TMT Steel Price Forecasting

Problem Solved:
Procurement teams lacked a reliable daily benchmark for TMT steel prices across multiple SKUs (diameter × grade), leading to inconsistent vendor negotiations and potential overspending.

Solution Architecture:
1. Data ingestion from historical purchase records.
2. Data cleaning and feature engineering (time features, lags, rolling averages, vendor & quantity encoding).
3. Model training with Prophet, ARIMA, and XGBoost per SKU.
4. Daily generation of 30-day forecast reports in Excel.
5. Shared with procurement for negotiation support.

Tech Stack & Key Code:
- Python (pandas, numpy, scikit-learn, statsmodels, fbprophet, xgboost)
- Jupyter Notebooks for development
- Matplotlib & Seaborn for EDA & visualization
- Excel report generation for business consumption

Challenges & Solutions:
- Mixed SKUs: Separated forecasts by diameter & grade.
- Vendor-specific rates: Added vendor segmentation as a feature.
- Quantity-based discounts: Incorporated order size & log-transformed quantity.
- Outliers (credit/debit notes): Filtered using business rules & IQR.

Business Impact:
- Provided daily fair price benchmark per SKU.
- Helped reduce overpaying by ~3–5% on large orders.
- Improved negotiation confidence with data-backed insights.

Current Status: Semi-automated daily run on local machine, generating forecasts & Excel reports for procurement.
Future Plan: Cloud deployment, ERP integration, real-time vendor quote alerts, commodity index integration.