In the spotlight
Mariann Ollár on full implementation and belief restrictions
What is the article about?

“This article illustrates how belief restrictions can be used to achieve full implementation. Full implementation is a subfield within Mechanism Design that asks the question: when it is possible to find a mechanism that achieves, or in other words, implements a particular outcome, for example the socially efficient one. Full implementation also studies the properties of the implementing mechanism when implementation is possible.

Let me give two less abstract examples here. In an exchange situation, one can think of a mechanism as a market with its formal and informal rules, and one can think of an outcome as the resulting payments and allocations from this market. In a social decision situation, one can think of a mechanism as a particular voting system with all its rules, and one can think of an outcome as the result of the election. In these two examples a question for full implementation can be: which market mechanism or voting mechanism guarantees the best allocation or best choice for the participants?

In Mechanism Design, the difficulty often centres on information. The participants of the mechanism are the ones who best know their own preferences, their own characteristics, their own willingness to pay. But for the social planner or designer, who does not know this information, it is key to incorporate dependence on this individual information to guarantee the best outcomes. Therefore the planner needs to design a mechanism in which participants’ individual decisions, based on their own information, deliver the good outcome.

It has recently been shown that the prospects of full implementation can be quite grim. In particular, robust full implementation is unfortunately impossible if the participants’ preferences are strongly interdependent. This means that a slight misunderstanding about the participants’ beliefs, either among themselves or on the part of the designer, may lead the mechanism to implement unintended, inferior outcomes.”

What are the main results of your research?

“In our paper, we clarify that, contrary to the previous understanding, it is not interdependent preferences per se that cause the issue of impossibility, but rather the strategic externalities necessarily created by the usual design method of ex post implementation. Armed with this clearer understanding, we set out to design these strategic externalities directly. We do so by modifying the previous transfer schemes using the designer’s, possibly limited, knowledge about what the participants believe about each other’s preferences. Our innovative approach of using information about beliefs appears to be sufficiently useful to achieve interim full implementation in many economic environments, which is quite surprising given the previously known impossibility results.

Our design principle relies on information in the form of moment conditions. Moment conditions are best understood from the participants’ perspectives as conditional expectations of other participants’ information given their own information. Moment conditions can also be understood as the results of regressions based on commonly available data. This reliance on limited but practically realistic information is promising and suggests practical applicability, for example, for contribution schemes in public good decisions or compensation schemes in developmental economics.”

What makes you so enthusiastic about your research discipline?

“I am fascinated by the power and impact of basic research in microeconomics. This basic research provides today the major language, toolbox, and models that advance our understanding in many fields in the social sciences; including political science, economic history, field experiments, developmental economics, gender studies, and sociology. Contrary to popular belief, Microeconomics, Game Theory, and Mechanism Design are far from being ‘done’. Some of the open questions recently became pressing because of the fast evolution of our technological environment (communication, transportation, computation). For example, one open question that became relevant is implementability if the social planner knows more about the participants than these participants collectively know about themselves. I feel fortunate to be part of this field as a long-time learner, teacher, and contributor too.”

Mariann Ollár is an assistant professor in the research programme Economics, Econometrics and Finance since 2016.