Department of Economics
University of Texas at Austin

ECO 348K: Time Series Econometrics (Spring 2026)

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Lectures: UTC 3.122, MW 2:00 – 3:30 p.m.
Course Website: Canvas

Course Description

This course provides a comprehensive introduction to time series econometrics with applications in economics and finance. We begin with the basic properties of time series data and move through autoregressive (AR), moving average (MA), and ARMA models, emphasizing model identification, estimation, and forecasting. Building on these foundations, the course introduces advanced topics such as serial correlation, and volatility modeling using ARCH and GARCH. The second half of the course focuses on multivariate models, including VARs, impulse response analysis, and cointegration, followed by nonlinear time series models and state-space methods. Alongside theory, students will gain practical experience with Stata, developing the skills needed to estimate, interpret, and critically evaluate empirical models. With hands-on experience in model estimation and hypothesis testing, students will emerge well-prepared to tackle complex economic and financial challenges using advanced econometric methods and statistical tools.

Prerequisites

Economics 341K or 441K, and 420K or 420S with a grade of at least C- in each.

Readings

I will use difference sources to prepare the lectures so the focus should be on the lecture notes and slides. However, the Enders textbook provides a good complement.

- **Essential Reading:**
  - Enders, W. (2015). Applied Econometric Time Series. 4th Ed.. John Wiley & Sons.
- **Useful Readings:**
  - Asteriou, D. & Hall, S. (2011). Applied Econometrics. Macmillan
  - Diebold, F. X. (2004). Elements of Forecasting. South-Western Cengage.
  - Ghysels, E., & Marcellino, M. (2018). Applied economic forecasting using time series methods. Oxford University Press.
  - Gujarati, D. (2003). Basic Econometrics. 4th Ed., McGraw-Hill.
  - Harris, R. & Sollis, R. (2003). Applied Time Series Modelling and Forecasting. Wiley.

  - Wooldridge, J. M. (any edition). Introductory econometrics: a modern approach. Cengage.

- **More Advanced Readings:**
  - Hamilton, James D. (1994). Time Series Analysis. Princeton University Press, New Jersey.
  - Hayashi, Fumio (2000). Econometrics. Princeton University Press, New Jersey.

Software

Students are required to use the statistical package STATA in this course. Class examples will be illustrated using STATA, and students will use **STATA for empirical exercises in homework assignments**. You have several options for accessing STATA:

- STATA can be purchased and installed on your computer. A six-month student STATA/BE license is available for $48 at: Buy STATA
- You can access STATA licenses owned by UT remotely on the Stat Apps Server (Wincompute). Instructions for doing this are at: Remote Access. Note that the number of available STATA licenses is limited, which might make access difficult during peak use times (i.e., the evening before a homework assignment is due).
- Various computer labs on campus have access to Stata, including the data lab in PCL. It may be possible to access these labs remotely, see: Remote Labs
- We will use STATA in the class, but students are expected to improve their software skills on their own. There are many tutorials available online that you can also consult: Learning Stata

Lecture Format

Lectures will be in person on Mondays & Wednesdays from 2:00 - 3:30 p.m. in UTC 3.122. Regular attendance is strongly encouraged, as **there will be no class recordings**.

From past experience, students who attend regularly tend to do very well, while those who miss lectures often find it hard to keep up with the fast pace of the course. If you do need to miss a class, please make sure to review the material on your own so you don't fall behind.

Assessment and Grading

1. **Homework Assignments (32% of total grade):** There will be **five homework assignments** aligned with the course content. Assignments will be posted on Canvas one week before the due date and must be submitted as a single PDF file (with relevant code, if required) at the beginning of class on the due date. Tentative deadlines are: *Jan 28, Feb 11, Mar 4, Mar 25, and Apr 13.* You are allowed to skip one assignment. If all five are submitted, the lowest grade will be dropped. Each counted assignment is worth **8%** of the total grade.
2. **Midterm Exams (36% of total grade):** There will be three midterms exams:
   - **In-Class Midterm Exam 1 (12%):** Scheduled for **Wednesday, Feb 18** during class time (*2:00–3:30 PM*). This closed-book exam covers **Lectures 1–10** and emphasizes analytical reasoning and conceptual understanding (no Stata).
   - **In-Class Midterm Exam 2 (12%):** Scheduled for **Wednesday, Apr 1** during class time (*2:00–3:30 PM*). This closed-book exam covers **Lectures 12–20** and also emphasizes conceptual understanding and analytical reasoning (no Stata).
   - **Take-Home Midterm Exam (12%):** Distributed on **Wednesday, Apr 15 at 2:00 PM** and due by **Thursday, Apr 16 at 2:00 PM** (24-hour window). This exam focuses on practical applications using *Stata*, covering material up to and including **Lecture 24**.

3. **Pop Quizzes (8%):** There will be **10 short pop quizzes** across the semester. Your best **8 quizzes** will count toward the final grade. If you miss a quiz due to an excused absence, you must notify me within 48 hours. That quiz will be dropped, and the others reweighted. Without an approved excuse, the missed quiz will receive a grade of zero. University-approved absences must be verified via the Dean of Students.
   - Students are required to bring a laptop or tablet to class for completing quizzes. These devices must be used **only for the quiz** and not for any other purpose during class.
   - Pop quizzes will appear unannounced in Canvas and will require a password to access. Students who are not present in class will not receive the password, and therefore cannot take the quiz.
   - **Sharing the quiz password with students who are not present is strictly prohibited.** If the number of quiz attempts exceeds the number of students present in class, **all students will receive a score of zero** for that quiz. Please be mindful and do not share the password under any circumstances.
4. **Final Exam (24% of total grade):** The final is a cumulative two hours long, in-class exam scheduled for **Monday May 4, 10:30-12:30 PM** in UTC 3.122. You may bring a one-sided, handwritten cheat sheet on an 8.5×11 inch paper, which must be submitted along with your exam.

Important Notes:.

- **Midterm and Final Exam Absence Policy:** If you miss an **in-class midterm exam** due to a **university-approved excused absence**, the weight of the missed midterm will be **transferred to the other in-class midterm exam**. If the absence is **not university-approved**, the missed midterm will receive a score of **zero**.

  If you miss the **final exam** due to a university-approved excused absence, you will receive an **Incomplete** in the course, in accordance with university policy. Missed final exams without an approved excuse will receive a score of **zero**. All excused absences must be verified through the Dean of Students.
- **Late assignments and make-up exams:** Late submissions and requests for make-up exams will **not be accepted** except in cases of university-approved absences. Any request for accommodation must be submitted in writing **before the exam**. Please note that the TA is not responsible for handling excused absences or accommodations.
- **Academic Dishonesty:** Academic integrity is taken very seriously in this course. While you are encouraged to discuss homework problems with your assigned working group, you must submit your own individual write-up. **Collaboration is strictly prohibited on the take-home exam.** Similarly, the use of AI tools (e.g., ChatGPT or similar platforms) for assignments, exams, or any other graded component is **not permitted**.

  Any suspected violation will be treated as **academic misconduct**. All such cases must be referred to the **Office of Student Conduct and Academic Integrity** for formal review; informal resolution between instructor and student is no longer an option.
- **Regrade requests:** Requests for regrading must be submitted in writing within five working days of receiving your graded work. The entire submission will be re-evaluated, not just selected questions. Requests submitted after the deadline will not be considered.
- **Grading scale:** Final grades will follow the university's plus/minus grading scale (A, A-, B+, ...). Grades will be curved based on your weighted average and overall performance in the class.

Lecture Schedule

Table 1 provides a tentative outline of the topics the course will cover; some adjustments should be expected. The schedule on Canvas will be updated throughout the semester with specific readings, handouts, and dates.

For your convenience, you will also receive a "Course Notebook" file, which will be updated regularly to reflect the specific topics covered in each lecture. This file will serve as a central hub and will include links to:

- Lecture slides and notes,
- Homework assignments and solutions,
- State codes,

— Exams and solutions, and

— Any other course materials.

In short, this file will be your **one-stop resource** for everything you need in this course.

Table 1: Tentative Lecture Schedule

Lecture	Date	Topics	Readings	Assignments
1	Mon Jan12	Introduction; Syllabus Outline; Basic models and properties	Enders Ch. 1	
2	Wed Jan 14	Basic models and properties	Enders Ch. 2	
3	Wed Jan 21	AR, ACF and ACV	Enders Ch. 1 & 2	HW 1 posted
4	Mon Jan 26	AR, Information Criteria, Stata Examples	Enders Ch. 2	
5	Wed Jan 28	MA, ARMA, Box-Jenkins Methodology	Enders Ch. 2	HW 1 due
6	Mon Feb 2	Serial Correlation and tests	Enders Ch. 2	
7	Wed Feb 4	Non-Stationarity	Enders Ch. 2 & 4	HW 2 posted
8	Mon Feb 9	Forecasting & Evaluation	Enders Ch. 2	
9	Wed Feb 11	Financial Time Series and Volatility, ARCH Models	Enders Ch. 3	HW 2 due
10	Mon Feb 16	Review Session		
11	Wed Feb 18	**Midterm Exam 1 (In-class)**		
12	Mon Feb 23	GARCH models, Stata examples	Enders Ch. 3	
13	Wed Feb 25	Dynamic Multivariate Modelling	Enders Ch. 5 & 6	HW 3 posted
14	Mon Mar 2	Dynamic Multivariate Modelling: cont., Stata examples	Enders Ch. 5 & 6	
15	Wed Mar 4	VARs	Enders Ch. 5 & 6	HW 3 due
16	Mon Mar 9	VARs and forecasting	Enders Ch. 5 & 6	
17	Wed Mar 11	VARs and IRFs	Enders Ch. 5 & 6	HW 4 posted
18	Mon Mar 23	VARs in Stata	Enders Ch. 5 & 6	
19	Wed Mar 25	Granger Causality; Cointegration	Enders Ch. 6	HW 4 due
20	Mon Mar 30	Review and Stata examples		
21	Wed Apr 1	**Midterm Exam 2 (In-class)**		
22	Mon Apr 6	Non-Linear Time Series Models	Slides	HW 5 posted
23	Wed Apr 8	Non-Linear Time Series Models	Slides	
24	Mon Apr 13	Non-Linear Time Series Models	Slides	HW 5 due
25	Wed Apr 15	**Take-Home Exam**		
26	Mon Apr 20	State-Space Models	Slides	
27	Wed Apr 22	State-Space Models	Slides	
28	Mon Apr 27	Review and exam instructions		

Note: Dates, topics, and readings are tentative and subject to change. Updates will be posted on Canvas. Please keep track of the the "Course Notebook" file.

University Policies & Resources

Statement on Academic Integrity:. The University of Texas Honor Code states: The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and the community. Each student in this course is expected to abide by the UT Honor Code and uphold academic integrity. Students who violate University rules on academic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on academic dishonesty will be strictly enforced. For further information, please visit the Student Conduct and Academic Integrity website at: conduct.

What this means for this course: You are allowed/encouraged to study together with your groups and to discuss information and concepts covered in the lecture and the recitation sections. However, this cooperation should never involve one student having possession of or copying directly from another student's work that is to be graded. Should such copying occur, both students involved will receive zeros for the assignment. In addition, directly copying from websites/books, etc., for the homework will also return zero for the assignment. In addition, any collaborative behavior or use of unauthorized material for graded work will lead to University disciplinary action. Finally, using books, notebooks, notes, electronic (e.g. phones), or other means during the exams, or copying from other students, violates the University and course policies.

In this course, every element of class assignments must be fully prepared by the student. The **use of generative AI tools for any part of your work will be treated as plagiarism**. If you have questions, please contact me.

Use of Class Materials:. No materials used in this class, including, but not limited to, lecture handouts, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class unless you have my explicit, written permission. Unauthorized sharing of materials promotes cheating. It is a violation of the University's Student Honor Code and an act of academic dishonesty. I am well aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in sanctions, including failure in the course. Additionally, all these materials are copyright-protected works. Any unauthorized copying of the class materials is a violation of federal law and may result in disciplinary actions being taken against the student.

Diversity, Equity, and Inclusion:. It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that student's learning needs be addressed, and that the diversity that students bring to this class can be comfortably expressed and be viewed as a resource, strength, and benefit to all students. Please come to me at any time with any concerns.

Other:. Please do not use phones/laptops/tablets in the class, as it is distracting to me and your classmates. If you need to use technology inside the classroom for a specific reason, please talk to me before the class.

ADA Notice:. The university is committed to creating an accessible and inclusive learning environment consistent with university policy and federal and state law. Please let me know if you experience any barriers to learning so I can work with you to ensure you have equal opportunity to participate fully in this course. If you are a student with a disability, or think you may have a disability, and need accommodations please contact Services for Students with Disabilities (SSD). Please refer to SSD's website for more information: SSD website. If you are already registered with SSD, please deliver your Accommodation Letter to me as early as possible in the semester so we can discuss your approved accommodations and needs in this course.

Counseling and Mental Health Center:. The Counseling and Mental Health Center serves UT's diverse campus community by providing high quality, innovative and culturally informed mental health programs and services that enhance and support student's well-being, academic and life goals. To learn more about your counseling and mental health options, call CMHC at (512) 471-3515. If you are experiencing a mental health crisis, call the CMHC Crisis Line 24/7 at (512) 471-2255.

Behavior Concerns Advice Line (BCAL):. If you are worried about someone who is acting differently, you may use the Behavior Concerns Advice Line to discuss by phone your concerns about another individual's behavior. This service is provided through a partnership among the Office of the Dean of Students, the Counseling and Mental Health Center (CMHC), the Employee Assistance Program (EAP), and The University of Texas Police Department (UTPD). Call 512-232-5050 or visit behavior concerns website.

BeVocal:. BeVocal is a university-wide initiative to promote the idea that individual Longhorns have the power to prevent high-risk behavior and harm. At UT Austin, all Longhorns have the power to intervene and reduce harm. To learn more about BeVocal and how you can help to build a culture of care on campus, go to: BeVocal website.

Emergency Evacuation Policy:. Occupants of buildings on the UT Austin campus are required to evacuate and assemble outside when a fire alarm is activated, or an announcement is made. Please be aware of the following policies regarding evacuation:

- Familiarize yourself with all exit doors of the classroom and the building. Remember that the nearest exit door may not be the one you used when you entered the building.
- If you require assistance to evacuate, inform me in writing during the first week of class.
- In the event of an evacuation, follow my instructions or those of class instructors.
- Do not re-enter a building unless you are given instructions by the Austin Fire Department, the UT Austin Police Department, or the Fire Prevention Services office.

For more information regarding emergency evacuation, please contact the Office of Campus Safety and Security, 512-471-5767, safety website.

Title IX Reporting:. Title IX is a federal law that protects against sex and gender-based discrimination, sexual harassment, sexual assault, sexual misconduct, dating/domestic violence, and stalking at federally funded educational institutions. UT Austin is committed to fostering a learning and working environment free from discrimination in all its forms. When sexual misconduct occurs in our community, the university can:

1. Intervene to prevent harmful behavior from continuing or escalating.
2. Provide support and remedies to students and employees who have experienced harm or have become involved in a Title IX investigation.
3. Investigate and discipline violations of the university's relevant policies (title IX relevant policies website).

Beginning January 1, 2020, Texas Senate Bill 212 requires all employees of Texas universities, including faculty, to report any information to the Title IX Office regarding sexual harassment, sexual assault, dating violence, and stalking that is disclosed to them. Texas law requires that all employees who witness or receive any information of this type (including, but not limited to, writing assignments, class discussions, or one-on-one conversations) must be reported. I am a Responsible Employee and must report any Title IX-related incidents that are disclosed in writing, discussion, or one-on-one. Before talking with me, or with any faculty or staff member about a Title IX-related incident, be sure to ask whether they are a responsible employee. If you would like to speak with someone who can provide support or remedies without making an official report to the university, please email advocate@austin.utexas.edu. For more information about reporting options and resources, visit title IX website, contact the Title IX Office via email at titleix@austin.utexas.edu, or call 512-471-0419.

Personal Pronouns:. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name unless they have added a preferred name with the Gender and Sexuality Center. I will gladly honor your request to address you by a name that is different from what appears on the official roster, and by the gender pronouns you use (she/he/they/ze, etc). Please advise me of any changes early in the semester so that I may make appropriate updates to my records. For instructions on how to add your pronouns to Canvas, visit pronouns website.

Land Acknowledgment:. (I) We would like to acknowledge that we are meeting on Indigenous land. Moreover, (II) We would like to acknowledge and pay our respects to the Carrizo & Comecrudo, Coahuiltecan, Caddo, Tonkawa, Comanche, Lipan Apache, Alabama-Coushatta, Kickapoo, Tigua Pueblo, and all the American Indian and Indigenous Peoples and communities who have been or have become a part of these lands and territories in Texas, here on Turtle Island.