

TITLE

**Using Artificial Neural Networks to forecast economic variables**

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**ABSTRACT**

Econometricians have been using linear method to forecast economic variables for a number of years. The Ordinary Least Squares (OLS) method is the most used as it provides accurate results and it is easy to use. However, the OLS cannot be used in the analysis of a non-linear time series. Recent studies have shown that an important number of economic variables are non-linear. Hence, the application of OLS in this case leads to spurious results. Time series such as business cycle, stock prices, economic growth, Phillips curve, exchange rate, are non-linear or chaotic.

It is therefore prudent to use non-linear methods in the analysis of these time series. Artificial Neural Network (ANN) is one of the non-linear tools that has been adopted recently in econometrics to forecast economic variables. ANN is a computational model designed to operate like the biological nervous system. It has been used for diverse applications such as diagnose of chest pain, diagnose of cardiovascular system, play backgammon, decode deterministic chaos, forecast financial time series.

ANN has been popular for its learning ability, which enables the estimation of parameters. This process is known as back-propagation and it is similar to the non-linear regression analysis used by Robbins and Monro. The innovation of ANN lies, first of all, introduction of a hidden layer between the input layer and the output layer. The hidden layer captures all indirect relations between explanatory variables and the dependent variables. Second, the application of the activation function, such as the logistic function

was a major breakthrough in such that the activation function has the ability to approximate any non-linear function.

This paper shows the difference as well as the similarity between econometric and the ANN technique. Instead of being considered as a substitute to econometric models, ANN must be combined with regression analysis to produce a much stronger forecasting device. There is definitely a mutual benefit concerning the application of these two techniques as forecasting tools of economics time series.