MIDDLE EAST TECHNICAL UNIVERSITY
Faculty of Economics And Administrative Science
BA4318 - Business Data Processing with Python

Term Project Report

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<p align="center">**Turkish Airlines Stock Price Forecasting Project**</p>

STEP 1 - Business Understanding

Turkish Airlines is a flag carrier company in Turkey. It has operated for almost eighty years. It is a member of the star alliance, so many passengers prefer to travel from Turkey to foreign countries or domestic locations. We want to invest stock of Turkish Airlines as investors, so we should make some estimation to look at some trends and understand the data of stock of Turkish Airlines.

STEP 2 - Getting Data

Data wrangling was needed to work with data that is appropriately formatted and not so crowded with redundant entries. Therefore, the data provided was prepared; accordingly, it is first altered to csv format from an Excel file to read and process. The data was taken from finance.yahoo.com, and some queries were selected, such as the range of the data and date. The range of data is between 1/2007 and 01/2020 as monthly. We have 156 observations as row, and we have three columns, which are year, month, and adjusted close price.

STEP 3 - How to Code

Firstly, we need to import the necessary libraries and the data file. After this step, to write some codes for naive estimation, simple average estimation, moving averages for the last 12 months, exponential smoothing estimation with alpha, holt trend estimation with alpha. We researched some websites, such as towardsdatascience.com and documents in class. Some of the functions that we used are if … in ... , def, if and else.

Conclusion

In our time series analysis, the objective is to apply/develop models that can describe the given time series with a fair amount of accuracy. Also, plotting a time series data gives us a clear picture of the spread over the given time period. It becomes easy for a human eye to detect any seasonality or abnormality in a given time series. We used adjusted closing price since it amends a stock's closing price to accurately reflect that stock's value after accounting for any corporate actions. It is considered to be the actual price of that stock and is often

used when examining historical returns or performing a detailed analysis of historical returns. Therefore, proper analysis is required quality data to be appropriately corrected.

A time series generally comprises of a trend component, irregular (noise) component, and can also have a seasonal component, in the case of a seasonal time series. Decomposing time series means separating the original time series into these components.

After decomposing the time series, we had four graphs, which show the observed series, the smoothed trend line, the seasonal pattern, and the residual part of the series.

Ø The trend graph depicts a series in which there is an obvious upward trend over time.

Ø Our time series can be identified by regularly spaced peaks and troughs that have a consistent direction and approximately the same magnitude every year, relative to the trend. The following diagram depicts a strongly seasonal series. The seasonal variation looked to be about the same magnitude across time, and so an additive decomposition might be functional.

To conclude, we get different forecasts for 02/2020 price of THY.

Naive	14.460.000
Simple Average	6.032.705
Moving Average	13.175.000
Exponential Smoothing	14.049.612
Holt Trend	14.087.291

Appendix I