

Business Analytics and Data Visualisation

Business Report - Semester 2, 2023

Around the world, policymakers and regulators are pursuing strategies to enhance the presence of women on corporate boards. In various European countries, this drive has taken different forms, with some adopting gender quotas and others employing networking and mentoring programs to expedite women's advancement in leadership positions. For instance, Norway and Spain currently enforce mandatory gender quotas, requiring a minimum of 40% female board representation, while others have introduced soft guidelines or incentives. In contrast, Australia has not implemented such measures, but it has witnessed a significant increase in female representation on corporate boards.

Recent findings from the Australian Institute of Company Directors (AICD) illustrate this trend. The percentage of female directors on the Australian Securities Exchange (ASX) rose from 8.3% in 2009 to 28.2% in 2022. Furthermore, the number of female directors has climbed to 35% among the Top 300 ASX firms, with a 15% increase in the number of female directors among the Top 300 ASX firms that

The psychology literature suggests that women generally express a reduced inclination to embrace risks when compared to men. This phenomenon is, in part, attributable to women having higher levels of loss aversion. Consequently, the AICD wants to investigate the advantages associated with gender-diverse boards so that they can provide recommendations to Australian regulatory bodies in this regard.

You, as an analyst of market research division of the AICD, need to report to the AICD board of directors to see whether female participation in company boards is associated with lower risk. You choose the company cost of debt (CoD) as a measure of firm risk. The CoD refers to the interest payment obligation linked to borrowed funds. In simpler terms, it represents the interest

¹ <https://aicd.companydirectors.com.au/advocacy/board-diversity/statistics>

² <https://www.governanceinstitute.com.au/news-media/media-releases/2023/apr/2023-board-diversity-index/>

rate owed by a company for any financial obligations, such as loans and bonds. The extent of the cost of debt is determined by the creditworthiness of the borrower (i.e. company), with higher costs indicating a higher perceived risk associated with the company.

You begin the analysis by selecting the Top 500 companies listed on the ASX as at the end of the 2022 financial year (i.e. 30 June 2022). These ASX-listed companies are categorised based on their industry sectors, and there are a total of 11 industry sectors in the Australian market. They include Consumer Discretionary, Consumer Staples, Energy, Financials, Health Care, Industrials, Information Technology, Materials, Real Estate, Communication Services, and Utilities. For the purpose of your analysis, you have chosen to focus on three specific industry groups: Energy, Health Care, and Consumer Staples. Each individual company is classified under one of these industries, and you will analyse 100 companies within each of these three industries.

A board of directors is a group of people who are responsible for the overall management of a company, whereas a board of non-executive directors is a group of people who are not involved in the day-to-day management of a company. The data for this analysis is sourced from the ASX website and is available in an Excel file named "ECOM5005_BR_2023.xlsx".

Column A: Firm ID

- To describe the firm, the firm ID is assigned to each firm from 1 to 300.

Column B: Cost of debt

- The cost of debt is calculated as the interest expense scaled by total interest-bearing debt. If the company does not have any interest-bearing debt, the cost of debt is set to zero.

$$\frac{\text{Total interest expense}}{\text{Total interest – bearing debt}} \times 100$$

Column C: Industry group

- There are 3 industry groups in the sample. They are Energy, Health Care and Consumer Staples
 - 1 = if a company belongs to the Energy industry sector
 - 2 = if a company belongs to the Health Care industry sector
 - 3 = if a company belongs to the Consumer Staples industry sector

Column D: Gender-diversity board

- Indicate if the company board of directors has any female director.
 - 1 = there is at least one female director on the board (gender diversity board)
 - 0 = there is no female representation on the board (non-gender diversity board)

You need to address the following questions as part of your **written report** to the ASIC Board of Directors.

1. Does the representation of female directors on the board of directors depend on industry sectors?
2. Do companies with a high debt to equity ratio (CoD), compared to those with a low debt to equity ratio, have a higher proportion of female directors on their boards?
3. Is there any correlation between the proportion of female directors on the board of directors and the industry sectors, namely Energy, Health, and Financial Services?

DUE DATE

Your business report is due on **Friday, 10 November 2023 (11:59pm AEST)**.

- There are two types of reports to be submitted: written report and Excel workings.
 - The written report should be submitted as a pdf file. You should name the file “YourStudentID_LastName_report.pdf”.
- The written report is the Turnitin assignment, designed to prevent plagiarism. Further information about Turnitin can be found on the university website: https://academicintegrity.curtin.edu.au/students/Turnitin_student.cfm
 - There should be no assignment coversheet for the written report. You should put ***your name, student ID and email address*** in the header of the written report.
 - When submit to Blackboard, you should convert your written report to ***pdf file***, and the name of your report should be “YourStudentID_LastName_report.pdf”
- The location of Blackboard submission points for the written report and Excel workings is “Assessments \ Assessments 2: Business Report [40%]”

- Excel automatically produce the histogram with gap (default at 150%). You need to reduce the gap to 0% (right click to the histogram, then choose *Format Data Series*, then reduce the *Gap Width* to 0%)
 - Students can see the following video recording for creating a histogram in Excel
<https://echo360.net.au/media/b0ab790e-b6af-4383-a770-29f9ca35d0c8/public>
- For each of the tests, you need to perform at 3 significance levels (1%, 5% and 10%) and the decision to reject or accept the null hypothesis must refer to all 3 significance levels.
- This is a **computing** assignment. You are expected to use Excel to perform relevant tests (t-test and F-test).
 - In the report, you need to show the results of relevant tests.
 - The results must be presented in a clear and concise manner. The tables must be clearly labeled and show statistical significance (1%, 5% and 10%).
 - Please condense all the results into one table.
 - For t-test, you need to perform both one-tailed and two-tailed tests. You need to report the results of both tests, but not both.
 - The final conclusion must be based on the difference between the two populations. You need to use the appropriate formulae, then find the critical value and compare it with the test statistic.
- The report (including the conclusion) must not exceed **12 pages**; marks will be deducted for exceeding the limit. Pages must be correctly numbered throughout.
- For each question above, perform separate statistical tests to answer the questions. This assignment should be presented in a **professional** manner and you need to demonstrate that **considerable thought** has gone into the analysis of data.
- The marking criteria for each of the question should be as follows:
 - Technique identification: why should you use a certain technique?
 - Define the populations and parameters of interest

- Checking the conditions of the chosen technique: If a certain condition is not met, you keep doing the test as usual but need to discuss the limitation in the **Conclusions** part
- Following 6 steps in the hypothesis testing procedure
 - Describe the procedure to obtain the relevant tests
 - Present Excel results in table
 - Clearly mention the test statistic, rejection region
- Decision to reject or accept the null hypothesis must be referred to all 3 significance levels, that is, 1%, 5% and 10%.

Mark Allocation:

- The total mark for the report is 100 marks (final mark)
- Each question is worth 20 marks
- 3 marks for presentation and format with separate sections and **Conclusions**.
 - Your report must be in a professional format with separate sections and **Conclusions**.
 - Please ensure that the report is well-structured and easy to read.
 - You must include a title page in the header of the written report.
- 3 marks for the hypothesis testing procedure
 - The hypothesis testing procedure must be clearly outlined for each of the three questions
- 4 marks for the results and conclusions
 - The results of the hypothesis testing must be clearly outlined and any **limitations**.
 - The results of significant tests and any qualifying statements made about the nature of the testing data used.
 - Limitations of the tests should be discussed.

