TIØ4317 Project proposal - Group 13

Kristine Eide Rapp
Lars Ivar Skårset
Lea Holc
Liv Semlitsch

Research question

Our research question is: ***How well can time-series models predict short-term volatility in the NOK/EUR exchange rate?***

Our research question involves analyzing exchange rate movements using historical data and applying econometric time-series models to predict short-term volatility. Exchange rates exhibit volatility clustering, trends, and seasonality, making them an interesting topic for our project.

Data

We plan to retrieve the data from Yahoo Finance, which is publicly available. We will use the API that they offer. However, since none of us have used an API in R before, using a CSV can be a backup plan.

Code

We will use R in this project. The libraries we believe to be relevant are *quantmod, tidyverse* for data retrieval and preprocessing, *rugarch, fGarch* for volatility modeling, *forecast, vars* for models, ggplot2 for visualization.

Empirical design

The project will use the following modeling approach for volatility prediction:

Exploratory data analysis (EDA):

- Visualizing exchange rate movements and volatility over time
- Checking for stationarity with the Augmented Dickey-Fuller (ADF) test

Time-series modeling:

- ARIMA model for exchange rate trend analysis
- GARCH(1,1) model for short-term volatility estimation

Performance evaluation:

- Comparing models using AIC, BIC, ACF and PACF
- RMSE and MAE for model performance

Contribution

Each group member will contribute equally to the project.

Task	**Group member**
Data retrieval	Lars Ivar, Liv
Empirical analysis	Kristine, Lars Ivar, Lea, Liv
Preparation of written report	Liv, Lea
Preparation of recorded ppt-presentation	Lars Ivar, Kristine
Peer-review report	Kristine, Lea