Dipartimento di
Scienze Politiche

Cattedra di Metodologia
delle Scienze Sociali

How cognitive limits affect our reasoning: a study on bounded rationality and framing effects

Relatore

Prof. Daniele Santoro

Candidato

Eleonora Salluzzi

Matricola 065992

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Introduction

Rational choice theory has always been one of the main interests of the social sciences field and it traces its origins back to the 19th century, when economists started to be concerned with the process that was at the basis of individual decision-making aimed at optimizing the subjective utility. To put it as Adam Smith wrote in his masterpiece "*The Wealth of Nations"*, individuals do not act for benevolence but with regard to their own interest.[1] According to this descriptive and normative theory developed in the late 20th century, that has become a paradigmatic way of analyzing human behaviour, the rational actor embodies the features of the *homo oeconomicus,* whose choices are oriented to maximize his own pay-off. The individual ought to, and actually does, search for the best means to achieve a given end, set his preferences in a coherent, complete and transitive manner. Nevertheless, some social sciences scholars, among whom there is the remarkable contribute of Amos Tversky and Daniel Kahneman, began to contest its assumptions, as the theory implications seem to deviate from the actual behaviour of people. The drawn criticism highlights the cognitive, computational and informational limits that are intrinsic of human nature. The rational actor has to take into account the imperfect feature of his rationality and face the possibility to not be able to make a cost-benefit evaluation properly. Furthermore, the manner in which a problem is presented to a person may influence her decision-making: often decisions that are supposed to be rationally driven

[1] As he wrote: "It is not from the benevolence of the butcher, the brewer or the baker that we expect our dinner, but from their regard to their own interest" - "The Wealth of Nations", 1776, p. 20

may be shaped by so called framing effects, leading to a systematic violation of rational choice theory assumptions. The present topic deserves to draw attention in so far as it challenges the foundations of one of the economics mainstream branches and it strives to question the descriptive nature of rational choice theory, taking into account various underestimated forces that influence the human decision-making and providing alternative explanations of how the choice process actually occurs. In this dissertation I will attempt to illustrate the main boundaries of rational behaviour and to focus on the implications of framing effects on the rational actor's choices, why the rational behaviour paradigm struggles with collective action sometimes and how the main assumptions are systematically violated. Furthermore, particular attention will be paid to the social and domestic implications of framing effects, and how such psychological effects lead to miss opportunities to fulfil our lives, even when they are available and tangible, due to a different transmission of human capital among generations. In the first chapter a description of rational choice theory will be presented, followed by the main critique held by Herbert A. Simon, who formalized the concept of *bounded rationality*, and some of the empirical flaws that affect the model will be analyzed. The second chapter will be focused on the main impacts of framing effects on the rational behaviour and how the manner in which alternatives are presented may determine different outcomes, according to prospect theory tenets. After have confronted two rival theories of decision-making, an explanation of how framing effects act on public goods game and an account of the influence played by framing effects on political decision-making will be provided. Finally, in the third chapter an analysis of a report that is focused on the lack of

generational mobility will be carried out with regard to how framing effects at a micro-level can influence the process of shaping socially relevant values according to the socio-economic context of a family, stressing how sometimes life opportunities are missed, and how investments in human capital are inherited by newer generations due to an occurring of framing process.

First chapter: an account of bounded rationality

1.1 Rational choice theory

Rational choice theory is a common topic that has driven the attention of many social sciences scholars. Initially developed in microeconomics, this model has spread out and shifted its boundaries influencing other important social branches as well. Essentially, it states a classical version of *homo oeconomicus*, whose aim is to maximize a precise and well-ordered function, such as utility,[2] and it assumes that the individual is the fundamental unit of analysis. Rational persons are able to order their preferences assigning a number to them, so that the options they desire the most get higher values, on the basis of a coherent and transitive positioning. By maximizing their own utility, individuals employ rationality in order to do what they like and desire the most, as David Hume held in his work "*A Treatise on Human Nature*". More specifically, the rational process is synonymous of acting consistently: it means behaving as the goal of the action is seeking to maximize the value of something.[3] Furthermore, if a rational player faces two pure strategies[4], he would never choose one of them randomly, unless he is indifferent between them. In fact, if one strategy were regarded optimal than the other, the rational player would not even play the one that gets a worse position. It can be said that people guided by rationality choose the course of action that is

[2] Gary S. Becker, "Irrational Behaviour and Economic Theory", The Journal of Political Economy Vol. 70 n.1, 1962, p.1
[3] Kenneth Binmore, "Game Theory – A very short introduction", Oxford University Press, 2007, pp. 1-20
[4] A pure strategy defines a specific predetermined move or action that the player will do in every possible situation in a game. In this case moves are not randomly followed.

supposed to guarantee the greatest satisfaction. Thus, rational choice is instrumental: what leads the action is its outcome, and the research of the best means to achieve a specific end becomes the main purpose. According to the theory, rational individuals take into account costs and benefits before taking any action, and they act after they have analyzed the available information they get from the surroundings. Therefore, for given ends, the search for optimal means implies an adjustment to circumstances,[5] given the presence of constraints that limit the possible actions. Nevertheless, the instrumental rationality as described above has been subject of a large debate that has shaken the foundations of the theory. Many criticisms have been brought against this approach, because of its supposed unsuitableness to explore the many-sided human nature.

1.2 Herbert A. Simon's concept of bounded rationality

As mentioned before, rational choice theory has undergone a large critique that has questioned the tenets of rationality's neoclassical notion. In the mid-1950s the concept of *bounded rationality* began to circulate in economics circle, thanks to the work of Herbert A. Simon, an economist who formalized the concept. In his book "*A Behavioural Model of Rational Choice*", Simon challenged the optimal instrumental rationality and proposed a new paradigm of economic behaviour taking into account the bounded computational abilities and the imperfect access to information that individuals have to face whilst seeking it in the environment around them. According to Simon's definition, the principle of bounded rationality is the capacity of the human mind for formulating and solving complex problems is very

[5] Jon Elster, "Nuts and Bolts for the social sciences", Cambridge University Press, 1989, p. 24

small compared with the size of the problems whose solution is required for objectively rational behaviour in the real world - or even for a reasonable approximation to such objective rationality.[6] Basically his effort is to build up an alternative process of decision-making, considering the constraints that economic agents encounter before selecting any course of action. In fact, rationality is primarily bounded by environmental constraints that make difficult to calculate the best action. Simon goes in the opposite direction of neoclassical economists, accusing them of lack of realism with regard to theoretical rationality assumptions. In fact, according to his bounded model, decision-makers do not have a perfect knowledge of alternatives of available choices or a clear prevision of what the outcomes of the chosen action will be, and seldom they clearly explicit their preferences in a coherent way. Substantially Simon identifies the incomplete, limited knowledge and cognitive limits as the boundaries that reshape the extent of the application of instrumental rationality. However, his work not only includes a *pars destruens* but also a *pars costruens.* In fact, his aim to simplify the choice problem leads him to formulate the idea that it is possible to solve the issue replacing the maximization of utility with a course of action that is *satisfactory*, an alternative that is good enough, being considered some given criteria. Thus, *satisficing* rather than maximizing is compatible with incomplete orderings of preferences and with multiple parameters of choice, features that are peculiar of men's behaviour in the environment they live and get access to information. A good example of how rational decision-making actually works explains what Simon interprets as *satisficing.* The chess game is the most glaring evidence

[6] Herbert A. Simon, "Models of man: social and rational; mathematical essays on rational human behavior in society setting", Wiley, 1957, p. 198

that human computational ability is not unlimited. In fact, for every player it would be beyond unrealistic to evaluate all the possible hundred moves and choose the most suitable strategy. Instead, chess players analyze a smaller number of actions and stop looking for the best plan of action once they have found the first choice, which is recognized as enough satisfactory on the basis of some criterion. Substituting maximization for something that is satisficing enables Simon to reconsider rationality as operating in an undetermined field, rejecting the idea according to which global rationality acts with given premises. Bounded rationality is a refusal of the idea that individuals may ever be able to know all the alternatives they have, and it highlights that there could be inability to make a cost-benefit evaluation over consequences of a plan action. Individual do not merely own alternatives of choice already: they have to actively discover and elaborate different kinds of action, facing constraints on the information-processing capabilities. Summing up, the main claim of Simon is that acts follow a simple rule: satisficing rather than optimizing the available choices.

1.3 The problematic relationship between means and end

Related to the limits of rational choice analyzed by Simon, there is a relevant issue that makes the model less stable: in fact, the imperfect interaction between means and end can lead the rational decision-making process to a failure, due to the possible wrong belief about which means someone has to pursue an end. As said before, rational choice is classified as instrumental because given goals lead the way to search for the appropriate means to realize them. Nevertheless, utilizing the supposed right means can be tricky for several reasons. Firstly, what the agent has reason, or ought, to do, may be influenced

by what he *believes* his best means to be. The individual may have an altered perception of his circumstances and may act as he is really following a rational process, even though the alternative choices had been discovered by chance or the agent had not acknowledged all the possible means. Thus, if a person wrongly reckons that her circumstances are just like she believes them to be, she will be convinced to maximize her outcomes because her alternatives have become objective and tangible to her eyes. Still, means to an end might have a low probability to cause that end. In particular, even if someone takes a necessary means to pursue a certain end, he might not have enough reason to do it, interrupting the flood in which reasons to an end are transmitted to necessary means. Furthermore, there could be incongruity between local and global coherence. In fact, even if an individual's strong desire is to achieve a global coherence in a situation of desires of bigger account, however he could do something that helps him achieve a coherence that is only local. For example, consider a situation in which a man's greatest wish is to save some money but he intends to play slot machines in a casino. Although he believes that spending some money is a necessary means because he intends to do it, actually he is reaching only a sort of local coherence that represents the first-degree desire, while still lacking to pursue the second-degree one without seeming to be incoherent. In the matter of this discrepancy, another assumption of bounded rationality is that it is not the single action that has to be checked as rational, instead the rational control should concern rules and strategies as a whole. Indeed, it is more complex to ensure that every single action is coherent with the goal and maximizes the outcome due to the fact that human mind is cognitively restricted and computational process could be erroneously carried out, but it comes

easier to formulate a good strategy to achieve the end and to verify if its rules are rational or not. Thereby strategies are nothing less than cognitive devices to elude computation over the best action to be taken.

1.4 A paradox of rationality: the Prisoner's Dilemma

The neoclassical assumption according to which the economic agent maximizes his pay-off under conditions of perfect information and knowledge may actually be contested by one of the most famous versions of game theory: the prisoner's dilemma. Game theory postulates interdependence in the decision-making process, due to the fact the each player has to take into consideration not only what action is better to take for himself but also all the possible moves of the enemy. This particular example called *the prisoner's dilemma* is concerned with a situation of strategic interaction in which every player who takes part in the game has a dominant strategy, which is the best response to all of the moves of the rival. The classical version of the game deals with two prisoners suspected of being accomplice of a crime, who are now locked in two separate rooms. The prosecutor promises both of them leniency in exchange for a confession that could disadvantage his partner in crime.

Player B Player A	Defection	Cooperation
Defection	1; 1	5; 0
Cooperation	0; 5	3; 3

The chart above shows the respective pay-off of each player whether he decides to cooperate or to defect. A rational agent should choose to

defect because in this ways he is going to maximize his individual pay-off, but he foresees that presumably his accomplice would do exactly the same choice that he does. Defecting is the only Nash equilibrium, causing a worse expected penalty than not defecting, and the outcome of their choice will be worse for each player than the consequence they could have reached if cooperating. The described paradox clearly shows that even if each player moves rationally in order to maximize his own gain, in the end their interactive decisions make both their outcomes worse than in a situation of cooperation: the not-cooperative outcome is said to be Pareto-inefficient because the rational choice leads to an outcome that is only suboptimal for each player. The weakness of the rational choice theory applied to an interactive game like the prisoner's dilemma is that the notion of rational decision-making is defined within the range of a single individual. Thus, it fails when it comes to be applied to a collectivistic group of two or more people. If a player has the opportunity to maximize his personal pay-off, it would be irrational for him not to make that optimal action. However, if he makes his own decision in a context in which other individuals can affect and condition his outcome while trying to rationally maximize their gain, then the final outcome could turn out to be worse for everyone than the consequences that would have come along in a situation of isolated individual actions. The prisoner's dilemma seems to mirror the complexity of multi-agent interaction in the real life and the failure to achieve a rational cooperative outcome in which every participant gains a higher pay-off. If individuals rationally calculate their personal optimal pay-off for each course of action, it would be unrealistic for a single agent to choose an alternative that could favour other individuals rather than himself. Thus, cooperative solutions might

seem unfeasible: rational actors do not have individual stimulus to sustain cooperative actions.

1.5 Rational choice theory and collective action

Stating that rational individual seeks to maximize his own utility function, the rational choice theory seems to consider self-interest as the only leading force that guides individual actions. Furthermore, individual contribute can reveal itself as trivial and irrelevant in a group of massive dimension. Nevertheless, collective action exists and rational actors increasingly take part into associations, organizations and collective forms of decision-making. It is an important point to understand why cooperative structures came to live and why individuals deem that cooperation can generate some undeniable benefits for single actors. If every person believes that her contribution is of no or small account as the rational choice theory suggests, it is unclear how she is still motivated to be part of a structure that does not follow an individual rationality. If people join collective actors it might mean that there is a reason that overcomes the core of rational choice theory. Indeed, people obey collective rules that have been established in order to circumscribe the boundaries of self-interest reasoning. In every society the individual interiorises collective norms since a young age and takes into consideration group-oriented decisions. Mancur Olson states that collective action may be reinforced by what he calls *selective incentives*, according to which the individual-oriented action seeking maximization can be directed towards a collective group if the group can guarantee some specific and exclusive advantages to its members.[7] However, a similar

[7] Mancur Olson, "The logic of collective action: public goods and the theory of groups", Harvard University Press, 1965, p. 51

position tends to exclude other important social factors that influence the decision to join a participative grouping. Many scholars have stressed how social norms such as reciprocity play a big role in the individual decision-making process. In addition, if in a group social interaction is frequent, the cooperative strategy might appear as rational. Not only cooperation enhances the construction of a good reputation in a condition of iterated relationships, but it also leads to reciprocal benefits, fostering commitment and loyalty to any collective entity the individual takes part in. Dealing with the Hobbesian problem of order, Talcott Parsons rejects any utilitarian position implied in the explanation of social phenomena and clearly identifies a limit in the instrumental rationality as a model that does not suit human nature's predisposition to collaboration. Indeed, the social action goes beyond a pure rational motivation and favours a reason that is focused on the actor's orientation towards normative resolutions. Jon Elster's account of social action follows the way traced by Parsons, holding that the rational motivation of action is not sufficient to support the social order. In order to defend his thesis, Elster assigns a remarkable weight to social norms endorsed by human feelings such as guilt, shame, endorsement, respect, etc.[8] Thus it is undeniable that instrumental rationality lacks of realism when it leaves out some important features like social norms and interior commitment to them in order to give substance to collective action. In conclusion, the rational choice theory seems to be too narrow to explain the multi-dimensional human action and neglect to include various aspects that help an individual to make his choice.

[8] Jon Elster, "Nuts and Bolts for the social sciences", Cambridge University Press, 1989, p. 113

1.6 Choice influenced by cognitive factors: the framing effect

Many scholars have argued that the logic of choice is not plausible because it lacked to offer a systematic and descriptive theory of the rational decision-making process. Deviations from the described model have been observed more and more, and it is not unusual to take note of individual who regularly violated its basic assumptions.[9] According to Tversky and Kahneman, who are said to be the pioneers of framing effects influence on action, the framing effect is a cognitive process that is able to influence and determine the human choice simply using different frameworks to refer to a same problem, leading to different final decisions depending on how the outcome is portrayed. Framing effects are widely used to highlight the incoherence of human decision-making and to contest the application of the rational actors' model developed by neoclassical economists. Firstly, the invariance, one of the tenets of the rational choice theory, is commonly violated by empirical facts. Although the invariance shows that even two different presentations of the same problem lead to the same alternative that is the one preferred the most, the experience has demonstrated that how alternatives are presented and framed may take to different decisions. Shifts in the framing of alternatives in a process of decision-making continuously cause violations of invariance that cannot be ignored. More specifically, it has been observed that choices involving gains tend to be risk averse while alternatives that contemplate losses are risk seeking. For example, in a situation in which a sure gain and a higher gain but less probable are offered, the majority of actors choose the sure gain with

[9] Amos Tversky, Daniel Kahneman, "Rational choice and the framing of decisions", The Journal of Business Vol. 59 n. 4 part. 2, 1986, p. 254

a very high percentage. On the contrary, if individuals have to choose between a sure loss and a probable higher loss also connected to a low probability to lose nothing, they pick the second alternative with a higher percentage, showing off their risk-seeking attitude. The ability of individuals to change their approach towards risk in relation to how the outcome is framed is called *reflection effect* and it has been formalised in the *prospect theory*. Undoubtedly the classical rational model of decision-making manifests some flaws when it attempts to illustrate the features of choice behaviour. More specifically, people fail to evaluate probabilities and outcomes in a linear way of thinking and they are not able to build up canonical representation of decisions without effort and automatically, as the rational model holds. The choice process consists of two phases: the first one is about framing and editing information, then a stage of evaluation follows up. The framing effect concerns the introductory analysis of the decision problem, which frames the outcomes among other things. The framing operation affects the choice problem and it is monitored by norms and habits that are characteristic of the actor. The second phase involves a procedure of evaluation of the framed alternatives in order to select the highest outcome. The preference for an alternative or another of a decisional problem depends on how the problem is interpreted and organized, with the consequence that the outcome can be easily manipulated even in an elementary situation. However, it has not been possible to formulate a formal and complete elaboration of the problem because the framing effect varies in relation to some variables like the context in which the choice is taken and the language in which the alternatives are presented. The attempt to demonstrate that the classical model of rational choice theory reveals undeniable weaknesses has involved noteworthy contributes

and it was aimed at questioning the basis of this important economic model generally used in other disciplines. The rational decision-making process presents some uncertainties and debatable assumptions that have led renowned scholars to propose alternative premises and new models. The rationality is intrinsically bounded because of the imperfect human cognitive abilities and the computational errors, it seems to be too narrowly related to the collective human action and it can influence and manipulated by effects of framing alternatives. However, bounds of rationality may produce some positive results once the development of individual capabilities is taken into account. Positive constraints to rationality can be related to rationality understood as means to an end in a way that shapes and influences the freedom of choice, meant as freedom to choose between alternative combinations of functionings. Therefore acting on capabilities is equivalent to acting on available opportunities that an individual has in order to satisfy functionings that are considered important. The framing effect itself can be utilized to explain that how choices are represented may increase some important functionings in a situation of free choice. Thus, in order to condition individual opportunities of choice it may be required to influence the individual's will of choice or even generate some opportunities that can be counted in the list of available opportunities to reach a certain function. For example, how the importance of the right to education is framed in a society can have consequences on a person orienting her possibilities to increase her perspective of life based on a high rate of education, and the task of a government should be that of making effective the external conditions to achieve actors' perspectives.

Second chapter: an account of framing effects

2.1 What is a framing effect

As briefly discussed in the first chapter, it has been observed that the manner in which a set of choices is presented may notably affect the individual and collective decision-making, thus the actions that arise from it. Psychologically the presentation of available options to decide between has been found to determine the final choice in a way that may contrasts with the classic axioms of rational choice theory. This discovery has led a branch of behavioural economics[10] to explore the cognitive implications of the decisional process. Two famous Israeli cognitive psychologists, Daniel Kahneman and Amos Tversky, have been the pioneers of such an important research and have demonstrated that how the alternatives of a problem are framed has a decisive impact on the listener's values and beliefs. In fact, in framing experiments the different formulation of formally identical problems has yielded various responses. Generally a framing effect explicates its power by changing the wording of the given problem and consequently it has been shown that participants are inclined to accept the formulation provided rather than actively putting effort into a process of information-seeking. In particular, framing options of formally identical meaning of a given case as a gain or as a loss may determine how the actors perceive the problem and how they relate to it. A popular example provided by Kahneman

[10] Behavioural economics is an inter-disciplinary branch of economics and cognitive psychology that analyzes the human behaviour in economics choices. It is especially renown for experiments in which economics choices have been observed to violate the main assumptions of neoclassical economics theory (Treccani Encyclopedia, http://www.treccani.it/enciclopedia/behavioral-economics/)

and Tversky is aimed at demonstrating that how the problem is presented may have significant psychological implications, and the final decision depends on this specific act of framing. The given example of framing effects deals with the fictional outbreak of an Asian disease in the US, which is expected to kill 600 people. Two alternative programs are presented to two different groups of surveyed participants in order to fight and restrain the possible disastrous consequences of the disease. Initially the problem is portrayed in terms of lives saved, so in terms of gains. If program A is adopted, 200 lives will be saved while if program B is chosen, there is 1/3 probability that 600 lives will be saved and 2/3 probability that no life will be saved. The two psychologists have recorded that the majority of participants of the first group surveyed chose the program A (72%) while the 28% of them preferred the program B. The same problem is then illustrated to a second group but is depicted in negative terms, framing the alternative programs as a loss. If program C is adopted, 400 people will die while if program D is adopted, there is a 1/3 probability that nobody will die and 2/3 probability that 600 people will die. In this second case the majority of participants chose the program D (78%) while the 22% of them favoured the program C. The conclusion Kanheman and Tversky have drawn from the experiment is that when a set of options is framed as a gain (lives saved), people tend to be risk adverse. On the contrary, when two alternatives are portrayed as a loss (lives lost), actors are more risk seeking, although the problems are formally equal. This statement clearly shows that equivalent descriptions of the same issue may give rise to inconsistent evaluations. Furthermore, the same decisional situation can be framed with regard to different reference frames, establishing

various representations that lead to inconsistencies in choice conduct. The presence of framing effects indicates that choice behaviour is basically influenced by the way information about a decision is given, for example which benchmark is chosen, rather than by real values and convictions of the decision-maker. Then, the choice people make is determined by the manner they build internal representations of the problem exposed. More precisely, the framing operation happens at the very early stage of the choice process, involving a range of psychological and physical editing procedures, and it determines the preference for an alternative instead of another one depending on how the problem is organized and assimilated by the listener, with the consequence that it may be relatively easy to manipulate the result of a given problem even in the most elementary decisions by presenting the options in a slightly different manner.

2.2 Prospect theory against expected utility model

Expected utility theory has been one of the first descriptive models of economic behaviour to take into account a situation of decision-making under conditions of risk and it has been widely accepted as a normative paradigm of rational choice. It asserts that the decision-maker selects between risky and unsure perspectives by merely comparing their expected utility values, obtained by summing the utility of outcomes times their respective probabilities. According to this model, at the end the rational decision-maker would choose the action whose associated probability provides the maximum expected utility.[11] John Von Neumann and Oskar Morgenstern have

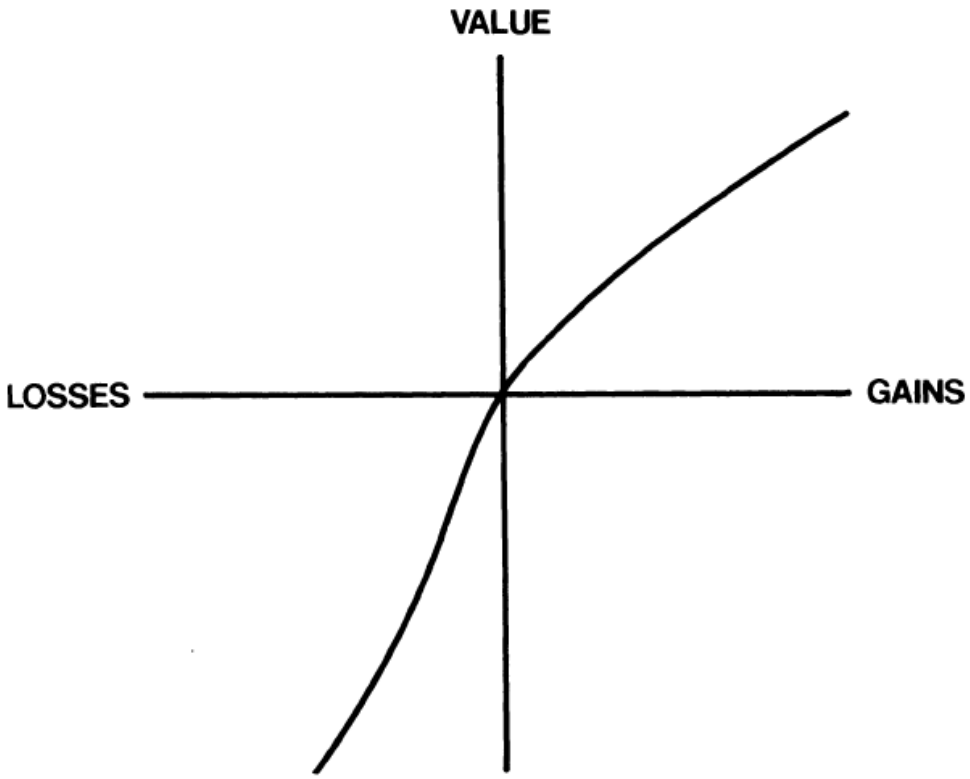
[11] Philippe Monging, "Expected utility theory", Handbook of economic metodology, Edward Elgar, 1997, pp. 342-345

formalized this approach, providing a methodological support to the idea held by Bernoulli in the 18th century, according to which it is possible to choose between uncertain situations by calculating the expected utility. Von Neumann and Morgenstern have introduced a theorem of expected value that takes into account the expected utility of a risky decision, for example a lottery. The theorem implies that when an individual has to choose between different lotteries, according to the model he will compare the expected utility levels associated to each lottery and choose the lottery with the highest expected utility. If the actor intends to respect the present model, he will utilize his utility function to evaluate the utility associated with every prize of each lottery and he will calculate the expected utility of each lottery, obtained by summing the probability of each prize multiplied by the corresponding utility. However, Tversky and Kahneman have demonstrated in experimental conditions that the decision-maker often violates the basic assumptions of the expected utility model and does not respect the normative requirements of the classical rational process of action.[12] In addition, the subjective expected utility theory is not an adequate descriptive and normative model of rational choice because it fails to offer a satisfactory understanding of decision-making. In line with their research, the two economists have developed an alternative and empirically supported account of how people actually make their decisions called *prospect theory*. Basically the theory states that rational actors do not merely make decisions depending on the subjective utility they assign to certain options but on the way in which their brains process and assimilate information, involving a range of

[12] Amos Tversky, Daniel Kahneman, "Rational choice and the framing of decisions", The Journal of Business Vol. 59 No. 4 part. 2, 1986, p. 252

computations in order to edit and evaluate a choice. Moreover, as discussed before, people tend to be risk averse when the alternatives are perceived as a gain and risk seeking when the options are depicted as a loss. This is due to a concept named *certainty effect*: people tend to overweight outcomes that are considered sure in spite of outcomes that are regarded as solely probable. Thus, in a positive domain the certainty effect leads to a sure gain over a larger but only probable gain; on the contrary, in a negative domain the same effect contributes to pick the risk seeking alternative that ensures a merely probable larger loss over a sure smaller loss. For this reason, in prospect theory value is assigned to gains and losses rather than to assets as in expected utility model. Furthermore, people often ignore components that the alternatives share, focusing instead on components that distinguish the prospects. However, this approach may yield inconsistent preferences in a way that leads different decompositions of prospects towards different preferences. This result is called *isolation effect* in the present theory. In contrast with the expected utility value, where the utility of outcome is multiplied by its probability, in prospect theory the value of each outcome is multiplied by a decision weight that represents the impact of events on the attractiveness of prospects. Thus, decision weights go beyond the likelihood of events. An important contribution prospect theory offers is the formulation of an alternative value function that distinctly shows different features compared to expected utility function. Firstly, prospect theory replaces the absolute value of an option with a relative one, determined by comparison with other options, thus changes in value count more than an absolute. Comparing diverse alternatives is fundamental because it enables to obtain a *reference point* that is a

standard point on which deviations from it are defined to determine the function. Therefore, an agent's utility can be described by a value function that is measured over deviations from the reference point. Secondly, the value function is S-shaped and is concave for gains and convex for loss, and it is steeper for losses than for gains.



In conclusion, the model formulated by Tversky and Kahneman provides an alternative explanation of the decision-making under conditions of risk and it offers a method to derive the value function from preferences between alternatives, explaining how an information framed in a particular domain may vary and have effect on the final decision of rational actors.

2.3 The violation of rational choice tenets

As mentioned in the first chapter, rational choice theory represents the main contribution that concerns a model of a rationally defined behaviour oriented to maximize the utility of an action. Its axiomatic assumptions - cancellation, transitivity, invariance and dominance - have defined the parameters of its subject and have laid the foundations for a normative and descriptive account of a rationally consistent behaviour. While cancellation has always been a target of criticisms, the other axioms have generally been accepted according to their normative attractiveness. The property of cancellation consists of eliminating any states that produce the same outcome in order to choose an option, although many scholars involved in rational choice studies have contested it. The assumption of transitivity is a an answer to the contingent problem of cyclic preferences and it calls for an ordinal utility scale in a way that an alternative X is preferred to another alternative Y whether u(X) > u(Y), but every options is required to have a value that does not depend on the other available alternatives.[13] Dominance is another important and simple requirement of a rational decision is supposed to satisfy and it theorizes that if one alternative were better than another, it would be irrational not to choose the dominant option. Finally invariance claims that different depictions of the same problem should lead to the same choice, thus it formalizes the intuition that the form in which a problem is represented should not be relevant in order to come to a coherent preference. Nevertheless, the branch of research that was aimed at understanding the cognitive mechanisms underlying rational decision-

[13] Amos Tversky, Daniel Kahneman, "Rational choice and the framing of decisions", The Journal of Business Vol. 59 No. 4 part. 2, 1986, p. 253

making has shown that in particular some of these axioms are often empirically violated and lead the way to an inconsistent behaviour, thus the normative theory of rational choice is not appropriate to give an accurate account of rational logic of choice. The failure of axioms such as invariance or dominance is a clear evidence of the flaws that the mainstream rational choice theory presents. According to their research, Tversky and Kahneman have demonstrated that people frequently incur in a systematic violation of invariance because they are not able to spontaneously combine simultaneous prospect and to convert the outcomes into a common frame. Moreover, the individual often fails to build canonical representation of decisions because the analysis of outcomes and their likelihood is not linear. For this reason the principle of invariance does not hold and it leads to a recurring violation of the axiom. In addition, in many experiments considered, a violation of invariance has been found likely to be related to a violation of dominance. In fact, in many cases the specific framing of outcomes implied in the simultaneous decisions led the surveyed participants to express a preference for a combination of alternatives dominated by the rejected ones because the evaluation of the alternatives was carried out after the aggregation of them; then the individuals surveyed in the experiments have shown that the combination of preferences they regarded as rational and reasonable led them to choose a dominated option. Additionally, their researches have explained that whether the relation of dominance is not transparent, the dominated prospect does not get rejected and the manner in which the alternatives are presented begins to influence the decision-making.

2.4. The impact of framing effects on public goods contribution

Experimental research has repeatedly illustrated that the manner in which a problem is presented to an individual may have a large impact on the observed behaviour. Among all the works concerning the powerful influence of such a cognitive bias, of particular relevance is the attempt by many scholars to understand the way social implications and circumstances determine and shape the human behaviour. Taking into account the significant role that public goods play in every society, it is of particular interest to analyze the classical social dilemma represented by the trade-off between individual and collective benefit. Since cooperation is an undeniable feature of human life, it is of fundamental relevance to figure out why many rational actors contribute to public goods, although this participation can diminish their income. Moreover, even though free riding is a dominant strategy in a one-shot public goods provision problem, it is not uncommon to observe a lack of free riding during public goods laboratory experiments. Supported by empirical results, James Andreoni has proposed an explanation of the reason why people tend to cooperate in a public goods game. He holds that cooperation in such a game is largely due to framing of situations and the warm-glow of cooperating generates a positive externality that exceeds the cold-prickle of creating a negative externality.[14] In order to analyze the impact of positive and negative framing on the level of cooperation in public goods laboratory experiments, Andreoni has taken into account two different framing conditions: a positive-frame condition, in which an individual's choice is depicted

[14] James Andreoni, "Warm-glow versus Cold-Prickle: The effect of positive and negative framing on cooperation in experiments", The Quarterly Journal of Economics, Vol. 110, Issue 1, 1995, pp. 1-21

as contributing to a public good that enhances the situation of other subjects, and a negative-frame condition, in which an actor's choice is represented as buying a private good that makes other subjects worse off. From his research Andreoni has provided evidence that cooperation rates are higher in the positive-frame condition and lower in the negative domain. The conclusion he draws is that much of the cooperation observed in the public goods experiments is determined by framing choices in a way that contribution is made out to generate benefits for the large majority of people in a society. Thus, social and cultural influences such as altruism and warm-glow play a big role in outlining the value of giving a contribution and for this reason Andreoni highlights that many fund-raising charity activities mostly refer to advantages that contribution may lead to instead of referring to losses that free riding brings about. As mentioned before, from the experiments carried out he has deduced a symmetrical statement concerning the externality, according to which a contributory action generates a positive externality for other subjects and on the other hand an individualistic behaviour leads to invest in a private good making the others worse off. In the second case framing the action of a subject as causing a negative externality to other members of a group has been found to reduce the intention of free riding. Indeed, framing externalities as a positive factor leads to an increase in cooperation. For this reason, the framing effect has a greater impact on people with individualistic value orientation rather than those with cooperative value orientation. According to these empirical data it is undeniable that many subjects violate the prototype of self-interested individual maximizing only his payoff due to a strong presence of social propensity for kindness and generosity. This cultural and social

force is involved in the construction of a framed presentation of situations and builds a sort of positive externality generating and strengthening cooperation. Hence, to understand giving behaviour it is fundamental to examine social influences, given that it is debatable to claim that cooperation happens because subjects bump into errors and confusion while playing the game. On the contrary, cooperation occurs because individuals are willing to contribute to collective and shared values and institutions.

2.5 Why framing effect occur in political decision-making

As largely debated, the context of an issue may lead to relevant differences in decision-makers' internal depiction of the problem. Undoubtedly framing is one of the most influential concepts employed in the analysis of public opinion since the frame adopted by political elites basically influences and shapes the public eye. Moreover, the manner in which electoral issues are presented is expected to determine a significant impact on the outcome of the voting. Elites face a few constraints when utilizing a frame to influence and manipulate citizens' opinion. A great section of research on the effect of framing information has focused on the role news media play in building a certain image of a problem and orientating the public opinion towards the best public policy. However, many scholars do not believe that framing a problem acts in a way that manipulates the orientation of public opinion. James N. Druckman believes that framing effects occur because citizens turn to elites to provide them with guidance on what to think. Thus, citizens seeking for guidance entrust authority to a credible source

that is able to shape the public thought.[15] It is fundamental that the source aimed at offering guidance enjoys the property of credibility: the elite must be perceived as credible in order to frame an issue successfully. To demonstrate that framing effects used by a credible source are persistent in shaping the general opinion about a specific public policy, Druckman has carried out a laboratory experiment to give support to his thesis. The topic of the experimental research dealt with the possibility of whether or not to increase spending on poor people. Two proposals were presented, one regarding the reduction of assistance to poor, the other one concerning an increase of assistance due to a rise of federal expenses. Both proposals were framed according to a description that was expressed either in terms of government expenses and humanitarianism. The government expenditures frame focused on increased assistance that would cause an increase of public spending; on the other hand the humanitarian frame was based on benefits for poor people that an enhanced assistance would bring about. An essential feature of the experiment concerns the level of credibility of the frame source that oversees the presentation of the statements. In fact, only a credible source is supposed to modify the perception of the overall public opinion about different observations. Symmetrically, framing is destined to fail if the statements presented are attributed to a non-credible source. It is indispensable that the source is perceived as credible for the framing to be successfully effective. The result of the study shows that when the assistance is framed by a considerably credible source in terms of humanitarianism, people agree to help the poor, even though this leads to an increase of the federal

[15] James N. Druckman, "On the limits of framing effects: who can frame?", The Journal of Politics, Vol. 63, No. 4, 2001, pp. 1041-1066

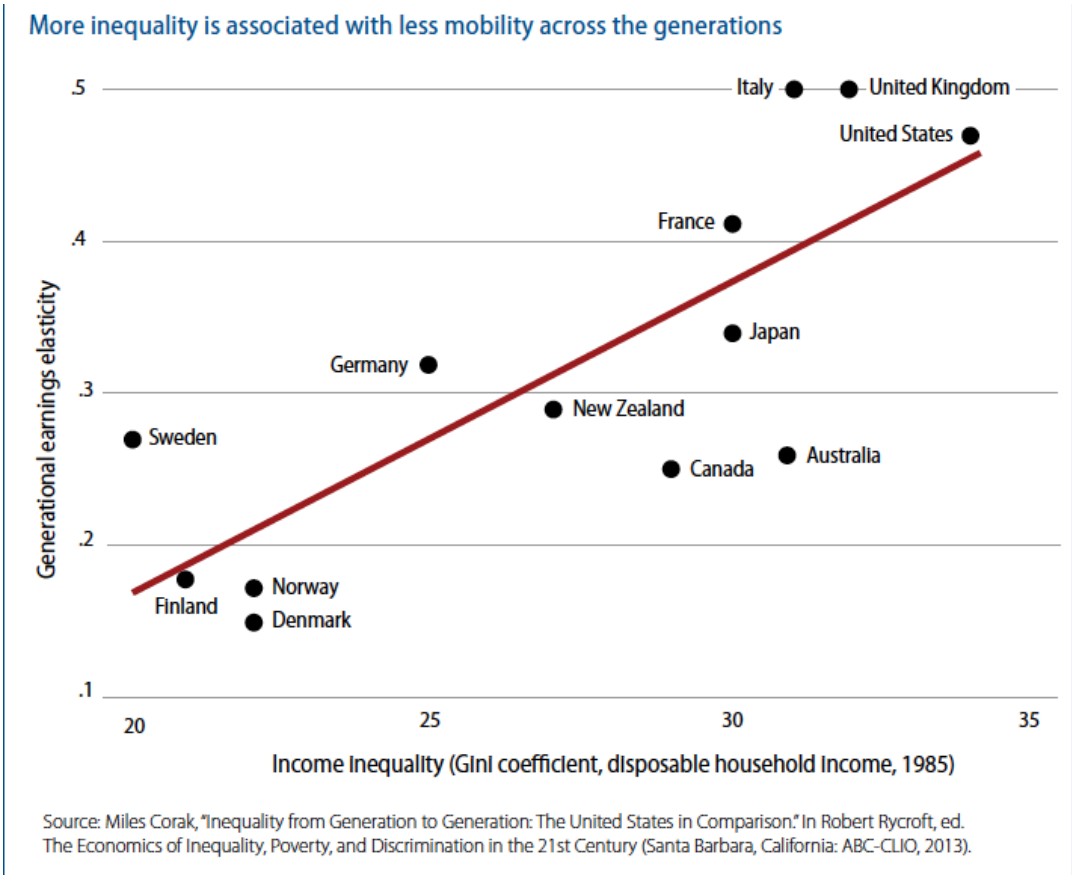
government expenditures; on the contrary when the assistance is framed in terms of government expenditures, individuals tend to be less altruistic and show less support to poor people's well-being. According to Druckman it is important to specify that framing effects do not operate on belief content because framing is different from a mere process of persuasion, so that the framing does not have effect on the alteration of belief content. Moreover, he holds that it is difficult to understand which consideration will be more susceptible to framing effects, the result being that not all the beliefs will be included in the frame. Still, to reinforce their credibility an elite should have available a credible media apparatus. It is ascertained that how media frame political issues influence the manner in which individuals perceive those issues, substantially shaping the decision-making strategy that voters adopt. Media frames truly impress meaning and importance to political issues that otherwise would be bare without a meaningful and coherent context. Furthermore, the attention paid by news media on a specific issue or policy largely influences the amount of attention that citizens will pay to that issue. News media are seen as critical vehicular instruments of political communication that shape the agenda-setter of public discussion and the voters' perception of political life in order to gain a large section of public opinion. In conclusion, mass media explicate an activity of news framing that enhances the power held by the elites and is aimed at shaping the general orientation of public opinion given a specific political issue. In fact, they shape news in a way that enhances the public to understand the causes and the solutions of central political issues.

Third chapter: framing effects and transmission of human capital

3.1 Educational opportunities and generational mobility

As explained in the previous chapters, framing effects have large social implications on human behaviour and play a big role in shaping and portraying socially relevant values in certain ways. Therefore, as discussed in the previous chapter, how the ruling class and the news media frame a social value may orient and influence the public opinion. However, it is possible to observe that at a micro-level of analysis framing effects are found to determine not only how a value is perceived but also how opportunities are regarded or discarded by individuals in a domestic context, given that the family is one of the fundamental units of social and economic evaluation. To support this statement, a helpful case will be illustrated and examined in a framing perspective, taking the cue from a report conducted by the professor Miles Corak in the United States in order to explore the relationship between life chances and generational mobility. In particular, he has surveyed the level of generational mobility in several countries and his research has provided a strong correlation between the level of social mobility and that one of social inequality. In general, if a society shows a high level of inequality among social classes, then generational mobility is found to be trivial as well. At a macro-level of evaluation, if political elites does not fight against social inequality, life opportunities tend to be eroded. In fact, the societies in which there is a high level of inequality are also the countries in which children inherit the socio-economic status, and

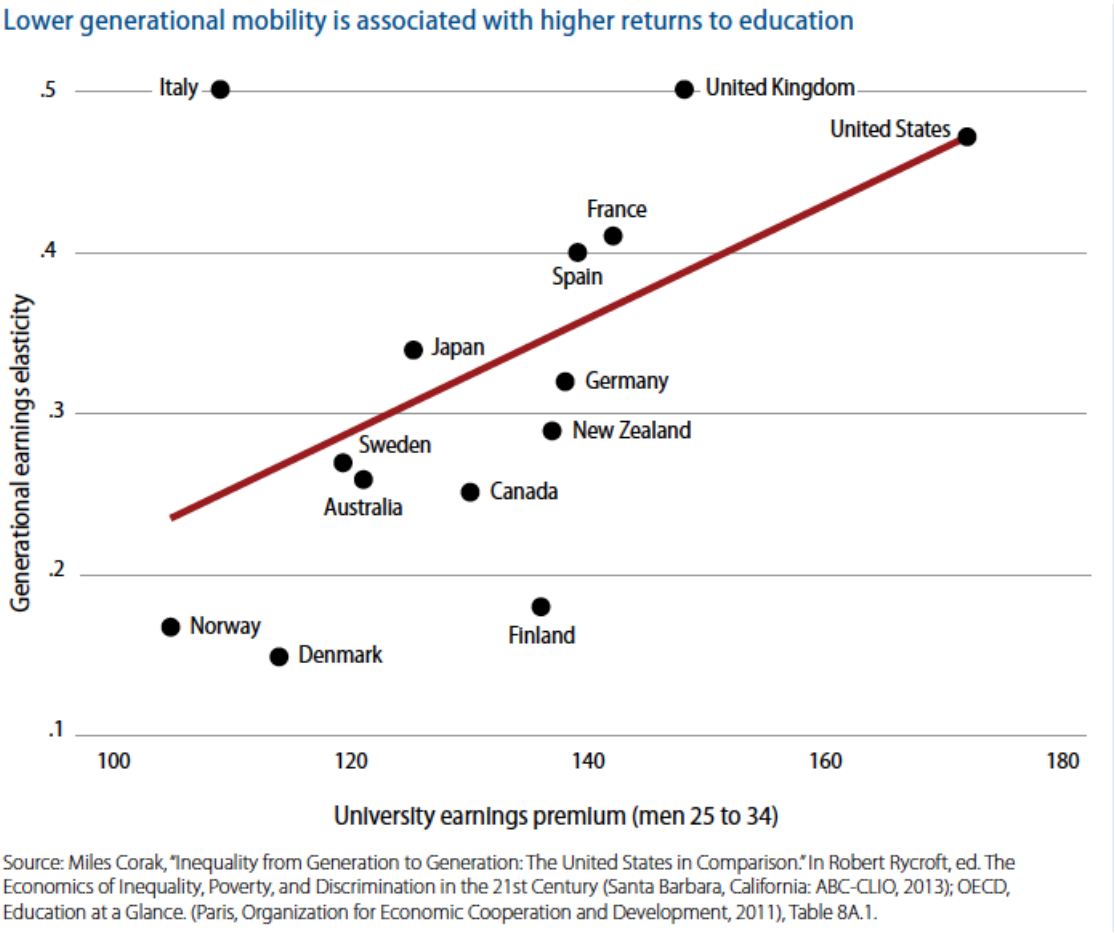
the advantages or disadvantages, of their parents. This mere association has given birth to the Great-Gatsby curve, which represents both the strong and the weak correlation between parental economic position and the adult outcome of children, according to where countries are positioned along the curve.



The Great Gatsby curve is the result of a series of socio-economic implications and of the quality that children get from the social environment. Basically life chances for children will be equal and strong when the family framework is well-established and public policies are progressive in so far as they reduce the gap between rich and poor people. For this reason, policy makers should seek to yield broader explanation of equality of opportunities and to shift down

the barriers that prevent low-income family's children from reaching the higher steps of education. Furthermore, the attitude towards life chances is correlated to the parental educational status. In fact, the family educational background undoubtedly determines the outcome of children's development. The report illustrates that the years of schooling and the kind of education that the parents received in their lives is strictly tied with the quality and quantity of education guaranteed to their children, and the level of earnings between the two generations is very similar, strengthening the stickiness of intergenerational conditions. Families with more money invest more in their children, enabling them to aim for reaching the most qualified universities. High-income family are more likely to invest the best resources to let their children grow in a very stimulating environment, and to transmit the values and the aspirations to the younger generations with regard to the importance of going to a good college and having a satisfying job. Moreover, whether or not the family has deep-rooted connections with social and political elites influences and enhances educational opportunities, and how the family relates to the labour market is a strong indicator of the intergenerational cross-cultural differences. When the interaction between a family and the labour market is barely established, public policies act in the sense of making the market more accessible and fair. An equal public policy aimed at diminishing the sharp gap between low-income and high-income families may allow or foster the entering of new forces in the labour market and play a big role on both monetary and non-monetary resources that families are supposed to invest in their children's education. In addition, unequal societies are those in which the return of each additional year of education is not considered

influential in order to determine the position that an individual will hold in his future professional life. When the return to education, that is the difference in earnings between less-educated and more-educated individuals, is higher, then generational mobility is consequentially lower.



Source: Miles Corak, "Inequality from Generation to Generation: The United States in Comparison." In Robert Rycroft, ed. The Economics of Inequality, Poverty, and Discrimination in the 21st Century (Santa Barbara, California: ABC-CLIO, 2013); OECD, Education at a Glance. (Paris, Organization for Economic Cooperation and Development, 2011), Table 8A.1.

The case represented by Italy may be seen as the exception that allows considering the phenomenon in terms of framing effects. In fact, Italy shows a low degree of generational mobility but an even lower level of university earnings premium. In a few words, whether the society is not equal is not determined by the amount of additional years spent studying at a good college. However, the macroeconomic data does not suggest anything about the deep cause

of this phenomenon. It is not clear from this mere correlation what can bring someone not to take advantage of some opportunities, even if they are existing and tangible to the eye. Therefore, showing how people miss life chances may be explained considering the impact of framing effects observed at a micro-level analysis.

3.2 Framing effects and life chances missed at a micro-level of analysis

It is relevant to understand not much the macroeconomic correlation exhibited in the present report but the process of framing decisions on life chances in a narrow perspective. The case of Italy previously observed suggests that there is a micro-force that may lead to miss important opportunities correlated to certain social values, e.g. the value to pursue a good education in order to contribute to the economic and social growth. Although the Italian society is depicted as highly unfair, it does not mean that public policies are not provided or that they are of little account. No causal explanation is given about the issue, and the general data does not allow furthering other precise considerations. The main idea at the basis is to search for the truly genuine causal relationship between the two variables at a social micro-level, where family represents the basic unit of analysis of the community. As showed in the previous paragraph, it has been observed an association between the socio-economic status of the family and the low intergenerational mobility: in fact, parents are found to reflect aspirations and beliefs on their children and to influence their pattern of life. However, it is unclear how they manage to do it and how they lead their children to refuse important opportunities of life. Actually it seems that parents have big responsibility in framing some lifestyles and social values.

Since at an early phase of life, family is one of the major socializing agencies and can easily guide the children to interiorize social manners and cultural references. Given the big role that the family plays within the domestic walls, parents may psychologically influence and shape the fruition of opportunities by their sons. With regard to the Italian data, an explanation could be the drawn: indeed, the fact that the educational return has no influence on social inequality means that the value of education is often trivialized and it leads to not take profit of certain life chances when actually these opportunities are even available and ready to be caught thanks to the good socio-economic status of the family. The effective cause behind the correlation may be that how parents frame and depict some socially relevant life opportunities turns to determine the final outcome of children's choices. As said before, given that going to university is quite universally recognized as a good choice with intrinsic value, the cultural context of the households helps to frame the value of receiving or not an higher education and to receive it. An example will better illustrate when framing effects go into action in a particular domestic context and how they lead to miss some social opportunities. Undoubtedly the level of household's income has a direct impact on the range of available opportunities because parents are more likely to invest in their children and in an excellent education. However, even when the family has a wealthy background, some opportunities are still missed. This is because parents may come from a traditional context and consequently discard life chances seen as unusual or unnecessary, framing these options in a negative domain. Consider the situation of a high school student close to begin the university, whose family is a dual-earner with high income. His strong interest in international affairs would

lead him abroad to study what he likes and intends to do in the most renowned universities, and he actually has a monetary opportunity to fulfil this life chance. Nevertheless, if the family context is traditional and narrowly oriented to consider the option of going outside the native birthplace in order to receive a higher level of education, parents are found to frame the life opportunity in a negative manner, stressing other factors as relevant, like being at home with the family and working in the profitable family business, showing a risk-adverse attitude and leading the sons to miss remarkable opportunities that could otherwise have been caught. Therefore, the causal justification of the macroeconomic result may be an aggregation of micro-level decisions affected by micro-level framing effects. The awareness of the importance of the home environment in shaping children's achievement is the starting point to address issues of educational attainment and generational inequality. The household performs its duty to strongly influence children's life chances taking into account the ability to form and develop the human capital of its children. How the family is able to build the human capital is essential in order to strengthen the children's capabilities to become who they want to be in their lives. Parents manage to do it both with monetary and non-monetary investments: in fact, it has been shown that richer families are more likely to invest in a good education, but also the reflection of their aspirations and beliefs represents a valid motivation to explain whether a family is willing or not to lavish incentives on their sons. Families with more human capital are able to invest more resources on their children's skills and abilities often transmitted from parents to sons, while families with more children usually do not have a considerable capacity to do so as well, especially if the cost of human

capital investment increases. But how does the human capital actually get transmitted from generation to generation? To which extent are parents responsible for their children's skills and knowledge acquisition?

3.3 Intergenerational transmission of human capital

First of all, human capital is an important concept used in social and economic labour, and it corresponds to a stock of knowledge and skills that the individual has gradually gained in his life and that constitutes the range of his productivity. In recent years there has been a great interest over the investments in human capital that consist of investments in education, health care, training and work attitude. The power of human capital to further studies on it stems from the fact the physical capital has substantially lost its appeal to explain income differences between regions, countries and periods of time. In fact, the diversity of future income level among countries takes into account noteworthy less tangible resources to give reason of this economic gap, such as the knowledge and the skills possessed. Therefore, investments in human capital are addressed to emphasize the intangible resources and to understand the inequality in future income level among different social classes and different nations. Gary Becker has formalized the great shift of attention towards investments in people, labelling it as the cause of different income earnings. The growing literature that has mainly focused on this argument, has studied the extent to which socio-economic status is transmitted from an older generation to a younger one. Human capital, and its consequent impact on income level, is exactly the channel through which the transmission takes place. Parents have a significant impact on children's educational attainment and

significantly contribute to form their children's human capital through a mechanism in which the household explicates its strength helping the children during the primary phase of education process. Parents with a higher and better degree of education offer a help of higher quality, which enhances and fosters the children's incentives to study. Even the schooling represents a main vehicle of human capital transmission, given that school is considered as one of the most important driving forces of labour market achievements. The transmission occurs both through private transmission of physical and human capital, for example monetary resources and intellectual stimulus since at an early age, and also through a public channel of transmission, like taxation to invest in primary education. Referring to the private side, the intergenerational transmission of human capital inequalities is caused by the different monetary situation of the household due to a scarce availability of resources, and by contextual parental disadvantages that may have a negative influence on the children's outcome, like the level of education and the compactness of the family. So far two types of models have been used to analyze the educational and professional outcomes that children achieve during their life. On the one hand, there is the model characterized by a strong impact of parent's aspirations on children and determine both their sons' opportunities and the decision they will be going to make. In this case the parents invest in human capital in order to shape and direct children's future outcome. On the other hand, the alternative model is focused on young adults' personal decisions about schooling and type of education, given that they have some intrinsic capabilities. Indeed, the connection between different generations of the same family is reinforced by family endowments transmitted from parents to

children, which comprehend various factors, including honesty and reliability. Becker and Nigel Tomes propose a human capital approach to income inequality because parents are found to invest in a different proportion in their children's future, seeking to maximize their utility by choosing the optimal incentives. In addition, the theory they introduce shows that endowments and market rewards are in part determined by luck, so that different income earnings is partially due to an unavoidable link between luck and maximizing behaviour.[16] The concept of endowment is central in the present analysis because children are supposed to obtain endowments of capital by family connections and reputation, cultural family context and inherited genetic constitutions. Therefore, the estimated endowment of children depends on the endowments of parents and the general endowment in the society. To summarize, the transmission of human capital happens at a very early stage of children's life and it involves parent's effort and dedicated time, the quality of such help, and children's intrinsic abilities. Schooling itself plays an enormous role in the transmission process, since it represents one of the most significant forces that drive the achievements in the labour market. Parents' education is positively correlated to the transmission of human capital in the primary stage of children' education, moreover the amount of effort put in the investments provided by each parent is positively correlated to the level of education that parents achieved, even if parents have to constantly face a cost-opportunity when they offer their help. Differences in human capital investments may explain the

[16] Gary S. Becker, Nigel Tomes, "An equilibrium theory of the distribution of income and intergenerational mobility", Journal of Political Economy, Vol. 87, No. 6, 1979, pp. 1153-1155

gap existing between income levels in so far as they unite social and economic assumptions, offering a satisfactory method to give account of the heterogeneous distribution of intergenerational incomes in a given society and between different ones.

3.4 Framing effects and transmission of non-material incentives

As discussed in the previous section, framing effects have an enormous impact on domestic transmission of non-material incentives. Since at an early age, children incorporate norms and beliefs in a way that is already framed by the household as they grow up, and a set of skills, knowledge, and convictions is transmitted to them, such that they reflect the values framed by the socio-economic context of the parents. Therefore, framing effects decisively enhance the transmission of human capital and represents the mechanism by means of which newer generations inherit those values and skills. The endowment of children comes from the endowment of parents and gathers a series of behavioural attitudes internalized by being framed into a particular perspective of choice. Thus, even if an individual faces important decisions during the course of his life, and he is in principle free to choose among different options, his freedom of decision will be naturally and inevitably influenced by cultural and cognitive mindsets assimilated in the household. For this reason, these sorts of decision-making processes usually hides an effect of framing that involves the transmission of immaterial incentives, which foster the newer generations towards a high educational and professional fulfilment, although this is not always true, given that it may happen that framing effects yield a situation in which the educational progress is not supported by the domestic context.

Conclusion

The present work aims at highlighting some of the major limits of the main assumptions of neoclassical economics that every individual seeks to maximize his own pay-off under conditions of perfect information about the options he faces, given that his goal is to find the most suitable means to reach a given end. Many scholars have criticized the view of the *homo oeconomicus* during the years. Among the various alternatives the model of bounded rationality explains quite well how the human behaviour is intrinsically constrained by cognitive and computational limits, so that the rational agent is not able to make the best decision to optimize his utility. Furthermore, rational choice tenets have been found to be systematically violated by the so-called framing effects, a psychological phenomenon that has both individual and social implications. The way the outcome of an issue is framed strongly determines the decision-making process and shapes the final decision, according to whether the alternatives are presented in a positive or in a negative domain. In particular, looking at the global social side of the story, framing effects limit the rational, tangible opportunities an individual may have in so far as the domestic environment depicts a specific social value in an attractive way or not. Some contemporary social sciences scholars have challenged the descriptive nature of the rational conduct that works when a decision is made. With regards to the rational maximizing behaviour, its descriptive feature does not provide a realistic account of how people actually make their decisions individually or collectively. When a rational agent is engaged in a decision-making process, he is not isolated from the social and domestic context;

instead his choices and opportunities are shaped by social and cultural norms and by feelings that bolster social institutions. It is unrealistic to relegate the human conduct in a solely selfish and self-oriented dimension, given that people show a high rate of cooperation in the social environment, even when it would be rational and convenient for them to act as free-riders. In the same way it is unconvincing that the neoclassical rational agent decides what it is best for him in a situation of perfect information and flawless computational ability: indeed, human mind is deeply bounded and affected by psychological restrictions. Since framing effects have a massive impact on human decisions, rational choice theory is inevitably threatened by the empirical evidence. Framed issues constantly influence rational individuals, especially when an accredited source, like political elites, uses this power to orient the public opinion in order to obtain a certain outcome. The prospect theory discussed seems to be more suitable to describe features of human reasoning concerning the expectations of an action. The utility function merely shows the point in which an individual maximize his set of preferences, on the contrary the prospect theory offers a prospect, a reference point with which to compare and evaluate how better or worse an individual is doing over a period of time. Lastly, by acknowledging that human processes are basically constrained, we can avoid the risk to invalidate the simplification and idealization, and thus the application, of those theoretical models used to explain and predict human actions, simply recognizing that they present some limits.

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