

Course Syllabus: ECON2293: Computational Methods in Macroeconomics

[Fall 2024]

Course Information

Course Title: Computational Methods in Macroeconomics

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Office Hours: TBA

Class Time: Monday and Wednesday, Section 1 from 1:30 to 2:45, and Section 2 from 3:00 to 4:15, beginning Monday, Aug. 26, with the last class on Monday, December 9. There are no classes on Labor Day (Sept.2), Fall Break (Oct 14), Thanksgiving break(Nov. 27)

Class Location: Fulton 425

Course Description

- Textbook: *An Introduction to Computational Macroeconomics*, by Bongers, Gomez and Torres, 2019. We refer to this book as **BGT**.
- Amazon address: [Link](#)
- This course examines familiar models in Macroeconomics in a computational setting
- They are the Keynesian IS/LM model of a closed economy, the Dornbusch model of exchange rates, and the classical growth models, old and new.
- What can we learn, and learn more sharply, from models once we calibrate them and run them on a computer?
- In other words, we want to subject these familiar models to "computational experiments".
- In particular do the models help us to understand familiar patterns we see in macroeconomic data?
- Can these models help us to assess the macroeconomic effects of counterfactual policies?
- Models can also be used for forecasting. That is the domain of Econometrics.
- We will examine data, even large datasets, but we want to explain patterns and discuss/debate policy
- We need to remember that Macroeconomics is a "data challenged" discipline
- Most macro data are quarterly or monthly.
- For the Euro Area, there are only 24 years of quarterly or monthly data, since the Euro started in 2000.
- Would the NIH take any research seriously if medical procedures were proposed on the basis of 100 quarterly observations?

Course Objectives

- Ability to implement and extend familiar macro models in a computational setting
- Ability to present the results of computational experiments with visual graphics for better understanding
- Ability to collaborate in class subgroups for developing presentations in a clear, concise way.
- Having fun doing collaborative research and group learning. Economics is a *social* science.

Coding Issues

- Excel, Jupyter Notebooks, from Anaconda, as well as Julia, Stata, and Dynare links. Students can also access Matlab. And use Excel
- An example of installing and using Dynare with Julia in a Jupyter notebook may be found on my GitHub pages.
- There are many ways to code. The world of computational macro has become a polyglot world. But we have chatGPT to help us along
- The models discussed by Bongers Gomez and Torres are written in Excel format, as well as Dynare for Matlab. Dynare also works in the open-source Julia.
- Dynare is the simplest way to set up, simulate and analyze models.
- However, for several models, Brian Jenkins has a set of Python codes for many of the familiar models we discuss. See Jenkins
- However, the python coding is harder to implement.
- That said, Python has become the lingua franca of finance, and it is worthwhile to practice. But chatGPT is coming along to simplify all of this.
- My solution is to run the models in their simplest way in Excel or Dynare (either either with Matlab or Julia), to give you a taste.
- Then save and share the data in csv files and analyze it in Python, or Excel or Stata.
- To benefit from this class, students are expected to become *computationally engaged*, not fluent And have fun as well.
- Like good food in a restaurant, we will sample most of these.
- One does not have to be fluent in Italian language to enjoy Italian food. Similarly we did not have a course in grammar before we starting speaking to our parents as infants.
- Coding, like any language acquisition, is a life-long learning process. We also learn from our mistakes. With the help of chatGPT and other AI systems, the learning curve is much less steep.
- As AI systems improve, the coding issues will become much less important. It is not the coding talent but the questions we bring to coding.
- The main skill to learn from the course is to lean to ask critical questions through these models about economic behavior.
- I will present data from specific models for the assignments as well as sample codes which students can access. But the goal is not to dwell on the code but the story these models tell us.

Class Environment

- Attendance Policy: Faithful class participation is essential for making this course work well for you.
- I do understand that students may need a encore, and at times may miss class, or arrive late, so each class will be recorded.
- Students should arrive prior to the start of class. Occasional late arrivals are understandable, but chronic tardiness is an imposition on the class in the form of persistent distraction.
- Drinking coffee or soft drinks is permitted but students should not have a late lunch or afternoon snack in the classroom while the class is going on. This is distracting to all others in the class.
- Use of electronic notebooks is recommended in the class but such notebooks or other electronic instruments should be used only for accessing classroom material.
- Engaging in social texting or social internet browsing during class is distracting to the other students in the class.
- Late Work Policy: Meeting deadlines is important in the real world. Students are expected to complete their projects on time, except for reasonable mitigating circumstances.
- Academic Integrity: Using ChatGPT to help with coding or finding references (if you check them out) is encouraged, but the writing up of results should be original work, with proper citations. Remember that chatGPT is subject to AI hallucination.
- Disability Accommodations: All students are welcome to this class.

Requirements

- **Assignments:** There will be three essays, five to ten pages each, presenting the results of "computational experiments" with the models we analyze, or alternative models.
- The assignments may be co-authored with two other students in the class, thus groups of three (or less) but no more.
- The assignments should be submitted on the due dates, in October, November and the end of the class.
- The weighting for the class will be 20 percent for the first assignment, and 30 for the next two, with the final 20 for class participation.
- **Participation:** When the assignments are submitted, there will be opportunities to critique and learn from one another's work.
- Students are encouraged to talk with me or the Assistant to discuss their progress.
- **Integrity:** Use of chatGPT and other AI systems are permitted for alternative codes for computational experiments and for finding sources to cite in their presentation.
- Sources from chatGPT and AI systems are subject to *hallucination*, so the sources should be verified.
- However all written material submitted should be original material, and proper credits should be given to sources.

Class Outline: Tentative

- Classes 1-2: Introduction to Models - McNelis lecture and **BGT**: ch. 1
- Classes 3-6: The IS-LM model - **BGT**: ch. 2
- Classes 6-14: Dornbush model of exchange rate instability - McNelis lecture and Jupyter notebook, and **BGT**: ch. 3
- First assignment due: **October 23**
- Classes 12-16: Consumption-Saving Decision - **BGT**: ch. 3-5
- Classes 17-20: Fiscal policy (government spending) - **BGT**: ch. 6
- Classes 21-22: Tobin's Q and investment - **BGT**: ch. 7
- Second assignment due: **November 15**
- Classes 22-24: Growth and optimal growth - **BGT**: ch. 8-9
- Classes 24-28: Summary of modeling strategies and insight.
- Final assignment: **December 12**