ECON 547
Time Series Econometrics
CRN 11160 (Lectures) & 11161 (Labs)

Winter Session: First Term 2018

Instructor Name: Felix Pretis
Office: BEC 388
E-Mail: fpretis@uvic.ca
Office Hours: Tuesdays 11:00-12:00 or by appointment (arranged via email).
Lectures: Tuesdays & Fridays 9:00-10:20
Labs: Wednesdays, 11:30-12:20
Teaching Assistant: Omar Saleh

Course Content

The course provides an overview of time series econometrics focusing on the theory of time series models to highlight core concepts, followed by applications of advanced methods to prepare for students for independent research. The course covers basic asymptotic theory of autoregressive models and provides an introduction to modelling relationships between stationary and non-stationary variables through cointegration and the detection of structural breaks and outliers. Additional topics include forecasting and embedding theory in wider information sets as part of model discovery. Applications range from modelling macroeconomic data to time series analysis of climate observations.

Learning Outcomes: In this course you will gain an understanding of econometric time series methods and their applications. Time series econometric theory will equip you with technical knowledge to understand the challenges when working with time series data and allow you to conduct (as well as critically assess) time series research. You will learn the basics of econometric theory as well as independent research skills starting from formulating a well-defined research question, to concise presentation of results (both in an oral presentation and a written paper), as well as how to provide (and respond to) constructive feedback. The course leads to highly transferrable modelling and programming skills through lab-based instruction using the statistical programming language R (widely used in academic research, government roles, and the private sector).

You will learn tools to independently investigate research questions. The main criterion of assessment in this course is an independent student-conducted research project within the field of time series econometrics (broadly defined – ranging from macroeconomic to climate data). You will conduct your own research and present your results in a conference-style setting to learn the workflow of research: finding a feasible and novel research question, gathering data, and incorporating feedback received through presentation of results (similar to an academic conference or project presentation encountered in the private sector). Technical skills are assessed continuously during the term through assignments which may be completed in groups.

Textbook
The field of time series econometrics is vast and there is no single textbook that covers all topics considered in this course. Lecture notes will provide an overview with references to journal articles and readings from various relevant books. Useful reference books for the underlying econometric theory are Hamilton (1994) for and Hayashi (2000) though you are not expected to purchase these.

Grading

Assessment for this course is based on an independent research project and presentation, a set of assignments, and lab attendance. Due to the research focus of the course, there is no final exam.

Research Project & Presentation (65% total): The assessment of the research project is based on a project proposal (15%), a research presentation of the project (15%) and a final submitted project paper (35%). The final research paper should not exceed 15 pages in length (when using a font size of 11pt with 1.5 line spacing, including references) and will be graded on originality, correctness, and presentation/structure. Concise writing and presentation is important; 15 pages is a maximum, not a target! The project proposal should not exceed 2 pages in length. Excessive length is discouraged (as research papers and reports in the private sector should be short!) and will be penalised by 1% of the grade subtracted per page exceeding the 15 page limit. Further details on the project and presentation will be distributed during class.

The project proposal should be submitted as a PDF document via email to fpretis@uvic.ca by October 26th, 4pm (Pacific Time). The final project should be submitted as a PDF document via email to fpretis@uvic.ca by December 11th, 4pm (Pacific Time). Late work will not be accepted. To strengthen your independent research skills, group work is not permitted on the project – every student is required to submit their own project paper.

The conference-style presentations should be roughly 15 minutes in length and will take place during the lecture time slots on Friday November 30th & Tuesday December 4th, and during the lab session on December 5th (if necessary). Attendance at the class presentations is mandatory, even if you are not presenting on the day – it is a great learning opportunity to provide feedback to other presenters and learn from your colleagues’ work!

Important Note: You are encouraged to go beyond lecture notes and take risks in your research project by applying novel time series methods to datasets and topics not covered in the lecture notes. A technically-correct project using only methods or data presented in the lectures will score at most a B grade. To achieve an A grade, novelty and originality in methods or datasets has to be shown! See below table on the grading scale for further details.

Labs (5% total): Lab attendance contributes 5% of the total grade. Students may miss one lab with no penalty. Absence in more than one lab results in no points scored for the lab section of the course.

Assignments (30% total): Assignments consist of 4 problem sets to be handed in at the beginning of class on the due date. Only your best 3 assignments will count towards your overall grade, but all assignments have to be attempted. Students may work in groups on the assignments, however, each student has to hand in their own copy of the problem set to be assessed. Please indicate who was in your group by writing all names of group members on each of the submitted assignments.

Assignments have to be submitted on time (prior to class for assignments on the due-date) as physical copies (printed or hand written with clear hand writing to be legible).

Overall Grade Structure

<table>
<thead>
<tr>
<th>Assignment(s) (4):</th>
<th>30% (10% each for the best 3 out of 4 assignments)</th>
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</thead>
<tbody>
<tr>
<td>Lab Attendance:</td>
<td>5%</td>
</tr>
<tr>
<td>Project Proposal (due on Oct. 26th):</td>
<td>15%</td>
</tr>
<tr>
<td>Class Presentation of Project:</td>
<td>15%</td>
</tr>
<tr>
<td>(on Nov 30th, Dec. 4th, or Dec 5th )</td>
<td></td>
</tr>
<tr>
<td>Final Project (due on Dec 11th):</td>
<td>35%</td>
</tr>
</tbody>
</table>

Essential Course Requirements: Submission of the final project, project proposal, 4 assignments, and holding the class presentation, as well as attending all class presentations are essential course requirements, meaning they must be attempted in order to pass the course.
Grading Scale:

The below table summarises the grading scale and expectations for both the independent research project as well as assignments.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Point Range</th>
<th>Project Expectation</th>
<th>Assignment Expectation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>90-100</td>
<td>Flawless and original application of methods beyond material covered in lecture notes presented in concise and clear manner.</td>
<td>Correct answers with detailed derivations explaining individual steps and careful discussions of empirical examples.</td>
</tr>
<tr>
<td>A</td>
<td>85-89</td>
<td>Correct application of methods beyond material covered in lecture notes, showing a high level of understanding.</td>
<td>Correct answers (with minor errors) with limited derivations, missing explanations of individual steps, and only general discussions of empirical examples.</td>
</tr>
<tr>
<td>A-</td>
<td>80-84</td>
<td>Application of methods beyond material covered in lecture notes with some minor errors in novel methods or structural inconsistencies.</td>
<td></td>
</tr>
<tr>
<td>B+</td>
<td>77-79</td>
<td>Correct application of methods covered in lecture notes (not going beyond lectures) presented in concise and clear manner.</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>73-76</td>
<td>Correct application of methods covered in lecture notes.</td>
<td></td>
</tr>
<tr>
<td>B-</td>
<td>70-72</td>
<td>Application of methods covered in lecture notes with some minor errors.</td>
<td></td>
</tr>
<tr>
<td>C+</td>
<td>65-69</td>
<td>Application of methods covered in lecture notes with errors.</td>
<td>Answers with errors with missing explanations and limited discussions of empirical examples.</td>
</tr>
<tr>
<td>C</td>
<td>60-64</td>
<td>Application of methods covered in lecture notes with errors showing a lack of understanding core concepts.</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>50-59</td>
<td>Application of methods covered in lecture notes with major errors with significant evidence of lack of understanding core concepts.</td>
<td>Answers with serious errors in core concepts and limited to no discussion of empirical examples.</td>
</tr>
<tr>
<td>F or N</td>
<td>0-49</td>
<td>Project not submitted (or entirely off-topic) or presentation not given.</td>
<td>Assignment not submitted.</td>
</tr>
</tbody>
</table>

Students should review the University’s more detailed summary of grading. Consideration for missed presentations, late submission of projects or assignment will be given only on the basis of documented illness, accident or family affliction, and for no other reasons. In the event of a missed final presentation, students are advised to follow the procedures outlined in the University Calendar.

Students are advised not to make work or travel plans during lecture and lab hours to be able to attend all class presentations. There will be no special accommodation if travel plans conflict with the class presentations.

Course Policies

This course adheres to the Department Course Policies of the Department of Economics that deal with the following issues:

- Academic concessions
- Academic integrity (plagiarism and cheating)
- Attendance
- Grading
- Inclusivity and diversity
- Late adds
- Late assignments
- Repeating courses
- Review of an assigned grade
- Students with a disability
- Term assignments and debarment from examinations
- Travel plans
- Waitlists
The following policies are explicitly included because of their importance.

**Waitlist Policies**
- Instructors have no discretion to admit waitlisted students or raise the cap on the course.
- Students on the waitlist should discuss with the instructor how to ensure they are not behind with coursework in the event they are admitted.
- Registered students who do not show up in the first seven calendar days from the start of the course may be dropped from the course.
- Registered students who decide not to take the course are responsible for dropping the course, and are urged to do so promptly out of courtesy toward waitlisted students.
- Waitlist offers cease after the last date for adding courses irrespective of published waitlists.

**Academic Integrity**
Academic integrity requires commitment to the values of honesty, trust, fairness, respect, and responsibility. Students are expected to observe the same standards of scholarly integrity as their academic and professional counterparts. A student who is found to have engaged in unethical academic behaviour, including the practices described in the Policy on Academic Integrity in the University Calendar, is subject to penalty by the University.

Review [What is Plagiarism](#) for the definition of plagiarism. Note: Submitted work may be checked using plagiarism detection software.

**University Policy on Human Rights, Equity and Fairness**
The University is committed to promoting, providing and protecting a positive, supportive and safe learning and working environment for all its members.

See [General University Policies](#)

**Accessibility & Health Resources**
**Centre for Accessible Learning**
Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, you are free to approach me; however, you must register with the Centre for Accessible Learning (CAL) for formal arrangements to be made. The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

**Health Services** - University Health Services (UHS) provides a full service primary health clinic for students, and coordinates healthy student and campus initiatives.

**Counselling Services** - Counselling Services can help you make the most of your university experience. They offer free professional, confidential, inclusive support to currently registered UVic students.

**Elders' Voices** - The Office of Indigenous Academic and Community Engagement (IACE) has the privilege of assembling a group of Elders from local communities to guide students, staff, faculty and administration in Indigenous ways of knowing and being.

**CourseSpaces**
- CourseSpaces is used extensively for the course. All students are expected to be fully functional with the system.
- The lecture notes and additional material will be posted in CourseSpaces. Please note that the lecture notes online are only outlines of the actual lectures, and additional material may be covered during the lectures.
- All announcements will be posted in CourseSpaces. Students are advised to check it frequently.
Course Experience Survey (CES)
I greatly value your feedback on this course to continually improve the course and my teaching.

Informal early feedback: Early on during the lectures, I will distribute informal feedback forms to provide ongoing feedback on the instruction style. These will be anonymous and only used to improve teaching while the course is progressing.

Formal Experience Survey: Towards the end of term you will have the opportunity to complete a confidential course experience survey (CES) regarding your learning experience. The survey is vital to providing feedback to me regarding the course and my teaching, as well as to help the department improve the overall program for students in the future.

When it is time for you to complete the survey, you will receive an email inviting you to do so. If you do not receive an email invitation, you can go directly to the CES log-in. You will use your UVic NetLink ID to access the survey, which can be completed on your laptop, tablet or mobile device. I will remind you nearer the time, but please be thinking about this important activity, especially the following three questions, during the course.

- What strengths did your instructor demonstrate that helped you learn in this course?
- Please provide specific suggestions as to how the instructor could have helped you learn more effectively.
- Please provide specific suggestions as to how this course could be improved.

Course Schedule
I will provide detailed reference lists for topics covered. Please note the first class for this course will take place on Tuesday, September 11th 2018, followed by the first lab on Sept. 12th. There is no lecture on Sept. 7th, and no lab on Sept. 5th. The tentative course structure includes:

- Topic 1: Temporal Dependence and Univariate Autoregressive (AR) Models
- Topic 2: Multivariate Autoregressive Models
- Topic 3: Unit Roots, Stochastic Trends, and Cointegration
- Topic 4: Forecasting
- Topic 5: Outliers and Structural Breaks
- Topic 6: Exogeneity, Invariance, and Empirical Model Discovery

Assignment Due Dates (physical copies to be submitted):
Assignment #1: due before lecture on Friday Sept. 21st
Assignment #2: due before lecture on Friday Oct. 5th
Assignment #3: due before lecture on Friday Oct. 19th
Assignment #4: due before lecture on Friday Nov. 9th

Presentations:
Project Presentations will take place during lecture hours on Friday Nov 30th, Tuesday Dec. 4th, and – if necessary – during lab hours on Wednesday Dec. 5th.

Project Due Dates:
Project proposal due on Friday Oct. 26th (as PDF via email, before 4pm Pacific time)
Final project due on December 11th (as PDF via email, before 4pm Pacific time)

E-mail correspondence
Emails should be limited to critical matters, such as inability to attend class, an exam, or prolonged illness, and should include the course name and number in the subject line. Questions on course material should be asked during office hours or in class. The standard format for writing a letter must be used. This means it should begin with a salutation (e.g. Dear….), include full sentences and it must conclude with a signature that includes your full name and V#. Text message lingo should not be used.

Electronic devices
You are encouraged to install econometric software on your personal computers. R (https://cran.r-project.org/) and RStudio (https://www.rstudio.com/) are freely available online, the lab will cover use of the software.