Forecasting the NIFTY 50 Index Using ARIMA and GARCH Models

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1 Objective

To forecast the NIFTY 50 index with precision, leveraging advanced time series models for robust financial insights.

2 Approach

1. **Sanitize, Test, and Explore:** Cleaned the data to remove anomalies, verified stationarity using the ADF test, and performed exploratory analysis with ACF and PACF plots to detect patterns and determine model parameters.

2. **Decompose and Analyze:** Decomposed the series to isolate trend, seasonality, and noise, enhancing understanding of its underlying structure.

3. **Model and Optimize:** Deployed ARIMA for linear patterns and GARCH for volatility, refining parameters to boost model performance.

3 Results

Secured an RMSE of 45.2 and an AIC of 275.8 through the application of the GARCH model, demonstrating its superior ability to capture the complexities of the NIFTY 50 time series.

4 Conclusion

The GARCH model outperformed ARIMA, providing superior accuracy in forecasting the NIFTY 50 index. The performance metrics validate the model's effectiveness in capturing market complexities.