Research Paper

The Effect of the Relative Rationality on the Economic Decision-Making. The Impact of the Emotional Adjusted Value on the Expected Value and Expected Utility

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ABSTRACT

The goal of the research is to study the human behaviour in decision making and test if the decisions are made through "relative rationality". The relative rationality's idea of the research is to incorporate emotion within the decision-making process to calculate what the researcher has named "Emotional Adjusted Value" equation ("EAV"), to integrate the "emotional revenues and emotional cost" with the traditional economic revenues and cost. The sum of all EAV multiplied with the probability of the event give the "Emotional Adjusted Expected Value". The researcher has developed a flowchart to "price" the emotion in economic value, this allows to calculate the monetary subjective value of the emotion with the goal to figure out the "true" subjective value of the choice considering both economic and emotional factors. The researcher has elaborated the Emotional Adjusted Expected Utility 's idea, where the standard subjective utility of the payoff is replaced by the utility of "Emotional Adjusted Value" and multiplied by the subjective probability to get more accurate subjective utility value considering both emotional and economic factors under decision making process.

Key words: relative rationality, human behaviour in decision making, subjective emotional revenues, subjective emotional cost, emotional adjusted value, emotional adjusted expected value, emotional adjusted expected utility, behavioural economics, choice under uncertainty, role and effects of psychological, emotional, social factors on decision making.

INTRODUCTION

Any human action has a goal that can be conscious or unconscious to the subject carrying out the action, but which in any case brings him a benefit, otherwise he would not act. Even when a person acts by instinct, he satisfies an unconscious need. The researcher has called the real reason for the action, the "dominant dynamic" of acting, that is the unconscious and emotional reason for the action and it is possible to implement a strategy that dominates over the others, because it is aimed at satisfying our dominant dynamic of our actions. Each personal choice is aimed to satisfying our own emotion, our dominant dynamic, our unconscious state and therefore our action follows a "relative rationality" and this is beyond economic factor of the choice. This implies that any human behaviour can be explained if we look at the personal emotional sphere, leaving room for a relative rationality of the choice dictated by unconscious, emotions and psychological factor. The utility of an action is strictly personal, the same actions could have two different emotional value from two person. Depending on the personal emotion and objectives, what for us is a dominant dynamic is not necessarily the same for others, because the emotional value that we derive from our action is subjective and is independent from other people actions, because the aim is to satisfy

our unique and personal emotional need. If we identify our true goal, our dominant dynamic, we can always decide the best solution for ourselves and we do not have to wait for the strategy of others, because we know what we really want.

In my opinion non-economic cost and revenue should be added to the decision-making process to evaluate the choice's payoff, because the utility and the benefit of a choice is personal, everyone has the own dominant dynamic, so non-economic factor has importance in the decision-making process. This could explain the apparent irrationality of some choices. For example, to give a "rational" answer to the following question: do I prefer to work in my Country at a lower salary or to emigrate and receive a higher salary? According to the economic 's theory and expected value theory, the choice emigrate would be rational and immediate, but this choice, perhaps for personal reasons, does not happen. So, if one person chose to stay in his one's own Country with a lower salary, this choice could be explained if one considers the personal and emotional benefit and cost, the usefulness of this choice, since every choice has not only economic cost and a profit, but also emotional subjective cost and revenues.

So, for example, even if you have a more favourable salary abroad, you may prefer to stay in your own Country, because perhaps the subjective emotional utility of the familiar environment or consuetudine to which you are used, is greater than the economic benefit you would receive from a salary increase.

In my opinion the reluctance to change Country and emigrate to get better salary can be view as an endowment effect in behavioural economics, because the personal value attribute to the actual owner Country is higher respect to a foreign Country.

The purpose of the research is to do an empirical study of human behaviour through questionnaires in order to analyse the behaviour and empirically test the theoretical elaboration of the theory of relative rationality. I would like to examine if the decision making goes beyond the economic benefit, so to evaluate a choice we have to take into account not only the economic returns, but also the benefit and cost of the decision on the emotional-sentimental-unconscious spheres.

For example, a person could work for a company even if he has a low wage compared to the average wage and compared to his skill, but for example if the work environment is familiar or work guarantees a Status quo higher than average, he could decide to remain in the company. Looking this problem from an economic point of view, for the person should be convenient looking the highest salary that should better compensate his skill. The aim of an action, the dominant dynamic and the benefit from this behave is different from each person. So not all agents are rational in the economic sense (revenue-costs), but they are rational in a perspective of personal emotional benefit and emotional costs (relative rationality), so he can decide taking into account other factors. Maybe a person may not behave as expected in line a rational economic agent and that deviations from conventional norms need not demonstrate irrationality in decision making, because the person could behave with a relative rationality or logic that comes from his personal and unique emotional-sentimental-unconscious sphere.

According to the researcher any human action has an aim, the "dominant dynamic": it can be conscious (rational-economic revenues-cost) or unconscious (relative rationality-emotional revenues-cost).

When a behaviour could be not economic rational, could be explained considering that the person could follow his instinct and the choice satisfies an unconscious emotional need.

The choice we make has a personal emotional benefit different respect another person, that could have a different goal and emotion respect to us and therefore he could make a different choice.

A choice is done to satisfy our personal believes, our unique emotional unconscious sphere and therefore our behave follows a relative rationality, that go behind the economic benefit of the choice, but that consider also the personal and unique emotional benefit.

That means that any behaviour could be explained if one looks at the personal sphere and thus the behave of the "homo economicus" could be not followed, leaving space to a rationality relative behave dictated by the unconscious, that allow us a relative benefit to our personal sphere and increase-decrease the emotional payoff of the choice.

For example, according to standard economic theory if you have a mobile phone dated 2010, you should accept the free exchange with a new recent and modern phone (more economic value), if you don't accept the exchange, it means that you could prices the emotional value of already owner already the phone (endowment effect) or if is a gift, you could prices the emotional value linked to the person from which you received the gift.

Therefore, the behaviour that seems irrational could become almost rational, if during the decision-making process, beside the economic factors are also considered the subjective emotional factors and including emotional factor in the expected value and expected utility and therefore considering the personal emotional choice's benefit.

For example in the case of the choice of means of transport to go to another Country, the personal choice could be different from the one suggested from an economic rational optimisation choice: the plane given the shorter travel time and assuming the lower cost of the ticket, compared to the train, bus, car or ship, should be chosen as the preferred means of travel, being a dominant choice compared to the other choices, since in our assumption it guarantees the lowest cost and the lowest time. But if we consider the subjective emotional revenues-cost of the individual associate a different transport choice, then the transportation choice may be different from the dominant economic choice, even if this may seem irrational.

For example, a person could evaluate the usefulness of the trip with the largest car, because he could stop during the journey in all the cities and see new landscapes, or compared to other means of transport, the fear associated with the plane could be greater than the value of reduction of the traveling time and reduction cost.

The thesis research's idea is that under decision-making process what cannot be explained by economic behaviour can be explained by the subjective emotional utility. So, the emotional benefit and value, being subjective, does not allow to predict the behaviour and consequently predict the choice of each individual, as they could not act economic rationally due to the emotional bias.

The goal of an actions and the marginal emotional utility associated to the choice varies from person to person.

Consequently, a subject could behave not economically rational (monetary revenues-costs), has expected by a rational economic agent under expected value theory, but its action becomes explainable if is considered the emotional adjusted value of the person's choice, which considers human emotional costs and benefits and unconscious and psychological factors other than income.

The irrational behaviour could be explained by the relative rationally, if during a decision-making process not only economic factor are considered, but also human emotion is considered, like the subjective emotional costs and revenues. So, the subjective emotional factors could be an explanation of irrational economic and finance decision making.

Given that the economic system is the sum of all individual choices and if the choice of the individual cannot be predicted, because each person has its own emotional and relative subjective utility function, then become impossible to predict the choice according an economic model, because not all person act according to revenue-cost

economic analysis only, but human also has a heart and feelings, which are the emotional inputs of the emotional adjusted value equation.

The concept of relative rationality may explain the irrational behaviour if we consider under decision making process both the economic payoff (rational) and the subjective emotional payoff of the choice (relative rationality), so we could get more accurate and real payoff of the choice.

The significance of the problem is to highlight different non-economic variable that human behaves consider in economic and financial decision-making process.

The goal of the research is to consider the human behaviour as a factor that has an impact on the economic and financial decision making in contraposition with the standard economic theory. The research result could help to emphasise that the investment is made not only through expected value theory, but that emotional and behavioural factor are playing an important role within the economic and financial decision making.

Emotional Adjusted Value

The relative rationality's idea means that the choice may not be rational from an economic point of view, so not rational according to the expected value theory, but the decision could be relatively rational if we incorporate the subjective emotional cost and revenues of the choice within the decision-making process.

The purpose of this study is to understand the role of human behaviour in decision making in the economy and financial market to test if the decisions are made through not only economic rationality, but human emotional bias.

According to this research not only economic factor should be considered in decision making process, because if we also consider human behaviour and human bias in the decision-making process, the choice could be different from the traditional economic rational expectation.

For this reason, I have introduced the concept of Emotional Adjusted Value (EAV). To summarize my personal view, also emotional factor should be used to calculate the profit or loss in decision making and the following formula summarize the idea behind the calculation:

Emotional Adjusted Value (EAV): (economic revenue + subjective emotional revenues of the choice) - (economic cost + subjective emotional cost of the choice).

The formula has been named Di Toro's emotional adjusted value equation and represents the profit or the loss of the choice, calculated considering both economic and emotional factors.

With the name economic revenues and emotional revenues is considered any positive economic and emotional event, so for example the economic revenue in case of buy an asset is the economic value of the asset and the sea view is the emotional revenue.

The goal of the research is to proof that in the equation to calculate profit and loss in the decision-making both economic and emotional revenues and cost are considered, consequently the emotional factor influence the subjective expected value's amount and for this reason the researcher has introduced the concept of "Emotional Adjusted Expected Value" (EAEV), where to calculate the "emotional adjusted expected value" is needed to multiply subjective probabilities with the Emotional Adjusted Value (EAV).

Emotional Adjusted Expected Value (EAEV) = $P_1 * EAV_1 + P_2 * EAV_2 + \ldots + P_X * EAV_X$

Where P is the subjective probability of the referring event and EAV is the emotional adjusted value of the referring event, that consider both economic and emotional value, instead of to consider only the economic value as for tradition expected value's theory.

To calculate the EAV the economic cost or economic revenues should be considered only one times when they are referring to the same cash flow; for example if buy an

house 100 EUR is considered as economic revenue by the decision maker, the same cash flow should be not also considered as an economic cost (cash out-flow to buy it), other hand the economic value is zero, is only a swap of the wealth in different type, cash exchange for house.

Let's clarify with an example. Assume that we need to choose between two lotteries. If you chose lottery A you can win 50 EUR with 50% probability or you can win a house "without sea view" of the economic value of 100 EUR. If you chose lottery B you can win 50 EUR with 50% probability or you can win a house "with sea view" of the economic value of 80 EUR.

According to the traditional expected value the payoffs of the 2 lotteries are:

Expected value of A:

$50\% * 50 + 50\% * 100 = 75$ EUR

Expected value of B

$50\% * 50 + 50\% * 80 = 65$ EUR

If we calculate also the expected utility, the utility of A should be higher of the utility of B (the marginal utility should be decreasing, additional EUR gets lower the more money you have, nevertheless considering the fact that the event has the same probability, the utility of 100 EUR should be higher than utility of 80 EUR, other factor has same utility), so if we consider the economic agent rational according to the traditional expected value and utility theory we should choose A on B, A has higher expected value and utility than B.

Let's now introduce the emotional factor within the decision making.

Let's suppose that the decision maker has great love and emotion linked for the house "with sea view", and we are assuming an emotional value of 40 EUR, hence is willing to pay 40 EUR more to have a house with sea view. The way to calculate the economic value of the emotion will be explained later with the flowchart for pricing emotion.

Let's assume there are no economic or emotional cost.

Emotional Adjusted Value of A

EAV = Economic values (economic house value) + Economic Emotion (house with sea view) = $100 + 0 = 100$ EUR

Emotional Adjusted Value of B

EAV = Economic revenues (economic house value) + Economic Emotion (house with sea view) = $80 + 40 = 120$ EUR

The other factor of the lottery is present to both lottery with the same probability and value (50% * 50 EUR), for this reason can be considered a constant and assuming than no emotional revenues is associated is not needed to calculate the EAV for this example, normally for each event or factor within the decision making or lottery should be calculating the EAV and the emotional adjusted expected value (EAEV).

After we have calculated the EAV, let' calculate the emotional adjusted expected value (EAEV).:

Emotional Adjusted Expected Value = $P_{1a} * EAV_{1a} + P_{2a} * EAV_{2a}$

$= 50\% * 50 + 50\% * 100 = 75$ EUR

Emotional Adjusted Expected Value B = $P_{1b} * EAV_{1b} + P_{2b} * EAV_{2b}$

$50\% * 50 + 50\% * 120 = 85$ EUR

How we can see now the emotional adjusted expected value of B is 85 EUR, when before without consider the emotional revenues, the expected value was 65 EUR, because only economic payoff is considered with the traditional expected value. At this point we can expect that the decision maker will choose lottery B, with higher emotional adjusted expected value and utility, instead of A. Indeed, if we calculate the emotional adjusted expected utility, the utility of B is higher of the utility of A, (considering the fact that the event has the same probability, the utility of 120 EUR should be higher than the utility of 100 EUR, other factor have the same utility). Hence, if instead of the traditional expected utility theory (choice A), we use the emotional adjusted expected utility, we should choose B. This is the most important result of the research that shows that instead of to use the economic payoff, using the EAV, that consider both emotional and economic payoff, change the payoff of the expected value and expected utility and

consequently the preference and ranking of the choice. This is also in line with the finding of the later on empirical research of thesis.

Pricing subjective emotional revenues and subjective emotional cost

The research tries to analyse and study what is the impact of the individual emotion on the economic decision and if the human emotional factor impact the economic decision beyond the economic cost and benefit analysis.

To sum up is used the Di Toro' s Emotional Adjusted Value decision making equation:
Emotional Adjusted Value (EAV) =
(Economic revenue + subjective emotional revenues of the choice)- (economic cost
+ subjective emotional cost of the choice)

The formula is useful if you need to choose between two choices, to decide if you want to exchange your asset with another, if you need to decide to exchange your work with another job's offer, to choose between two lottery with different asset as a premium and so on. Furthermore, the formula is useful if you want to know effetely a which price you are willing to sell your asset or the formula could help to choose between different choices without uncertainty (no probabilistic event), preferring the choice with higher EAV, for example choose between two different jobs offer or a parity of EAV choosing the option with less cash outflow to buy the asset. For example, between 2 choices with the same Emotional Adjusted Value, but choice A with acquisition cost of 50 EUR and choice B acquisition cost 70 EUR, is better to choose A, less outflow of money a parity of EAV.

The EAV help the decision maker to find the best choice under decision making process. For this reason, I have modified the subjective utility function to consider the "Emotional Adjusted Value", as input of the subjective utility value of the choice. The "Emotional Adjusted Value" considers the economic value of both economic and emotional factor during a decision-making process and for this reason I have

renominated the expected utility as Emotional Adjusted Expected Utility.

What is important to use consistence in the economic and emotional input between two different choices, so an event that is considered as positive emotional factor, should be keep the same category in the other alternative choice, also if has an economic value of zero. The same if is negative emotional cost should be kept in the same category in the other choice.

For example, if one input is considered as "emotional revenues", for example the "sea view" for the choice of a house, must be kept in the same category also for the other alternative choice. Hence, if in the alternative choice the house has not "sea view", should be write zero (0) emotional revenues in relation to this emotional input, and should be no consider as an emotional cost in the alternative choice, hence to standardize the analysis of the two different choice, the same input should be kept with the same category between different choice.

When two choices have the same emotional adjusted value, the decision maker should be indifferent to choose one of another choice, if in terms of acquisition price they have the same cash outflow amount, other hand should prefer the choice with lesser cash outflow.

To price the economic value of the motion can be used the Di Toro's flowchart as for below explanation.

The Di Toro's flowchart has been built with the goal to find out how much the decision maker want to be economically compensated for the loss of the emotional revenue or to figure out the economic amount is willing to renounce to eliminate the emotional cost. To price in economic value the emotional revenues and cost allow to calculate the emotional adjusted expected value to use under decision making process under uncertainty as an input for the emotional adjusted expected utility.

To figure out the economic value of one emotional revenue factor, you need assume that do not exist others emotional revenues factor, so to isolate the emotional factor that

you want to price and assume zero economic and emotional cost (they do not impact your choice at this stage), and use the following equation:
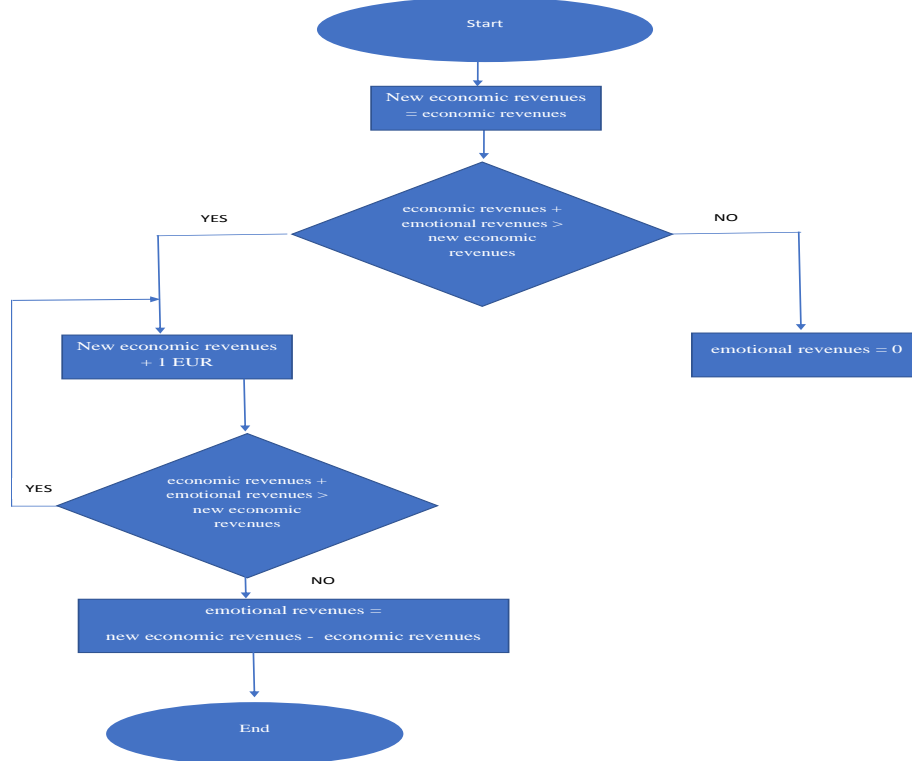
economic revenues + emotional revenues > "new" economic revenues

where a first step "new" economic revenues "is equal to the economic revenues, in this way that the only difference of the inequality could be linked to the emotional cost.

The next step is to think to the emotional revenues that you want to price or associated to the choice and you need ask yourself if for you the choice, on the left side of the inequality, is higher than the right side, to find if the choice has any emotional revenues that has also economic value. If no it means the emotional revenues are zero, if yes you increase the "New" economic revenues of 1 EUR until you reach the amount value that lead you to consider the inequalities not anymore valid: so for the decision maker the left side is not anymore higher than the right side, so it mean that the right side has reached a value equal to the left side. At this point you have got the economic value of the emotional revenues, subtracting the economic revenues to the "new" economic revenues. The same process is needed to price each emotional revenue input, keeping the other emotional revenue out of the process. The Di Toro's flowchart to price subjective emotional revenues is showed in the next figure and allow to figure out how much the decision maker want to be economically compensated for the loss of the emotional revenue and so indirectly know the economic value of the emotional revenues.

I have developed a flowchart to "price" the emotion in economic value that allow to calculate the monetary subjective value of the emotion with the goal to figure out the "true" subjective value of the choice considering both economic and emotional fact as we are human and not algorithm decision maker.

Figure 1. Price subjective emotional revenues

To figure out the economic value of one emotional cost factor, you need assume that do not exist other emotional cost factor, so to isolate the cost factor that you want to

price and assume zero emotional revenues (they do not impact your choice at this stage), and use the following equation:

economic revenues - emotional cost < "New" economic revenues

where a first step "New" economic revenues is equal to the economic revenues, so that the only difference of the inequality could be linked to the emotional cost.

The next step is to think to the emotional cost you want to price or associated to the choice and you need to ask yourself if for you the choice on the left of the inequality is lesser than the right side.

If no it means the emotional cost are zero, if yes you decrease the "New" economic revenues of 1 EUR until you reach the amount value that lead you to consider the inequalities not anymore valid: so for the decision maker the left side is not anymore lesser than the right side, so it mean that the right side has reached a value equal to the left side. At this point you have got the economic value of the emotional cost, subtracting the "new" economic revenues to the economic revenues. The same process is needed to price each emotional cost input, keeping the other emotional cost out of the process. The Di Toro's flowchart to price subjective emotional cost is show in the below figure and allow to figure out the economic amount that the decision maker is willing to renounce to eliminate the emotional cost, so indirectly know the economic value of the emotional cost.

**Figure 2. Pricing subjective emotional cost**
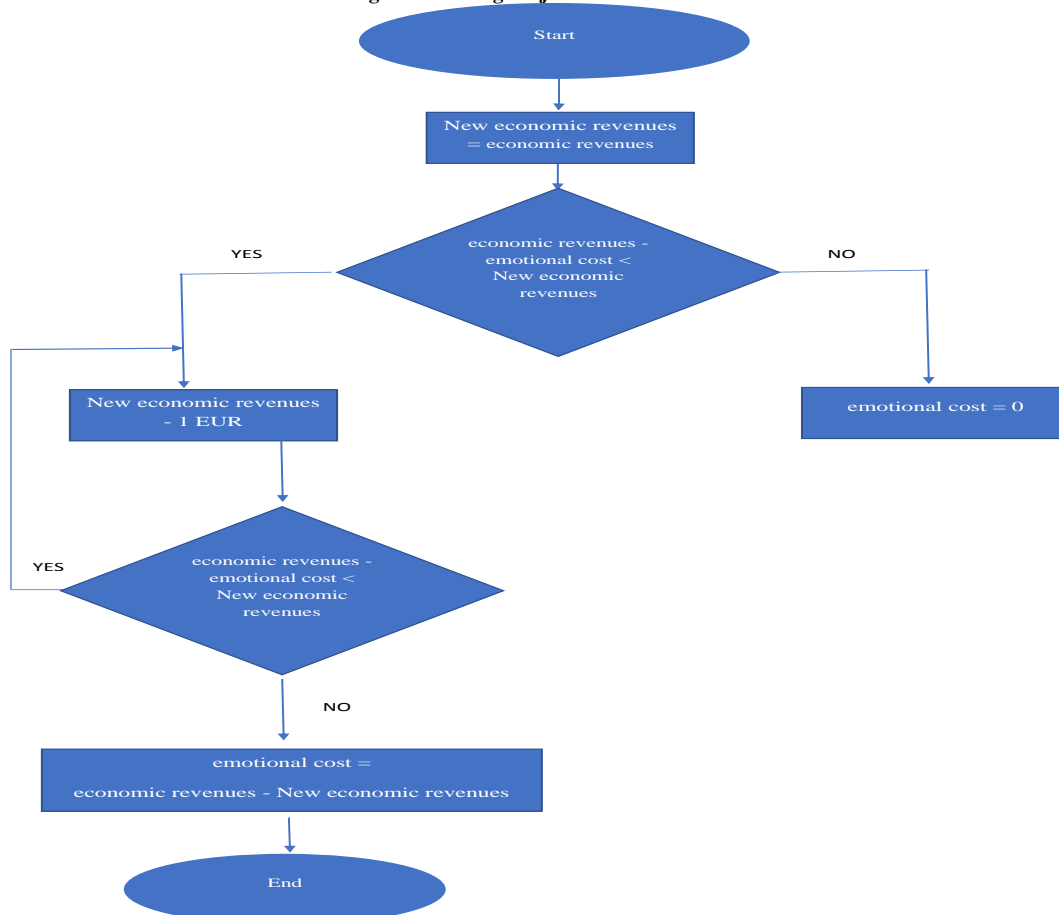
The next figure shows the Di Toro's emotional adjusted value flowchart for decision making between choice A and B at condition that both A and B are without uncertainty, no probabilistic event. For example, choice between two different jobs offer: accept job offer

with salary of 100 EUR and work flexibility or accept job offer with salary of 120 EUR with no flexibility.

Figure 3. Emotional adjusted value decision making
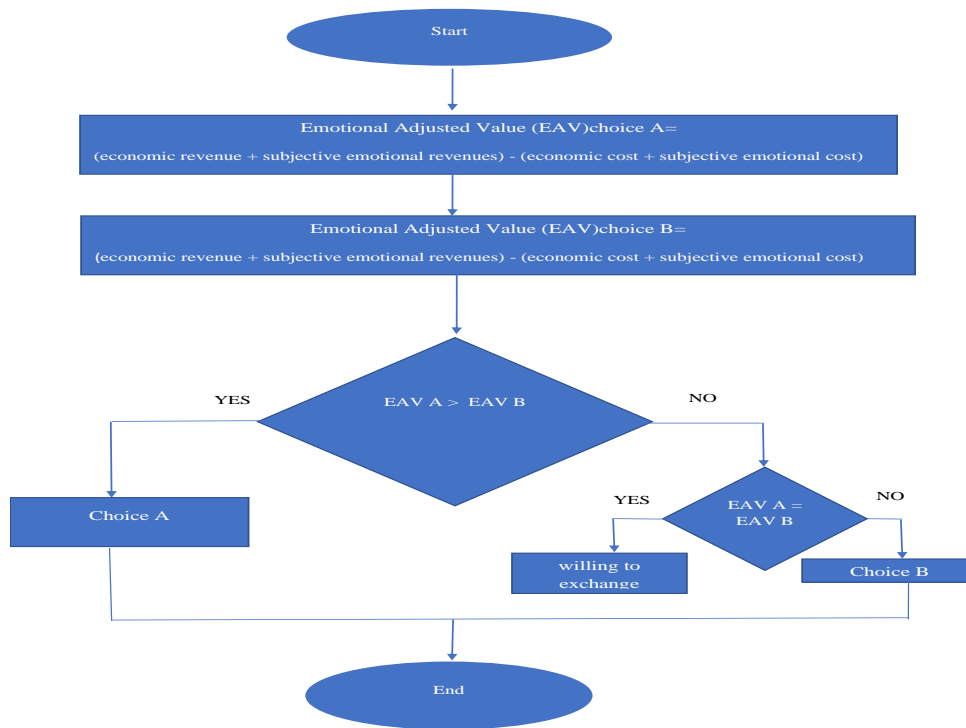
The Di Toro's emotional adjusted value equation helps to quantify the economic value of the emotional factor within the decision-making process and thanks to Di Toro's flowchart is possible to find the "economic" amount value of the "emotional" factor, in other words to price the subjective emotional cost and revenues. Due to the fact that the choice is personal and each individual has the owner emotional-psychological sphere, the same emotional input could be economically valuated different from two different individual, but thanks to the Di Toro's equation, each decision maker, can figure out the "economic" value of the emotional factor of each choice.

Furthermore, the relative rationality's idea introduces the concept of emotional adjusted expected utility (EAEU), the emotional factor influences the subjective expected utility's amount, and for this reason the researcher has modified the expected utility formula to incorporate the emotional payoff. According to the researcher the utility payoff should be adjusted including emotional cost and emotional revenues too and consequently to choose the option that maximizes the "emotional adjusted expected utility" (EAEU), calculated with the following formula:

Emotional adjusted expected Utility (EAEU) = P_{1a} * $U(EAV_{1a})$ + P_{2a} * $U(EAV_{2a})$ +……+ P_X * $U(EAV_X)$.

Where P is the subjective probability of the referring event and U(EAV) is the utility associated to the "emotional adjusted value" of the referring event. EAV is calculated using the Di Toro's emotional adjusted value equation and consider both economic and emotional factors.

For example, to calculate the emotional adjusted expected utility associated to the choice X, with two possible event A and B:

Emotional adjusted expected utility (EAEU) $= P_A * U(A_{EAV}) + P_B * U(B_{EAV})$

Where $U(A_{EAV})$ is the utility of emotional adjusted value associated to the event A and $U(B_{EAV})$ is the utility of the emotional adjusted value associated to the event B and P_A and P_B are the respective subjective probability of the event A and B. Due to the fact that the EAV is composed of both economic factor (economic revenues – economic cost) and emotional factor (emotional revenues - emotional cost), the emotional adjusted expected utility should be more accurate respect the traditional utility that consider only the utility of the economic payoff of the event.

Using the relative emotional adjusted expected utility theory, the decision that is right for one person is not necessarily right for another person. It all depends on the utilities assigned to the different payoff after taking in consideration the subjective emotional revenues and emotional cost too.

The goal of the research is to proof that in the equation of profit and loss in the decision-making both economic and emotional revenues and cost are considered, consequently the emotional factor influence the traditional expected value and subjective utility.

In other words, under emotional expected utility idea, the choice is done considering both the economic and emotional expected value, incorporating also emotional factor for the decision.

Presentation of Results

The research questions want to investigate if there is an impact of subjective emotional cost and revenues on the economic/finance decision making process.

This research question is directly investigating to the effect of the personal emotion through the subjective cost and revenues bias in the decision-making process.

The alternative hypothesis of the research question is that there is significant impact of emotional subjective cost and revenues on the economic decision making process. The null hypothesis stated that there is no correlation between emotion and decision-making process, so the agent is always economically rational.

Indeed, to answer to the research question on the impact of the individual emotion on the economic decision making, the researcher has used 8 different sub-research questions, that have been all indirectly written to answer the research question on the potential impact of subjective emotional cost and revenues during a decision-making process.

For each research question is present a table to represent the sample's answer.

The table shows the number of the sample that has participated and is showed the percentage's answer type. The survey has been conducted with a web-based survey thorough Likert-type survey using closing question. Is present a statistical result table that contain the standard deviation, average score, Z-score, p-value and the result of the test if the null hypothesis is rejected or not.

Below is analysed the sub-question number 1 relative to the research question.

Assuming that you are an ethical ESG (Environmental, social, and governance) investor, to satisfy your ethical behaviour would you prefer to invest in companies with particularly high standards with regard to the environment, society and governance, for example investing in an ESG/SRI index with an expected return of 5%, instead of to invest a not ethical ESG/s Index with expected return of 6%?

The following tables show the answer and statistic result of the empirical research question.

Table 1 Answer Choices Sub-Question 1

Answer Choices	Responses %	Responses
Strongly disagree	5,30%	22
Disagree	5,54%	23
Neither agree nor disagree	43,61%	181
Agree	31,57%	131
Strongly agree	13,98%	58
Total	100%	415

Table 2 Statistical Results Sub-Question 1

Standard Deviation	Average Score	Z -score value	Reject null hypothesis? If Z score > 1,645	p value	Reject null hypothesis? If p-value < 5%
0,98	3,4	8,315	Yes	0,00%	Yes

Table 4 Statistical Results Sub-Question 2

Standard Deviation	Average Score	Z -score value	Reject null hypothesis? If Z score > 1,645	p value	Reject null hypothesis? If p-value < 5%
1	3,6	12,223	Yes	0,00%	Yes

Z-score is higher than the one-side Z-score critical value 1.645 for 95% confidence level and the p-value is less of .05 significance level (alpha), there is sufficient evidence to reject the null hypothesis. The empirical research supports the alternative hypothesis that the investor prefers to invest in an ethical ESG Index with less expected return respect a traditional Index, the result shows that the investor is willing to accept less expected return to satisfy their moral values, factoring in decision making process moral value, so emotional revenues.

According to the economic theory the investor should choose the highest return to all others input equal. So, the investor should prefer 6% expected return respect to 5% expected return. The choice of 5% ESG index confirms the assumption of subjective emotional revenues, within the investor's ESG, ethical investment has such high value to induce him to choose a lower expected return to satisfy is ethical value in line with the relative rationality idea, that incorporate within the choice also emotional factor.

Below is analysed the sub-question number 2 relative to the research question.

Assuming you are scared to traveling by airplane, so you personally prefer travel with another type of transportation, but you have decided to go in holiday with your friends and they have already agreed to travel by airplane. Are You willing to accept the choice of the plane?

The following tables show the answer and statistic result of the empirical research question.

Table 3 Answer Choices Sub-Question 2

Answer Choices	Responses %	Responses
Strongly disagree	4,82%	20
Disagree	9,40%	39
Neither agree nor disagree	20,48%	85
Agree	51,08%	212
Strongly agree	14,22%	59
Total	100%	415

Z-score is higher than the one-side Z-score critical value 1.645 for 95% confidence level and the p-value is less of .05 significance level (alpha), there is sufficient evidence to reject the null hypothesis. The empirical research supports the alternative hypothesis that despite of your fear, you are willing to travel with the airplane.

The above research question introduces the friendship value and the potential herd behaviour within a group, during decision-making process. The spirit of the holiday with a friend is to enjoy the time together, to choose the airplane keep united the group, avoid potential problems linked to different time of arrive and so on. This case the decision maker applies a heuristic process, therefore a satisfactory choice and not the best one for him (another means of transport).

The above example could be also a proof of the herd behaviour bias in decision making, because we decide to follow the decision of the other 4 friends that are already favourable to take the airplane.

If you do not factorize the friendship contest within your decision, you should choose to travel with another means of transportation different of the airplane, that has higher benefit for you (no fear), so the emotional revenue (value) of friendship is higher of the emotional cost of the airplane's fear.

Hence, because you're a within a group contest, your decision become correlate also to other decision or influenced by the others as a sort of herd behaviour. The choice of airplane against your preferred transportation mean, confirms the assumption of subjective emotional revenues linked to the friendship has such high value, to induce you a choice different from your best choice's preference. The empirical test shows that the economic agent chooses considering beside the

economic cost benefit analysis also emotional revenues and cost linked to the friendship.

Furthermore, is important to consider the herd behaviour influence on the decision-making process. Let's assuming that we are not scared of the airplane and we assume that the airplane is the faster and cheaper means of transportation. Due to the economic convenience of money and time's saving, the decision maker should choose the airplane, but nevertheless is we consider also emotional factor, could happen that the decision maker opts for other travelling option. For example, he could opt for the car due to the possibility of enjoying the journey, the possibility to visit and photography different place, eat in nice landscape, have a break when he wants and so on. Therefore, the emotional factor linked to the car could be higher than the economic saving of time and money with the airplane.

For this reason, if the decision maker needs to choose alone without the group and friendship bias, in case he chooses different transportation of the airplane, that could be economically irrational due to the saving of money and time, but could be relative rationale, if we consider the emotional revenues associated to the car's choice (e.g. visit more place, enjoy the landscape, etc.).

Below is analysed the sub-question number 3 relative to the research question.

Assuming you are working in your Country, but you have got a better job's offer with higher salary, but in another foreign Country. Are you willing to reallocate in another country within 1 months to grab the opportunity?

This research question is the basilar stone in the researcher's idea, indeed the overall relative rationality and emotional input to be factored within the decision making come out through the observation of different people that have preferred do not emigrate and get better job offer. This observation brings me the idea in 2013 that in decision making process is not only economic factor are considered and that the human emotion could affect the final decision taken. Hence,

the economic agent is not always rational, for this reason some economic model based on strict assumption could fail to predict the real human behaviour under decision making process. In the question is not quantified the increase in salary, this to avoid the personal judgment.

The following tables show the answer and statistic result of the empirical research question.

Table 5 Answer Choices Sub-Question 3

Answer Choices	Responses %	Responses
Strongly disagree	22,41%	93
Disagree	18,31%	76
Neither agree nor disagree	25,06%	104
Agree	24,82%	103
Strongly agree	9,40%	39
Total	100%	415

Table 6 Statistical Results Sub-Question 3

Standard Deviation	Average Score	Z-score value	Reject null hypothesis? If Z score < - 1,645	p value	Reject null hypothesis? If p-value < 5%
1,29	2,8	-3,158	Yes	0,08%	Yes

Z-score is lesser than the one-left-side Z-score critical value -1.645 for 95% confidence level and the p-value is less of .05 significance level (alpha), there is sufficient evidence to reject the null hypothesis. The empirical research supports the alternative hypothesis that you are no willing to reallocate in another country within 1 months to grab the opportunity of a better job's offer with higher salary.

If you do not factorize emotional revenues and cost within your decision, you should choose to grab the new job's opportunity that has higher salary and higher economic value. The choice of do not take the economic advantage of an increase of salary, so do not change your job that has less salary, confirms the assumption of existence of subjective emotional revenues and cost linked to the jobs 'change. For example, in the research question is clearly stated that you need to change your own Country to grab the new job's opportunity

and perhaps this could have in the mind of the decision maker an emotional cost higher of the economic increase of salary. Furthermore, also if is not stated the need of change your own Country, so assuming to get increase in salary within the same town, the decision maker could refuse it, because could factor, within the decision-making, the good relationship with the actual colleague, the risk of increase of stress or mobbing within a new office, the distance of the workplace respect to the home, the facility of the access to the office place through the public transportation or motorway and so on, or any cost associated to the change in the individual habit. The empirical test shows that the economic agent chooses considering beside the economic and cost benefit analysis, also the emotional subjective revenues and cost.

The idea is to shows that the decision maker does not act according to the traditional economic theory, other hand he should choose to grab the new job opportunity, because has higher salary and so he could increase his wealth. The decision maker does not accept high salary, because he factors within the decision-making emotional revenues and cost linked to the job's change (e.g., different colleague, Country, town, etc.). This is what we will analyse in the next research question.

Below is analysed the sub-question number 4 relative to the research question.

Assuming you are working in your Country and you have a good relation with your colleague, but you have got a better job's offer with higher salary, but in another foreign Country outside United Stated. Nevertheless, in changing job you could phase the risk that your new colleague could be not nice to you, the risk of not easily adaptation to the new foreign Country or any other personal not economic factor you may consider. Beside the economic factor (salary increase) will you consider in your decision making any not economic factor too?

The following tables show the answer and statistic result of the empirical research question.

Table 7 Answer Choices Sub-Question 4

Answer Choices	Responses %	Responses
Strongly disagree	4,59%	5
Disagree	9,17%	10
Neither agree nor disagree	45,87%	50
Agree	29,36%	32
Strongly agree	11,01%	12
Total	100%	415

Table 8 Statistical Results Sub-Question 4

Standard Deviation	Average Score	Z-score value	Reject null hypothesis? If Z score > 1,28	p value	Reject null hypothesis? If p-value < 10%
0,95	3,3	3,297	Yes	0,05%	Yes

Z-score is higher than the one-side Z-score critical value 1.28 for 90% confidence level and the p-value is less of .10 significance level, there is sufficient evidence to reject the null hypothesis. The empirical research supports the alternative hypothesis that emotional revenues and cost have an impact in the final the decision-making process, in line with the relative rationality.

The decision maker should prefer the new job with higher salary, but changing job you could phase the risk that your new colleague could be not nice to you, the risk of not easily adaptation to the new foreign Country or any other personal not economic factor may you consider.

Below is analysed the sub-question number 5 relative to the research question.

Assuming that you have received a birthday's gift of value of 100 USD and later on someone propose you to exchange it with his similar item of value 105 USD, would you be willing to keep your birthday's gift due to the personal value attributed?

The following tables show the answer and statistic result of the empirical research question.

Table 9 Answer Choices Sub-Question 5

Answer Choices	Responses %	Responses
Strongly disagree	3,67%	4
Disagree	16,51%	18
Neither agree nor disagree	34,86%	38
Agree	28,44%	31
Strongly agree	16,51%	18
Total	100%	415

Table 10 Statistical Results Sub-Question 5

Standard Deviation	Average Score	Z-score value	Reject null hypothesis? If Z score > 1,28	p value	Reject null hypothesis? If p-value < 10%
1,06	3,4	3,940	Yes	0,05%	Yes

Z-score is higher than the one-side Z-score critical value 1.28 for 90% confidence level and the p-value is less of .10 significance level, there is sufficient evidence to reject the null hypothesis. The empirical research supports the alternative hypothesis that decision maker is willing to keep his birthday's gift due to the personal value attributed. Hence, do not accept the exchange, because the gift' emotional adjusted value is considered higher than the extra economic value of the other items.

Within the experiment the decision maker is not willing to exchange is birth's gift with an item more expensive. Even if the exchange should be economically convenient the deal is refused, maybe due to the personal value attribute to the gift received. So even in this case the relative rationality is confirmed, the emotional choice could overwhelm the economic choice. Endowment effect could explain also the behaviour, the people tend to give more value to the object that already own.

In these examples, choices are not predictable, because the payoff depends on the emotional value attribute to the gift by the decision-maker.

The personal decision making linked to the emotional sphere is unpredictable and could be different from the economic theory, where the agent is fully rational and under

decision making is using economic expected value to make the choice.

The Di Toro's flowchart can be used to exactly price the emotional revenues associated to the gift.

Below is analysed the sub-question number 6 relative to the research question.

You have to choose between two lotteries A and B.

With lottery A, you have 50% probability to win a house located in a place where you do not like to live with value of 100,000 USD or you have 50% probability to win 50,000 USD. With lottery B, you have a 50% probability to win a house located in a place where you have always desired to live with value of 90,000 USD or you have 50% probability to win 50,000 USD.

Would you choose lottery B, so in case of winning the house, the house would be located in your favourite place where you've always desired to live?

The following tables show the answer and statistic result of the empirical research question.

Table 11 Answer Choices Sub-Question 6

Answer Choices	Responses %	Responses
Strongly disagree	2,17%	9
Disagree	3,37%	14
Neither agree nor disagree	20,96%	87
Agree	36,63%	152
Strongly agree	36,87%	153
Total	100%	415

Table 12 Statistical Results Sub-Question 6

Standard Deviation	Average Score	Z-score value	Reject null hypothesis? If Z score > 1,645	p value	Reject null hypothesis? If p-value < 5%
0,95	4	21,444	Yes	0,00%	Yes

Z-score is higher than the one-side Z-score critical value 1.645 for 95% confidence level and the p-value is less of .05 significance level, the null hypothesis is rejected. The empirical research supports the alternative hypothesis that the decision maker chooses a lottery with less economic expected value, but with higher emotional adjusted expected value, consequently with higher emotional revenues linked to the

location of the house, factoring in decision-making process emotional revenues.

According to the economic expected value theory the investor should choose the lottery with higher expected value that is the probability multiplied by the value of each outcome and then summing all of those values. The choice of lottery B with less expected value, but with higher "emotional adjusted expected value" confirms the existence of subjective emotional revenues in the decision-making process.

Indeed, the decision maker chooses considering in the cost-benefit analysis also the emotional revenues and cost. Within the decision maker the house' location has such high emotional value to induce him to choose a lower expected value lottery, but that satisfy is emotional value. The economic expected value of the lottery 's A is 75.000 USD, while the economic expected value of the lottery 's B is 70.000 USD.

According to the relative rationality's idea that incorporate within the choice emotional factor too, the "adjusted emotional expected value" of lottery 's B should be higher, so it means to the traditional economic expected value of 70.000 USD, should be added at least more than 5.000 USD expected emotional value, that increase the real emotional adjusted expected value of the choice and induce the decision maker to choose lottery 's B. Hence, the emotional adjusted value (EAV) let the decision maker to choose a lottery different from the lottery that should be chosen, according to the traditional expected value and utility theory. The most important insight of the research is that the emotional adjusted expected value and emotional adjusted expected utility considering the emotional adjusted value (EAV) payoff may provide a ranking of choices different from those given by expected value and expected utility that consider only the economic payoff of the choice. The relative rationality's idea introduces the concept of emotional adjusted expected value and emotional adjusted expected utility, the economic

payoff should be adjusted for the emotional revenue and emotional cost and the decision maker should choose the option that maximizes the emotional adjusted expected utility, instead of the traditional expected utility.

The empirical test confirms the researcher's idea of the relative rationality, the decision maker, instead of to choose the choice with higher expected economic value and utility, choose the choice with higher "emotional adjusted" expected value and utility, where both economic and emotional factor are considered.

In this lottery's example the emotional revenues linked to the house's location give to the decision maker higher emotional adjusted value and adjusted utility. Using expected value theory, the correct choice is the same for all people. Using the relative emotional adjusted expected value, what is right for one person is not necessarily right for another person. It all depends on the value assigned to the different payoff, taking in consideration both economic and subjective emotional revenues and cost and the impact that this emotional adjusted value payoff has on the emotional adjusted expected value and utility.

The goal of the research is to proof that in the equation of profit and loss in the decision-making process both economic and emotional revenues and cost are considered, consequently the emotional factor influence the traditional profit and loss payoff and consequently the expected value and subjective expected utility payoff.

In other words, under relative rationality theory, the choice is done considering both the economic and emotional value (EAV) and the emotional adjusted value become a factor of the emotional adjusted expected value and emotional adjusted expected utility.

According to the relative rationality, due to the subjective emotional adjusted value, the choice B has an "emotional adjusted" expected value and "emotional adjusted" expected utility higher of the choice A. This could explain the not rational behaviour to

choose the lottery's B with less economic expected value, but the choice could be relatively rational if we consider the higher "emotional adjusted" expected value and "emotional adjusted" expected utility due to higher emotional adjusted value associated to the choice's B.

Within the lottery's B the potential expected loss in economic terms is compensated by a higher emotional value linked to the location of the house, so a higher emotional factor that is translated in higher "emotional adjusted" expected value and utility amount. Within the lottery's B the location of the house brings to the decision maker an emotional adjusted expected utility higher than the lottery A and this emotional revenue is translated in an economic amount at least higher than 10.000 USD. To figurate the correct amount can be used the Di Toro's flowchart for pricing emotion.

Below is analysed the sub-question number 7 relative to the research question.

You have to choose between two lotteries A and B.

With lottery A, you have 50% probability to win a house located in a place where you do not like to live with value of 100,000 USD or you have 50% probability to win 50,000 USD. With lottery B, you have a 50% probability to win a house located in a place where you have always desired to live with value of 100,000 USD or you have probability 50% probability to win 50,000 USD.

Would you choose lottery B, so in case of winning the house, the house would be located in your favourite place where you've always desired to live?

The following tables show the answer and statistic result of the empirical research question.

Table 13 Answer Choices Sub-Question 7

Answer Choices	Responses %	Responses
Strongly disagree	1,45%	6
Disagree	3,61%	15
Neither agree nor disagree	21,45%	89
Agree	39,52%	164
Strongly agree	33,98%	141
Total	100%	415

Table 14 Statistical Results Sub-Question 7

Standard Deviation	Average Score	Z-score value	Reject null hypothesis? If Z score > 1,645	p value	Reject null hypothesis? If p-value < 5%
0,91	4	22,386	Yes	0,00%	Yes

Z-score is higher than the one-side Z-score critical value 1.645 for 95% confidence level and the p-value is less of .05 significance level, the null hypothesis is rejected. The empirical research supports the alternative hypothesis that the decision maker considers also the emotional value linked to the house's location and choose the Lottery B, even though both lotteries having an equal economic expected value and utility. The decision maker chooses the lottery with the house located in a place where he has always desired to live, it means implicitly that the house's location has a further subjective emotional value, that is different from the economic value, indeed both houses have the same market value of 100 USD. Consequently the "emotional adjusted" expected value and utility is higher in lottery B and for this reason the decision maker prefer B.

Below is analysed the sub-question number 8 relative to the research question.

Let's assume that you do not have work and we have to choose the time of the training courses between two different alternatives: morning or evening training course. You can choose to follow the training courses in the evening - from 19.00- to 21.00, and if you find a job, you could continue to follow the training courses and you would not lose the enrolment costs and the priority in registering for the next semester course. Or you can choose to follow the training courses in the morning from 09.00 to 11.00, and if you find a job, you could not continue to follow the training courses and you would lose the enrolment costs and the priority in registering for the next semester course. Let's assume that we believe that to find job take longer than a semester and let's assume that in the morning we have more energy to follow a training course, so we can have more performance during the

course. Would you choose morning courses instead of evening course?

The reason behind this research question is to test if the decision maker maximizes economic payoff choosing dominant strategy or prefer to choose non-dominant strategy, but with higher "emotional adjusted" expected utility.

The following tables show the answer and statistic result of the empirical research question.

Table 15 Answer Choices Sub-Question 8

Answer Choices	Responses %	Responses
Strongly disagree	6,75%	28
Disagree	20,48%	85
Neither agree nor disagree	29,16%	121
Agree	32,29%	134
Strongly agree	11,33%	47
Total	100%	415

Table 16 Statistical Results Sub-Question 8

Standard Deviation	Average Score	Z-score value	Reject null hypothesis? If Z score $> 1,645$	p value	Reject null hypothesis? If p-value $< 5\%$
1,1	3,2	3,704	Yes	0,01%	Yes

Z-score is higher than the one-side Z-score critical value 1.645 for 95% confidence level and the p-value is less of .05 significance level, the null hypothesis is rejected. The empirical research supports the alternative hypothesis that the decision maker considers also the emotional value linked to the timing of the training and choose morning training.

The evening's choice should have a greater economic benefit in case the decision maker will find a job, allowing him not to lose money and to continue the training, could be considered a dominant strategy respect the morning choice. Should be more rational to choose the evening, but the morning's choice could be explained using the relative rationality theory, maybe the decision maker feels more active, productive and has more energy to follow the training during the morning, so higher emotional adjusted value and emotional utility, so the emotional factor compensate more than the potential economic loss associated to the morning

choice, in case the decision maker will find a job.

CONCLUSION

This research question is directly investigating to the effect of the personal emotion through the subjective cost and revenues bias (relative rationality) in the decision-making process and the empirical result has confirmed the existence of emotional factor within the choice.

In another terms the research result has proven that the human decision making goes beyond the economic benefit, so to evaluate a choice we have to take into account not only the economic returns, but also the benefit and cost of the decision on the emotional-sentimental-unconscious spheres. That beyond the economic revenues and cost, should be used also subjective emotional cost and revenues to find the Emotional Adjusted value (EAV) of the individual decision making. For this reason, the decision that are no coherent with economic theory and could be not rational under an economic revenues and cost analysis or expected value, could be explained using the relative rationality concept introduce in this research. Considering in the decision-making process, not only economic factor, but also emotional subjective revenues and cost that are unique subjective factor that should be used to calculate the emotional adjusted value.

Due to the fact that the emotional factor could change the emotional expected subjective value of the decision, increasing or decreasing the personal value of the choice beyond the economic benefit or cost.

The null hypothesis of the research states that there is no significant impact of subjective emotional cost and revenues on the economic/finance decision making process. In other words, there are no correlation from economic decision and irrational human behaviour, consequently no correlation with emotional behaviour. According to the null hypothesis the agent is

rational, there are correlation from economic decision and rational behaviour.

The alternative hypothesis of the research question is that there is significant impact of emotional subjective cost and revenues on the economic/finance decision making process. According to the alternative hypothesis the agent is relatively rational.

Hence, the research question wants to investigate if the decision maker could be economically irrational, because his decision could be no correlated to the economic rational behaviour. In other word there is correlation from economic decision-making and emotional factor that could lead a not economic rational human behaviour, but such behaviour could be explained through the relative rationality idea, if we consider not only economic factors, but also sociological, psychological and emotional behavioural factors linked to human unconscious and emotions.

Indeed, to answer to the research question on the impact of the individual emotion on the economic decision making, the researcher has used 8 different sub-research questions, that have been all indirectly written to answer the main research question on the potential impact of subjective emotional cost and revenues during a decision-making process.

This research question is directly investigating to the effect of the personal emotion through the subjective cost and revenues bias in the decision-making process.

The empirical test has showed that there is significant impact of emotional subjective cost and revenues on the economic-finance decision making process.

During the decision-making process, the human behaviour takes in consideration not only economic factor like revenues and cost, but also personal emotional revenues and cost. The empirical result has confirmed the researcher idea of the "emotional adjusted value", "emotional adjusted expected value" and "emotional adjusted expected utility".

The sub-question number 1 supports the alternative hypothesis that the investor prefers to invest in an ethical ESG Index with less expected return respect a traditional Index.

According to the researcher view and line with the relative rationality idea, the investor chose according to the "emotional adjusted expected value" rather than the traditional economic expected value and utility and it means that the "emotional adjusted expected utility" of the choice made is higher respect to the other choice.

The sub-question number 2 prove that there is emotional bias in decision-making. Emotional revenues (friendship) and cost are part of the gain and loss equation in the decision-making equation. Furthermore, the research confirms the existence of the herd behaviour.

During decision-making process, emotional factor like friendship, could change your choice of transportation, thence the emotional revenue (value) of friendship is higher of the emotional cost of the airplane's fear.

The above example could be also a proof of the herd behaviour bias in decision making, because we decide to follow the decision of the other 4 friends that are already favourable to take the airplane, instead of to choose the best for us.

The sub-question number 3 shows that the economic agent chooses considering beside the economic and cost benefit analysis, also the emotional subjective revenues and cost.

Hence, the economic agent is not always economically rational, for this reason, the researcher has introduced the concept of emotional adjusted value, emotional adjusted expected value and emotional adjusted expected utility.

The sub-question 4 show that there is significant impact of subjective emotional cost and revenues on the economic decision making process.

The research question confirm that the emotional revenues and cost have an impact in the final the decision-making process.

The sub-question 5 show that exist an emotional bias in decision-making.

Consequently, emotional revenues and cost are part of the decision-making process.

Within the experiment the decision maker is not willing to exchange is birth's gift with an item of the same type, but more expensive. Even if the exchange should be economically convenient, the deal is refused by the decision maker, maybe due to the personal value attribute to the gift received. So, even in this case the relative rationality is confirmed, the emotional choice could overwhelm the choice based only on the economic value.

The sub-question 6 demonstrate that the decision maker use "Emotional Adjusted Expected Value" instead of the traditional expected value. The research question proof that the decision maker is willing to choose a lottery with less expected value, but with higher "emotional adjusted" expected value. Therefore, the decision maker, instead of to choose the choice with higher expected economic value, has chosen the choice with higher "emotional adjusted" expected value, where both economic and emotional factor are considered, consequently the emotional factor influence the traditional subjective expected utility's payoff too. Indeed, the research question proof that the decision maker is willing to choose a lottery with less expected utility, but with higher "emotional adjusted" expected utility.

The sub-question number 7 show that there is significant impact of subjective emotional cost and revenues on the economic decision-making process.

The empirical test has proven, in line with the relative rationality, that the decision maker chooses the strategy with higher "emotional adjusted" expected utility, due to the subjective emotional adjusted value. This research question is like to the previous one and the goal of the similarity of the research question is to find any asymmetric behaviour or inconsistency logic between the two similar research questions. Both questions have confirmed emotional value linked to the house's location and both answer are consistent under the logic of the relative rationality theory.

The sub-question number 8 prove that there is emotional bias in decision-making, emotional revenues and cost are part of the decision-making process. The empirical research show that the decision maker considers the emotional value linked to the time of the training and for this reason choose the morning training.

The morning's choice could be explained by the greater subjective emotional utility attributed to the courses in the morning, maybe you are more active and productive, so more emotional subjective value and emotional payoff.

According to the relative rationality the morning's choice has an "emotional adjusted" expected value higher respect to the evening's choice, due to a higher value attributed to the subjective emotional revenues, instead of the traditional economic expected value.

To summarize the empirical research has showed the emotional behavioural bias, that prove that emotional revenues and cost are considered together with the economic cost and revenues.

According to the researcher, emotional adjusted value, emotional adjusted expected value and emotional adjusted expected utility are used during the decision-making process.

The human behaviour takes in consideration not only economic factor like revenues and cost, but also personal emotional revenues and emotional cost during the decision-making process. The empirical result has confirmed the researcher 's idea of the relative rationality and "emotional adjusted value", hence the decision maker consider also emotional factor within the decision making process.

According to the works of Akerlof and Kranton (2000), they have introduced identity and how identity affects economic outcomes. In the utility function they proposed, identity is associated with different social categories and how people in these categories should behave.

They produced models in which emotional variables are added to the traditional choice

model, incorporating the psychology and sociology of identity into an economic model of behaviour.

The empirical result of this research confirms the existence of emotional bias within the investor behaviour during a decision-making process.

Furthermore, according to the researcher's idea, beside the economic value, the emotional cost and emotional revenues should be used to calculate the emotional adjusted value (EAV), the emotional adjusted expected value (EAEV), and the emotional adjusted expected utility (EAEU). The emotional adjusted value (EAV) and the subjective probability should be used as inputs for the calculation of emotional adjusted expected value (EAEV) and as inputs of the utility equation to get the "emotional adjusted expected utility" (EAEU), that consider the utility of the emotional adjusted value (EAV), so the utility value of both side of the human behave, the economic and emotional. Utilize the EAV as input of the emotional adjusted expected utility avoid to consider only the utility associated to the economic payoff of the choice, but add also the utility associated to the emotional factor within the decision making, increasing the representative of the reality word of the decision maker. The monetary value of the emotional factor is calculated through the flow chart to price emotion.

The research findings as proven the existence of the emotional bias under decision making process. Indeed, the principal behavioural bias, herd behaviour, loss aversion, imagine bias, regret bias, irrational behaviour could be explained incorporating the emotional factor within the decision-making process.

For this reason, the researcher practical recommendation is to introduce in the economic decision model the emotional adjusted value, where the emotional revenues and cost are calculated according the Di Toro's emotional flowchart and utilize the emotional adjusted expected utility as more realist expected utility value,

due to the consideration of both economical and emotional factor in the equation.

So, the research has proven that the agent could be economically irrational, because his decision under uncertainty could be no correlated to economic rational behaviour. In other word there is correlation from economic decision-making and emotional factor that could lead a not economic rational human behaviour, but such behaviour could be explained through the relative rationality idea, if we consider not only economic factors, but also sociological, psychological and emotional behavioural factors linked to human unconscious and emotions. The concept of relative rationality may explain the irrational behaviour is we consider under the choice both economic payoff (rationality) and the subjective emotional payoff of the choice (relative rationality), we get the true and real personal payoff of the choice.

For example, the donation done to the non-profit company with the goal to help people is a real example of the research finding, indeed the economic wealth is exchanged with the positive emotion that the donator receives. The economic value of the donation should be negative due to the cash outflow, without be compensated of an acquisition of good, but if we consider also the emotional benefit that the person receive with the act of donate, we could have a positive emotional adjusted value, that could explain the relative rationality of the action.

The recommendation for further research is to continue to investigate in the emotional bias on decision-making process, because is true that the human has mind and so we could expect rational behaviour, but is also true that human have also heart, educational and cultural factor, family and social contest that could lead an irrational behaviour.

The importance to have further research is because with emotion bias is not easily to find the true, for example one interviewed could be shy to admit the true reason behind his behaviour or maybe himself is not aware of his emotional bias that lead his economic financial decision, unconscious bias.

The most important point is the confirmation of the research of the emotional bias under a decision-making process. Maybe for this reason, the human behaviour could be different from the one forecasted by the economic model. For example, after a huge increase of the interest rate, the decision maker could not reduce the borrowing as expected by the economic theory; if the emotional benefit associated to the acquisition of the good (through borrowing) is higher of the economic cost associated to the increase of the interests.

In contraposition with the standard economic theory, the recommendation of the researcher is to consider the emotional human behaviour as an input in economic-financial decision-making process and include the emotional adjusted value within the expected value and expected utility, with the goal to help different stakeholder to develop a tailor-made economic offer or strategy or understand the behaviour of the decision maker (relative rationality).

The most important finding of the research is that instead of to use the economic payoff to calculate the expected value and expected utility, should be used the emotional adjusted value (EAV) that consider both economic and emotional payoff. This theory (EAV) leads a ranking of choice different from the choice suggested by the traditional expected value and expected utility, as has been proven with the above example of the house's lottery.

REFERENCES
1. Akerlof, G.A. and Kranton, R.E. (2000), Economics and identity. *The Quarterly Journal of economics*, *115*(3).
2. Brosnan S. (2007) Endowment effect in chimpanzee. *Vanderbilt Law and Economics Research* 08(13), 1-14.
3. Di Toro, M. (2022). The effect of the Relative Rationality on the economic decision-making process. Doctorate Thesis, Swiss Management Center.
4. Kahneman, D., and Tversky, A. (1979). Prospect Theory: An analysis of decision under risk. *Econometrica, 47*(2), 263-291.
5. Likert, Rensis (1932). A Technique for the measurement of attitudes. *Archives of Psychology, 140*(1), 1–55.

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