FORECAST OF EXCHANGE RATES USING ANN

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REZUMAT. Previziunile financiare joacă un rol foarte important în contextul economic actual, în care reţelele neuronale artificiale au devenit o bună alternativă tehnică faţă de metodele tradiţionale. Game vaste de modele neuronale sunt dezvoltate pentru a realiza o mai bună precizie în prognoză. În plus, modalităţile de a găsi o arhitectura neurală bună sunt în curs de explorat de către comunitatea de cercetare. În literatura de specialitate, principalele probleme sunt schiţate în zona de pregătire a datelor şi proiectare a reţelei neuronale.

Cuvinte cheie: Reţele neuronale artificiale, rata de schimb, predicţie financiară.

ABSTRACT. Financial forecasting plays a critical role in present economic context where neural networks have become a good alternative technique over traditional methods. Vast ranges of neural models are developed to achieve better accuracy in forecasting. In addition, the ways to find out a good neural architecture is being explored by the research community. In the literature, main problems are figured out within the area of data preparing and neural network design.

Keywords: artificial neural network, exchange rate, financial forecasting.

1. INTRODUCTION

Forecasting exchange rates plays a major role in day-to-day financial markets, which becomes a difficult task due to high volatility and complexity. Even though it is easy to trade in financial markets, it is very difficult to make a profit as a result of highly unpredictability of exchange rates.

Along with the beginning of the application of the flexible exchange rate system, prediction of exchange rate movements gained importance. Changes in exchange rates have an effect on imports, volume of external trade, balance of payments, inflation and public debt.

In this respect, exchange rate is an important factor in an economy as both an important indicator of total demand and also in the application of financial policies.

However, exchange rates may not always be completely predictable. This is because movements in exchange rates have highly varying, chaotic and noisy structures. This characteristic makes exchange rates difficult to predict. For this reason, estimating exchange rate movements is always a difficult and important topic in academic frameworks and business life and, therefore, this has been one of the main concerns of academics and other researchers in multi-national financing.

2. TRADITIONAL FORECASTING TECHNIQUES

It is widely recognized that current forecasting techniques are in a very unsatisfactory state and ineffective, yet in terms of chronology can remember some valuable contributions in the field:

- Messe and Rogoff;
- Model of random drama;
- Model time-varying coefficients;
- Sarantis and Stewart model, uncovered interest parity model, which seems produce the most accurate forecast, quantitative model can be expressed as follows:

e =a0+a1 * (rt*- rt) + a2 * ((t *- (t) + a3 * (pt * - pt) + a4 * ca

where

e - the natural logarithm of the exchange rate;

p, r, - natural logarithm of the short-term interest rates, expected rate of inflation and price level,

ca - GDP (-error).

3. GENERAL PROBLEMS OF USING ANN TO FORECAST EXCHANGE RATES

The fundamental problem in this situation is the correct input data, the choice of many sizes that are relevant on the exchange rate is the most appropriate choice question:

1. Exchange rate developments in a longer period of time (selling rate and process of purchasing);
2. volability of exchange rate;
3. interest rate
4. errors if previous predictions;
5. size of various monetary aggregates;
6. capital in various markets;

7. daily volumes traded currency;

8. values of futures and forward contracts;

As recommended in the works of Green and Person have won four rules in selecting the correct input variables:

9. selection of key data representative of the market, in our opinion, the rates market, liquidity, volatility, trading frequency, cross rates and spreads (Price difference)

10. assessment as accurate market data and assessing their level (Medium, high, low ,....);

11. verification of market liquidity;

12. Proper selection of market preferences and tools used primarily in transactions RNA architecture during the design of particular importance is the use of field experience, during this period must be performed to identify input, eliminate their interference in the market, data filtering, scaling and normalizing their fundamental of these is to establish an input vector with a minimal number of components, ANN structure can be optimized only after testing and measurement error, then after relative stabilization of the structure network will make field inspections and eliminate disturbances (noise, noise) and redundant variables. Unfortunately, this segment of forecasting exchange rates, even an optimized ANN can not be used as a finite time interval.

Here are the results of Grean and Perason in forecasting the exchange rate between dollar and pound sterling, the authors used 26 input variables, neural network is implemented on a Sun Spark Unix station type. After eliminating redundant variables in the final structure remained only five input variables, but among them were included historical data on rate movements since 1988.

4. CHARACTERISTICS OF ANN

Mathematically analyzing the ANN can highlight the following features:

- Complexity - dimensions and interconnections needed to be able to perform a particular task;
- Capacity - number of bits, memorable ANN;
- Choice paradigm - which is implemented in the most favorable case of ANN concrete application;
- Performance;
- Effective learning;
- Answer - tactical response time to application internal stimuli;
- Repeatability - the ability to get the same answer him successive application same input stimuli;
- Sensitivity to noise - accuracy to obtain responses in case of input noise (interfering signals);

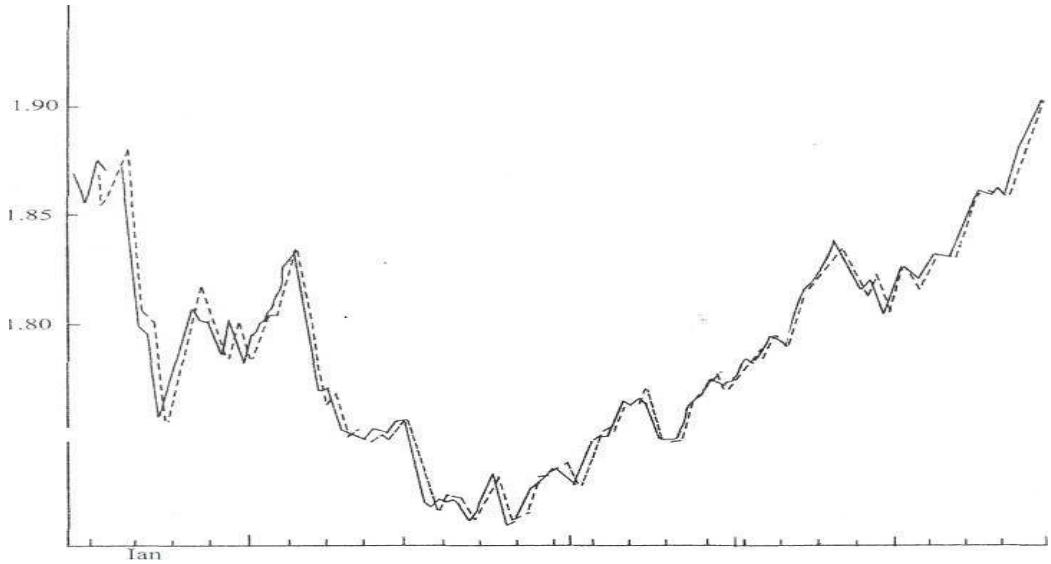

Figure 1

In this figure are shown graphically the results obtained over four and a half years of use of the network. Contribution author refers to the network using Matlab implementation, the principles set forth in the subparagraph on the use of ANN in predicting bankruptcy.

Compared with other methods used, time series, autocorrelation methods, the results were better accuracy, also in the business decision-making system with the ANN rate forecasting on average gave much better results than consideration of each input separately

4. CONCLUSIONS

In this study, we use neural network as an alternative forecasting.

As Panda and Narasimhan (2007) mention, it is no doubt that the better forecasting by using artificial neural network may help the policy makers to conduct a suitable monetary policy which will in turn achieve its desired objectives and higher economic activity. This may also help the policy makers in extracting useful information about the economic and financial conditions.

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