

Bayesian Predictive Score Analysis of RSI, MACD, and Bollinger Bands

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Abstract

This study applies a Bayesian framework to evaluate the predictive strength and uncertainty of three widely used technical indicators—Relative Strength Index (RSI), Moving Average Convergence Divergence (MACD), and Bollinger Bands—in forecasting market direction, using daily closing price data from the past two years for five representative companies across ten primary sectors of the National Stock Exchange (NSE) of India, prior, likelihood, marginal, and posterior probabilities were computed. A novel predictive score ($PS = 2 \times \text{Posterior Probability} - 1$) was introduced to transform posterior probabilities into a bounded metric (-1 to $+1$), capturing both the directionality and the strength of predictive signals while explicitly quantifying uncertainty. The results demonstrate sectoral variations in indicator performance, with MACD exhibiting higher predictive reliability for SELL signals in capital-intensive sectors, RSI showing moderate effectiveness in consumer-oriented sectors, and Bollinger Bands capturing volatility-driven movements in IT and financial sectors. The proposed PS metric provides a unified, probabilistic measure of technical indicator efficacy, enabling investors and analysts to interpret better the uncertainty embedded in trading signals. The findings contribute to the growing literature on Bayesian approaches in financial forecasting and highlight the potential for integrating probabilistic reasoning with classical technical analysis tools.

Keywords

Bayesian statistics, Stock Market forecasting, Technical Indicator Uncertainty, RSI, MACD, Bollinger Bands.