Data Science Lab 5

Team nr: 2	Student 1: Åmund Grimstad	IST nr: 1116675
	Student 2: Arthur de Arruda Chau	IST nr: 1116090
	Student 3: Benjamin Raymond Kuhn	IST nr: 1115778
	Student 4: João Rafael Freitas Lourenço	IST nr: 425699

TIME SERIES ANALYSIS

Traffic Time Series

DATA PROFILING

Data Dimensionality and Granularity

Figure 1: Traffic Time Series at the most granular detail

Figure 2: Traffic Time Series at the second chosen granularity

Figure 3: Traffic Time Series at the third chosen granularity

Data Distribution

Figure 4: Boxplot(s) for Traffic Time Series

Figure 5: Histogram(s) for Traffic Time Series

Figure 6: Autocorrelation lag-plots for original Traffic Time Series

Figure 7: Autocorrelation correlogram for original Traffic Time Series

Data Stationarity

Figure 8: Components study for Traffic Time Series

Figure 9: Stationarity study for Traffic Time Series

DATA TRANSFORMATION

Aggregation

Figure 10: Forecasting plots after different aggregations on Traffic Time Series

Figure 11: Forecasting results after different aggregations on Traffic Time Series

Differentiation

Figure 12: Forecasting plots after first and second differentiation of Traffic Time Series

Figure 13: Forecasting plots after first and second differentiation of Traffic Time Series

Smoothing

Figure 14: Forecasting plots after different smoothing parameterisations on Traffic Time Series

Figure 15: Forecasting results after different smoothing parameterisations on Traffic Time Series

Scaling

Figure 16: Forecasting plots after different scaling parameterisations on Traffic Time Series

Figure 17: Forecasting results after different scaling parameterisations on Traffic Time Series

Inflation Rate Time Series

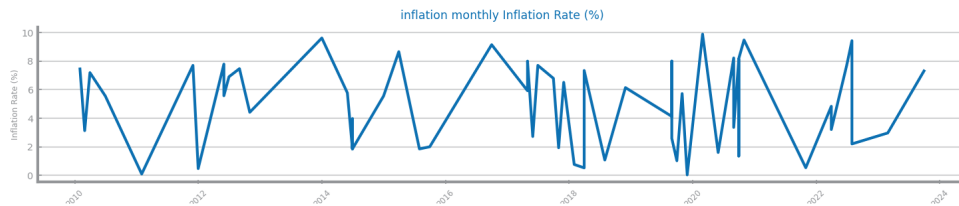## DATA PROFILING

Data Dimensionality and Granularity

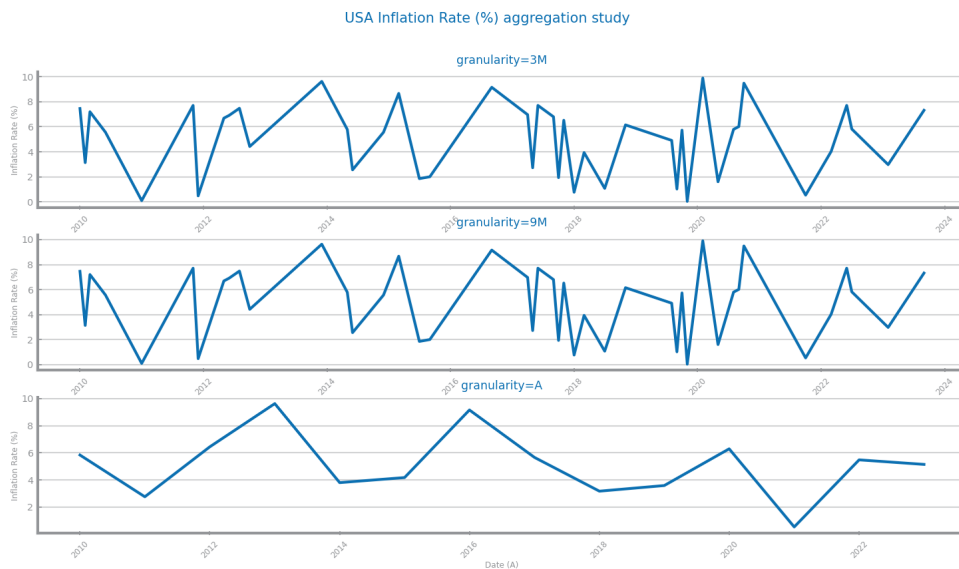Figure 18: U.S. Inflation Rate dimensionality over time.

Figure 19: Inflation Rate Time Series at three different granularities
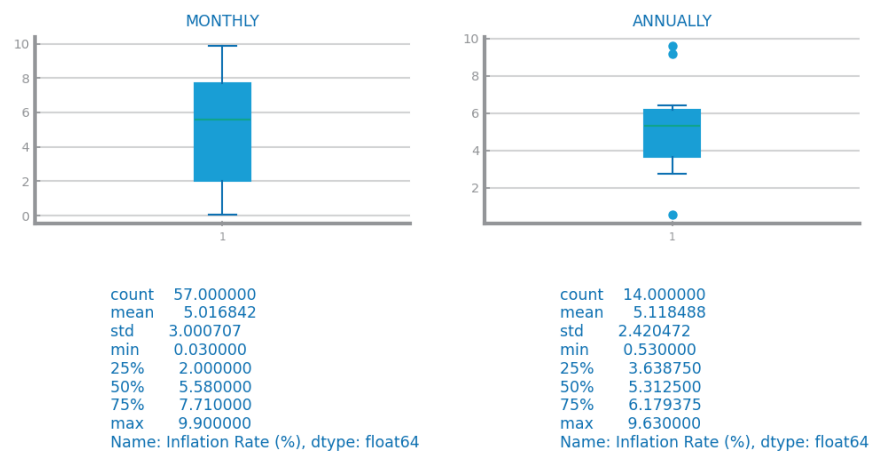
Data Distribution

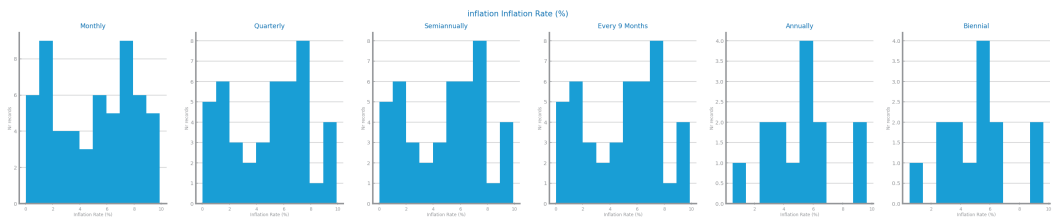Figure 20: Boxplot(s) for Inflation Rate Time Series

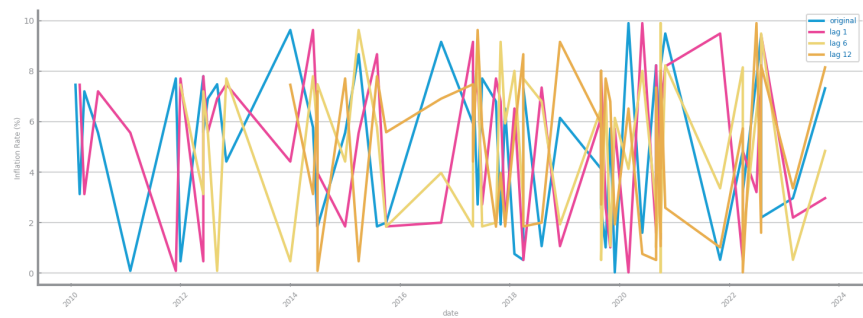Figure 21: Histogram(s) for Inflation Rate Time Series

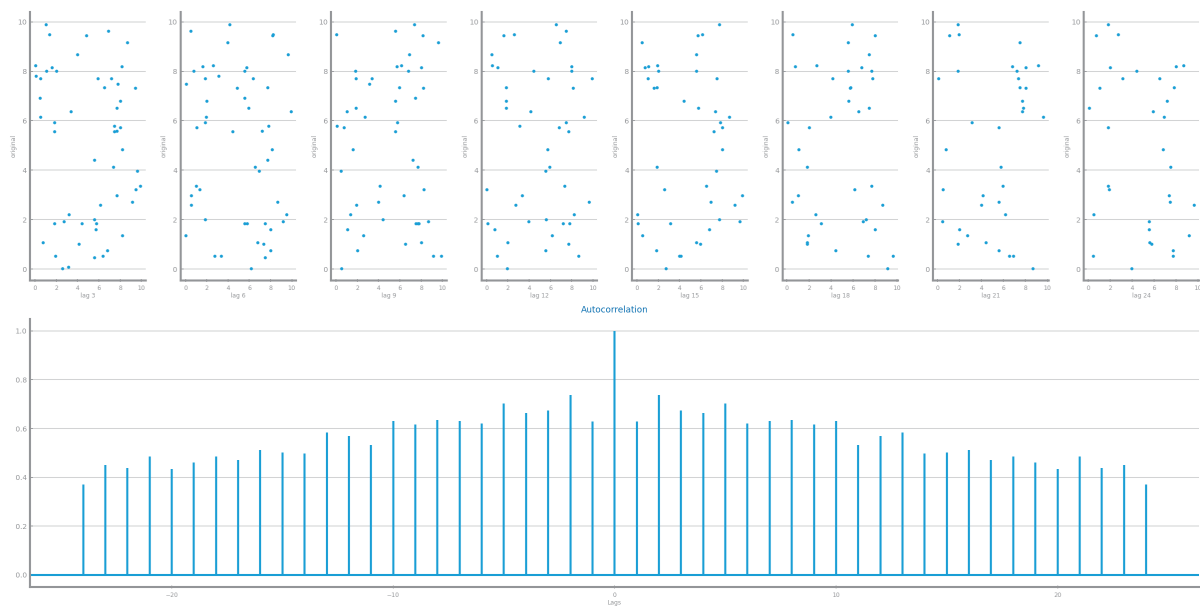Figure 22: Autocorrelation lag-plots for original Inflation Rate Time Series

Figure 23: Autocorrelation correlogram for original Inflation Rate Time Series

Data Stationarity
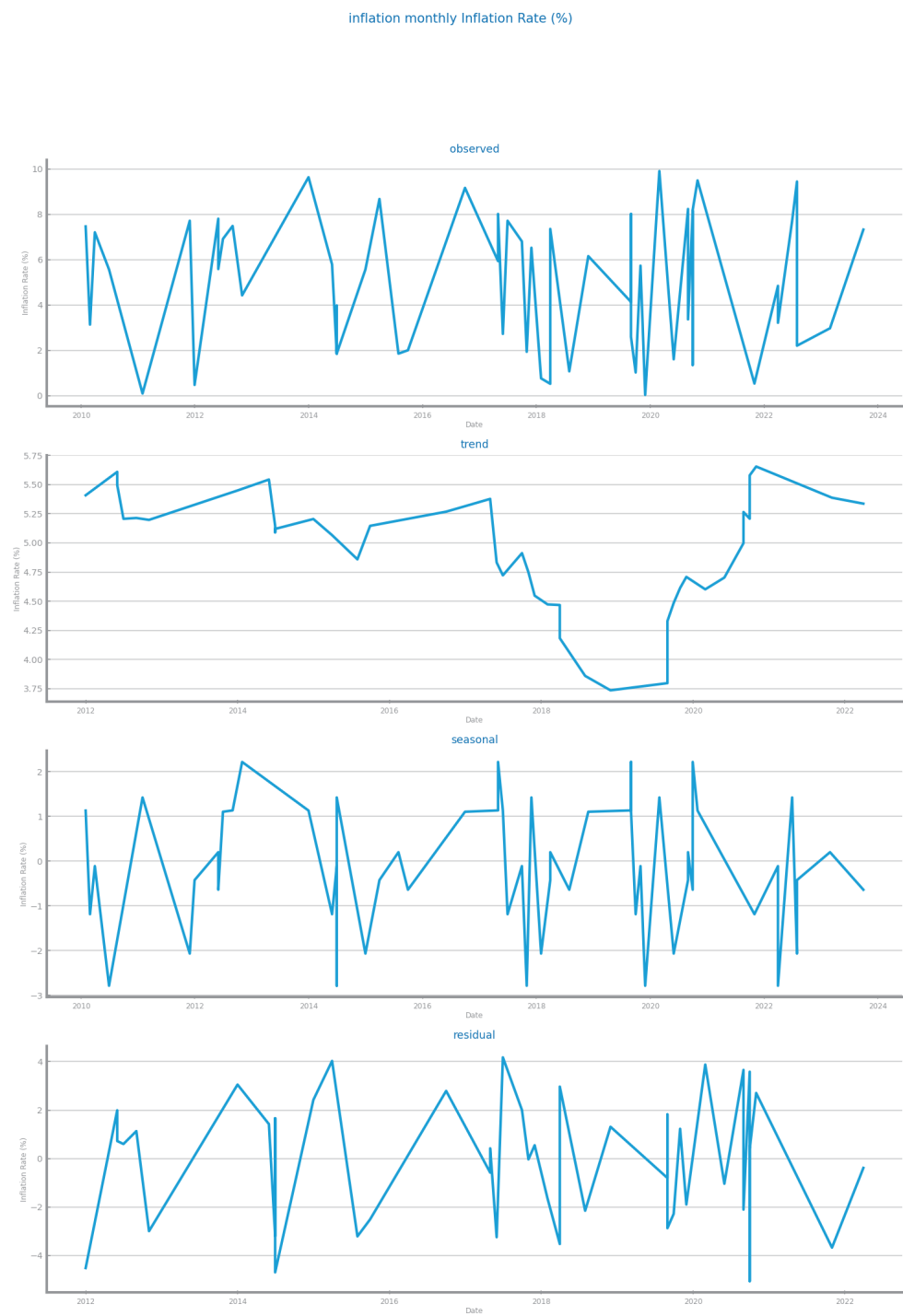
inflation monthly Inflation Rate (%)

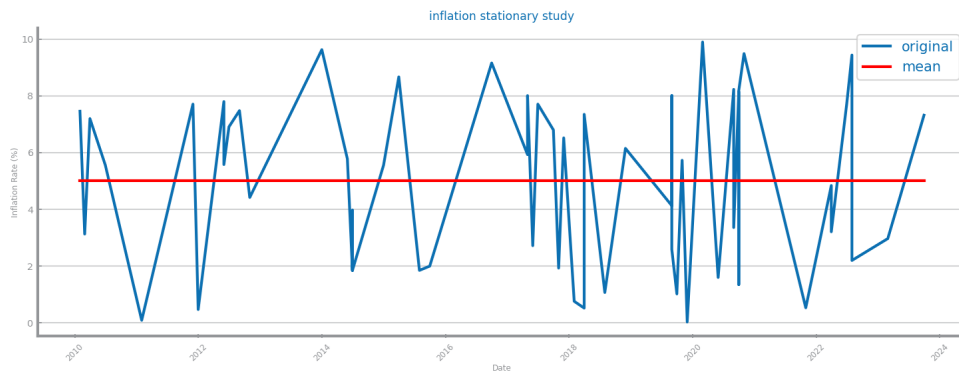Figure 24: Components study for Inflation Rate Time Series

Figure 25: Stationarity study for Inflation Rate Time Series
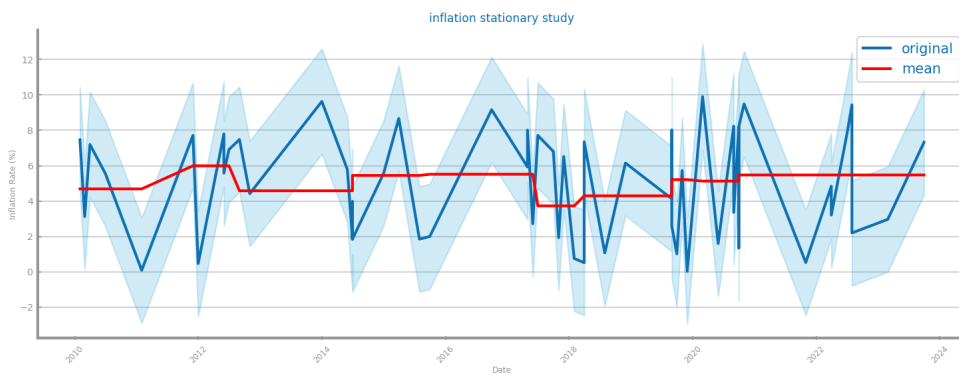

Figure 26: Stationarity study with bins for Inflation Rate Time Series


```
ADF Statistic: -10.410
p-value: 0.000
Critical Values:
        1%: -3.553
        5%: -2.915
        10%: -2.595
The series is stationary
```

Figure 27: Augmented Dickey-Fuller test results for Inflation Rate Time Series

DATA TRANSFORMATION

Aggregation

Figure 28: Forecasting plots after different aggregations on Inflation Rate Time Series

Figure 29: Forecasting results after different aggregations on Inflation Rate Time Series

Differentiation

Figure 30: Forecasting plots after first and second differentiation of Inflation Rate Time Series

Figure 31: Forecasting plots after first and second differentiation of Inflation Rate Time Series

Smoothing

Figure 32: Forecasting plots after different smoothing parameterisations on Inflation Rate Time Series

Figure 33: Forecasting results after different smoothing parameterisations on Inflation Rate Time Series

Scaling

Figure 34: Forecasting plots after different scaling parameterisations on Inflation Rate Time Series

Figure 35: Forecasting results after different scaling parameterisations on Inflation Rate Time Series