



Chapter IX

Improving Returns On Stock Investment through Neural Network Selection

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Abstract

Artificial neural networks' (ANNs') generalization powers have in recent years received admiration of finance researchers and practitioners. Their usage in such areas as bankruptcy prediction, debt-risk assessment, and security-market applications has yielded promising results. With such intensive research and proven ability of the ANN in the area of security-market application and the growing importance of the role of equity securities in Singapore, it has motivated the conceptual development of this work in using the ANN in stock selection. With their proven generalization ability, neural networks are able to infer the characteristics of performing stocks from the historical patterns. The performance of stocks is reflective of the profitability and quality of management of the underlying company. Such information is reflected in financial and technical variables. As such, the ANN is used as a tool to uncover the intricate relationships between the performance of stocks and the related financial and technical variables. Historical data, such as financial variables (inputs) and performance of the stock (output) is used in this ANN application. Experimental results obtained thus far have been very encouraging.

Introduction

With the growing importance in the role of equities to both international and local investors, the selection of attractive stocks is of utmost importance to ensure a good return. Therefore, a reliable tool in the selection process can be of great assistance to these investors. An effective and efficient tool/system gives the investor the competitive edge over others as he/she can identify the performing stocks with minimum effort.

In assisting the investors in their decision-making process, both the academics and practitioners have devised trading strategies, rules, and concepts based on fundamental and technical analysis. Innovative investors opt to employ information technology to improve the efficiency in the process. This is done through transforming trading strategies into computer-known language so as to exploit the logical processing power of the computer. This greatly reduces the time and effort in short-listing the list of attractive stocks.

In the age where information technology is dominant, such computerized rule-based expert systems have severe limitations that will affect their effectiveness and efficiency. In particular, their inability in handling nonlinear relationships between financial variables and stock prices has been a major shortcoming. However, with the significant advancement in the field of ANNs, these limitations have found a solution. In this work, the generalization ability of the ANN is being harnessed in creating an effective and efficient tool for stock selection. Results of the research in this field have so far been very encouraging.

Application of Neural Network in Stock Investment

One of the earliest studies was by Halquist and Schmoll (1989), who used a neural network model to predict trends in the S&P 500 index. They found that the model was able to predict the trends 61% of the time. This was followed by Trippi and DeSieno (1992) and Grudnitski and Osburn (1993). Trippi and DeSieno (1992) devised an S&P 500 trading system that consisted of several trained neural networks and a set of rules for combining the network results to generate a composite recommended trading strategy. The trading system was used to predict S&P 500 index futures and the results showed that this system significantly outperformed the passive buy-and-hold strategy. Grudnitski and Osburn (1993) used a neural network to predict the monthly price changes and trading return in the S&P 500 index futures. The results showed that the neural network was able to predict correctly 75% of the time and gave a positive return above risk.

Another work on predicting S&P 500 index futures was by Tsaih, Hsu, and Lai (1998). Similar to Trippi and DeSieno (1992), Tsaih et al. (1998) also integrated a rule-based system technique with a neural network to produce a trading system. However, in the Tsaih et al. (1998) study, they used reasoning neural networks instead of the backpropagation method used by Trippi and Desieno (1992). Empirical results in the daily prediction of price changes in the S&P 500 index futures showed that this hybrid artificial-intelligence (AI) approach outperformed the passive buy-and-hold investment strategy.

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