Gold Price Forecasting

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Forecasting Daily Gold Prices 7–30 Days Ahead Using Simple Time-Series Models

Objective

This brief outlines a practical methodology to forecast daily gold prices 7–30 days into the future using time-series forecasting models. Accurate short-term forecasts enable traders, investors, and financial institutions to optimize portfolios and manage price risk effectively.

Data Source & Tools

Historical daily gold price data (e.g., closing prices) is sourced from financial data providers such as Yahoo Finance. The forecasting solution is implemented using:

- **Python**: Core programming language for data processing and modeling.
- **pandas**: For data loading, manipulation, and time-series preprocessing.
- **statsmodels**: For fitting and forecasting with ARIMA and exponential smoothing models.
- **matplotlib**: For visualizing historical prices, trends, and forecast confidence intervals.

Methodology

Data Preparation: Load historical gold price data and check for stationarity using the Augmented Dickey-Fuller (ADF) test. Apply differencing if necessary to stabilize the mean.

Model Selection: Three simple time-series models are evaluated:

- **Moving Average (MA)**: Smooths noise; simple but limited predictive power.
- **Autoregressive (AR)**: Captures momentum; useful for short-term forecasts.
- **ARIMA(p,d,q)**: Combines AR, differencing (d), and MA; balances complexity and interpretability.

Forecasting: Fit each model to historical data (minimum 2–5 years recommended). Generate point forecasts and 95% confidence intervals for days 7–30. Validate using Mean Absolute Error (MAE) on holdout test sets.

Expected Outcomes

ARIMA models typically achieve MAE of 1–3% for 7–14 day horizons; accuracy degrades for 15–30 day forecasts due to increasing uncertainty. Results are visualized with matplotlib showing historical prices, fitted trends, and forecast bands.

Conclusion

This lightweight, interpretable approach provides actionable 7–30 day gold price forecasts without requiring complex machine learning. Future enhancements may incorporate exogenous variables (USD index, interest rates) for improved accuracy.