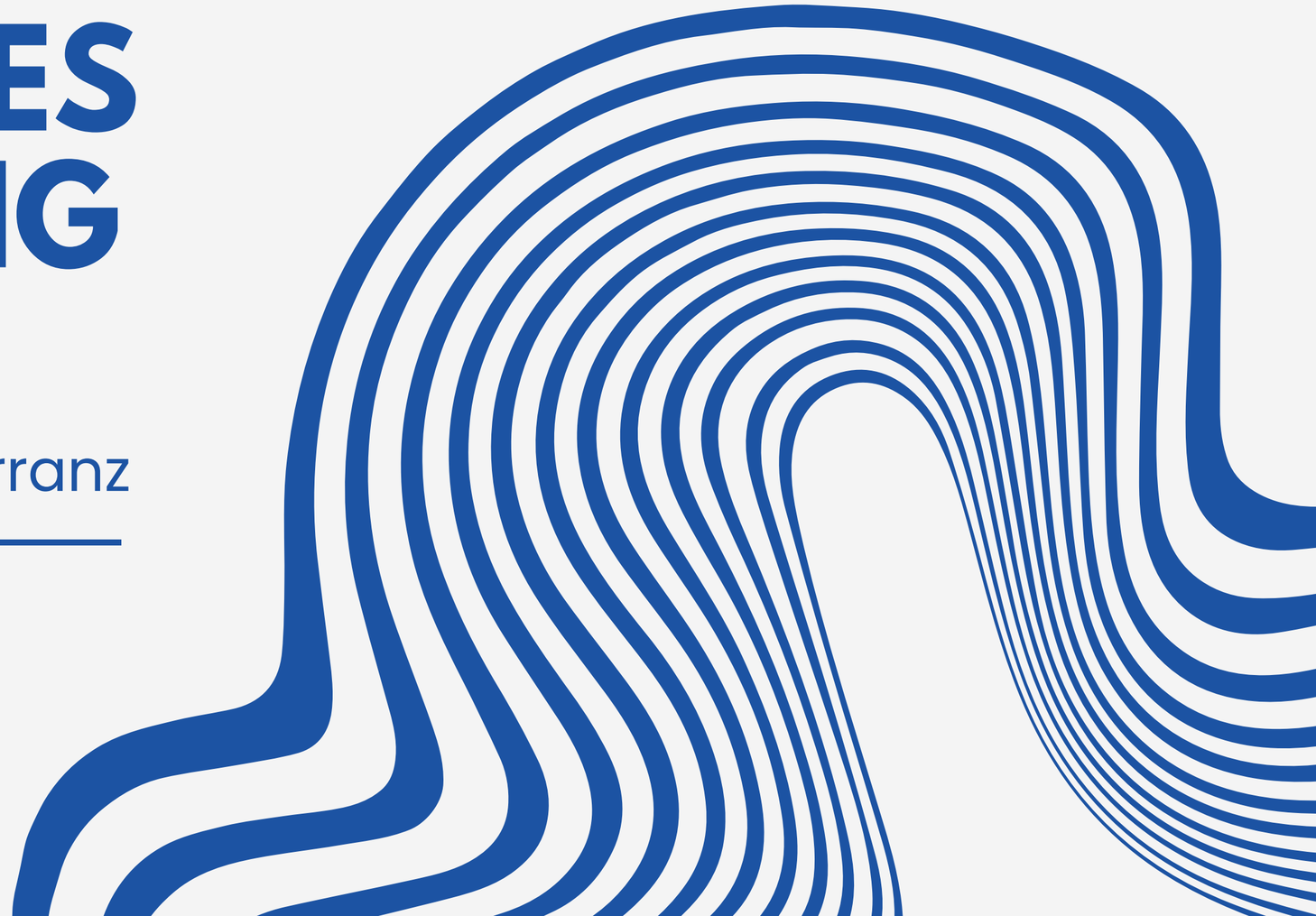
12/06/2024

STOCK PRICES FORECASTING

Created by Miguel Barriola Arranz



INTRODUCTION

- Forecasting ASML's stock prices using time-series data to provide actionable insights for portfolio optimization

OBJECTIVES OF THE ANALYSIS

- Identify the most accurate forecasting model for reliable market predictions
- Predict ASML’s stock price trends over a 2-week horizon to aid investment decisions

STAKEHOLDERS

Individual & Corporate investors

Financial Firms

BUSINESS CASE

CORE OBJECTIVE

- Forecast ASML stock trends for portfolio optimization

RESULTS IMPLICATIONS

1. Supports informed decision-making for portfolio strategies
2. Reduces market uncertainty with predictions

DATA

DATASET OVERVIEW

- **Source**: Data sourced from Yahoo Finance
- **Link to Source**: Yahoo Finance stock data API: https://pypi.org/project/yfinance/
- **Training Dataset**: Includes data from January 1, 2018, to 12 weeks before November 28, 2024*
- **Testing Dataset**: Last 12 weeks of data (up to November 28, 2024)
- **Data Format**: Initially daily stock prices, aggregated into weekly median values for smoother trends

***The end data is modifyable**

DATASET DESCRIPTION

- **ASML Stock Price:** Weekly closing price data
- **Supplier Stock Prices:** Weekly closing prices of three major suppliers (e.g., Carl Zeiss Meditec, Lam Research Corporation, and Tokyo Electron Limited)
- **Exogenous Binary Variables:**
  - Geopolitical Tension
  - Trade Sanctions
  - New Product_Launch

TIME SERIES ASML STOCK

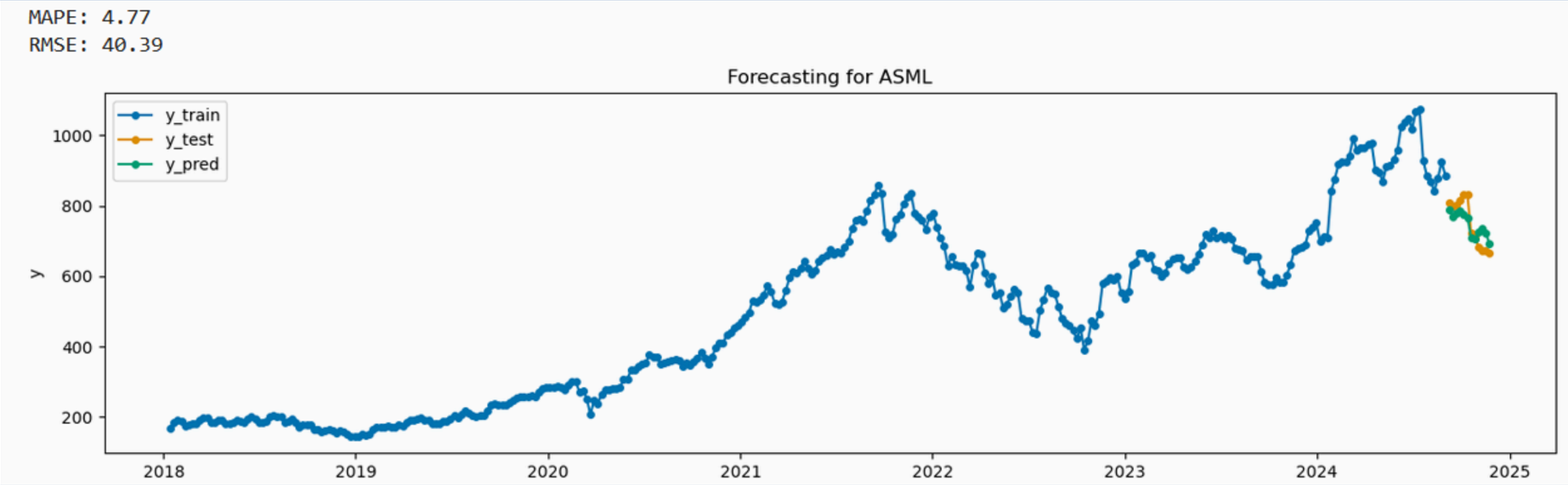
MODELLING APPROACH

MODELS TESTED

- SARIMAX, Prophet, XGBoost, Random Forest, Naive, and ETS (additive and multiplicative)

BEST MODEL

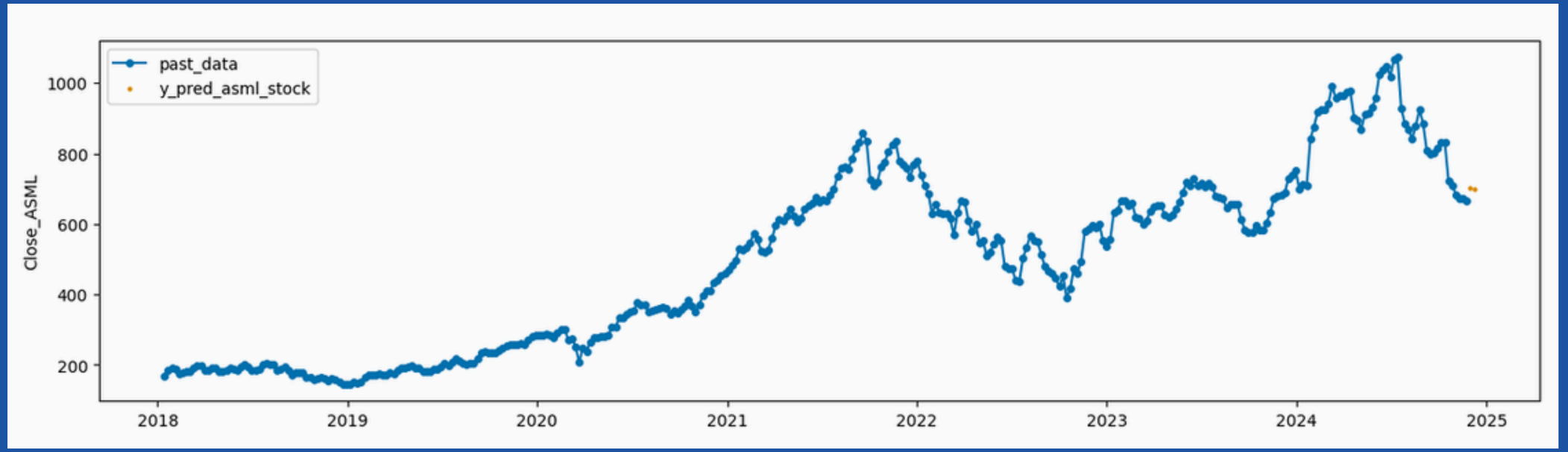
- Prophet because it had the best results in RMSE (root mean square error) and MAPE (mean absolute percentage error)



PREDICTIONS

WEEKLY STOCK PRICES FOR THE NEXT TWO WEEKS STARTING FROM NOVEMBER 28, 2024:

Date	Forecast
2024-12-01	$701.04
2024-12-08	$697.79



FOCUS AREAS

Predicting stock market prices is one of the most challenging tasks; therefore, by implementing these two ideas, we could achieve more reliable predictions

- **Integration of Real-Time Data:** Incorporate live updates and geopolitical events to enhance model responsiveness and accuracy

- **Advanced Feature Engineering:** Leverage sentiment analysis of tweets to capture market sentiment and improve stock price predictions

THANK YOU VERY MUCH

Miguel Barriola Arranz

LinkedIn: https://www.linkedin.com/in/miguel-barriola-arranz/

Medium: https://medium.com/@mbarriolaarranz