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FORECASTING OF INFLATIONARY PROCESSES ON THE BASIS OF NEURAL NETWORKS

In this article the discussion describes the necessity of using economical-mathematical models for forecasting inflationary processes, grounded selection of models based on neural networks; discussed main types of forecasting cases and their solutions within artificial neural networks, as the most effectively forecasting tool for inflation processes. The analysis shows that the prediction of inflation is necessary for quantifying the critical value of macroeconomic parameters as for the development and implementation of adequate mechanisms used by the government to influence the inflation rate, for the reason that controlling the inflation rate is one of the key objectives of economic policy.

It is a proven fact, that high inflation is one of the major indicators of macroeconomic instability, which influence the socio-economic development of the country.

In this article, the author proves the importance of predicting the inflation rate for a short-term forecasting of socio-economic development. The predicted rate of inflation is used to form the budget of the country, which defines the main direction of the monetary policy, which ensures the basic parameters of economic development.

Conducted researches have shown that, there are no universal tool in the modern economy for the analysis and prediction of a complex macroeconomic parameters such as inflation, so for today it is normal to use a specific set of approaches and methods. The choice of methods and models for forecasting inflation is caused, on one hand, by the possibility of method implementation, and on the other hand, by an existence of appropriate statistical base. The main objective of this article is to justify the feasibility of using the method of economical-mathematical modeling for forecasting inflation processes.

The author considers the most promising method to achieve the quantitative prediction – is through modeling within neural networks. Listed and described advantages of neural networks overachieve other known methods. The main advantage of neural networks method is that neural networks has more flexible structure, for changing the structure in the frame of defined architecture of the neural network which is sufficient to adjust the number of layers and neurons. Another benefit is the ability to change the activation function. Any minor conversions enable to completely change the structure of the network, which accommodate most suitable architecture that has a solution and in turn will minimize the error of network training (to increase the accuracy of prediction).

Proposed method of mathematical models which based on the artificial neural networks includes structural design and learning methods with accordance to the theory of nonlinear programming for prediction of inflation process.

The originality of neural networks is the ability to learn by examples, which forms training set as in analogue of biological brain. The learning process is considered as a neural network architecture, which set the weighting coefficient synaptic connections in accordance to the training set for the most effective solution of the problem. There are options for controlled and uncontrolled education.

Considered the implementation of one-parameter and multiparameter prediction tasks.

Typically, upon accomplishment of the training, the achieved data is reproduced to form the training set. If accuracy is tolerable and variations are within acceptable limits, it is considered that the constructed model is acceptable and we should expect a sufficient quality of the displayed data. However, if gathered information from the training data set, show large differences, we can assume that this was due to:

- the presence during the training set of inaccurate data with a large random component. To eliminate this phenomenon requirements must be increased for precision measurements; in case of time series, sampling step may be reduced or limited to a more defined value, such as monthly or annual values;

- neglect of essential features, which largely determine the pattern, this problem can be solved by expanding set of features, which are taken into account.

Using of economical-mathematical models based on artificial neural networks for forecasting inflation process will allow predicting the changes in inflation in the future and help identifying factors that will influence the inflation rate, which will make it possible to regulate not only inflation itself, but other macroeconomic processes.

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Novikova V.V. FORECASTING OF INFLATIONARY PROCESSES ON THE BASIS OF NEURAL NETWORKS

Purpose. The main goal of research is to justify the feasibility of using the methods of economic-mathematical modeling for forecasting inflation.

Methodology of research. In research author used a system of economic and statistical and economic-mathematical methods. In particular, the method of mathematical modeling based on the unit of artificial neural networks, which include structural design and learning methods and are based on a theory of nonlinear programming. Used basic types of problems for forecasting inflation. Methods used to characterize the graphs of simple neural network and the formation of a one-parameter and multiparameter prediction tasks. Done formation of sets of data for one-parameter problem by using " time windows". The method of multistep prediction of events presented in the form of time series.

Findings. Proposed the system of economic and mathematical models based on artificial neural networks for forecasting inflation.

Originality. Used a new approach to forecasting inflation on the basis of artificial neural networks to facilitate prediction of change in inflation in the future and to identify factors that will influence the increase in inflation and will be able to regulate not only inflation, but other macroeconomic processes.

Practical value. Proposed the basic types of problems for forecasting inflation process using artificial neural networks, which allow you to perform more effectively in future projections and apply appropriate mechanisms of state influence on inflation because inflation control is a key issue of public policy.

Key words: economical-mathematical modeling, forecasting, inflationary processes, artificial intelligence, neural networks.