Designing a Model for Predicting Valuation of Block Trade Transactions with a Focus on GRU Artificial Neural Network in the Industry in Metal industries, Automobile and Parts manufacturing, Materials and Pharmaceutical products[1]

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INTRODUCTION

The comprehensive model incorporates all factors influencing the prediction of block transaction valuations in the capital market, including industry-specific characteristics. This approach aims to minimize risk and maximize returns, thereby enhancing market efficiency and effectiveness, fostering economic growth and development. By developing a GRU artificial neural network model, this study focuses on predicting block transaction valuations for buying and selling block shares. The primary research question investigates whether the GRU neural network model is a suitable framework for forecasting block stock pricing across industries and whether consistent results regarding the impact of financial indicators on block transactions are observed at the industry level. To address this, the study first reviews theoretical foundations related to block transactions in the capital market, identifying key factors affecting transaction valuations as outlined in the theoretical literature. Subsequently, the research background is discussed. The methodology section outlines the population and statistical sample, research questions, and operational definitions of variables. Following this, the study presents the estimation and experimental results based on the GRU neural network model for predicting block transactions in industries. Finally, conclusions and recommendations are provided in the concluding section.

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RESEARCH METHOD

The data for block transactions was collected using the Kodal network and by studying financial statements through the new Rahavard software. Transaction data from the exchange board was obtained using the Information Site of the Tehran Stock Exchange Technology Management Company and TSE Client software. After gathering data using these software tools, functions within the software were employed to calculate research variables by inputting information into Excel. The statistical method chosen for analysis is artificial neural networks. This method aims to determine whether the research variables significantly impact the valuation of block transactions in the capital market. Calculations, predictions, and optimization using the artificial neural network employ the backpropagation algorithm within Python software. Subsequently, a new dataset serves as the benchmark for training and testing various machine learning algorithms. The study utilizes the GRU neural network architecture to conduct research. In the fourth step, the aforementioned variables are integrated into the artificial neural network model to derive an optimal model for predicting block transactions, and prediction errors are computed accordingly.

ANALYSIS AND EVALUATION OF RESULTS

To evaluate performance and demonstrate prediction effectiveness, the root mean square error (RMSE) measure is utilized, which accurately reflects prediction accuracy. Specifically, the GRU recurrent neural network model predicts block transaction valuations after excluding specified variables. Each block transaction dataset includes transaction data from 20 days prior to and 5 days following the transaction day. The network error is assessed using MSE and RMSE criteria, and accuracy percentages of the model are compared. Long Short-Term Memory (LSTM) and GRU neural networks are designed to address the limitations of recurrent neural networks by learning long-term dependencies. These networks are effective across a wide range of problems and have become popular in various research fields, particularly in predicting block transaction valuations.

FINDINGS

Industry managers of companies listed on the Tehran Stock Exchange, equipped with an understanding of how this model influences block transaction valuations, can manage price fluctuations of block shares. This capability helps mitigate investment risks and, consequently, reduces financing risks for the company. At the industry level, the impact of financial indicators on block transaction valuations varies across different sectors. This diversity underscores the independence of industries from each other in terms of their financial dynamics and market behaviors.

ORIGINALITY /VALU

In the model presented, measuring the valuation of block transactions aids industry managers in the stock market, as well as users, shareholders, and owners of shares, in making more informed evaluations of pricing.

Keywords: Stock Returns, BlockTrade Transaction Valuation, Industry, Deep Learning Neural Networks, GRU Model.
JEL Classification: G12, L16, C45.

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