

ECON 491: Topics in Nonlinear Econometrics

Fall 2023

Course Meeting: Tuesday, Thursday 9:30-10:50 AM

Credits: 3

Professor: Russell Weinstein

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Phone: 217-300-6410

Office Hours: By appointment

Course website: canvas.illinois.edu

Course Description

Duration analysis is used to address a wide range of questions relevant for policy organizations, central banks, the financial sector, and industry generally. Examples of these questions include: what is the probability that an individual will exit unemployment this week, given he has been unemployed for the past eight weeks; what is the probability that an individual defaults on their mortgage this month given they have not defaulted for the past 12 months; what is the probability that a firm adopts a new technology this year conditional on not having adopted for the past 3 years, and how does this depend on the firm's market share. The goal of this course is to develop the tools to understand, estimate, and interpret duration analysis models—statistical models used to analyze duration data. Students will gain practical experience organizing data and writing code for statistical software to estimate these models and better understand economic phenomena. Prerequisites include ECON 302 or 303, and ECON 471.

Course Texts

Cleves, Mario, William W. Gould, and Yulia V. Marchenko (2016): An Introduction to Survival Analysis Using Stata, Revised Third Edition, Stata Press.

Articles listed below can be obtained by searching in the University of Illinois Library Catalog (library.illinois.edu).

Topics and Readings (subject to change with advance notice)

Topic 1: Introduction to Survival Analysis [August 22]

Chapters 1

Topic 2: Describing the Distribution of Failure Times [August 24, August 29]

Chapter 2

Topic 3: Hazard Models [August 31, September 5]

Chapter 3

Topic 4: Censoring and Truncation [September 7, September 12]

Chapters 4

Topic 5: Recording Survival Data [September 14, September 19]

Chapter 5

Topic 6: Organizing and Preparing Data for Survival Analysis [September 21, September 26]

Chapter 6

Midterm [September 28 Review, October 3 Midterm]

Topic 7: Looking at Output and Nonparametric Analysis [October 5, October 10]

Chapter 7 and Chapter 8

Topic 8: Nonparametric Analysis: Survivor Function and Cumulative Hazard [October 12, October 17]

Chapter 8

Topic 9: Nonparametric Analysis: Hazard Function [October 19, October 24]

Chapter 8

Topic 10: The Cox Proportional Hazards Model [October 26, October 31]

Chapter 9

Topic 11: Cox Proportional Hazards Model: Hazard Functions and Additional Covariates [November 2, November 7]

Chapter 9 and Chapter 10

Topic 12: Cox Proportional Hazards Model: Interactions and Time-Varying Variables and Coefficients [November 9, November 14]

Chapter 10

Topic 13: Cox Proportional Hazards Model: Group Effects and Diagnostics [November 16, November 28]

Chapter 10 and Chapter 11

Topic 14: Applications: Unemployment, Banks, and Technology [November 30, December 5]

DellaVigna, Stefano and M. Daniele Paserman (2005): "Job Search and Impatience," *Journal of Labor Economics*, Vol. 23(3).

Whalen (1991): "A Proportional Hazards Model of Bank Failures: An Examination of its Usefulness as an Early Warning Tool," *Federal Reserve Bank of Cleveland, Economic Review*, Vol. 27(1).

Levin, Levin, and Meisel (1987): "A Dynamic Analysis of the Adoption of a New Technology: The Case of Optical Scanners," *Review of Economics and Statistics*.

i>clicker

An i>clicker remote, or a subscription to i>clicker Reef is required for in-class participation. See below for details on grading policies for i>clicker questions.

If you decide to purchase an i>clicker Reef subscription, you may purchase a six month subscription on the i>clicker website: <https://www.iclicker.com/pricing>

If you decide to purchase a remote, you may purchase any of the following models through the bookstore or a variety of online vendors (if you do not already have one):

The original i>clicker
i>clicker +
i>clicker 2

How to register your i>clicker:

To receive credit for the responses you submit with i>clicker, you must add this course by the beginning of the second class, August 24 at 9:30 AM. Students who register after this time will not receive credit for their participation in the classes before they added this course on their clicker account.

Follow the instructions from Technology services (<https://answers.uillinois.edu/illinois/page.php?id=120820>):

- Create a student account using your @illinois.edu address at iclicker.com or in the [iClicker Student app](#). For more details, you can view the video at the link above.
- Search for the iClicker course or by instructor name and then enroll in it.
- If you use a remote, you must [register its ID#](#) in your account profile.
- If you use the app, sign into the course session at the start of class before answering polls.

i>clicker Cheating Policy:

Bringing a fellow student's i>clicker to class and voting for them is cheating and a violation of the University Student Code (<http://studentcode.illinois.edu/>). If you are caught with a remote other than your own or have votes in a class that you did not attend, you will forfeit all clicker points and may face additional disciplinary action.

Activities and Grades

Grades are determined by the following rubric:

Participation: 10% (lowest dropped)
Lab Assignments: 30% (lowest dropped)
Midterm exam: 30%
Final exam: 30%

Each component is discussed below.

Participation will be based on iclicker responses. These questions will generally be graded for participation and not for accuracy. There will generally be three iclicker questions per class.

Lab Assignments will be based on the practical application each week. In these assignments, you will be asked to describe the data, methods, and results from the in-class lab exercise each week.

A midterm exam will take place on October 3 during class.

Final Exam will be cumulative but will focus on the material covered after the midterm. You are responsible for taking the midterm and final exam on the day they are given.

Students enrolling in this course for master's credit will have an empirical final project as an additional component to the course. Details to follow.

Course Policies

Grading Policies

Late responses to the weekly lab assignments will not receive credit, but a missed assignment can be used as the dropped score. If you have a university-accepted reason (e.g. illness with a doctor's note), and you contact Professor Weinstein, you may make up an assignment within 7 days of the original due date. If more than two classes are missed because of an illness, and there is an accompanying doctor's note, the student should contact Professor Weinstein and the Office of the Dean of Students Student Assistance Center (<https://odos.illinois.edu/community-of-care/student-assistance-center/>).

In this course, we will be assigning +/- letter grades. I will assign grades as follows:

A+	\geq than 97.0
A	93.0 to 96.9
A-	90.0 to 92.9
B+	87.0 to 89.9
B	83.0 to 86.9
B-	80.0 to 82.9
C+	77.0 to 79.9
C	73.0 to 76.9
C-	65.0 to 72.9
D	60.0 to 64.9
F	less than 60.0

Academic Assistance

Students are encouraged to utilize the many resources we have throughout campus to assist with academics. We recommend that you seek them out starting early in the semester, not just in times of academic need, in order to develop good study habits and submit work which represents your full academic potential. Many resources are found on the Economics Website including details about the Economics Tutoring Center, Academic Advising, and other academic support options: <https://economics.illinois.edu/academics/undergraduate-program/academic-student-support>

Academic Integrity

According to the Student Code, 'It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions.' Please know that it is my responsibility as an instructor to uphold the academic integrity policy of the University, which can be found here: <https://studentcode.illinois.edu/article1/part4/1-401/>

Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity policies. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask Professor Weinstein if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity. Read the full Student Code at <https://studentcode.illinois.edu/>

Students with Disabilities

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TTY), or e-mail a message to disability@illinois.edu. DRES Website: www.disability.illinois.edu/

Please note accommodations are not retroactive to the beginning of the semester but begin the day you contact Professor Weinstein with a current letter of accommodation from DRES.

Community of Care

As members of the Illinois community, we each have a responsibility to express care and concern for one another. If you come across a classmate whose behavior concerns you, whether in regards to their well-being or yours, we encourage you to refer this behavior to the Student Assistance Center (217-333-0050 or <http://odos.illinois.edu/community-of-care/referral/>). Based on your report, the staff in the Student Assistance Center reaches out to students to make sure they have the support they need to be healthy and safe. Further, we understand the impact that struggles with mental health can have on your experience at Illinois. Significant stress, strained relationships, anxiety, excessive worry, alcohol/drug problems, a loss of motivation, or problems with eating and/or sleeping can all interfere with optimal academic performance. We encourage all students to reach out to talk with

someone, and we want to make sure you are aware that you can access mental health support at the Counseling Center (<https://counselingcenter.illinois.edu/>) or McKinley Health Center (<https://mckinley.illinois.edu/>).

For mental health emergencies, you can call 911 or walk into the Counseling Center, no appointment needed.

Disruptive Behavior

Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office for Student Conflict Resolution for disciplinary action.

Emergency Response Recommendations

Emergency response recommendations can be found at the following website: <http://police.illinois.edu/emergency-preparedness/>. I encourage you to review this website and the campus building floor plans website within the first 10 days of class. <http://police.illinois.edu/emergency-preparedness/building-emergency-actionplans/>.

Religious Observances

The Religious Observance Accommodation Request form is available at <https://odos.illinois.edu/community-of-care/resources/students/religious-observances/>. Submit the form to the instructor and to the Office of the Dean of Students (helpdean@illinois.edu) by the end of the second week of the course; in the case of exams or assignments scheduled after this period, students should submit the form to the instructor and to the Office of the Dean of Students as soon as possible.

Family Educational Rights and Privacy Act (FERPA)

Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <http://registrar.illinois.edu/ferpa> for more information on FERPA. Student information and records will not be released to anyone other than the student unless the student has provided written approval or as required by law.

Sexual Misconduct Reporting Obligation

The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: <http://www.wecare.illinois.edu/resources/students/#confidential>.

Other information about resources and reporting is available here: <http://wecare.illinois.edu/>.

Student Support

The Counseling Center is committed to providing a range of services intended to help students develop improved coping skills in order to address emotional, interpersonal, and academic concerns. Please visit their website to find valuable resources and services: <https://counselingcenter.illinois.edu/>.

Counseling Center Information: 217-333-3704

Location: Room 206, Student Services Building (610 East John Street, Champaign IL)

McKinley Mental Health Information: 217-333-2705

Location: 3rd Floor McKinley Health Center 1109 South Lincoln, Urbana, IL

Emergency Dean: The Emergency Dean may be reached at (217) 333-0050 and supports students who are experiencing an emergency situation after 5 pm, in which an immediate University response is needed and which cannot wait until the next business day. The Emergency Dean is not a substitute for trained emergency personnel such as 911, Police or Fire. If you are experiencing a life threatening emergency, call 911. Please review the Emergency Dean procedures: <http://odos.illinois.edu/emergency/>

Academic Dates and Deadlines

Students should make note of important academic deadlines for making changes to their courses (add, drop, credit/no-credit, grade replacement, etc.). <https://registrar.illinois.edu/academic-calendars>

Please check with your academic department regarding specific procedures and policies.

Run > Hide > Fight

Emergencies can happen anywhere and at any time. It is important that we take a minute to prepare for a situation in which our safety or even our lives could depend on our ability to react quickly. When we're faced with almost any kind of emergency – like severe weather or if someone is trying to hurt you – we have three options: Run, hide or fight.



Run

Leaving the area quickly is the best option if it is safe to do so.

- ▶ Take time now to learn the different ways to leave your building.
- ▶ Leave personal items behind.
- ▶ Assist those who need help, but consider whether doing so puts yourself at risk.
- ▶ Alert authorities of the emergency when it is safe to do so.



Hide

When you can't or don't want to run, take shelter indoors.

- ▶ Take time now to learn different ways to seek shelter in your building.
- ▶ If severe weather is imminent, go to the nearest indoor storm refuge area.
- ▶ If someone is trying to hurt you and you can't evacuate, get to a place where you can't be seen, lock or barricade your area if possible, silence your phone, don't make any noise and don't come out until you receive an Illini-Alert indicating it is safe to do so.



Fight

As a last resort, you may need to fight to increase your chances of survival.

- ▶ Think about what kind of common items are in your area which you can use to defend yourself.
- ▶ Team up with others to fight if the situation allows.
- ▶ Mentally prepare yourself – you may be in a fight for your life.

Please be aware of people with disabilities who may need additional assistance in emergency situations.

Other resources

- ▶ police.illinois.edu/safe for more information on how to prepare for emergencies, including how to run, hide or fight and building floor plans that can show you safe areas.
- ▶ emergency.illinois.edu to sign up for Illini-Alert text messages.
- ▶ **Follow the University of Illinois Police Department** on Twitter and Facebook to get regular updates about campus safety.