

# Modeling and Forecasting Implied Volatility - an Econometric Analysis of the VIX Index

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## Abstract

This paper models the implied volatility of the S&P 500 index, with the aim of producing useful forecasts for option traders. Numerous time-series models of the VIX index are estimated, and daily out-of-sample forecasts are calculated from all relevant models. The directional accuracy of the forecasts is evaluated with market-timing tests. Option trades are simulated based on the forecasts, and their profitability is also used to rank the models. The results indicate that an ARIMA(1,1,1) model enhanced with exogenous regressors has predictive power regarding the directional change in the VIX index. GARCH terms are statistically significant, but do not improve forecasts. The best models predict the direction of change correctly for over 60 percent of the trading days. Out-of-sample option trading over a period of fifteen months yields positive returns when the forecasts from the best models are used as the basis for investment decisions.

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