

# AEDECON 6120: Applied Econometrics I

Spring 2022

Instructor: Abdoul G. Sam ([sam.7@osu.edu](mailto:sam.7@osu.edu))

Lecture time: Tuesday and Thursday 11:10am-12:30pm EST (Kottman Hall 116)

Office hours: from 1/10 to 2/28: Wednesday 10am-12pm EST (AA 338) and by appointment  
from 3/1 to 4/25: Thursday 9:30am-11:30pm EST (AA 338) and by appointment

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Lab time: Wednesday 4:10-6pm (AA005)

**Course Description:** This is the second in a three-course sequence in applied econometric methods. The overall goal of the course is to apply the tools of econometric analysis acquired from AEDE 6110 and related quantitative courses in order to conduct sound applied research. To achieve this goal, we will be working closely with industry partners for an in-depth analysis of a real-world project. The project study will be supplemented by practical homework assignments and in-class applications using real and/or simulated datasets.

**Online access:** to attend the lectures live online, login to the class page on Carmen and click on the Zoom tab located in the panel the left side of the screen.

**Required Textbook:** Wooldridge, Jeffrey M. Introductory Econometrics: A Modern Approach, 7th ed., Cengage, 2020.

**Evaluation:** There will be a number of homework assignments and a term project--described below. Completion of homework assignments will require the use of a statistical software.

**Term Project:** We are working with the Risk Modeling and Analytics (RMA) team at Huntington National Bank (S&P 500) in downtown Columbus to undertake the following projects:

- Impact of the state of the economy, interest rates and/or portfolio characteristics on residential mortgage prepayment behavior
- Deposit portfolio rate modeling

Prepayment risk is one of the key risks in managing credit portfolios and is an important factor in credit loss and interest income forecasting. It is believed to be impacted by the state of the economy, current interest rates, as well as loan characteristics. Prepayments are typically rising during periods of lower interest rates; however, the sensitivity to the state of the economy as well as the type of the borrower may play an important role as well. The first project will focus on identifying 1) the sensitivity to rate environment, and 2) groups of borrowers with the similar sensitivities to risk drivers.

Deposit portfolio rate is an important parameter to forecast especially in the current volatile rate environment. This project will focus on identifying the short-term and long-term underlying drivers of the deposit rate.

Huntington National Bank will provide the data for the analysis of the project. The RMA team is cognizant of students' competing academic priorities and have set their expectations accordingly. One or more members of the team will visit our class before the undertaking of the projects to provide clarifying details. Students will also present progress reports to the RMA four to five times in the second half of the semester as well as final findings. These presentations are excellent opportunities for the students to ask questions and receive guidance to help make these projects a meaningful and informative experience for all. **The class project will culminate in a formal business presentation made by students at a venue to be announced later.**

Students will be divided into small groups for the undertaking of the projects. It is crucial to learn how to work effectively with others because a lot of the work done in industry and academia is done as teamwork.

Since I cannot accurately determine individual effort within a group, each student will participate in one confidential peer evaluation of his or her teammates at the end of the term in order to minimize the likelihood of free-riding and reward exceptional involvement in project completion. The peer evaluations are to be taken seriously and will count for ten percent of your final grade. Any student failing to complete the peer evaluations by the deadline is penalized by twenty percent reduction of their own average peer evaluation score.

There is no uniform structure prescribed for the final project report but it should at a minimum contain the following items:

- introduction: describe the project and discuss its rationale and significance
- model specification: discuss/justify the functional form adopted, justify the choice of variables included in the study; discuss variable selection mechanism
- data: discuss the source and type of data and provide descriptive statistics
- results and recommendations: display findings of the econometric analysis (including all relevant statistical tests) in professionally-styled tables, interpret the key findings.

I will place a significant premium on the written quality and presentation of the final document. You are encouraged to use material from a variety of sources in your analysis; however, you must cite others' work properly.

### **Statistical Software:**

A statistical software package is required for this course. Options include R, Stata and SAS. SAS software, freely available to all OSU students. Follow these steps to download and install SAS, if you are interested:

1. Go to <https://osuitsm.service-now.com/selfservice/>
2. Sign-in to your account (red tab on the top right under the OSU logo)
3. You will be prompted to authenticate your account
4. Scroll to the middle of the page and click on the red tab "Request Software" to the right
5. Enter/verify your email and phone number and click the "Next" (Next tab is located on the right)
6. Choose "SAS workstation for Teaching and Research" and then the version that is compatible with your computer (Windows 9.4 64 bit or Windows 9.4 32 bit)
7. Follow instructions on the screen.
8. When you are done the system will generate a ticket and you should receive an email within a few minutes with instruction on how to download/install SAS.
9. Call the [CFAES IT Services Help Desk](#) if you run into issues.

It is quite helpful to watching the following video before installing the software on your machine.  
<https://support.sas.com/en/documentation/install-center/94.html#step-3-deploy>

A free versions of **R studio** is available at <https://rstudio.com/products/rstudio/download/>

**Assignment Submission Policy:** You are expected to submit work assignments on time. Except in cases of documented emergency, there will be a reduction of 3 percentage points per day (baseline equals total points available for the assignment) for a late submission up to 3 days; submissions that are more than three days late will not be awarded points.

## Grading

Homework assignments		30%
Term project	Preliminary project presentations (four)	10
	Dry-run presentation (1)	5
	Peer critiques of preliminary presentations	5
	Final project presentation	15
	Final written project	25
	Peer grade for project involvement	10
<b>Total</b>		<b>100%</b>

## Course technology

For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at OCIO Help Hours, and support for urgent issues is available 24x7.

- **Self-Service and Chat support:** (<http://ocio.osu.edu/selfservice>)
- **Phone:** 614-688-HELP (4357)
- **Email:** [8help@osu.edu](mailto:8help@osu.edu)
- **TDD:** 614-688-8743

## Carmen Access

You will need to use BuckeyePass multi-factor authentication to access the course. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click “Enter a Passcode” and then click the “Text me new codes” button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the Duo Mobile application to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357 (HELP) and the IT support staff will work out a solution with you.

**Tentative course schedule (subject to change)**

Date	Lectures	Individual homework assignment dates
Week 1 1/11-13	Review of the linear regression model Robust standard errors Goodness of fit measures	
Week 2 1/18-20	Class visit by Andriy Shyshkov Model selection in data-rich environments Binary dependent variable models and classification	
Week 3 1/25-27	Receiver operating characteristic curve Area under the curve Scoring for predictive analytics	Homework 1 due on 2/3 @ 11:59 pm
Week 4 2/1-3	Regression with time series data Strict exogeneity, trends, seasonality, stationarity, weak dependence	
Week 5 2/8-10	Highly persistent time series Random walk, random walk with a drift, integration, unit root tests	Homework 2 due on 2/17 @ 11:59 pm
Week 6 2/15-17	Serial correlation and heteroscedasticity in time series data Unwinding data transformation for prediction	
Week 7 2/22-24	Time series modeling example: bank deposits	
Week 8 3/1-3	Discussion of the Huntington project (visit by Andriy Shyshkov) Autoregressive conditional heteroscedasticity	Homework 3 due on 3/3 @ 11:59 pm
Week 9 3/8-10	Generalized autoregressive conditional heteroscedasticity Initial student presentations of the Huntington project	
Week of 3/14-18	Spring break (no classes)	
Week 10 3/22-24	In the last five weeks we will largely focus on completion of the Huntington Project and coverage of related econometric topics. Check out the class page on Carmen for a full schedule of Huntington presentations.	
Week 11 3/29-31		
Week 12 4/5-7		
Week 13 4/12-14		
Week 14 4/19-21		

**Attendance Policy:** Students are expected to attend lectures and to do so on time. Regular class attendance and full participation in group project activities are a critical part of success given the experiential nature of the course.

**UNIVERSITY POLICIES** see: <https://ugeducation.osu.edu/faculty-and-staff-resources> **for current versions**

**Academic Misconduct:** It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at Student Life <http://studentconduct.osu.edu>.

### **Ohio State's academic integrity policy**

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's *Code of Student Conduct*, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's *Code of Student Conduct* is never considered an "excuse" for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

**If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct.** If COAM determines that you have violated the University's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

### **Copyright disclaimer**

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course. **Intellectual Property** (covered by copyright) includes Course materials (Text, Audio, Video, Multimedia, Sims, Apps, etc.), and Student Generated materials.

### **Disability Services:**

The university strives to make all learning experiences as accessible as possible. If you would like to request academic accommodations based on the impact of a disability qualified under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, contact me privately as soon as possible to discuss your specific needs. Discussions are confidential. In addition to contacting me, please contact the Student Life Disability Services at [614-292-3307](tel:6142923307) or [ods@osu.edu](mailto:ods@osu.edu) to register for services and/or to coordinate any accommodations you might need in your courses at The Ohio State University. Go to Office of Student Life - Disability Services for more information.

## UNIVERSITY RESOURCES:

### **Counseling and Consultation Services:**

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life Counseling and Consultation Services (CCS) by visiting [ccs.osu.edu](http://ccs.osu.edu) or calling (614) 292- 5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at (614) 292-5766 and 24 hour emergency help is also available through the 24/7 National Prevention Hotline at 1-(800)-273-TALK or at [suicidepreventionlifeline.org](http://suicidepreventionlifeline.org).

David Wirt, [wirt.9@osu.edu](mailto:wirt.9@osu.edu), is the CFAES embedded mental health counselor. He is available for new consultations and to establish routine care. To schedule with David, please call 614-292-5766. Students should mention their affiliation with CFAES when setting up a phone screening.

### **Creating an environment free from harassment, discrimination, and sexual misconduct**

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic

programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

- i. Online reporting form at [equity.osu.edu](http://equity.osu.edu),
- ii. Call 614-247-5838 or TTY 614-688-8605,
- iii. Or Email [equity@osu.edu](mailto:equity@osu.edu)

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

This course adheres to The Principles of Community adopted by the College of Food, Agricultural, and Environmental Sciences. These principles are located on the Carmen site for this course; and can also be found at <https://go.osu.edu/principlesofcommunity>. For additional information on Diversity, Equity, and Inclusion in CFAES, contact the CFAES Office for Diversity, Equity, and Inclusion (<https://equityandinclusion.cfaes.ohio-state.edu/>). If you have been a victim of or a witness to a bias incident, you can report it online and anonymously (if you choose) at <https://studentlife.osu.edu/bias/report-a-bias-incident.aspx>.