

2021 BUSA3015 – BUSINESS FORECASTING

Case Study Report 2

Due: 11:59 pm, Friday 29th October

Format

The submission of this assessment requires:

- A numerical submission for Exercise 1 and Exercise 2 via an iLearn quiz tool.
- A written submission for Exercise 3 via a PDF submission through Turn-It-In.

The main tables, charts and results should be presented throughout the report to highlight your responses to the questions. There is no need for an appendix.

For the numerical submission: an online quiz tool will be available on iLearn from the 29th of October where you can type in your numerical answers. All answers are to be rounded to 2 decimal places.

For the written submission: 800 words (+/- 10%) not counting labels and numbers on graphs AND no more than three A4 sheets in portrait/vertical mode (use the template DOC file provided on iLearn). A Turn-It-In submission link will be available on iLearn from the 29th of October.

Convert your DOC file into a PDF prior to submission. You will also have to upload your XLS file through iLearn. Only the PDF file will be marked, the XLS file will not be marked.

There will be a deduction of **10% of the total available marks** made from the total awarded mark for each 24-hour period, or part thereof, that the submission is late (for example, 25 hours late in submission – 20% penalty). This penalty does not apply for cases in which an application for Special Consideration is made and approved.

For the written part of this assignment – the answers must be typed on the pre-formatted DOC file that has been uploaded on iLearn.

Please do not alter the formatting of the pre-formatted DOC file:

- Do not change the font size.
- Do not change the line spacing.
- Do not change the paragraph settings.
- Do not change the page margins.
- Do not change the headers or footers.
- Do not edit or delete the questions.
- Do not edit any other component of the file apart from typing your answers and cutting and pasting relevant output.

As per the pre-formatted DOC file on iLearn, your answers will be in Georgia font, size 11. The answers are to be in black font.

Not adhering to the above will result in a penalisation of marks. This includes a 10% penalty per page over the limit. A critical thinking skill is about making judgments about the information that is relevant and can be presented in an efficient and effective way.

If you want relevant output to be marked, you can cut-and-paste relevant output into these pages. **Any pages including appendices (beyond the required 3 pages) will not be marked.**

Do not use appendices, all relevant output from Excel or Minitab must be included within the body, within your answer. Appendices will not be marked.

All questions about the assignment must be via the iLearn “General discussion forum”.

2021 S1 BUSA3015 – BUSINESS FORECASTING

You are repeating the overall case study from Report 1 but using a regression forecasting instead.

You have been employed as a consultant for a joint project by the *Labour force Association of Australia* and the *Australian Government Treasury*.



As part of your role in the Business Analytics and Data Analytics team, you have been asked to forecast total employment (i.e. total employed), as part of a wider report being commissioned by the above collaboration – on Australia's Labour Force Status.

Questions

You are to use the exact same data sets that you used in Report 1. You do not need to re-download the data. If your data is lost, the instructions for obtaining it are repeated (from Report 1) below:

- Obtain the ABS statistics for *Labour Force* - 6202001 – available at: <https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia/jul-2021#data-downloads>
- Download Table 1.
- For the purposes of this report you are to consider the **Total Employed** Labour Force data. There are **three series** in Table 1: *Original*, *Seasonally-adjusted*, and *Trend* (**please choose carefully throughout this report!**)
- **For the purposes of this report, only consider the data from August 2011 to July 2020 as the sample of data that is available to you – that is, ignore any recent observations.**
- **This means that the first actual observation in your Excel file is from August 2011 and your last actual observation in your Excel file is from July 2020.**
- Use Excel and no other statistical software for the purposes of this report.
- You may use Minitab for constructing correlograms.

This report will require two separate submissions.

The numerical responses need to be submitted via a quiz tool in iLearn.

The written responses need to be submitted via a PDF uploaded via Turn-It-In in iLearn.

Instances of plagiarism will be dealt with according to the relevant policies and procedures.

Numerical responses to be submitted via a quiz tool on iLearn:

Exercise 1 – Application (10 marks)

As for Report 1:

For the purposes of this report, only consider the data from August 2011 to July 2020 as the sample of data that is available to you – that is, ignore any recent observations.

This means that the first actual observation in your Excel file is from August 2011 and your last actual observation in your Excel file is from July 2020.

For the *Seasonally-adjusted* data for the *Employed total* (Series ID: A84423043C) available in Table 1: Forecast the out-of-sample values for every month in the period August 2020 – July 2021 (both months inclusive) using a simple linear regression with an intercept, **and time (t = 1, 2, 3,...) as the explanatory variable.**

Once you perform this regression, what are the following numerical values:

1. The coefficient of time.
2. The t-statistic for the coefficient of time.
3. The p-value for the coefficient of time.
4. The value of the intercept.
5. The value of R^2 .
6. The within-sample forecast for April 2020.
7. The out-of-sample forecast for October 2020.
8. The out-of-sample forecast for July 2021.
9. The standard error of the regression
10. The F Statistic (not the P-value!)

[Please turn over]

Exercise 2 – Application (10 marks)

As for Report 1:

For the purposes of this report, only consider the data from August 2011 to July 2020 as the sample of data that is available to you – that is, ignore any recent observations.

This means that the first actual observation in your Excel file is from August 2011 and your last actual observation in your Excel file is from July 2020.

For the **Original** data for the *Employed total* (Series ID: A84423085A) available in Table 1: Forecast the out-of-sample values for every month in the period August 2020 – July 2021 (both months inclusive) using a multiple linear regression with an intercept, time as an explanatory variable, and 11 dummy variables for all months except January – hence use January as the base.

Once you perform this regression, what are the following numerical values:

11. The coefficient of time.
12. The t-statistic for the coefficient of time.
13. The p-value for the coefficient of time.
14. The value of the intercept.
15. The value of R^2 .
16. The within-sample forecast for April 2020.
17. The out-of-sample forecast for October 2020.
18. The out-of-sample forecast for July 2021.
19. The standard error of the regression
20. The F Statistic (not the P-value!)

Exercise 1 (10 marks) + Exercise 2 (10 marks) + Exercise 3 (60 marks) = Report 1 (80 marks)

[Please turn over]

Written responses submitted via a PDF upload via Turn-It-In in iLearn:

Exercise 3 (60 marks)

800 words (+/- 10%) not counting labels and numbers on graphs AND no more than three A4 sheets in portrait/vertical mode (use the template DOC file provided on iLearn):

Your Exercise 3 responses should refer to Exercise 2 (you may refer to Exercise 1 in some of your comments).

For the model in Exercise 2, given that you have the actual data for the out-of-sample period (you considered the within-sample period to end in July 2020 – but you do have data for August 2020 and onwards) – discuss your forecasting method, your forecasts, and the employment insights from these, using the following steps:

- Attribution (5 marks)
- Scope (5 marks)
- Application (10 marks)
- Analysis (10 marks)
- Articulation of Issues (10 marks)
- Critique (10 marks)
- Position (10 marks)

You must use the above steps as sub-headings in your response. Failure to do so will result in a loss of marks.

Note in the rubric on iLearn – "sources" are from within the assignment including your own sources of generated results. You do not need to cite the materials provided via iLearn. Given the nature of this task, you will not be penalised for not referring to other sources (although other sources may give you unique insights for your responses).

You do not need a reference list. However, you may include one for completeness after your 3 pages.

Please turn over for pointers for Exercise 3.

Pointers – for each of these sub-headings, at least consider the following (you can consider more!):

Attribution – Consider the marking rubric.

Scope – Explain **the model in Exercise 2** by using language that is understood by a **non-technical** audience.

Application – Describe and explain how you applied the data and your knowledge to perform the forecasts in **the model in Exercise 2**. Describe and explain using language that is understood by a **technical** audience.

Analysis – Consider the marking rubric, to assist you, you should include:

For the model in Exercise 2, a plot of the considered sample (August 2011 – July 2020) and the forecasts (within and out-of-sample) on one chart.

A description of the chart and an analysis of your forecast.

Another plot of the actual data that is beyond the considered sample (August 2020 to the present) and the forecasts.

A description of the chart and an analysis your forecast.

Articulation of Issues – Consider the marking rubric, to assist you, you should:

For the model in Exercise 2, perform the appropriate check/s & test/s – provide some of this evidence.

What are the issues based on your check/s and test/s above?

Note: If you are stretched for space, do not worry about including *evidence* for the error tests.

Critique – Consider the marking rubric, to assist you, you should:

Critically evaluate **the model from Exercise 2 in Report 2** vs. **the model from Exercise 2 in Report 1**.

Critically evaluate these models from both business forecasting & business intelligence points of view.

Position – Consider the marking rubric, to assist you, you should consider:

Given all of the discussion above, **as well your discussion in Report 1**, state your position regarding **your choice of model – from both a business forecasting and a business intelligence points of view.**

Exercise 1 (10 marks) + Exercise 2 (10 marks) + Exercise 3 (60 marks) = Report 1 (80 marks)