Macroeconometrics - Past and Future

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1. Background

It is easy to argue that macroeconomics is the most important major component of economics as its main variables, such as aggregate income, consumption, investment, price indices, interest rates, exchange rates, and unemployment, effect the main decision makers in the economy, such as employers, consumers, investors, and government policy makers. Attempts to measure and model the relationships between such variables have involved virtually all of the dominant econometric methodologies and the problems that have arisen and were resolved have been extremely important in the development of econometrics. Amongst the first were the large, simultaneous models built with annual or quarterly data constrained by some well formulated and generally accepted theory. In many cases the model is fully specified from the theory and the only task remaining was estimation of the parameters, but what a difficult task that proved to be in many cases! The traditional search for better estimators and an understanding of their properties returned with the later consideration of rational expectations. Originally the large models were not very dynamic, in contrast with the main alternative approach (called here just “time series analysis”) which concentrated on dynamics, paid little or no attention to economic theory and built models involving only a few variables. Over the years these two approaches have interacted with each other, one side learning from and being influenced by the other. The large models became more dynamic and involved unit roots and cointegration, the time series models considered size, that is, the number of variables used more seriously and payed more attention to the use of economic theory.

There have obviously been changes in methodologies, attitudes, and approaches to modeling. Theories used have changed quite considerably over the past thirty years, the emphasis on identification has declined, the important of rational expectations is less clear-cut than once thought, for example, in large scale modeling. In time series, the univariate models are not thought of as relevant models for most important practical purposes in economics, although they are still much used as experimental vehicles for studying new models and techniques. Topics such as spectral analysis and chaos have been found wanting and fractionally integrated long-memory processes may also fall into the “empty box” category, having interesting theory but no useful practical examples in economics. It is quite possible that some of the topics currently thought to be important will suffer similar fates.

I do not feel competent to discuss all parts of modern macro-econometrics, such as real business cycle models or any model giving an emphasis on fitting “stylized facts.” I agree with the comments in Fair (1994).
Similarly, the attempts to build the macro-economy from a claimed well understood micro-behavioral model and aggregation, possibly without paying enough attention to dependencies between the micro units, are a long way from my area of understanding. I will claim a similar ignorance about Bayesian methods, and thus take no position on their past accomplishments and their future use.

2. Where Next?

The present state of macro-econometrics consists of rather small vector models using vector autoregressions or error-correction specifications at one extreme, and very large models, mostly commercial or in government agencies, involving hundreds or thousands of equations. The real future, I believe, should lie somewhere between these extremes. The obvious questions are: how big does a model need to be? how much theory (and which theory) should be used? should the theory provide a background to the model, that is be embedded in it, or constrain it? how much simultaneity should be used in the model, or can a reduced form be sufficient? Further questions are: How much nonlinearity should a model contain? Should time varying parameters be considered (perhaps as an alternative to nonlinearity)? How does one handle structural breaks, regime changes, and outliers? All of these questions are currently considered important in time series research and can have major impacts on structural models if not handled correctly. The evidence currently available is that there is some nonlinearity in macro-data but that these effects are not strong, in either first or second moments.

Many of the answers to these questions can vary a great deal if all annual and quarterly data is replaced by monthly values, extrapolated by use of related monthly series and the Kalman Filter. Even higher frequency is potentially available, say weekly, for many major macro series, but seasonal effects may be partially lost.

As more data becomes available, forecasts will not be made just for conditional means and variances, but for the whole predictive distribution. Any user can then find any forecast required using any given cost function.

A major problem that arises with both large models and with predictive distributions is how they can be evaluated, and how alternatives can be compared. Just having statistical measures may not be enough, a quantifiable measure of economic significance will be required, possibly based on the utility or wealth achieved by decision makers using the alternative specifications. Evaluation is made easier if data from several countries can be used, and if the model is thought to be transferable. The link with the idea of poolability in panel data analysis is clear but is not often used with macro data, I believe.
The future of macro-econometrics will largely depend on the questions asked by macro-economists. If, for instance, the business cycle really is dead, then one area of research concerned with leading indicators, will be irrelevant. The type of controls available to, or used by, policy makers will also have an impact. As controls will be clearly endogenous, we will need classes of dynamic, stochastic models with a great deal of subtle feedback, rather different in form than most used by engineers, I believe.

A few of the topics mentioned here, particularly evaluation, are discussed further in Granger (1999).

References