UNSW Business School

School of Economics

ECON3206

Financial Econometrics

Course Outline

Semester 2, 2017

Course-Specific Information

The Business School expects that you are familiar with the contents of this course outline. You must also be familiar with the Course Outlines Policies webpage which contains key information on:

- Program Learning Goals and Outcomes
- Academic Integrity and Plagiarism
- Student Responsibilities and Conduct
- Special Consideration
- Student Support and Resources

This webpage can be found on the Business School website:
https://www.business.unsw.edu.au/degrees-courses/course-outlines/policies

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1 STAFF CONTACT DETAILS

Lecturer-in-charge: Dr Rachida Ouysse
Location: Room 441 UNSW Business School
Phone: 9385 3321
Email: rouysse@unsw.edu.au
Consultation Times: Wed 2pm-4pm (and by appointment)
(Please, email me before coming!)

1.1 Communications with staff

You should feel free to contact your lecturer(s) about any academic matter. However, it is strongly encouraged, for efficiency, that all enquiries about the subject material be made at lectures or tutorials or during consultation time. Discussion of course subject material will not be entered into via lengthy emails.

Email correspondence on administrative matters (e.g. advising inability to attend a tutorial) will be responded to within 48 hours, but not over weekends. Please note that the lecturer has no advance notice of the date and time of the final exam.

2 COURSE DETAILS

2.1 Teaching Times and Locations

Lectures run from Week 1 to Week 12. The time and location are

Thursday 13:00-15:00, Central Lecture Block 6

Tutorials start in Week 2 and finish in Week 13. A list of tutorial classes, times and tutors will be posted on the Course Website.

2.2 Units of Credit

The course is worth 6 units of credit. This course is taught in parallel to both undergraduate and postgraduate students.

2.3 Summary of Course

This course is concerned with the special statistical characteristics that arise when modelling time series data, such as commodity prices, interest rates or exchange rates. Topics include key characteristics of financial data, concepts of volatility and risk, modelling time varying volatility (ARCH models), and modelling relationships among financial series. The knowledge and methods acquired in this course are particularly useful and sought after in the public and private finance sector.

2.4 Aims and Relationship to Other Courses

The course aims to provide students with the basic framework for modelling financial time series data. In particular, it will benefit students in terms of:

1. Developing their ability to model the expected mean and volatility in financial data as a means to a more informed assessment of the risk and return associated with different investment strategies;
2. An awareness of the empirical evidence supporting alternative models of asset price determination;

3. Developing their proficiency with the computer skills required to actually model financial data in practice (students should be proficient in **EViews** or **Stata** by the end of the course).

This course is offered as part of the economics stream in the B.Com and B.Econ degrees (ECON3206) and M.Com degree (ECON5206).

A prerequisite for ECON3206 is ECON2209 Business Forecasting. A prerequisite for ECON5206 is ECON5248 Business Forecasting. The course requires good mathematical and statistical skills.

2.5 Student Learning Outcomes

The Course Learning Outcomes are what you should be able to DO by the end of this course if you participate fully in learning activities and successfully complete the assessment items.

The Learning Outcomes in this course also help you to achieve some of the overall Program Learning Goals and Outcomes for all students in the Business School. Program Learning Goals are what we want you to BE or HAVE by the time you successfully complete your degree. You demonstrate this by achieving specific Program Learning Outcomes - what you are able to DO by the end of your degree.

For more information on Program Learning Goals and Outcomes, see the School's Course Outlines Policies webpage available at https://www.business.unsw.edu.au/degrees-courses/course-outlines/policies.

The following table shows how your Course Learning Outcomes relate to the overall Program Learning Goals and Outcomes, and indicates where these are assessed:

Program Learning Goals and Outcomes		**Course Learning Outcomes**	**Course Assessment Item**
This course helps you to achieve the following learning goals		*On successful completion of the course, you should be able to:*	*This learning outcome will be assessed in the following items:*
1	Knowledge	Explain various assumptions, concepts, principles, and methodologies underlying time series models for financial data; Understand different estimation methodologies; Apply programming tools such as Eviews, Stata to real word financial data.	• Mid-session Exam • Course Project (AOL) • Final Exam (AOL)
2	Critical thinking and problem solving	Use learned statistical techniques and skills to analyse, interpret and present relevant data; Apply financial econometric tools to modelling, estimation, inference and forecasting of financial data.	• Mid-session Exam • Course Project (AOL) • Final Exam (AOL)

3a	Written communication	Construct written work that is logically and professionally presented; Critically evaluate empirical econometric work; Present comprehendible results to a non technical audience.	• Course Project (AOL)
3b	Oral communication	Communicate ideas in a clear and concise manner.	• Video Assignment (AOL)
4	Teamwork	Work collaboratively to complete a task.	• Course Project (AOL)
5a.	Ethical, environmental and sustainability considerations	Identify and assess ethical considerations in problems in economics, finance, and business.	• Final Exam (AOL) • Course Project (AOL)
5b.	Social and cultural awareness	Formulate economic and business interactions in analytical terms and analyse them using tools provided by the theory.	• Not specifically assessed in this course

The course assessments indicated with (AOL) are used to assess the Program Learning Goals and Outcomes according to the Assurance of Learning (AOL) processes of the UNSW Business School. At least some components of the AOL assessments will be marked according to the AOL rubric for the assessment criteria. The AOL rubric relevant for your course will be posted on the course Moodle site. More specifically, on completion of the course, students should be able to:

1. Statistically describe and interpret financial data
2. Apply basic models/methods to analyse financial time series
3. Model the mean behaviour of financial time series.
4. Model the volatility in financial data and perform Value-at-Risk calculations that are used as an input into the financial decision making process.
5. Model the long-run relationships among financial time series.
6. Be proficient at econometric modelling of financial data using the software programs EViews and Stata which are widely used in Business world.

3 LEARNING AND TEACHING ACTIVITIES

3.1 Approach to Learning and Teaching in the Course

The philosophy underpinning this course and its Teaching and Learning Strategies are based on the "Guidelines on Learning that Inform Teaching at UNSW", which may be viewed at: www.guidelinesonlearning.unsw.edu.au. Specifically, the lectures, tutorials and assessment have been designed to appropriately challenge students and support the achievement of the desired learning outcomes. A climate of inquiry and dialogue is encouraged between students and teachers and among students (in and out of class). The lecturers and tutors aim to provide meaningful and timely feedback to students to improve learning outcome.

This is not a course where you can become proficient just by observing. You will need to get involved in class activities - evaluating information, asking and answering questions. You also must learn to organise your independent study and practise enough problems to gain a thorough understanding of concepts and how to apply them. You must get your hands dirty and learn by doing!

Students are expected to:

- Put a consistent effort into learning activities throughout the session by preparing for the regular assessment tasks;
- Take a responsible role in preparing for tutorials and participating in them;
- Develop communication skills through engaging in classroom discussions and preparing assignments;
- Concentrate more on understanding how and why to use formulas and less on memorising them;

3.2 Learning Activities and Teaching Strategies

The material given in the Lecture Schedule, the content of the lectures, and the content of the Tutorial Program define the examinable content of the course.

3.2.1 Lectures

The purpose of lectures is to provide a logical structure for the topics that make up the course, to emphasise the important concepts and methods of each topic, and to provide relevant examples to which the concepts and methods are applied.

Not all the material in the textbook is included in the lectures, and not all the material in the lectures is covered in the textbook. The lectures contain all the course material taught at the level required for the assessment tasks, and are your guide to the course content.

As not all topics will be presented extensively, students should refer to the textbook and relevant readings for further details.

This is a lecture based course, which will proceed as quickly or slowly as is necessary. Class attendance is very important for understanding the lecture notes.

Students are expected to develop the skills and ability to derive the results on their own. Memorizing formulae and final results will not be of a great help in the exams; only a proper ability to develop these results will ensure success.

3.2.2 Tutorials

The more you read the more you know, but **the more you practice the more you learn and understand**. Accordingly, the key to the understanding of this course is problem solving.

The purpose of the tutorial program is to enable you to raise questions about difficult topics or problems encountered in your studies. *You must not expect another lecture, but must come prepared with informed questions of your own.*

Tutorial discussion will be normally based on a sequence of exercise sheets that will be distributed regularly during the course. You are expected to make a serious attempt at all questions on an exercise sheet before attending your tutorial session. It will not be possible to discuss all the problems set in the allotted time and you should not expect all questions to be solved in depth at the tutorials. Some tutorial exercises will require the use of statistical software (Eviews, Stata) to undertake estimation of financial models and analysis of the data.

In tutorials, some students are randomly chosen to discuss his/her attempt to answer the tutorial problems. The aim is to encourage discussion within the classroom and to solve the issues you and your classmates have encountered with the problems.

80% of attendance (9 tutorials) is required by UNSW and Business School rules. Attendance may be checked.

If, owing to illness or other exceptional circumstances, you are unable to attend your usual tutorial, you may try to attend another tutorial in the same week. However, you are required to attend your usual tutorial class at least 9 times during the session. This allows for occasional absence due to minor illness and other reasons, hence special consideration applications will not reduce this requirement.

Students should also note that, in certain circumstances, such as where a request for special consideration is made in relation to assessment items, tutorial attendance will be taken into account in determining your final assessment or whether special consideration is granted.

3.2.3 Out-of-Class Study

While students may have preferred individual learning strategies, it is important to note that most learning will be achieved outside of class time. Lectures can only provide a structure to assist your study, and tutorial time is limited.

A recommended strategy (on which the provision of the course materials is based):

- Reading of the relevant chapter(s) of the text/notes/slides and other required material (if any) **before the lecture.** This will give you a general idea of the topic area;
- Attending lectures, where the context of the topic in the course and the important elements of the topic are identified. The relevance of the topic should be explained;
- Attending tutorials and attempting the tutorial questions **beforehand**.\

4 ASSESSMENT

4.0 You must complete the "Working with Academic Integrity" module on your Moodle site, before you hand in any written work.

- You MUST complete the 'Working with Academic Integrity' module AND THE MODULE'S QUIZ, found on your course Moodle site, BEFORE YOU ARE ALLOWED TO SUBMIT ANY WRITTEN ASSESSMENT.
- If your submission is delayed because you did not complete the module and the quiz, you may be liable to late penalties as specified in your course outline.
- Failing to comply with the University rules of Academic integrity may result in serious consequences:
    - All cases of plagiarism (regardless of their severity) ARE recorded with the University Integrity Office University register.
    - Depending on the level of the plagiarism/misconduct, the penalties may include a FAIL grade for the assessment piece, a FAIL grade for the course, or being expelled for serious/repeat offences.

Any misconduct, including plagiarism, is recorded on your Conduct Record. If you have only one academic misconduct at the lowest level (level A) in your career, then the record is wiped clear when you graduate. Otherwise it remains there permanently. *Many professions, such as accounting and law, require access to the student's Conduct Record.*

4.1 Formal Requirements

In order to pass this course, you must:

- achieve a composite mark of at least 50 out of 100;

- make a satisfactory attempt at ALL assessment tasks. This means attendance at 80% of tutorials (9 tutorials) and a mark of at least 40% in all assessment items;

AND

- Achieve a satisfactory level of performance in the final exam, which means a minimum 46% of the final exam.

4.2 Assessment Details

Assessment details are listed in the table below. Please note that ***employment obligations or holiday/travel plans of any kind are not acceptable reasons for failing to complete any assessment items.***

Assessment Task	Weighting	Length	Due date
Course Project	20%	No more than 10 pages	21 October, 18:00 (Week 12)
Mid-session exam	20%	45-60 minutes	Week 7
Video Assignment	10%	3 minutes video	Week 10
Final Exam	50%	2 hours	As scheduled in official exam period
	100%		

4.3 Midsession exam

An unseen, closed book exam will be conducted during lecture time of **Week 7, Thursday, September 7th**. The time limit for the exam is 45-60 minutes. The mid-session exam will test topics introduces in the first 5 weeks. All lecture, textbook, tutorial material is examinable.

The aim of the mid-session exam is to:

- Test your knowledge of the topics covered so far;
- Give you an opportunity to demonstrate your learned skills in problem solving;
- Give you a timely feedback on your learning;
- Assess your ability to interpret output from ;
- Help develop your analytical skills;
- Assess your ability to apply financial econometric tools to modelling, estimation, inference and forecasting of financial data;
- Test your understanding of different estimation methodologies.

There will be NO supplementary mid-session exam offered for the mid-session exam. Students who do not attend and do not have adequate reasons will be awarded a mark of zero.

In cases of serious illness, students will need to apply for Special Consideration with full and convincing documentation of that illness. For students who are found to be genuinely too ill to have attended a mid-session exam, the final exam will have a weight of **70%**.

For information on Special Consideration please refer to the Business School's Course Outlines Policies webpage.

Work commitment, holiday/travel plans are NOT valid reasons for Special Consideration.

Applications for special consideration must be **lodged online through myUNSW within 3 working days of the assessment** (Log into myUNSW and go to My Student Profile tab > My Student Services channel > Online Services > Special Consideration). Then submit the originals or certified copies of your completed Professional Authority form (pdf - download here) and any supporting documentation to Student Central.
No special consideration will be offered for missing an assignment.

4.4 Course Project

The group assignment gives students opportunities to demonstrate their understanding of the learned principles/techniques and their ability to apply them to practical problems. It also provides an environment for students to cooperate. The project topic, format and marking criteria are set out in a separate document on the course website (TBA). This is a teamwork assessment. Students MUST form groups of two. The groups will be discussed during tutorial session of **Week 4.**

4.4.1 Submission Procedure for Course Project

Each group must submit 1 hard copy AND 1 electronic copy (in Word format or PDF) of their assignment. The electronic copy must be submitted via Moodle by **11:59PM** of **Friday, 20 October 2017**. Further instructions will be available on the website.

A hard copy of your project must be dropped at the Economics Assignment **Box 2** no later than **6:00PM of Friday, 20 October 2017**. Alternatively, you may hand in to your tutor during your normal tutorial workshop time in Week 12.
Do not use plastic sheets or binders. Do not submit loose-leaf sheets of paper. Simply attach the completed cover sheet that will be provided, and staple the pages together. **Check that the names and student IDs of each group member have been completed on the cover page.**

All electronic copies of essays will checked for plagiarism on the Turnitin software into which they are uploaded. See notes on Plagiarism below and also note that the Turnitin software will automatically check against all other assignments submitted.

4.4.2 Late Submission of course Project

20% of the value of each project paper will be deducted for each day (24 hours) or part thereof which the electronic copy of an assignment is submitted to the course website after the deadline. Projects submitted more than five days late will not be marked.

4.5 Video Assignment

There will be one oral presentation that must be submitted in the form of a video on Week 10. Details of the assignment and submission procedure will be made available on Moodle.

4.6 Final Exam Format

The final examination will be held during the **university examination period**. It will be worth **50%** of the overall mark for the course, and will be based on all the material covered throughout the duration of the session. The exam will include a mixture of theoretical and numerical questions designed to test your knowledge, analytical skills, problem solving ability, your ability to explain and discuss issues informatively, and your ability to interpret the output of a statistical software.

Past exam papers for this subject are useful for your preparation and to gauge your knowledge and understanding of the concepts covered. However, due to recent changes to the course content, you should be advised that they are by no means indicative of the exact material to be covered in the current final exam.

My advice to you:

- Don't fall behind. Study the material on a lecture by lecture basis, as you will see that every lecture depends on the previous material.
- Do all the assigned homework. This is an integral part of the course. You should try harder problems - don't give in easily.
- Make use of the resources that are at your disposal: textbook, extra material, and my office consultation hours.

4.7 Protocol for viewing final exam scripts

The UNSW Business School has set a protocol under which students may view their final exam script. Please check the protocol here.

4.8 Quality Assurance

The Business School is actively monitoring student learning and quality of the student experience in all its programs. A random selection of completed assessment tasks may be used for quality assurance, such as to determine the extent to which program learning goals are being achieved. The information is required for accreditation purposes, and aggregated findings will be used to inform changes aimed at improving the quality of Business School programs. All material used for such processes will be treated as confidential and will not be related to course grades.

5 COURSE EVALUATION AND DEVELOPMENT

Each year feedback is sought from students and other stakeholders about the courses offered in the School and continual improvements are made based on this feedback. UNSW's myExperience Survey Tool is one of the ways in which student evaluative feedback is gathered. You are strongly encouraged to take part in the feedback process.

6 COURSE RESOURCES

The website for this course is on UNSW Moodle at: http://moodle.telt.unsw.edu.au

Lecture notes, lecture slides and tutorial questions, with additional readings, will be posted on the Moodle Course website. Lecture notes provide concise description of lecture material, but cannot be used as a substitute for the textbook and assigned readings.

6.1 Textbook

The main textbook for the subject is:

- Brooks, Chris (2014) ***Introductory Econometrics for Finance,*** Cambridge University Press. Third Edition.

This book is recommended, but it is not mandatory. This book is written at an introductory level and covers most of the material we will discuss in class. In addition, it describes how to estimate the econometric models in the software program EViews.

6.2 Additional Useful References

- [**Johnston]** Jack Johnston and John Dinardo, Econometric Methods (fourth edition), McGraw-Hill, 1997. [Johnston]
- **[BBL]** Breitung, J., Bruggemann, R. and H. Lutkepohl, 2004, "Structural Vector Autoregressive Modeling and Impulse Responses", in Applied Time Series Econometrics,

Lutkepohl, H. and M. Kratzig (eds.), Chapter 4.

- **[Enders]** Enders, W., 2010, Applied Time Series Analysis (third edition), Wiley,
- [**Gujarati]** Gujarati, D.N. and D.C. Porter, 2009, Basic Econometrics (5fth edition), McGraw-Hill,
- **[Lutkepohl]** Lutkepohl, H., 2004, "Vector Autoregressive and Vector Error Correction Models", in Applied Time Series Econometrics, Lutkepohl, H. and M. Kratzig (eds.)
- [**Verbeek]** Verbeek, M., 2012, A Guide to Modern Econometrics (fourth edition), John Wiley & Sons
- Campbell, J.Y., A.W. Lo, and A.C. MacKinlay (1997). The Econometrics of Financial Markets. Princeton University Press.
- Tsay, Ruey S. (2002), Analysis of Financial Time Series, John Willey & Sons.

6.3 Journal Articles

- Cont, R., (2001) Empirical properties of asset returns: stylized facts and statistical issues, *Quantitative Finance* 1, 223–236;
- Sharpe, W.F., (1991) Capital Asset Prices with and without Negative Holdings, *Journal of Finance*, 46(2), 489-509;
- Engle, R.F., (2001) GARCH 101: The Use of ARCH/GARCH Models in Applied Econometrics, *Journal of Economic Perspectives*, 15(4), 157-168;
- Lee T.-H. & Bao Y., Saltoglu B., (2007) Comparing density forecast models, Journal of Forecasting, 26(3), 203-225;
- Berndt, E., Hall, B., Hall, R. & Hausman, J. (1974), `Estimation and inference in nonlinear structural models', Annals of Economic and Social Measurement 3/4, 653-665;
- Bollerslev, T. (1986), `Generalized autoregressive conditional heteroskedasticity', Journal of Econometrics 31, 307-327;
- Diebold, F. X. & Mariano, R. S. (1995), `Comparing predictive accuracy', Journal of Business and Economic Statistics 13(3), 253-263;
- Engle (1982), `Autoregressive conditional heteroscedasticity with estimates of the variance of united kingdom inflation', Econometrica 50, 987-1007;
- Giacomini, R. & White, H. (2006), `Tests of conditional predictive ability', Econometrica 74(6), 1545-1578;
- Ng, S. & Perron, P. (2005), `A note on the selection of time series models', Oxford Bulletin Of Economics And Statistics 67, 115-134.

7 COURSE SCHEDULE

7.1 Lecture Schedule

Lectures start in Week 1 and finish in Week 12

LECTURE SCHEDULE	
Week	Lecture Topic and Readings
Week 1 24 July	**Topic 1 Introduction** • Understanding Financial Data- Brooks Ch.1 + lecture notes • Basic statistical and mathematical concepts- Brooks Ch.2 + lecture notes
Week 2 31 July	**Topic 2 Linear regression Model** • Brooks Ch.3&5 + lecture notes

Week 3 7 August	**Topic 3 Univariate Time Series Analysis** • Building ARMA models- Brooks Ch.6 (6.3-6.7)+ lecture notes • Estimation of ARMA models- Brooks Ch.6 (6.8)+ lecture notes **Additional References** Enders Ch.2; Gujarati Ch. 21&22; Hamilton Ch. 3&4; Johnston Ch. 7
Week 4 14 August	**Topic 3 Continued** • Forecasting with ARMA models-Brooks Ch.6 (6.11-6.12) + lecture notes • ML Estimation- Brooks Ch.9.9 +lecture notes **Additional References** Enders Ch.2; Gujarati Ch. 21&22; Hamilton Ch. 3&4; Johnston Ch. 7
Week 5 21 August	**Topic 4 Nonstationary Time Series** • Stationarity and Unit Root- Brooks Ch. 8 (8.1-8.3)+ lecture notes **Additional References** Enders Ch 4; Gujarati Ch. 21
Week 6 28 August	**Topic 5 Long-run relationships** • Cointegration Analysis- Brooks Ch. 8.4 + lecture notes • Error Correction models- Brooks Ch. 8 (8.5-8.7) + lecture notes **Additional References** Enders Ch 4; Gujarati Ch. 21
Week 7 4 September	**MIDSESSION EXAMINATION**
Week 8 11 September	**Topic 6 Multivariate Time Series Analysis** • Simultaneous Equations Models- Brooks Ch. 7 (7.2-7.10)+ lecture notes • Vector Autoregressive (VAR) Model- Brooks CH. 7 (7.11-7.17)+ lecture notes **Additional References** BBL Ch. 4; Enders Ch. 5; Gujarati Ch. 22; Lutkepohl Ch. 3; Verbeek Ch. 9
Week 9 18 September	**Topic 7 Risk and volatility Analysis** • ARCH/GARCH- Brooks Ch. 9 (9.2-9.10)+lecture notes • EGARCH- Brooks Ch. 9.13+lecture notes **Topic's Additional References** Enders Ch. 3; GujPor Ch. 22; Verbee Ch. 8
Mid-semester break: 23 September – 2 October inclusive (2 Oct = Labour Day Public Holiday)	
Week 10 3 October	**Topic 7 Risk and volatility Analysis** • GJR/GARCH in mean- Brooks Ch. 9 (9.12-9.15)+lecture notes • Stochastic Volatility - Brooks Ch. 9.20 +lecture notes
Week 11 9 October	**Topic 7 Simulation Methods** Brooks Ch.13
Week 12 16 October	**Finish Unfinished/Review**
Week 13 23 October	*NO LECTURES*

- This schedule is approximate and is subject to change.

7.2 Tutorial Schedule

Tutorials start in Week 2 and finish in Week 13.

TUTORIAL SCHEDULE		
Week	Topic	Reference
Week 1 24 July	NO TUTORIALS	No Tutorial
Week 2 31 July	Follows from Lectures with a one week lag. See Section 7.1	Tutorial 1
Week 3 7 August		Tutorial 2
Week 4 14 August		Tutorial 3
Week 5 21 August		Tutorial 4
Week 6 28 August		Tutorial 5
Week 7 4 September	**MIDSESSION EXAMINATION (in lecture)**	Tutorial 6
Week 8 11 September		Tutorial 7
Week 9 18 September		Tutorial 8
Mid-semester break: 23 September – 2 October inclusive (2 Oct = Labour Day Public Holiday)		
Week 10 3 October	No Assigned questions- tutorial times are used for work on project with tutor help **Online Video**	
Week 11 9 October		Tutorial 9
Week 12 16 October	**Course Project Due**	Tutorial 10
Week 13 23 October		Tutorial 11

* This schedule is approximate and is subject to changes.