly, in this question, the low- or high-anchor hardly influenced the level of confidence. In fact, in the *underestimate* groups more than 60% of respondents show *fearless* overconfidence. However, the same behaviour does not occur when looking at the confidence level for the *overestimate* groups; more respondents *overestimate* when faced with a low-anchor than when faced with a high-anchor. Also, for the calibration group, only around 6% of responses fall in the *correct estimate* interval, while more than 85% are either *confident* or *fearless*.

Table 9: Estimates of life expectancy

Subgroup	Interval		Type of overconfidents		
			conservative	confident	fearless
Low-anchor	**Underestimate**	**76.7%**	6.8%	9.7%	60.2%
	Correct	**8.8%**	1.0%	2.9%	4.9%
	Overestimate	**14.5%**	1.0%	2.9%	10.6%
	Subgroup	100.0%	**8.8%**	**15.5%**	**75.8%**
High-anchor	**Underestimate**	**78.2%**	2.8%	12.7%	62.7%
	Correct	**14.6%**	1.8%	3.6%	9.2%
	Overestimate	**7.2%**	0.9%	2.7%	3.6%
	Subgroup	100.0%	**5.5%**	**19.0%**	**75.5%**
Calibration	**Underestimate**	**90.4%**	4.9%	10.7%	74.8%
	Correct	**5.9%**	0.0%	1.0%	4.9%
	Overestimate	**3.8%**	1.9%	0.0%	1.9%
	Subgroup	100%	**6.8%**	**11.7%**	**81.3%**
Total	**Average**		**7.0%**	**15.5%**	**77.5%**

Table 10 shows the overconfidence in the answers given by the respondents to the question regarding the number of countries in the African continent. In general, respondents are *fearless* (78.2%).

Unlike the previous answer, respondents of the three subgroups (low-anchor, high-anchor and calibration) who belong to the *correct estimate* group are much more overconfident than those in the *underestimate* or *overestimate* groups, regardless of the subgroup. However, the calibration

subgroup is more *fearless* in their overconfidence (70.9%) than the low- and high-anchor subgroups (58.3% and 58.2%, respectively).

Comparing just the *conservative* group by subgroup reveals different postures among respondents: those who belong to the *underestimate* group adjust their decisions to the low-anchor (5.8%), while those who belong to the *overestimate* group base their decisions on the high-anchor (7.3%).

Table 10: Estimates for the number of African countries

Subgroup	Interval	Type of overconfidents		
		conservative	confident	fearless
Low-anchor	**Underestimate**	**17.40%**	5.8%	2.9%	8.7%
	Correct	**67.10%**	4.9%	3.9%	58.3%
	Overestimate	**15.60%**	4.9%	2.9%	7.8%
	Subgroup	100.00%	**15.5%**	**9.7%**	**74.8%**
High-anchor	**Underestimate**	**7.20%**	0.9%	2.7%	3.6%
	Correct	**64.50%**	1.8%	4.5%	58.2%
	Overestimate	**31.90%**	7.3%	6.4%	18.2%
	Subgroup	100.00%	**10.0%**	**13.6%**	**76.4%**
Calibration	**Underestimate**	**6.80%**	1.0%	1.9%	3.9%
	Correct	**79.60%**	5.8%	2.9%	70.9%
	Overestimate	**13.60%**	4.9%	0.0%	8.7%
	Subgroup	100.10%	**11.7%**	**4.9%**	**83.5%**
Total	**Average**		**12.3%**	**9.5%**	**78.2%**

The low-anchor subgroup of the *underestimate* group has higher percentages in the three overconfidence groups when compared with the calibration subgroup of the *underestimate* group. In turn, the high-anchor subgroup of the *overestimate* group has higher percentages over the three overconfidence groups compared to the calibration subgroup of the *overestimate* group. Accordingly, the anchoring effect plays a role in this question.

The overconfidence shown in the answers to the question regarding the percentage increase in public sector pay in Mozambique is shown in Table 11. In general, respondents are *fearless* (61.7%).

The *conservative* and the *confident* groups are of a relatively similar size at around 19%, although the *conservatives* are based around the low-anchor and calibration subgroups, and the *confidents* are based around the high-anchor subgroup.

Similar to the previous question, the largest number of respondents in the low-anchor subgroup belong to the *correct estimate* group. However, contrary to the previous question, the *overestimate* group is the largest for the high-anchor subgroup. In turn, in the calibration subgroup, the *underestimate* group is the largest. Clearly, there was no homogeneity in the responses, which may reflect the lack of familiarity respondents have to the question.

Table 11: Estimates of the percentage increase in public sector pay

Subgroup	Interval	Type of overconfidents		
		conservative	confident	fearless
Low-anchor	**Underestimate**	**32.10%**	11.7%	3.9%	16.5%
	Correct	**43.70%**	8.7%	6.8%	28.2%
	Overestimate	**24.20%**	2.9%	5.8%	15.5%
	Subgroup	100.00%	**23.3%**	**16.5%**	**60.2%**
High-anchor	**Underestimate**	**17.20%**	1.8%	2.7%	12.7%
	Correct	**34.50%**	4.5%	10.0%	20.0%
	Overestimate	**48.20%**	3.6%	16.4%	28.2%
	Subgroup	100.00%	**10.0%**	**29.1%**	**60.9%**
Calibration	**Underestimate**	**42.70%**	6.8%	6.8%	29.1%
	Correct	**31.10%**	5.8%	4.9%	20.4%
	Overestimate	**26.30%**	11.7%	0.0%	14.6%
	Subgroup	100.10%	**24.3%**	**11.7%**	**64.1%**
Subgroup	**Average**		**19.0%**	**19.3%**	**61.7%**

When comparing the *conservative* group by subgroup, it is possible to conclude that there are differentiated behaviours: the *underestimate* group is influenced by the low-anchor (11.7%), while the *overestimate* group is not influenced by the high-anchor (3.6%). In turn, *fearless* behaviour is also influenced by anchoring: while the *overestimate* group is biased by the high-anchor (28.2%), the *underestimate* group is biased by the low-anchor (16.5%), although in both cases the percentages of the *overestimate* group for the low-anchor and of the *overestimate* group for the high-anchor are not negligible, with 15.5% and 12.7%, respectively.

The low-anchor subgroup of the *underestimate* group has a larger percentage of *conservatives* (11.7%) than the calibration group (6.8%). In turn, the high-anchor subgroup of the *overestimate* group has a larger percentage of both *confident* and *fearless* groups compared to the calibration group. Clearly, although anchoring is present, its role is not as strong as in the previous question.

From this section, we can draw the conclusion that respondents display high levels of confidence, even when estimates were wrong. Felipe and Campos (2008) note that

the use of intervals for calculating the estimates can lead to the appearance of overconfidence. To avoid this, we used open questions and implemented intervals afterwards. The percentage of correct answers in this study is 38.86%. In general knowledge questions, most estimates coincided with the *correct estimate* intervals where the real value was located. For example, 79.6% (calibration group) of the respondents to the question regarding the number of countries in Africa answered correctly. However, only 5.9% of respondents correctly estimated the life expectancy question.

Conclusions and limitations

Young Mozambicans have two opposing loss aversion behaviours in the financial decision making process when faced with risk: (i) *loss aversion*, when they face certain gains, as they prefer smaller gains to taking the risk of embracing higher earnings; (ii) *risk takers*, when they face potential losses, as they prefer to accept the risk when there is the possibility of reducing losses. The way the alternatives are presented determines the decision, as when losses are emphasised they tend to become risk takers and when gains are emphasised they tend to be risk averse. The level of knowledge and experience contribute to a reduction in loss aversion, as experienced and more knowledgeable people are more thoughtful in their analyses, seeking to maximise the most of each alternative. Finally, the development level contributes to loss aversion. In Mozambique, where the market economy is not developed, individuals are less likely to take on risk and therefore tend to have greater loss aversion. Meanwhile, in more developed countries, individuals tend to have lower risk aversion as they are more likely to be more acquainted with decisions involving economic risk. Therefore, the decisions made by young Mozambicans are influenced by loss aversion and not consistent with that predicted by rational models.

This study reveals that young Mozambicans do exhibit excessive optimism, believing that positive events are more likely to occur to them, and assuming that negatives events only occur to others. The belief regarding the likelihood of events depends on the way they are presented. In this line of reasoning, Mozambicans believe that the favourable events that occur in their lives are well above average (i.e. young Mozambicans are overly optimistic). What is not yet clear with this study is how training and business experience can blend with this excess of optimism.

This study reveals that financial decision making of young Mozambicans is influenced by anchoring and by the adjustment bias, which can lead to irrational decision making. Effectively, this type of decision making may lead to the loss of future prospects. However, the more knowledgeable individuals are about the question, the less they are cognitively biased, thereby making estimates much closer to the real values.

We found that young Mozambicans are overconfident, regardless of right or wrong estimates. This bias is most noticeable with common knowledge questions, in which respondents believe they answered correctly and display very high confidence levels. This case is most evident in the question regarding the number of countries in the African continent, where there are high levels of confidence that their estimates are accurate. Conversely, when the question is not considered to be common knowledge, individuals tend to have moderate levels of confidence, even when their estimates are right. So young Mozambicans tend to think they can predict the future better than they really can and overestimate their capabilities, accuracy, and quality of the information available.

The major limitation of this study is the lack of a stratified sample, with a proper spread over gender, age, level of education, and area of residence. This limitation is due to the difficulty of reaching young Mozambicans randomly, and the fact that an online questionnaire was used for completing the survey. Another difficulty was related to the low quality of internet service provision in Mozambique (compared to other, developed countries), making it difficult to reach out to more respondents. Consequently, future studies should use a more representative sample of the population. Future studies could embark on complementary comparative studies with Mozambican entrepreneurs, in order to assess the extent to which market/entrepreneurial experience makes a difference in the Mozambican context.

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