

Introduction: Understanding uncertainty

Uncertainty is a term all of us use in everyday life. Its meaning is informally motivated by an appeal to intuition and our experience. In the recent period it has been often used by economists.

When analyzing macroeconomic problems we cannot treat uncertainty as a primitive (generic) notion that does not require defining. Without any definition we are exposed to confusion resulting from different understanding and dependency on the analytical context. Hence, when defining uncertainty it is essential to characterize its nature – to determine whether it is the uncertainty resulting from natural variability and randomness, or the *epistemic uncertainty* associated with insufficient knowledge of the investigated phenomenon. This distinction is important because different types of uncertainty require different treatments, as pointed out by Frank Knight already 100 years ago. Knight wrote about *measurable uncertainty*, which he called risk, and *immeasurable uncertainty*. By the measurability he understood the possibility of describing the phenomenon by means of objective probability. When writing about quantifying the *immeasurable uncertainty* Knight used the term ‘subjective probability’.

It should be underlined that the nature of variability observed in economic systems is different from the uncertainty arising from limitations we face in the area of understanding, measuring and modeling economic phenomena. The *knowledge uncertainty* is a property of the observers, and variability is a feature of the investigated system (somehow external to the observer).

Recognizing the nature of uncertainty is also very important to answer the question whether and how uncertainty can be reduced and what strategy should be adopted in the face of uncertainty. We are not able to reduce the part of uncertainty that arises from randomness. We can only impact reduction of the *knowledge uncertainty*.

Central banks are used to face uncertainty in monetary policy decisions – both in assessing current state of economies as well as in forward-looking considerations. That is why we, as central bankers, try to fill the gap between what we already know and what we need to know to make adequate decisions.

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For this reason we develop research and analytical capabilities aiming at reduction of the *knowledge uncertainty*. We also try to improve methods of communication to reduce uncertainty for the public.

Studying an impact of uncertainty on an economy and on a business cycle is rather difficult, because it requires taking into account both variability of economic environment and uncertainty experienced by economic agents. As in the case of decision making processes it is necessary to specify sources of uncertainty relevant to analyzed problems, and to apply appropriate methods of its quantification. In testing volatility in the economic system we have at our disposal statistical methods and econometrics models. Quantifying the *epistemic uncertainty* seems to be more difficult. When analyzing its impact on the behavior of economic agents one should take into account their individual characteristics.

The modern monetary policy is often described as the management of expectations. Central banks attempt to influence expectations of the private sector, especially to anchor inflation expectations with the means of announced inflation targets and central bank communication. From this perspective understanding uncertainty faced by economic agents is extremely relevant for central banks. For this reason the National Bank of Poland monitors expectations or forecasts of different groups of economic agents, trying to quantify uncertainty they face. Business surveys conducted by the National Bank of Poland contain a question related explicitly to their subjective assessment of uncertainty. In order to have an adequate view on the uncertainty that accompanies macroeconomic forecasts of professional experts, in 2011 we launched the NBP Survey of Professional Forecasters. The results of the NBP Survey of Professional Forecasters enlarge considerably our understanding of the formation process of expectations by our experts.

At the same time we feel that research in this area, making us realize sources and the nature of uncertainty as well as its impact on the behavior of economic agents, is still required. I am sure that the papers to be presented at the workshop will enlarge our knowledge and help us design an ambitious research agenda on this topic. Being aware of the fact that the first necessary step in the research related to uncertainty concerns its definition, let me wish that one of the outcomes of the workshop was to reduce uncertainty as to the meaning of the term ‘uncertainty’ and thus, reducing the *linguistic uncertainty*.