COURSE OUTLINE, 2004

UNIT: BBA315 – Business Forecasting

LECTURER/COORDINATOR: Con Korkofingas

TIME:
Lecture - Monday, 10.00 am - 12.00pm
Tutorial - Monday, 12.00 - 1.00pm
Monday, 1.00 - 2.00pm

LECTURE LOCATION: W5A-T2

TUTORIAL LOCATIONS: C5C-211, C5C-213
BBA315 – Business Forecasting

Course Introduction:

As much as businesses are involved in activities in the present, they are also involved in planning for the future. The planning process requires strategic input from managers, budgeting, evaluation of the business’s current position, evaluation of the environment both internal and external, and prediction of future circumstances that will impact on the business. Forecasting is an important component of the planning process. Prediction of key variables such as sales and/or market share, external variables such as input prices, interest rates, exchange rates and economic activity are incorporated with strategic input to develop forecasts for key performance indicators of the business. These forecasts are used both as a direction for the business and benchmarks against which actual performance can be compared.

This unit explores business forecasting by considering the planning process of the organisation, the environment in which business forecasts are made, prediction of key variables using qualitative and quantitative information and the practical considerations of forecast implementation. Quantitative predictions will generally make use of spreadsheets and simple statistical procedures that can be easily applied in the business environment.

Unit Coordinator: Con Korkofingas
Building C5C Room 329
Tel: 9850 8545
Email: ckorkof@efs.mq.edu.au

Lectures and Tutorials:

Students are required to attend a 2 hour lecture presentation every week at Monday 10-12 in W5AT2. The lecture material will be presented using overheads, Power-point presentations and practical demonstrations on the computer. In addition to the 2 hour lecture students are required to attend a tutorial session held typically in the computing labs in C5C. There will be 5 tutorials held in the weeks indicated in the schedule (including the mid-semester examination). The tutorials will be generally be in C5C-211,213 at either Monday 12-1 pm or Monday 1-2pm.

Assessment:

Raw marks in this unit will be allocated on the following basis -

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Workbook</td>
<td>15%</td>
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<tr>
<td>Mid-semester test</td>
<td>15%</td>
</tr>
<tr>
<td>Assignments (2 assignments)</td>
<td>20%</td>
</tr>
<tr>
<td>Final Examination</td>
<td>50%</td>
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**Workbook:** There will be exercises assigned almost every week relating to forecasting and/or the material in the course. Students are expected to attempt these exercises and keep a workbook of their attempts and answers. The workbook will be collected 3 times during the semester at times indicated on the class schedule. The workbooks should be handed in to ERIC before the time indicated. There will be no provision for late submission under any circumstances. The purpose of the workbooks is to ensure that students work steadily through the unit and allow for feedback on student progress. *(Note: you will not be judged on the quantity of computer output nor strictly on the correctness of answers. The logic and justification of your answers with evidence will be of paramount importance. Presentation of answers and output will also be regarded.)* Students are advised to buy an exercise book or maintain a folder with the relevant answers and related and necessary output as questions will build output and results from earlier questions. Working together on computing and exercises can be beneficial, however students should ensure that all work reported in the workbook relating to answers and conclusions is their own. There will be heavy penalties for plagiarism (zero marks for this assessment component at a minimum).

**Mid-semester test:** There will be one mid-semester test to be held in tutorials on the Monday May 10th at either 12pm or 1 pm depending on your tutorial time. The test will cover all material from weeks 1-7 inclusive and will consist of multiple choice questions.

**Assignments:** There will be two assignments; the first assignment will be concerned with quantitative prediction and will be due on Monday 3rd May at 2.00pm. The second assignment will be an quantitative/essay type assignment on qualitative forecasting issues and is due on Monday June 7th at 2.00pm. Details of these assignments will be given at a later stage.

Assignments should be placed in the correct assignment box in The Economics Reference and Information Centre (ERIC). Note that it is the student’s responsibility to place the assignment in the correct assignment box. Students should also note that no excuses such as computer breakdown or loss of files or floppy discs will be accepted for late assignments. Penalties for late assignments will be 20% of total potential marks for each day late.

**Final Examination:** The final examination will be held on during the normal first semester examination period in June and July. Students are advised to check the relevant noticeboards at around approximately week 7 or 8 to find out the time and location of the final examination. The final examination will be a three hour examination which may consist of multiple choice, True or False questions and/or short answer questions. **All material in the unit is examinable.** Further details about the final examination will be given later in the semester.

In the examination components of the unit most complex formulae will be provided however students will be expected to memorise simpler formulae. Statistical tables will be provided. All examinations are closed book. Students will also be required to perform calculations requiring a calculator so they should bring one to all examinations.
Raw Mark and Grade Meanings

To assist students to interpret the meaning of the raw mark on assignments the following information is provided:

Range of Marks
(max 20)

0-8 Work is below the required standard. A major effort should be made to improve the quality of the work.

9 A marginal effort, has important weaknesses which require further attention.

10-13 A sound level of work with no major shortcomings. Meets the expected level of work at this unit level.

14-16 Displays academic excellence in some areas, but with limitations in scope and ability to sustain a position.

17-20 Work is among the highest quality produced by students at the level of this unit.

Final Grades

The final mark and grade awarded to students will be assessed on the following criteria

HD. Denotes performance which meets all unit objectives in such an exceptional way and with such marked excellence that it deserves the highest level of recognition.

D. Denotes performance which clearly deserves a very high level of recognition as an excellent achievement in the subject.

CR. Denotes performance which is substantially better than would normally be expected of competent students in the unit.

P. Denotes performance which satisfies unit objectives.

PC. Denotes performance which meets unit objectives only marginally, and which is therefore unlikely to be adequate preparation for further study in the area.

F denotes performance which does not meet unit objectives.

The raw mark will not necessarily be exactly the same as the final mark awarded. Raw marks may be scaled according to normal statistical procedures.

***Note that the total raw mark a student has achieved will not necessarily be indicative of the grade the student obtains. At the final tabulation stage, consideration will be given to individual student performance in all aspects of assessment but especially in the examination components and the above criteria for a grade will apply. Student raw marks may then be adjusted to reflect the grade awarded***
#All students are required to perform satisfactorily in the final examination to obtain a passing grade for the unit. The combined performance of the student in the examination components of the course will be a prime determinant of the student's final grade in this unit. In the case that a student has not achieved a satisfactory performance in the examination components, then the final mark awarded will be indicative of that examination performance ie marks in other assessment tasks will not be included in the final mark.

Special Consideration

You are expected to attend scheduled examinations with the other students completing this unit. If extraordinary circumstances prevent you from attending the scheduled examination or affect your performance in an examination, you may wish to lodge a request for special consideration.

Any such requests must be lodged on the appropriate form. If there are medical circumstances you wish to be taken into account when considering your request, the medical information must be lodged on the attached Professional Authority Form. No other form of medical certificate will be recognised.

Supplementary Examinations

The academic staff managing this unit may, at their discretion, decide that, in the light of the circumstances set out in a request for special consideration, the appropriate way to assess your performance in this unit is to invite you to sit a supplementary examination. (It is not automatic that you will receive a supplementary examination if you have missed an examination due to medical reasons or misadventure. Students need to have an adequate performance in other assessment components to be considered for a supplementary examination) If you are invited for a supplementary, please remember that, as students sitting a supplementary examination have had the benefit of additional preparation time, the examination may be set to a higher standard and it may well be marked more strictly.

There will not be a supplementary examination for the mid-semester examination in BBA 315.

Secondly, please remember that, if you sit a supplementary examination, the results of the supplementary examination will determine your overall result, regardless of how well you may have performed in the scheduled examination or in assessment overall.

Appealing Grades:

Students wishing to appeal their grades on assessment tasks or their final grade must do so through the authorized university channels. Appeals must be done in writing and must state clearly the case for appeal based on academic grounds. The student’s raw marks will then be reviewed to ensure that no simple mathematical errors or mark omissions have been made. There will be no provision for remarking of the content of examination components or reconsideration of grade allocation not based on genuine academic grounds.
Reference Book List:

There is no primary text for the course. We hope to have some course notes finalised by the second or third week of the term. These will be able to be purchased from the co-op bookshop.

Texts you may find of some use are:


Hanke J.E., Reisch A.G. “Businesss Forecasting” Prentice Hall (5th edition)


Wilson J.H., Keating B “Business Forecasting” Irwin (2nd edition)

Cheating and Plagiarism:

Cheating and plagiarism are regarded as attempts to gain an unfair advantage over your fellow students and will not be tolerated. Please read the attached Plagiarism and Cheating document which sets out the Division’s policy in these matters.

Support Services for Overseas Students:

The University Counselling and Health Services has appointed a counsellor specifically to assist students from overseas countries and those who speak English as their second language. She is particularly expert in assisting with difficulties which involve adjustment to University life or to Australian custom, personal difficulties or the skills of studying, of reading, learning and remembering, or organising and motivating study, or of facing the examinations. Much of the work with students is conducted on an individual basis in a confidential setting. However, each semester groups are conducted to assist students in study skills, stress management and preparation for examinations.
MACQUARIE UNIVERSITY

Professional Authority Form

This form must be completed by a professional authority.

Students at Macquarie University are able to apply for special consideration if they are unable to attend an examination or if they consider that their examination preparation or overall performance in a unit of study has been affected by unavoidable disruption or misadventure. Special consideration may also be granted if a student is forced to leave the examination room early due to illness or unavoidable disruption and believes that his/her examination performance has been affected. In most circumstances documentary evidence is required before special consideration will be granted and your assistance in providing information on the student's illness or misadventure would be appreciated. The information you provide will allow the University to make a fair decision about the student's academic performance and will only be used to assess the student's request for special consideration. If special consideration is requested on non-medical grounds, appropriate supporting documentation must be provided, e.g. statutory declarations by independent witnesses, police reports, or statements from sufficiently senior officials in the place of employment. Photocopies of documents will not be accepted unless they have been certified by a member of the Registrar's staff.

Professional Use Only

Student's Name: ___________________________ ID Number: ___________________________

Date of Consultation: ___________________________

Date/s of illness or misadventure: From: ___________________________ To: ___________________________

Please tick the box which best describes the student's illness or misadventure

In my opinion the effect of the illness or misadventure on the above day/s was (or will be):

Negligible ( ) mild ( ) moderate ( ) severe ( )

Was the student suffering from symptoms of the illness or misadventure on the date of the consultation? Yes/No

Please provide details of misadventure or illness including symptoms and the way in which the circumstances are likely to affect exam performance. Is the illness or misadventure related to or as a result of a pre-existing condition? Give details below.

________________________

Name and Title: ___________________________

Profession: ___________________________

Provider Number:

________________________

Signature: ___________________________

Phone number/s:

Stamp or seal of Professional Authority
(or attach letterhead)
THE DANGERS OF CHEATING AND PLAGIARISM AND HOW TO AVOID THEM

To cheat in the context of university assignments, tests and examinations is to attempt to gain an unfair advantage by violating the principles of intellectual and scholarly integrity. Cheating also encompasses plagiarism, which is the appropriation or imitation of another person’s ideas and manner of expressing them.

WHAT IS CHEATING?

You will be guilty of cheating if you do any of the following:

1. Copy from another student during a test or examination. This is cheating whether or not there is collusion between the students involved. Collusion with another student who wishes to cheat from you exposes both parties to penalties under University Regulations.

2. Use or paraphrase the work of others, including any document, audio-visual or computer-based material, when preparing an assignment or writing an examination, and pretend it is your own work by not acknowledging where it came from.

3. Copy from another student’s coursework whether that copying be with or without the knowledge of that student. This includes:
   - copying all or part of someone else’s assignment
   - allowing someone else to copy all or part of your assignment
   - having someone else do all or part of an assignment for you
   - doing all or part of someone else’s assignment for them.

4. Make up data and fabricate results in research assignments.

5. Impersonate someone else in an examination or test, or arrange such impersonation.

6. Use forbidden material in a test or examination, whether in printed or electronic form. For example, attempting to use a non-standard calculator in a restricted calculator examination.

WHY IS IT WRONG?

If you take and use the work of another person without clearly stating or acknowledging your source, you are falsely claiming that material as your own work and committing an act of plagiarism. This is wrong because:

- it violates the principle of intellectual and scholarly integrity.
- it devalues the grades and qualifications gained legitimately by other students.

PREVENTING CHEATING

All students and staff are responsible to prevent, discourage and report cheating.
Typically students cheat because they are having difficulty with the unit content, the language of the unit, or both. Cheating and/or plagiarism can be a temptation when students are experiencing difficulty with a heavy workload in the unit and seek to save time by using others' work.

To avoid having students resort to cheating, the University provides many services to help students with their course or to make thoughtful decisions about whether to continue. Within the Division of Economic and Financial Studies, students should first seek assistance from their tutor and/or lecturer. The University also offers help through the Dean of Students or the University Health and Counselling Services.

There is a difference between getting help and cheating. You are encouraged to get help if you need assistance to understand the material and any set work so that you are in a better position to create your own answers.

HOW TO PLAY SAFE

- To maintain good academic practice, so that you may be given credit for your own efforts, and so that your own contribution can be properly appreciated and evaluated, you should acknowledge your sources and you should ALWAYS:

  (i) State clearly in the appropriate form where you found the material on which you have based your work, using the system of reference specified by the Division in which your assignment was set;

  (ii) Acknowledge the people whose concepts, experiments or results you have extracted, developed or summarised, even if you put these ideas into your own words;

  (iii) Avoid excessive copying of passages by another author, even where the source is acknowledged. Find another form of words to show that you have thought about the material and understood it, but remember to state clearly where you found the ideas.

There is nothing wrong with working with other students in a group; indeed sometimes you will be encouraged to do so. But after a certain point, each student must work on their own to produce their own written answers. If no specific guidelines for group-work have been given, a reasonable interpretation is that it is acceptable for two or more students to discuss a problem among themselves or with a staff member. The group may then agree that the answer should include certain points. But then each member of the group must independently write their own answer to the problem.

PENALTIES

Students who are guilty of cheating and plagiarism will be penalised. Depending on the nature of the offence, the unit coordinator will determine the penalty. For example, extensive plagiarism may result in zero marks for an assignment. Repeat offences will be referred to the University Discipline Committee and may result in failure or exclusion from the university.

(This material has been compiled from the existing plagiarism documents of Macquarie University and University of Auckland.)
## Lecture Schedule: 2004

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics Covered</th>
<th>Other Information</th>
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</table>
| 1    | 1 March    | • Outline the forthcoming series of lectures and tutorials and advise the basis on which students will be judged.  
        • The meaning of forecasting. The philosophy of forecasting.  
        • Exploring the way it is used by business organisations today. Organisations, planning and budgeting. |                                        |
| 2    | 8 March    | • The forecast environment.  
        • Evaluation of forecasting tasks.  
        • Definition of time series.  
        • Sources of data for prediction.  
        • Errors of prediction. Costs of errors. |                                        |
| 3    | 15 March   | • Simple predictor models-  
        • Naïve, Moving averages, Simple Exponential Smoothing. | Tut1-Introduction Quantitative Prediction |
| 4    | 22 March   | • Prediction of trends, Holts smoothing model, Trend extrapolation.  
        • Descenosalising data | Tut2-Elementary smoothing Workbook collection ERIC by 2pm 22/04 |
| 5    | 29 March   | • Seasonal models. Decomposition. Winters smoothing model. | Tut 3 – Smoothing-trends and seasonality |
| 6    | 5 April    | • Regression models.  
        • Functional Forms  
        • Ways to evaluate models. |                                         |

**Recess**

**Assignment 1 due on Monday 3rd May, by 2.00pm (ERIC)**
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture Description</th>
</tr>
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| 8    | 3 May | - Regression Modelling in Practice
          - Ways to build models.                                                            |
| 9    | 10 May| - Cycles, predicting cycles.
          - Leading indicators-business indicators,
          - Anticipatory surveys.                                                            |
| 10   | 17 May| - Judgemental methods- management, sales force forecasts.
          - Formal surveys and market research based assessments.
          - Individual subjective probability assessments.
          - The role of judgemental prediction in the organisation |
| 11   | 24 May| - Scenario development methods
          - DELPHI approaches
          - Cross impact matrices
          - Analogy methods                                                                  |
| 12   | 31 May| - Using all the information to forecast.
          - Actions based on forecasts.
          - Combining Forecasts                                                             |
| 13   | 7 June| - Putting it all together.
          - Forecasting in practice.
          - Case studies of forecasting.
          - Evaluation of Forecast performance in general.
          - The future of forecasting                                                       |
Tutorials
BBA315 – Tutorial 1 (15th March)

Introduction to the data environment and computer applications.

The tasks that are set below should be used as examples to show you the data and computing environment. Feel free to browse and do some exploring at any stage of the process. You should however attempt to complete the sheet early in the course preferably in the tutorial. The notes will be a good companion to have with you during tutorials.

**Task 1**

Open up the **DX Data for Windows** option by using the menu hierarchy. (*Use START< Programs< Student Lab Programs< Economics*)
Check out the Databases on offer

You may have to change the directories in DX (Use the Options > Directories on the toolbar to obtain the Databases, Workfiles and Template directories. *Modify* the given directories and browse through the available drives to find appropriate Dxdata directories.

Open up the **ABS Time Series** database. Check out the range of options.

a) Go to **K: Business Surveys** and find a measure of company profits (original) for the following broad industries - Property and Business Services, Other Services, Retail Trade and Construction. Check out the company profit options available. (any option will do) Which option did you use? What was the frequency of collection and length of available data? (*Toggle across using the arrow keys*) View a graph of each of the industry company profits separately and comment on the type of components visible in each time series. (*Use the View option on the Toolbar to view the Data and then a Graph of the data*)

b) (i) Suppose we wish to obtain data for production in certain parts of the retail industry. The data that we seek is data for the dollar amount spent on grocery and supermarket purchases in monthly or quarterly periods. Find appropriate data on the database. (You will need to go to another category in the ABS Time Series)

What was the frequency of collection and length of available data?

(ii) Having found the data above for **Retail Turnover: Food retailing: Supermarkets & groceries** use the View option on the Toolbar to view the Data and then a Graph of the data. Comment on the nature of the graph.

(iii) Suppose we do not wish to utilise the entire time series but some relevant section of the time series. Dx allows the user to alter the timeframe to be used in the active window. Use *Options* on the Toolbar to alter the timeframe to:

1. the last 60 observations
2. Data from Jan-90 to Dec-98

*(c) Return to the window marked “ABS Time Series Statistics” ensuring that you have the variable Retail Turnover: Food retailing: Supermarkets & groceries highlighted*
Use the *Series* option on the Toolbar to create three new series which represent;

(1) The natural logarithms of the retail variable

(2) The % change in the retail variable (period on period)!!! (What is the difference between period on period and year on year change?)

(3) Yearly aggregated retail sales

(Dx will create a workfile for manipulations of data series. Be careful that you create the correct variables. Search the Series menu for the correct transformations. Before you do the second transformation make sure the highlight is on the original time series)

(i) *View the data* for all the above series together. (Highlight all variables in your workfile together and then View)

(ii) *Copy* the data to the clipboard. (Make sure that you have the Data in the active window otherwise you will copy only the time series headings). Open up EXCEL by using the Microsoft Office menu options. Paste the data into EXCEL.

(iii) Use EXCEL to make separate time series plots of the original retail sales variable, the logarithm of the retail sales variable, the % change of the retail sales variable and the yearly aggregated retail variable. (*Use the chart wizard in EXCEL and the line chart option. You can also use the scatter plot option if the dates are included in the data region*). Ensure that the charts you create allow the user to identify the main characteristics of the data.

(iv) Comment on the characteristics of each of the time series. Compare the aggregated retail sales variable with the disaggregated variable. What differences do you see? Why would one aggregate data?

**Task 2**

(a) Open up MINITAB. (*MINITAB is found on the Student Programs<Statistics menu*)

(b) Using the Copy/ Paste option in EXCEL paste the above variables with headings into the data window of MINITAB. (Be careful here to paste only the data and headings to the Data window in MINITAB. Make sure the data window is the active window before you paste)

(c) Use the Statistics>Time Series> menu to create a time series plot of the logarithm of retail sales and the percentage change in retail sales. Explore the options for modifying the time series plots.
BBA315 – Tutorial 2 (22nd March)

The notes will be a good companion to have with you during all tutorials

Task 1

(a) Open up the data Aus: Total Establishments: Employment in the category T of the ABS Time Series Statistics in Dx

(b) Comment on the nature of the data. What is the frequency of collection, the units of measurement and the length of the series?

(c) (i) Open up EXCEL. Create a naive forecast of the above series using EXCEL. (This period’s forecast is last period’s actual data. Refer to your notes). Calculate the errors of your forecast method for every forecast made. (Use the spreadsheet to do this). What are your one period and two period ahead forecasts?

(ii) Use the errors to calculate the MAE (Mean Absolute Error), MSE (Mean Square Error), RMSE and MAPE (Mean Absolute % Error) for the naive forecast.

(iii) Create a three period moving average forecast for the % change in retail variable. Calculate the MAE and MAPE for this forecast method. Compare the results of the naive method with the three period moving average. Which forecast method seems preferable? What are your one period and two period ahead forecasts?

(d) For the employment series create a simple exponential smoothing (SES) forecast for the entire series with alpha values of 0.2 and 0.7. Determine the errors of forecast with each method by calculating the MAE, MSE and MAPE. What are your one period and two period ahead forecasts?

(e) Compare the performance of the SES models with the above smoothing models. Which forecast method is preferable?

(f) Use the SOLVER sub routine in EXCEL to determine the optimal value of alpha if minimisation of MSE is required.

Task 2

(a) Open up MINITAB. (MINITAB is found on the Student Programs<Statistics menu)

(b) Paste the original data series from EXCEL with heading into MINITAB.

(c) Use the Stat > Time Series options to create a three period moving average for the employment variable. Generate forecasts for the next three periods. (Use the forecast option in the dialog box.) What do you observe about the forecasts?

(d) Discard the % change in Retail data. Open up the worksheet TRACK15.MTW on the MTBWIN\DATA directory. (you will need to search for this on the EFS02 directory. Open the file as a WORKSHEET not a PROJECT). Plot the data. Comment on the nature of the data. Use the Stat > Time Series option to estimate a simple exponential smoothing model for the data. (Use α = 0.5)
BBA315- Tutorial 3 (29th March)

Smoothing and Decomposition

Task 1
From the DX Econ Data retrieve the variable Lending and Credit Aggregates :credit: Housing in the database RBA Bulletin.

(a) Plot the data. Comment on the nature of the data. What factors influence the nature of the data?

(b) Copy data for the last 60 observations into EXCEL. (including the dates)

(c) Use the spreadsheet to create a HOLT smoothing model by reproducing the formulae below in the adjacent columns to the data. (You will need to think carefully about what you are doing!!)

\[ L_t = \alpha X_t + (1-\alpha) (L_{t-1} + T_{t-1}) \]
\[ T_t = \beta (L_t-L_{t-1}) + (1-\beta) (T_{t-1}) \]
\[ H_{t+1} = L_t + T_t \]

For the initial run of the model choose \( \alpha = .1, \beta = .3 \) (Set up the model with alpha and beta in two dedicated cells in the spreadsheet)

(It would be worthwhile to read your notes pages on the Holt model)

(d) From the third equation you should be able to generate in sample forecasts. Generate in adjacent columns the errors of forecast and calculate the MAD, MSE and MAPE using the spreadsheet.

(e) Alter the values of \( \alpha, \beta \) and see what effect it has on the model and the error criteria.

(f) Use the Solver tool on EXCEL to find the “optimum” values of \( \alpha \) and \( \beta \)

Task 2
Retrieve the data Domestic Sales of Australian wine and Table wine:Original:Table Red and rose wine:Total from the DX data. (You will find it in the ABS Time Series Database in the category Business Surveys)

(a) Comment on the nature of the data plot. What factors influence the nature of the data?

(b) Copy the data into MINITAB (you will find it easier when copying data into MINITAB to eliminate the identifier information in DX when copying to the clipboard.)

(c) Using MINITAB generate a Winters’ model for the data. Generate forecasts for the next 12 months. (Use the default values of \( \alpha, \gamma, \delta \) (\( \delta = \gamma, \gamma = \beta \) in the notes)

(d) Try a few alternate combinations of \( \alpha, \gamma, \delta \) and see what effect it has on the error criteria.

(e) Use the decomposition routine in MINITAB to generate forecasts for the next 12 months. Compare the performance of the Decomposition model with that of the preferred Winters’ model.
Task 3

Retrieve the data *Original Production: Beer (including ale and stout)* from the Dx Econ Data. (You will find it in the *ABS Time Series* database in *Manufacturing* )

Refer to your notes on Decomposition for this task.

(a) Copy the data for the last 24 observations and dates into EXCEL. (Don’t copy the identifier information)

(b) We will create a decomposition model on the spreadsheet. In the next column to the data create a 4 period moving average for the data. Place the first moving average value next to the second period and the final value next to the third last period.

(c) In the next column create a centred moving average by using a two period moving average of the moving average data. Place the first observation of the centred moving average at the third period and the final value at the third last period. Plot the centred moving average. What components of the data are evident?

(d) Use the original data and the centred moving average to create the seasonal relatives (=Original/ Centred M.A.)

(e) From the seasonal relatives create 4 seasonal indexes by averaging the seasonal relatives for each relevant quarter.

(f) Apply the Seasonal Indexes created above to all of the data. (You might need to use the Paste Special (Values) function when copying)

(g) Create the deseasonalised data by dividing the original data by the seasonal indexes. Plot the original data and the deseasonalised data on the same plot.

(h) Copy the deseasonalised data into the next column by using the Paste Special (values) option.

(i) Highlight the data and use the drop and drag facility to create linear trend projections for the next 4 quarters.

(j) Using the seasonal indexes and the linear trend projections create forecasts for the next 4 quarters.
BBA315: Tutorial 4: (17th May)

Regression

Task 1

(a) Do Exercise 1 on p. 120 of the course notes.

(b) Now re-estimate the model in logs using the entire sample. To generate the log of CHOOKS choose ‘Calculator’ from the ‘Calc’ menu. We will call the new variable LCHK. Type this name in the ‘Store result in’ box and loge (CHOOKS) in the ‘Expression’ box. Click ‘OK’ to generate the new variable. Generate the log of the other variables in a similar fashion and run the regression in logs. You should get an R2 of 0.983.

(c) Now re-estimate the model in differences of logs. To generate the difference of the log of chooks, choose ‘Calculator’ from the ‘Calc’ menu. We will call the new variable DLCHK. Type this name in the ‘Store result in’ box and LCHK-lag(LCHK) in the ‘Expression’ box. Generate the other variables in a similar fashion and run the regression in differences of logs. You should get an R2 of 0.264.

(d) Now add a lagged dependent variable to the model. Choose ‘Time Series’ from the ‘Stat’ menu and choose ‘Lag.’ In the ‘series’ box type DLCHK andin the ‘Store lags In’ box type ‘DLCHK1.’ This will be the lagged dependent variable. Type ‘1’ in the ‘Lag’ box and click OK. Run the regression including the lagged dependent variable. You should get an R2 of 0.443.

(e) We will now create a set of seasonal dummy variables. Since the data are quarterly we need to set up 3 seasonal dummies which we will call ‘q1,’ ‘q2’ and ‘q3.’ Firstly we will set up q1. Choose ‘Make patterned data’ from the ‘Calc’ menu, and choose ‘Arbitrary set of numbers.’ In the ‘Store patterned data in’ box type the name ‘q1.’ The arbitrary set of numbers that we want is 1 0 0 0. Enter these in the appropriate box. We want each value to be listed once, so put ‘1’ in the appropriate box. We now need to tell Minitab how many times we want this sequence repeated. Since there are 35 observations in the sample we want the sequence repeated 35/4 = 8.75 times. Unfortunately, Minitab insists that the number of repeats is a whole number. To get around this problem, type 9 in the ‘List the whole sequence’ box. This will generate 36 observations, from which we can delete the last to give us the required 35.

Click ‘OK’ to get q1. The variables q2 and q3 can be created in a similar fashion. For q2 the ‘Arbitrary set of numbers’ box should read 0 1 0 0, and for q3 it should read 0 0 1 0.

Press the END key to go to the last observation in the dummy variables. Use the ‘delete’ key and the arrow keys to remove the surplus seasonal dummies. You should end up with as many dummies as you have other variables. Now run the regression including the seasonal dummies. You should get an R2 of 0.48.

Task 2

Now do exercise 2 on p. 134 in the course notes.