International Journal of Forecasting's Best Paper Award Announced, 1996-1997

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The Directors of The International Institute of Forecasters are proud to announce the award for the best research paper in forecasting published in the *International Journal of Forecasting* in the years 1996-1997. The award is made by vote of the directors and associate editors. The award is jointly shared between Norman R. Swanson, The Pennsylvania State University, and Halbert White, University of California, San Diego..

> Norman R. Swanson and Halbert White (1997), "Forecasting economic time series using flexible versus fixed specifications and linear versus nonlinear econometric models," *IJF*, 13, 439-461.

Forecasting economic time series is a field where a practitioner has a large number of approaches and models to choose among. One of the aims of the prize-winning article of Norman Swanson and Halbert White is to compare the forecasting performance of representatives of model classes that somehow may be regarded as 'typical' for forecasting nonstationary macroeconomic series. Those classes include a simple random walk, a linear model, and a nonlinear model. The class of nonlinear models is vast. and the authors have chosen the Artificial Neural Network (ANN) model as its representative. The ANN model may be viewed as a rather general and flexible nonlinear model with strong nonparametric flavour. The article contains an interesting discussion on specifying ANN models: the specification proceeds, against the practice of many ANN modelers. from specific to general while the structure of the model in terms of variables included is being kept as simple as possible.

The time series to be forecast, serving more as illustrative examples than real "cases" in the article, are quarterly post-World War II US macroeconomic series. The authors are interested in ways of making a standard constant-parameter model more flexible. Their view is that an economy evolves slowly over time. One idea is to consider flexible specifications: when a new observation is added to the information set, the model is respecified, that is, the combination of variables included in the model is reconsidered. As the ANN model of the authors nests a linear one, the flexibility in the ANN ease also means the possibility to switch between a linear and a nonlinear specification.

There is another dimension of flexibility the authors incorporate in their model specification. This also accords with the view of a slowly evolving economy and means constructing models with slowly changing parameters. In fact, such models may also partly mitigate some of the consequences of another view of the world according to which the economy is subject to infrequent structural breaks. The authors allow parameter nonconstancy by using a rolling data window when the models are reestimated after adding another observation to the information set. This makes it possible to compare the predictive performance of fixed parameter (no roiling window) and flexible parameter models.

The discussion on forecast evaluation in the article can be recommended for every forecaster. The authors consider a number of measures for forecast accuracy and Stress the importance of the loss function of the forecaster or "end user" when choosing between them. They also review tests for pairwise model comparisons, the null hypothesis being that the two models have the same prediction accuracy.

All the above ingredients are ultimately put together in a vast empirical experiment where the predictive performance of all models, random walk, linear and ANN, fixed or flexible

specification. and constant and nonconstant parameter, is measured applying the above-mentioned evaluation criteria. Pairwise companions of different models are carried out using various tests. As may be expected, no clear winner among the models emerges from the competition, although it seems that pure random walk forecasts cannot be recommended. The outcome is also dependent on the rules of the game, that is, the measures of forecast accuracy and tests applied in each case. The article offers several other conclusions as well. Flexible specification models are worth considering, and nonlinear models cannot be counted out either. When fixed specification models are reestimated after adding observations, the coefficient estimates behave more erratically over time than they do in flexible specification models. Finally, flexibility seems a more important condition for successful forecasts than nonlinearity, and possible reasons for this are discussed. One that is not mentioned is that the series, at least when a rolling window is applied. may be rather short for ANN modeling.

Norman Swanson and Halbert White have done an excellent job in setting up and carrying out the forecasting experiment that is reported in their article. They remind the reader of the fact that economic forecasts may be obtained and forecast comparisons carried out in a large number of ways. They stress the importance of choosing the cost or loss function before selecting the final model to be actually used for forecasting. They also set a standard for everyone who wants to compare different forecasting techniques with each other. Their article can thus be warmly recommended both for those who build time series models for forecasting economic series and those who need economic forecasts in their work.

Comments by Timo Teräsvirta, Stockholm School of Ecomonics