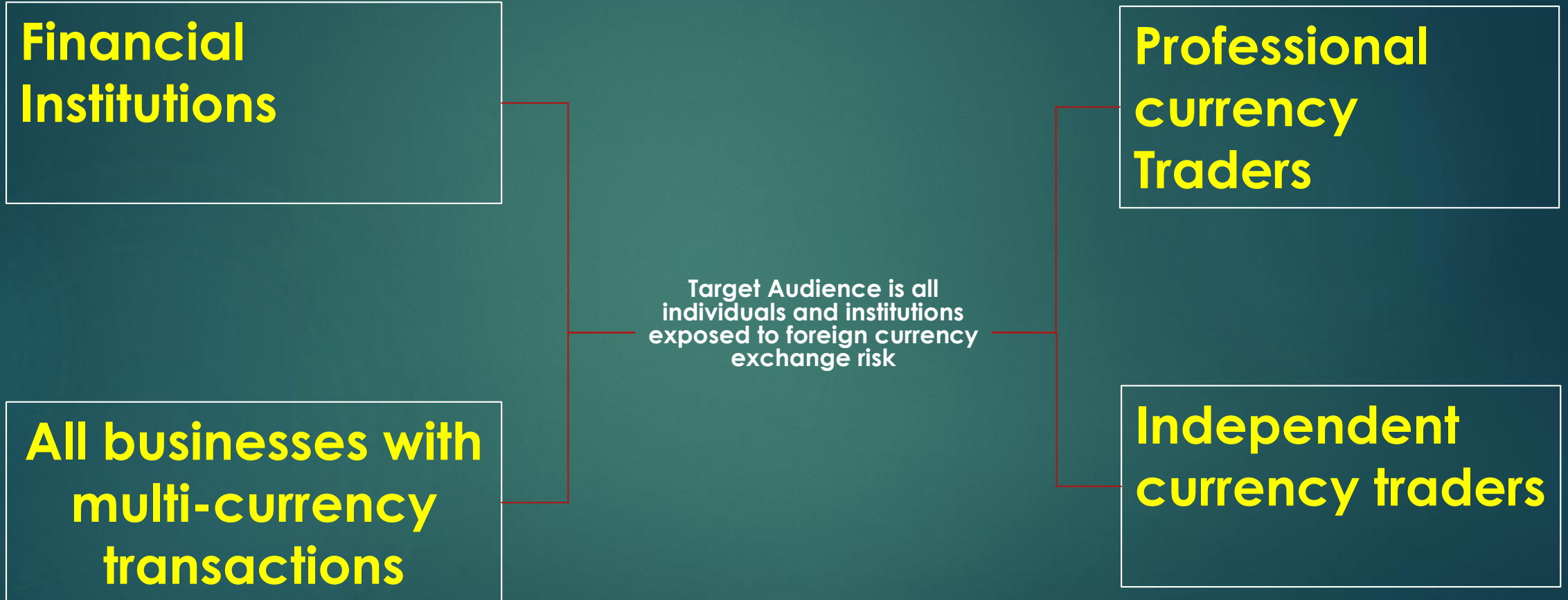




Timeseries Analysis

EURUSD FOREIGN EXCHANGE RATE

Client:



Problem Statement

Predicting foreign exchange rate has been a challenging task for traders and practitioners in financial markets

This project attempts to examine and compare the effectiveness and performance of ARIMA and Neural Networks in predicting Foreign Exchange rate.

Methodology and Data

Use foreign exchange rates from 2000 to 2019 to predict EUR/USD exchange rate: ARIMA and LSTM models.

ARIMA consists of three parts:

Autoregressive 'p' : (ACF)

Integrated 'd' : stationary test of time-series using Dickey-fuller test.

Moving average 'q': (PACF)

LSTM: predict values for time series using the multi-layered LSTM recurrent neural network

Dataset

Consists of daily closing exchange rate of eurUSD from [barchart.com](https://www.barchart.com)

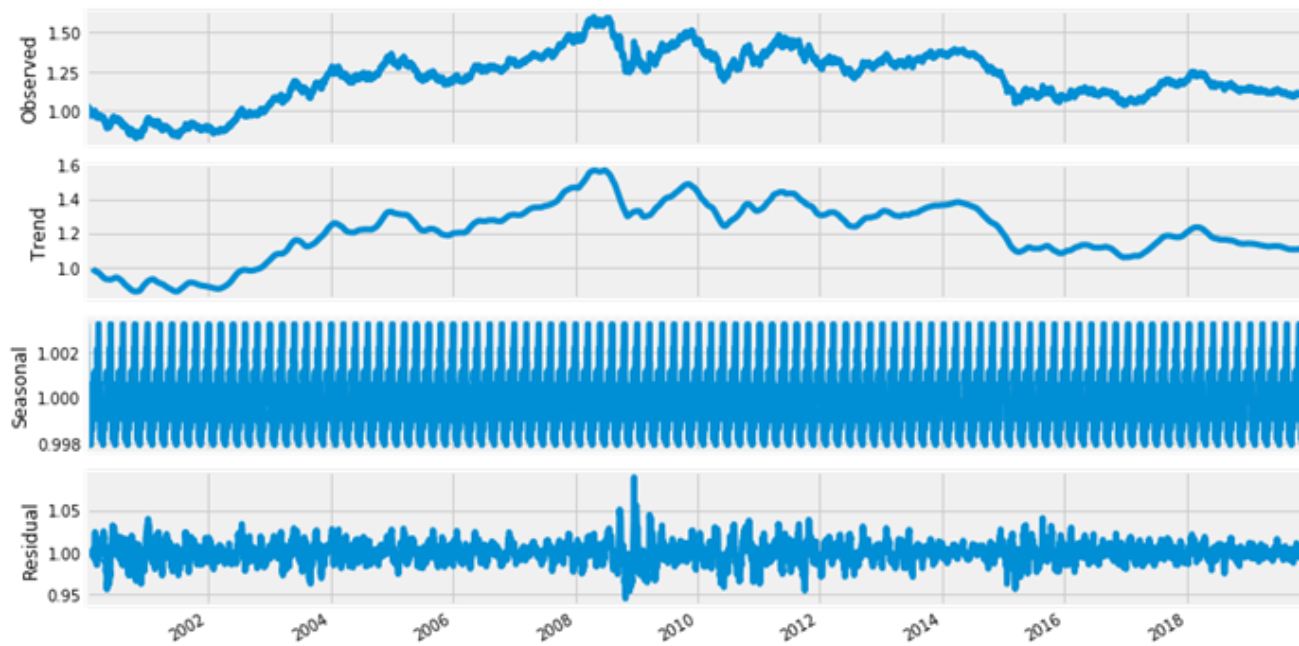
Exploratory Data Analysis

Hypothesis 1:

- ▶ p-value > 0.05 : Accept the null hypothesis (H_0), the data has a unit root and is non-stationary.¶
- ▶ p-value ≤ 0.05 : Reject the null hypothesis (H_0), the data does not have a unit root and is stationary.

Result of hypothesis:

- ▶ Standard deviation is stationary, while the mean is not. We will reject the null hypothesis H_0 , the data does not have a unit root and is stationary.



Rolling Mean & Standard Deviation



Exploratory Data Analysis

Exploratory Data Analysis

Statistical Normality Test

Statistical normality test quantifies whether data was drawn from a Gaussian distribution

Hypothesis 2:

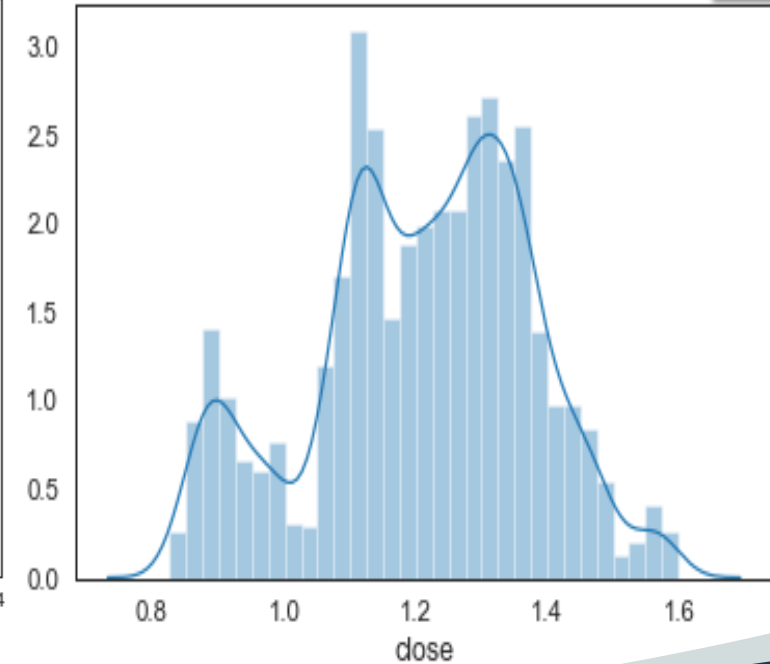
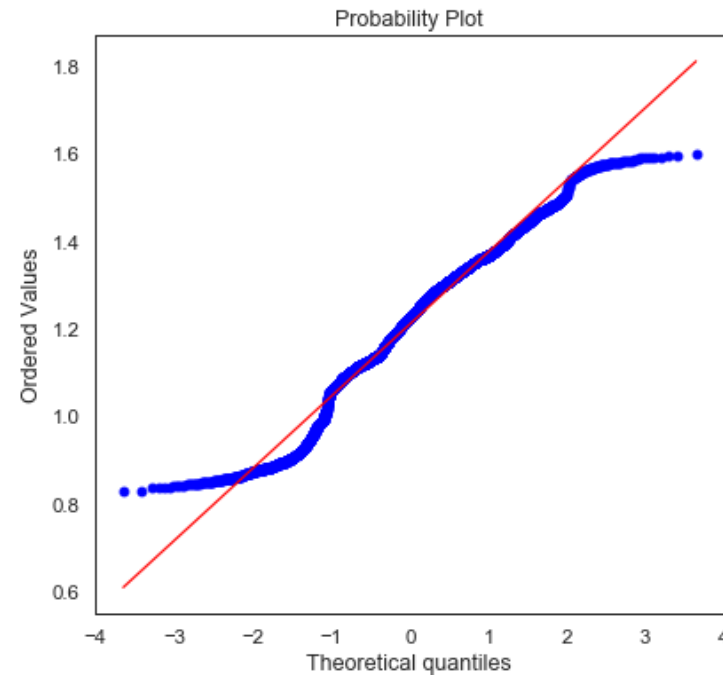
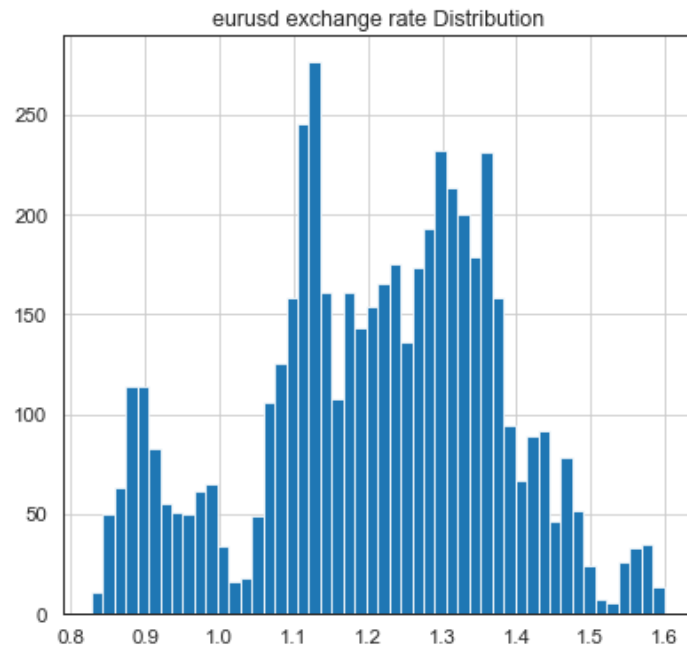
$p \leq \alpha$: reject H_0 , not normal. 1

$p > \alpha$: fail to reject H_0 , normal

Result of hypothesis:

Data does not look Gaussian, we will reject the null hypothesis H_0 .

The kurtosis of the distribution is less than zero and is light tailed. The distribution is fairly symmetrical



Exploratory Data Analysis

Statistics=137.136, $p=0.000$

Kurtosis of normal distribution: -0.43668157335097213

Skewness of normal distribution: -0.28722463936355497