Causal Bayesian nets (Pearl, 2000; Spirtes et al., 2000) have been employed fruitfully in computer science, epidemiology and political science. Thus far, the applications in research in economics remain limited. This is partly due to econometrics having its own modern approach to causal inference, the potential outcome framework; also, several leading econometricians like Heckman and Pinto (2013) and Guido Imbens (2019) have expressed serious doubts about the usefulness of causal directed acyclical graphs (DAGs). The lack of relevant empirical applications has been claimed to be the greatest obstacle to DAGs setting off in the econometrics literature.

This paper discusses the potential of graphical causal modeling using causal directed acyclical graphs in econometrics from a philosophy of methodology perspective. The research question is: What are the advantages of DAGs vis-à-vis the potential outcome framework? I argue that the potential is in fact big. Not only can DAGs help us state our assumptions more clearly, they even allow us to uncover new identification strategies (Hünermund and Barenboim, 2019).

I will focus on three aspects: firstly, the front-door adjustment to control for confounding (Bellemare and Bloem, 2019). The front door adjustment is a two-stage application of the the backdoor adjustment, which is itself roughly equivalent to classical conditioning on confounders, albeit taking care of not mistakenly conditioning on colliders. The front door adjustment exploits the presence of mediating variables on the path from cause to effect.

Secondly, causal discovery as a way to uncover yet new identification strategies, where such a strategy is the inference from a distribution to the parameters of the structural equations (Eberhardt, 2017). Causal discovery is the process of detecting new identifiable relations looking at the distribution of the variables. Only the DAG approach can provide a clear explication of the concept of ‘identifiability’ which has been around in econometrics for quite some time. The identification ‘templates’ used in the potential outcome framework can be completely reproduced in a DAG framework (Steiner et al., 2017).

Thirdly, expert domain knowledge as the initial material for the DAG’s structure. One remaining weak point of the DAG approach seems to be the claim that ‘expert knowledge’ is necessary to construct the DAG in the first place. I will show that this perceived weakness is actually a strength, as DAGs allow for the inclusion as well as testing of various sorts of knowledge about a given domain.
References


Guido Imbens. Potential Outcome and Directed Acyclic Graph Approaches to Causality: Relevance for Empirical Practice in Economics, 2019.

