ECON20003
Quantitative Methods 2

SUBJECT GUIDE
Semester 1, 2015

Dr Reza Hajargasht
Department of Economics
Faculty of Business and Economics
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**Subject Outline**

**Introduction**

Welcome to Quantitative Methods 2 (QM2). Having solid quantitative problem-solving skills is essential for most future careers in commerce. Learning these skills can be challenging, but they are becoming crucial for success in business and economics. It should not be a hard subject, it does require the mastery of analytic skills though and thus it requires your constant attention throughout the semester.

**Subject Aims**

The overall aim of this subject is to help you to become proficient in the use of the quantitative techniques essential for analysis in business and economics. A wide range of skills will be covered during the semester. On successful completion of the subject, you should be able to: (a) identify the correct technique to solve a particular quantitative problem, (b) be able to correctly implement each technique, and (c) interpret the results from using each technique correctly. You will use the skills you develop in QM2 both in the business and economics subjects you will study during the remainder of your time here at the University of Melbourne, and most importantly, in the workplace.

**Prescribed Text**


We will be using this text throughout the subject, and will refer to it as SSK after the initials of the text’s three authors. NOTE that the set text is the sixth edition not the fifth edition. Many students may already have this textbook as it is the text which has been used in QM1 for some years now. If you do not own this text, it is available for purchase at the University Bookstore. The text is available in the University Bookroom. (The library has only a very small number of copies of SSK on Reserve.) . NOTE also that some bookshops sell *Business Statistics abridged Sixth Edition*, by E. A. This (abridged version) is NOT the set text.

Other readings will be provided to students when those topics are reached. These readings will be available for download from the University’s Learning Management System (LMS). The schedule of lectures listed below provides an indication of when these readings will be assigned.
Learning Outcomes

Subject Objectives

On successful completion of this subject, students should be able to

- Conduct and interpret a number of parametric and non-parametric tests of the location of populations;
- Conduct simple and multiple regression analysis, construct appropriate tests on regression coefficients, analyse and interpret the estimation results and explain the findings;
- Identify the circumstances under which certain test procedures may not be valid;
- Analyse several specific models often employed in the various fields within business and economics;
- Identify the circumstances under which a model with a binary dependent variable is appropriate;
- Evaluate the results of a Logit model, test relevant hypotheses on the estimated coefficients from a Logit model and explain the findings;
- Explain the difficulties that can arise when studying time series data;
- Interpret season factors and seasonally adjust data;
- Employ several methods to analyse and forecast time series data; and
- Use and understand various publicly available statistics, including the many data series available describing the economy and markets.

Generic Skills

In this subject you will have the opportunity to develop important generic skills. These skills are grouped below by level of development in QM2.

High level of development:
- Statistical reasoning; application of theory to practice; interpretation and analysis; synthesis of data and other information; evaluation of data and other information; and use of specialised computer software.

Moderate level of development:
- Oral communication; written communication; critical thinking; problem solving; and receptiveness to alternative ideas.

Some level of development:
- Team work; and accessing data and other information from a range of sources.

Awareness Issues

At a broader level, studying this subject will increase your awareness of: the breadth of questions that are investigated within business and economics, the wide range of statistical information that is publicly available, and the future subjects you can take to learn more quantitative techniques.
**Prerequisites**

The main subject pre-requisite for Quantitative Methods 2 is ECON10005 (Quantitative Methods 1), the first year quantitative subject taught in the Faculty of Business and Economics or an equivalent subject taught at another tertiary institution. Other subjects that can also be used as pre-requisites for this subject are: MAST10010 and MAST10011. Basic statistical knowledge covered in these subjects will be assumed in QM2, as will some basic mathematics and calculus knowledge that you would have learnt in high school. Some knowledge of how to use a spreadsheet package such as Excel is also expected of students.

**Contact Details**

**Lecturer Contact Details**
Dr Reza Hajargasht.
Room: 457, 4th floor, FBE Building
Phone: 8344 5408, Email: har@unimelb.edu.au
Consultation Times: Friday 10:30-11:30, and by appointment.

**The Tutorial Coordinator**
Dr. Wasana Karunarathne
Room: 355, 3rd floor, FBE Building
Phone: 8344 4866 Email: lakminik@unimelb.edu.au
Consultation hours: Friday 2-4 p.m.
Any queries of an administrative nature related to tutorials or marks should be directed to Wasana.

**Email Protocol**

While academic staff endeavor to address queries received via email, it is more appropriate to resolve substantive questions face-to-face during normal consultation hours. With this in mind, all students are encouraged to familiarise themselves with the consultation hours offered by the lecturer and the tutors in this subject. In addition, students may use the Online Tutor to post questions regarding the subject. Details on how to access and use the Online Tutor are provided below.

Please note that only student emails coming from a University email address will be responded to. Please do not use non-university email addresses. Emails from non-University email addresses may be filtered by the University’s spam filter, which means that staff may not receive your email. All correspondence relating to this subject will only be sent to your University email address.
Lectures and Tutorials

Lecture Times

There are two one-hour lectures each week held in Copeland Theatre (Basement of the Spot)

<table>
<thead>
<tr>
<th>Stream/Sequence</th>
<th>Day</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture 1/Group 1</td>
<td>Monday</td>
<td>11 - 12</td>
<td>Spot-B01 (Copland Theatre)</td>
</tr>
<tr>
<td>Lecture 1/Group 2</td>
<td>Tuesday</td>
<td>15:15 - 16:15</td>
<td>Spot-B01 (Copland Theatre)</td>
</tr>
<tr>
<td>Lecture 2/Group 1</td>
<td>Thursday</td>
<td>16:15 -17:15</td>
<td>Spot-B01 (Copland Theatre)</td>
</tr>
<tr>
<td>Lecture 2/Group 2</td>
<td>Friday</td>
<td>13:15 -14:15</td>
<td>Spot-B01 (Copland Theatre)</td>
</tr>
</tbody>
</table>

Please note that Monday 9th of March (Labour Day) is NOT a University holiday. Lectures and tutorials will operate on that day.

Lecture Schedule (tentative)

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2&amp;5 March</td>
<td>Introduction &amp; Review</td>
<td>SSK 1,2,3, &amp;4</td>
</tr>
<tr>
<td>2 3&amp;6 March</td>
<td>Fundamental Concepts</td>
<td>SSK 7,8,10,11 &amp; 13</td>
</tr>
<tr>
<td>3 9 &amp;12 March</td>
<td>Testing Independent Sample (parametric)</td>
<td>SSK 12.1, 12.2, 14.1</td>
</tr>
<tr>
<td>5 16&amp;19 March</td>
<td>Ordinal Data &amp; Nonparametric Tests</td>
<td>SSK 21.1</td>
</tr>
<tr>
<td>6 17&amp;20 March</td>
<td>Matched Pair of Ordinal &amp; Non-normal Data</td>
<td>SSK 21.2</td>
</tr>
<tr>
<td>7 23&amp;26 March</td>
<td>ANOVA 1</td>
<td>SSK 16.1</td>
</tr>
<tr>
<td>8 24&amp;27 March</td>
<td>ANOVA2 - Kruskal-Wallis Test</td>
<td>SSK 21.3</td>
</tr>
<tr>
<td>9 30Mar &amp;2 Apr</td>
<td>Correlation &amp; Simple Regression</td>
<td>SSK 18</td>
</tr>
<tr>
<td>10 1&amp;16 April</td>
<td>Regression 1-Simple</td>
<td>SSK 18.1 to 18.4</td>
</tr>
<tr>
<td>11 13 April</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>12 14&amp;17 April</td>
<td>Regression 2- Simple</td>
<td>SSK 18.1 to 18.4</td>
</tr>
<tr>
<td>13 20&amp;23 April</td>
<td>Regression 3- Multiple</td>
<td>SSK 19.1 &amp; 19.2</td>
</tr>
<tr>
<td>14 21&amp;24 April</td>
<td>Regression 4- Diagnostics and Prediction</td>
<td>SSK 19.1, 19.2 &amp; 19.3</td>
</tr>
<tr>
<td>15 27&amp;30 April</td>
<td>Regression 5- Dummy Variables</td>
<td>SSK 20.2</td>
</tr>
<tr>
<td>16 28 Apr &amp; 1 May</td>
<td>Regression 6- Model Building</td>
<td>SSK</td>
</tr>
<tr>
<td>17 4 &amp;7 May</td>
<td>Logistic Regression 1</td>
<td>SSK 20.4 , TBA</td>
</tr>
<tr>
<td>18 5 &amp;8 May</td>
<td>Logistic Regression 2</td>
<td>TBA</td>
</tr>
<tr>
<td>19 11 &amp;14May</td>
<td>Introduction to Time series</td>
<td>SSK 23.1, 23.2, 23.3</td>
</tr>
<tr>
<td>20 12&amp;15 May</td>
<td>Seasonality</td>
<td>SSK 23.4 &amp; 23.5</td>
</tr>
<tr>
<td>21 18&amp;21 May</td>
<td>Time Series Forecasting</td>
<td>TBA</td>
</tr>
<tr>
<td>22 19&amp;22 May</td>
<td>ARIMA</td>
<td>TBA</td>
</tr>
<tr>
<td>23 25&amp;26 May</td>
<td>Index Numbers and Time Series Review</td>
<td>SSK 24</td>
</tr>
<tr>
<td>24 28&amp;29 May</td>
<td>Subject Review</td>
<td>All of the above</td>
</tr>
</tbody>
</table>
The readings for the first 16 lectures are taken from the prescribed textbook, SSK, described above. Other readings will become available for download from the University’s Learning Management System (LMS).

**Lecture Participation Requirements**

The main lecture slides will be available for download from the QM2 section of the LMS prior to each lecture. Students can print these slides out and bring them to lectures. Students should also be prepared to take notes, as some important explanations of the material are not provided on the slides. Note also that the lectures will be recorded and available to students using the University’s Lecture Capture system, which will be accessible via the LMS (see details below).

**Tutorial Schedule and Participation Requirements**

Students are all expected to attend a one hour tutorial each week. Tutorials will commence in the first week of semester (week beginning Monday March 2nd). The tutorials are a fundamental component of the subject, and will give students the opportunity to practice the quantitative skills covered during lectures in the previous week.

The first tutorial provides an introduction to EViews which is the software used in the subject for all tutorials and assignments.

**Enrolling in Tutorials**

Students should do this via Student Portal. After subject registration, students are allocated to available classes. It is a student’s responsibility to ensure their registrations produce a clash-free timetable. Students can make changes to their timetable by following the instructions provided in the Student Portal, until it closes. Please note you will only be able to change your allocated tutorial time if there is space in alternative tutorials. For more information on tutorial enrolments including late enrolments please contact the tutorial coordinator.

**Using Lecture Capture (Echo 360)**

A video recording of lectures delivered in this subject will be made available to students. These recordings of lectures allow you to revise lectures during the semester, or to review lectures in preparation for the end of semester exam. You can access recorded lectures by clicking on the “Lecture Capture” link in the LMS page for this subject.

Please note that Lecture Capture recordings are not a substitute for lecture attendance; rather they are designed for revision. On occasions a Lecture Capture recording can fail, usually due to technical reasons. In such cases, the lecture recording may not be made available.
Assessment

Assessment Overview

Your assessment for this subject comprises the following:

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Due date</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Assignment</td>
<td>Monday March 30th</td>
<td>5%</td>
</tr>
<tr>
<td>Mid-semester online test</td>
<td>14th to 16th April</td>
<td>5%</td>
</tr>
<tr>
<td>Second Assignment</td>
<td>Monday 27th of April</td>
<td>5%</td>
</tr>
<tr>
<td>Third Assignment</td>
<td>Monday 25th of May</td>
<td>5%</td>
</tr>
<tr>
<td>Participation in tutorials</td>
<td>Weekly</td>
<td>10%</td>
</tr>
<tr>
<td>End-of-semester exam</td>
<td>Assessment Period</td>
<td>70%</td>
</tr>
</tbody>
</table>

Assignments

Students are required to complete three assignments which comprises 15% of the total marks. They should be submitted electronically via the Assignment Tool. See below for details of how to submit assignments using this Tool. Detailed information on the content of the three assignments will be provided during the semester via the LMS. The assignments often involve undertaking quantitative analyses of real-world data using the EViews statistical software package and including them in a word processor such as MS Word. When including graphs or charts in assignments, students should use patterns rather than colours to distinguish each data series in the graph or chart, as assignments will be printed in black and white for marking by tutors.

Assignment #1 is due on March 30th, Assignment #2 is due on April 27th and Assignment #3 is due on May 25th 2015.

Students should bring a copy of the assignment to the tutorial for that week where it will be reviewed. No late assignments are accepted because we will go over them in tutorials during the week the Monday morning they are due in.

In the work for this subject, students are expected to not only obtain correct numerical results, but also to be able to explain in words how those results were arrived at, what confidence we can have in them and what the results imply for management action or policy. Assignment answers should be well written. It is also important that students do not report calculations, estimates or statistical tests that are unnecessary or inappropriate.

Mid-Semester Online Test

The mid-semester test will be held during week six of semester. Students will undertake the test at any time of their choosing between 10 am on Tuesday the 14th of April and 4 pm on Thursday the 16th of April, 2015. Students will have 30 minutes to complete the test, which will comprise of 10 multiple choice questions and five true or false questions. The test will be accessible online via the LMS.

The test will cover the material presented during lectures up to the end of week four of semester (topics 1 to 3), and material covered in tutorials 1 to 4. Students should be aware
that the test has a strict time limit, so they should prepare for it accordingly. Students should have critical value tables for each distribution covered during lectures at hand when they take the test. These tables are printed in Appendix C of the SSK textbook, and are also provided on the LMS. Students should also have a calculator at hand, as some calculations may be required to answer certain questions. Further details regarding the mid-semester test will be provided during semester in lectures and on the LMS.

**Tutorial Participation**

Each weekly tutorial problem sheet (except those following assignment due dates) consist of two types of questions:

**PART A**: questions to be completed prior to the tutorial (bring printed answers that you can refer to and that will be checked off by your tutor), and

**PART B**: questions to be completed during the tutorial. The complete list of tutorials and assignments will be available on LMS.

Students are free to attempt the PART B questions before the tutorial if they wish. Gaining credit for the tutorial participation grade (10%) requires attending each tutorial (except tutorial 1) and showing evidence to the tutor that you have completed the questions, particularly the PART A homework questions. Students are requested to attempt the PART A questions before the tutorial, and to bring along the results to show the tutor.

**End-of-Semester Exam**

The end of semester exam, worth 70 percent of the final grade for this subject, will cover all the material covered during lectures and tutorials throughout the semester. This exam will occur during the University's normal end of semester assessment period, with the time, date and location provided by the University's administration later in the semester. The exam will be 2 hours in duration, and will have both multiple choice and short answer questions. Critical value tables for each distribution required to complete the exam will be provided to students in the exam package, as will a formula sheet. Students will be required to bring a calculator to the end of semester exam. Examination of your knowledge of EViews will be done via the interpretation of results that will be included in the exam.

**Exam Policy**

The Faculty requires that students are available for the entire examination period. Supplementary exams will not be provided in cases of absence during the examination period, unless the absence is due to serious illness or other serious circumstances. See the Special Consideration web site for more information: [http://www.ecom.unimelb.edu.au/students/special/#missing](http://www.ecom.unimelb.edu.au/students/special/#missing)
**Using the Assignment Tool**

The Assignment Tool allows students to submit assignments online from home or from any of the student computer laboratories on campus. During the course of the semester, students will be asked to submit assignments in electronic format into the Assignment Tool. The Assignment Tool can be accessed by clicking on Assignment Tool in the navigation menu from the LMS page for this subject.

A student guide has been prepared on the use of the assignment tool which can be downloaded here:


Please note that students are required to keep a copy of their assignment after it has been submitted, as students must be able to produce a copy of their assignment at the request of their tutor or lecturer at any time after the submission due date. The assignments in this subject will be discussed in the tutes for the week they are due.

**Plagiarism and Collusion**

Presenting material from other sources without full acknowledgement (referred to as plagiarism) is heavily penalised. Penalties for plagiarism can include a mark of zero for the piece of assessment or a fail grade for the subject.

Plagiarism is the presentation by a student of an assignment identified as his or her own work even though it has been copied in whole or in part from another student’s work, or from any other source (e.g. published books, web-based materials or periodicals), without due acknowledgement in the text.

Collusion is the presentation by a student of an assignment as his or her own work when it is, in fact, the result (in whole or in part) of unauthorised collaboration with another person or persons. Both the student presenting the assignment and the student(s) willingly supplying unauthorised material are considered participants in the act of academic misconduct.


CELT has prepared a help sheet on avoiding plagiarism, available at:


**Special Consideration**

Students apply for Special Consideration through My Unimelb via the Apply for Special Consideration link under Exams and Assessment in the Admin tab.
You must submit your online application no later than 3 working days after the due date for submission or examination of the particular component of assessment, to which your application refers.

**Referencing**

All sources used for a written piece of assessment must be referenced. This is to acknowledge that your material is not based entirely on your own ideas, but is based, in part, on the ideas, information, and evidence of others. This is desirable as you are attending University in order to learn from others. CELT has several helpsheets on citing and referencing, which are available from the CELT website.

**Further Assistance**

If you need assistance during the semester, you have several options:

**Online Tutor**

The Online Tutor allows students to direct questions to a QM2 tutor via the LMS. The Online Tutor can be accessed 24 hours a day, 7 days a week. The Tutor will attempt to answer your question within 24 hours (weekdays only).

Your questions and the tutor’s answers can be accessed by all students in the subject, allowing everyone to benefit from the question and answer. Importantly, your identity will not be revealed to other students. Even if you do not want to ask a question, you can still view existing questions and answers.

Note that the Online Tutor is not designed to replace attendance at tutorials, but rather to complement the tutorial process. Also, simple questions that can be answered by referring to the prescribed readings or the lecture slides will not usually be answered. You can access the Online Tutor via the Online Tutor link, located in the navigation menu of this subject’s LMS page.

When using the Online Tutor, students must adhere to the following:

1. Students must first check that their question has not already been answered on the Online Tutor. The Online Tutor system has a search facility for doing such checks.
2. Questions should be short, with only one specific question in each posting. If students have more than one question, use a separate posting for each one.
3. Questions must be specific. They should NOT be open ended, such as “I do not understand what a t-test is. What is it?” If you do not understand concepts, please see a tutor or the lecturer during their consultation hour.
4. Do not ask for the solutions to tutorial questions or assignment questions, even after they are completed. Brief solutions to Part A tutorial questions and assignment questions will be made available on the LMS.
Lecturer Consultations

Dr Reza Hajargasht is available for consultations on Friday from 10:30 am to 11:30 am during the semester. All other times will require an appointment. Please do not assume that the times right after or before lectures are available for consultation there is usually a subject that just precedes ours and just follows.

Tutor Consultations

There are several tutors for this subject. Each tutor will set aside an hour each week (starting from week 3 during weeks when tutorials are scheduled) to meet with students for individual consultations. The times and locations for consultations with these tutors will be provided on the LMS page for this subject from the second week of semester, under the “Tutorial Times/Enrolment” menu item. Students should attend the consultation hours of their own tutor.
If there is some legitimate reason for why a student cannot attend the consultation hours of their own tutor, they can attend the consultation hours of one of the other tutors on the list, but students of that tutor will have priority.

Revision Tests

Copies of a number of end of semester exams from previous years will be made available to students via the LMS towards the end of semester. Brief solutions for these past exams will also be provided. The form of the end of year exam will also be posted on LMS as well as during the review of the subject. However you should be aware that these tests are not necessarily written by the same coordinator that is teaching this semester.

Other Information

Statistical Software and Data

Students will be asked to analyse many different pieces of data during the semester, and will be expected to employ the EViews package to complete tutorial questions and assignments. If you are not familiar with EViews, do not worry. You will get plenty of practice during the tutorials, and your tutor will cover the basics. The tutorials in week 1 are intended to familiarise you with the basic aspects of the software.
The EViews statistical software is available on the computers in the Bouverie Street undergraduate computer laboratory. A Student Version of EViews is available for separate purchase from the University Bookstore for a very reasonable amount.
Students can also access EViews via the University's Citrix server, but generally students should be on campus when connecting. Connection is possible off campus, but should not be relied upon. There is a link to the Citrix server on the Department of Economics homepage, but a direct link is provided below.
To log in to the Citrix server, use your usual university login for email, with the domain being “STUDENT”.
Note that the number of students able to use EViews via the Citrix server at any one time is *limited*. It is necessary to log in to the University's Virtual Private Network (VPN) from off-campus to use EViews on Citrix. Students wishing to complete assignments using EViews on the Citrix server should not expect to gain access every time, particularly during peak use times. Peak times will always include the weekends and evenings before assignments are due. In addition, this subject is not the only one using EViews, so plan well ahead if you wish to use EViews via the Citrix server. More information on the University VPN can be found at: https://its.unimelb.edu.au/help/networks-access/networks-internet/vpn

The data students will use during the class or the tutorials will all be made available on the LMS.

**Comparison of QM2 with Introductory Econometrics**

This subject covers some different material to that covered in the Introductory Econometrics subject ECOM20001 offered by the Department of Economics. The techniques covered in M2 are more varied, and are less focused on regression analysis. There is still a significant proportion of the subject, however, devoted to some of the details in the use of regression. The statistical techniques covered in QM2 provide more of an overview of techniques in addition to regression. Specifically, the QM2 includes an introduction to nonparametric methods, forecasting time series and ANOVA that are typically not covered in Introductory Econometrics. Note that this subject is not necessarily easier than ECOM20001. We will cover a larger breadth of material, but in less depth. In recognition of the complementary nature of these subjects you may take both QM2 and Introductory Econometrics. Also note that you can still learn more econometrics in later years without Introductory Econometrics by taking Basic Econometrics (ECOM30001) in third year. Anyone who is considering doing an Honour’s or Master’s degree in Economics or Finance is encouraged to take econometrics subjects while doing their undergraduates since they often serve as prerequisites for entrance to these programs.