



**THE PREDICTIVE POWER OF MACROECONOMIC VARIABLES
ON THE INDIAN STOCK MARKET UTILIZING
AN ANN MODEL APPROACH: AN EMPIRICAL INVESTIGATION
BASED ON BSE SENSEX**

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Abstract

Research background: The paper focuses on the use of Artificial Neural Networks (ANNs) for forecasting time series data of the stock market since ANNs are dynamic and are more capable of handling complex data sets in comparison to conventional forecasting techniques such as regression, Logistic regression, and have massive potential for the prediction of stock market prices.

Purpose: Artificial neural networks are an effective method for forecasting time series. Therefore, this study aims to forecast the closing price of the BSE Sensex using artificial neural networks (ANNs).

Research methodology: The study uses nine input variables, including macroeconomic and global stock market factors, to estimate the BSE Sensex using scaled conjugate gradient algorithm artificial neural networks (SCGANNs) and Bayesian regularized artificial neural networks (BRANN).

Results: As per the empirical results of the study, the ANN model can forecast the closing values of the BSE Sensex with a Bayesian Regularization (BR) method with an accuracy of over 99 percent, thus leading to significant implications for domestic institutional investors (DIIs), foreign institutional investors (FIIs), investment houses, and so on. This study adds more value to the existing literature by proving that the BRANN models outperform SCGANN in stock market forecasting.

Novelty: This is the first study to employ macroeconomic variables as input variables for predicting the Indian stock market using ANN. The study highlights the ANN model's forecasting potential, giving investors robust and accurate stock value prediction capabilities.

Keywords: foreign exchange, index of industrial production, BSE Sensex, macroeconomic variables, prediction

JEL classification: G170

Introduction

Stock market prediction has long been of great interest to several investors, professionals, and researchers. Due to an inherently noisy and highly volatile environment, an accurate prediction of stocks is a difficult procedure (Ticknor, 2013). Various factors, including market news, political developments, and crises like COVID-19, influence the stock market's movement. Several factors that affect the stock market have been discussed in previous literature, including the foreign exchange rate, the "index of industrial production," the "consumer price index," the "long-term interest rates," the price of gold, Crude oil prices, the Indian Volatility Index, Morgan Stanley Capital International (MSCI) World Index, and the MSCI Emerging Market Index is added as a new variable to add novelty to the research.

According to a review of earlier studies, many researchers have used various models and approaches when projecting stock market time series (Gao, Zhang, Yang, 2020; Selvamuthu, Kumar, Mishra, 2019; Ticknor, 2013; Zhong, Enke, 2019). Generally, the review yields two kinds of models: statistical models and models based on machine learning. Regression techniques and ARIMA are the most widely used models in the field of statistical models. Machine learning algorithms and Artificial Neural Networks (ANNs) have rarely been used to predict the Indian stock market. Therefore, the current study has used artificial