

TSTA602– Quantitative Methods for Accounting & Finance (worth 20%)

Case Study, An Individual Assignment, Due: 26 February 2023 by 11:59pm

Structure of the assignment:

Your report must include the following sections, respectively:

1) Executive Summary (100 words). This section include:

- the primary purpose of the study
- the general methodology used
- the significant findings of each section and general conclusions
- recommendations.

2) Table of Contents with page numbers

3) Business Problem which is restatement of the primary purpose in business language.

4) Statistical problem includes methods you have used to do your analysis.

5) Analysis: This section should present the answers to all the questions.

6) General Conclusion: This section should briefly review and summarize the inference(s).

Also indicate the limitations of the results and your recommendations for action (based on what you have found in your study). In other words, give an overall conclusion which combine all the questions.

IMPORTANT:

- You must submit your assignment via Turnitin before the due date.

PRESENTATION OF ASSIGNMENT

1. Each part requires an output from any statistical computer package (Excel). The statistical output must be provided.
2. Your report can be maximum 1,500 words (including tables and figures), penalties will be applied if the report is longer than this.
3. Set the font to Times New Roman, size to 12 and line spacing 1.5 for your report.
4. Do not present the data in your assignment.
5. Correct grammar and spelling are important.
6. Insert an assignment cover sheet/ signed as own.
7. Tables/graphs should be properly prepared, numbered and labelled.
8. No broken table or graph across two pages.
9. Page number is necessary.

Summary of Marking Guide

The answered marks will be based on format (10%) and analysis (90%).

Total	100
Format	10
Analysis	90
Executive Summary	5
Statistical problem	5
Part 1 question 1	10
Part 1 question 2	10
Part 2 question 1	10
Part 2 question 2	10
Part 3 question 1	10
Part 3 question 2	10
Part 3 question 3	10
General Conclusion	10

ANALYSIS

You are going to analyse a dataset on the past winners of the Nobel Prize. Let's see what patterns you can uncover in the past Nobel Laureates and what can we learn about the Nobel prize and our world generally. The data are in an excel file named "nobel_prize_data". The file includes:

birth_date: date in string format.

motivation: description of what the prize is for.

prize_share: given as a fraction.

laureate_type: individual or organisation.

birth_country: has countries that no longer exist.

birth_country_current: current name of the country where the birth city is located

ISO: three-letter international country code.

organization_name: research institute where the discovery was made.

organization_city: location of the institution.

QUESTIONS

Part 1:

1. What percentage of the Nobel laureates were women? Construct a pie chart which shows how many prizes went to men compared to how many prizes went to women. Present your findings.
2. How many prizes were given out in each category? Construct a vertical bar chart which shows how many prizes awarded by category. Present your findings. Which category has the greatest number of prizes awarded? Which category has the fewest number of prizes awarded? Construct a vertical bar chart that shows the split between men and women by category.

Part 2:

1. Construct a horizontal bar chart which shows how many prizes awarded by country (only top 20 countries are needed). Is it best to use birth_country or birth_country_current? What are some potential problems when using birth_country? Construct a cross-classification table of prizes between category and country. Plot a vertical bar chart of prizes (Y variable) and category (X variable), then group the bar charts of category for top 6 countries and comment on the relationship between category and country. In which category does Germany have more prizes than the UK? In which categories does France have more prizes than Germany? In which category are Germany and Japan the weakest compared to the United States?
2. Calculate the age of the laureate in the year of the ceremony. What are the names of the youngest and oldest Nobel Laureate? What did they win the prize for? What is the average age of a winner? 75% of laureates are younger than what age when they received the prize? Investigate the prizes by country over time. Using a histogram to present the distribution of laureate age at the time of winning and number of prizes per age interval.

Part 3:

Answer the following hypothesis questions:

1. How does the winning age at different categories? Calculate the Mean, Median, Mode, Standard Deviation and Coefficient of Variation of winning age for different category. Compare the figures and explain that what conclusions you can draw from these analyses? Draw a box and Whisker plot for each category and comment on the shape of the graph.
2. Determine if average age for Physics is less than average age for Chemistry. Compare the result with question 1. Does the result confirm your previous findings? (Follow the

hypothesis testing steps, 0.05 level of significance, assuming “equal variances” of populations).

3. To get a more complete picture, we should look at how the age of winners have changed over time. Using a line chart to present the age of the winner (Y variable on vertical axis) and year (X variable, horizontal axis) for different category, comment on the trend for different category.

EXCEL Instructions

Activation of Data Analysis:

1. Click on **File**, then click **Options**.
2. Click **Add-Ins**, and then in the **Manage box**, select **Excel Add-ins**.
3. Click **Go**.
4. In the **Add-Ins** available box, select the **Analysis ToolPak** check box, and then click **OK**.
5. After you load the Analysis **ToolPak**, the **Data Analysis** command is available in the Analysis group on the **Data** tab.

Filter numbers:

Highlight the column of data/ Data tab/Sort/expand the selection / A/Z

Graphs:

1. Highlight all data including labels
2. Insert Tab/ choose the chart.

Summary statistics:

From Menu, Data Tab, Data analysis, Descriptive statistics (highlight data for input range), tick summary statistics and confidence interval, OK

Two sample hypothesis testing:

Excel/Data/Data Analysis/ t test, two sample assuming equal variances (or unequal)/ highlight data for variable 1 and 2/ insert the value for Hypothesized difference equal zero and level of significance 0.05.

**** If you have highlighted the labels tick (the relevant box).***

Anova:

From Menu, Data Tab, Data analysis, Anova single factor highlight data for input range), insert the value for alpha, OK

Regression:

From Menu, Data Tab, Data analysis, Regression, highlight data for Input Y range and Input X range, tick Residuals Plots boxes, OK