Nobels Give Econometrics Pioneers Their Due

By Lars Peter Hansen - Oct 12, 2011

Thomas J. Sargent and Christopher A. Sims richly deserve the Nobel Memorial Prize in Economic Sciences they were awarded this week for their seminal work in the fields of macroeconomics and time series econometrics.

I was fortunate to have a front-row seat to observe the development of their path-breaking research. As a graduate student at the University of Minnesota in the 1970s, I was a research assistant for both: Sims became my adviser, and Sargent was a member of my dissertation committee. Since then, Sims, who now teaches at Princeton University, has had a major influence on my research, and Sargent, at New York University, has been my longtime collaborator.

Starting in the 1970s, Sargent and Sims began to publish their remarkable contributions, which combined macroeconomic models with time series analysis in a unique way to address policy questions in macroeconomics. These insights were only possible with rigorous economic modeling and careful empirical analysis.

Time series analysis, applied to macroeconomics, provides the tools to examine some important questions that can’t be answered on purely statistical grounds without some form of economic modeling. How do we use macroeconomic time series data to identify and measure meaningful shocks or impulses to the economy, such as shifts in technology or monetary policy? How do we assess the accuracy of the resulting measurements? How do we use historical data to make inferences about the impact of alternative macroeconomic policies, including ones that are outside the range of historical experience?

Time Series

To provide answers, Sargent and Sims devised and applied methods that used time series statistical methods concurrently with dynamic economic models. Their approaches were distinct but complementary.

Sims illuminated what was required to use multivariate time series data to make causal statements. He also developed and applied methods that measure the effect of alternative sources of fluctuations and the uncertainty associated with those measurements.
This work by Sims and other researchers who used his methods challenged the monetarist view of macroeconomic policy and its impact on economic outcomes.

Initially, Sims investigated the time series relationship between money and aggregate output. Roughly speaking, his results were consistent with a view commonly held by monetarists of how the aggregate economy responds to exogenous movements in the money supply.

Multiple Variables

Yet when he made the model more complex by incorporating additional economic time series such as interest rates, the interpretation changed entirely. That finding upended previous analysis that focused on a single relationship with a monetary aggregate as the explanatory time series.

Instead, Sims showed why it was essential to study a richer collection of time series simultaneously, allowing for flexible and convenient interrelated feedback.

Using a statistical model called vector autoregressions, Sims and others proposed ways to extract meaningful shocks using “identifying restrictions” from economic analysis. This gave researchers the ability to measure the impacts of such shocks, including monetary ones, over multiple periods on macroeconomic time series.

As Sims put it: “With a variety of identifying assumptions, a consistent picture has emerged: Monetary contraction produces a decline in output and a decline in inflation, with both responses smooth and delayed and the decline in output quicker.”

Inflation Model

These insights have been extended to provide a more complete picture of changes in monetary regimes during the postwar period. His empirical analyses and those of others serve as a basis for economic models that show the interaction of fiscal and monetary policy as an essential determinant of prices and inflation.

This is merely one example. Sims’ impact on applied research in macroeconomic time series is pervasive, and his work is widely used in policy research by governmental agencies.

Sargent is an innovator in developing and using state-of-the-art dynamic economic models to deduce the implied restrictions on the economic time series.

His approach allows researchers to examine or test model implications using data on economic time series. His empirical analyses explored a wide variety of macroeconomic questions, including unemployment and inflation.
Historical Research

He also has conducted important research that explores a variety of current and historical evidence through the lens of alternative economic models, always with the purpose of understanding the ramifications for economic policy.

With other eminent scholars such as Robert Lucas, Finn Kydland, Edward Prescott and Neil Wallace, he initiated research demonstrating the need to alter macroeconomic policy when economic actors are forward-looking and rational. Based on this research, issues about credibility and commitment on the part of policy makers became central to the analysis of policy.

Sargent also explored the implications of these ideas in empirical investigations, for example, in his studies of European hyperinflations and fiscal policies used historically by European countries to finance wars.

A great example of this historical work is his study with Francois Velde of government debt, defaults and the subsequent inflation around the time of the French Revolution. Although the British had an established reputation for managing government debt, France did not. As a consequence, the macroeconomic outcomes for the two countries were substantially different. Their study explains why French policies led to fiscal imbalances, defaults and inflation along with government instability.

Rational Expectations

Sargent has continually found new tools for interpreting economic time series. Although he initially featured models in which individuals formed rational expectations, he subsequently focused on models with learning dynamics that can occur when it is hard for policy makers to distinguish among competing models.

In his 2001 book, “The Conquest of American Inflation,” Sargent shows how policy makers maintain confidence in one model for sustained periods of time, but sometimes shift views quickly after they examine historical data. This abrupt shift can induce inflationary episodes, and the “conquest” isn’t permanent.

Like Sims, Sargent challenged so-called monetarist views by showing why considerations of fiscal policy and its interactions with monetary policy are crucial to understanding the determination of prices and inflation. With this and many other insights and contributions, Sargent and Sims transformed the theory and practice of economics.

(Lars Peter Hansen, the David Rockefeller distinguished service professor at the University of Chicago, is a contributor to Business Class. The opinions expressed are his own.)
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To contact the writer of this column: Lars Peter Hansen at lhansen@uchicago.edu.

To contact the editor responsible for this column: Max Berley at mberley@bloomberg.net.