MN-M585: Applied Data Analytics

Individual Coursework Assignment

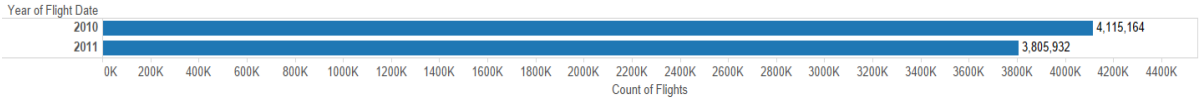
Submission Deadline: **Tuesday, 5th March 2024 by 2pm**

This coursework assignment is an individual coursework assignment worth 40% of the overall module mark. Please save all files using your student ID number.

Question 1

The Tableau file *Flights_data.twbx* contains information on all U.S. airline flights from 2010 and 2011. Create a Tableau worksheet to answer each of the following questions:

a) A quick visualization of flights over time shows a drop of more than 300,000 flights from 2010 to 2011:



From your experience, you know that flight activity did not drop so significantly between 2010 and 2011. Why does this visualization seem to indicate otherwise? Investigate flights over time in more detail to determine why these yearly numbers show such a large drop.

(7 marks)

b) You are interested in identifying days that are particularly light in terms of travel each year. Are there particular holidays that seem to experience substantially lower numbers of flights?

(8 marks)

c) You would also like to know which states tend to experience the longest departure delays. Create a map that visualizes the departure delay that you can expect in each origin state. Allow the user to filter by airline. Colours should range from dark blue for states with short departure delays to dark red for states with long departure delays.

(8 marks)

d) For this part, use the visualizations you created in parts b and c. Organize those worksheets into a dashboard. Note that any filter you may have it should update both graphs.

(7 marks)

(Overall: 30 marks)

Question 2

The Excel file *stock.xlsx* contains daily close, open, high, low price data and volume (number of transactions) data for three companies – Barclays, Vodafone and Prudential from 1/1/2010 to 31/12/2014.

a) Connect Tableau to the data contained in the file *stock.xlsx*. Plot, in one worksheet and in the most effective way, the average weekly volume and the percentage difference in average weekly close price over time for every company.

(15 marks)

b) Comment on the result.

(5 marks)

(Overall: 20 marks)

Question 3

The Excel file *capm.xlsx* contains daily close prices of Microsoft and S&P500 along with their daily returns (return_microsoft and return_sp500) and the risk-free rate from January 5, 2010 to December 31, 2013. Use a subsample of these data running from your birthday in 2010 to your birthday in 2013 to reply to the following questions:

a) Plot in one graph the daily close prices of Microsoft and S&P500 over time and comment on it.

(7 marks)

b) Obtain the scatterplot of Microsoft's risk premium against the market risk premium and comment on it.

(7 marks)

c) Estimate the Capital Asset Pricing model (CAPM). Provide the model in equation form. Interpret the coefficients. Is the stock aggressive or defensive?

(7 marks)

d) Test the significance of the coefficients at the 5% significance level.

(7 marks)

e) Test, at the 5% level, the hypothesis that Microsoft stock has the same volatility as the market portfolio against the alternative that the Microsoft stock does not have the same volatility as the market. What do you conclude?

(10 marks)

f) Discuss the goodness of fit statistic.

(5 marks)

g) Obtain the residuals and plot them over time. What is the mean of the residuals?

(7 marks)

(Overall: 50 Marks)

Tips for writing and submitting your report

- The report should be of approximately 1500 words.
- All results must be interpreted. Include the figures and tables you comment.
- You should submit all Tableau files separately. Please save all files using your student ID number.
- Deadline to submit is by 2pm on Tuesday 5/03/2024 via Turnitin.

Marking Criteria

Please see below the marking criteria for each element of assessment:

- Initiative: originality, innovativeness of answer.
- Assignment Structure: clarity of aims, objective, structure, and presentation.
- Quality of Writing: Readability and ability to convey key message(s) concisely.
- Quality/Scope of Literature Review: Understanding of established knowledge.
- Analysis: Quality/level of analytical skill demonstrated.
- Insightfulness of Analysis: Interest and usefulness of findings, conclusions drawn.
- Presentation of Tables and Figures: It must be possible to understand without reference to the main text.
- Understanding: Assignment demonstrates students have understood key topics.
- Overall Quality of Assignment.