The Generalized Method of Moments

The Generalized Method of Moments—a key contribution for which Lars Peter Hansen shared the 2013 Nobel Prize in Economics—is an elegant and powerful statistical method designed “to do something without having to do everything.”

Economists build models to test theories and understand economic relationships. In early stages of model building, it is advantageous to study, for example, the link between financial markets and the macroeconomy without having a fully detailed model of both financial and macroeconomic structures. The key is to devise ways to study relations between economic variables that do not require full specificity of all dimensions of the market or economy.

Developed in the early 1980s, GMM, builds on earlier econometric research by offering a way of isolating the relations of interest in a way that does not require a full representation of the dynamical economic system. It provides a way to draw meaningful conclusions from partially specified or incomplete models. And it is a useful tool for assessing economic models and identifying their strengths and weaknesses.

Hansen’s initial applications of GMM documented and characterized modeling challenges; with several coauthors, he applied the method to a variety of economic models. His work with Robert Hodrick studied relationship among forward and spot exchange rates, challenging the expectations hypothesis originally posed without accounting for risk adjustments.

His work with Ken Singleton built on earlier research by Sanford Grossman and Robert Shiller by showing how the conventional macroeconomic models of the day failed to price correctly asset returns from equity and bond markets. This helped to spawn a richer class of models linking financial markets and the macroeconomy. In work with Jagannathan and with Richard, Hansen developed and applied methods that allowed for a more general characterization of the observable time series implications for structural models of asset returns.

He focused subsequent work on modeling linkages between financial markets and the macroeconomy. Asset prices in financial markets can be an economic barometer, but it’s important to account for how investors’ tolerance for risk and uncertainty is incorporated into prices and returns. In recent work with Thomas Sargent, Hansen studies asset pricing in models where investors and consumers with incomplete information struggle in their assessments of an uncertain future.

Hansen’s methods can be used more generally within and beyond economics. His work helped test the theories of his fellow laureates, Eugene Fama of the University of Chicago and Robert Shiller of Yale University, showing where asset pricing behavior is relatively efficient and where it is quite irrational.