We hear that our choices shape our future. However, the future is inherently uncertain. It is so because making a choice most often does not determine its consequences. One choice alternative may entail different consequences. We cannot say a priori which one will occur. We call such a situation a choice under uncertainty.

We often learn about the nature of uncertainty in economics by observing the choices people make under the conditions of uncertainty. So, instead of using a predetermined definition of uncertainty, we can measure it indirectly by observing people's choices. Consider someone who dislikes uncertainty. Then the uncertainty is that aspect of choice that the person dislikes. Basing a definition on human choices makes it operational and less arbitrary. In a sense, the human participates in the measurement. Aumann and Serrano proposed this approach in the context of riskiness.

However, there are other sources of uncertainty besides risk. They differ in the level of knowledge of the probability distribution of possible consequences. If the distribution is known and given exogenously, it is called risk. When it is unknown ¬ it's called complete ignorance. Intermediate cases are called partial ignorance. Even if the objective probabilities are not fully or partially known to people, which is probably the case in most decision problems, it is often possible to define the so-called subjective probabilities that people (knowing it or not) attach to particular consequences. However, there are cases in which such measures do not exist because the constructed quantity would not satisfy the axioms of probability. We call such cases ambiguity or lack of probabilistic sophistication. The classic examples include the so-called Ellsberg paradoxes.

There are many reasons why people may not like uncertainty. One of the most important is loss aversion that may occur as a result of uncertainty resolution. Loss has many negative consequences. In particular, it can lead to bankruptcy, makes it necessary to correct our plans, reduce expenses or planned investments, etc. While the classical decision theory in the conditions of uncertainty presents the loss only as a percentage of the overall wealth held, the behavioral approach postulates putting more emphasis on losses, magnifying them as if through lenses.

The project aims to propose a method of measuring attitudes towards uncertainty and (dually to it) the uncertainty itself and its various sources, using the so-called indifference prices. The use of indifference prices, such as buying and selling prices, has many advantages. First, they are testable. Well-defined experimental tasks make them easy to elicit. Thus they provide a convenient tool to use in practical applications. Secondly, they can be defined within a very general model of reference-dependent preferences, in which: a) a loss aversion effect is present, and b) it is separated from other effects, and c) various sources of uncertainty can be quantified and compared with each other. Third, it is possible to use the indifference prices to determine the attitudes towards uncertainty and measure the uncertainty itself in line with the dual approach proposed by Aumann, Serrano.

As part of the project, the following are planned, among others: proposing an axiomatic representation of indifference prices in the context of uncertainty aversion in the reference point-dependent preference model, experimental testing of the reference point setting rules, loss aversion, and examining the rationality of the resulting preferences, definition, and characterization of uncertainty based on the above-described dual approach.

Meeting the project's cognitive goals will enable economists to understand better and measure different types of uncertainty and attitudes towards them, including the rationality of various behaviorally founded preferences. Applications include risk measures used in finance and insurance, models of a behavioral portfolio, elicitation of consumer preferences, or the patients' willingness to pay for a given drug/medical procedure, or the citizens' willingness to pay for a public project. The project consists of 7 phases, each of which ends with at least one article (eight in total) prepared for publication in leading economic journals.

Our methods include (but are not confined to): axiomatic approach, representation theorems, characterization results, functional equations techniques, design and conduct of experiments, testing of statistical hypotheses.