

Empirical Economic Modeling

Advanced M.A. course

MNB Institute, John von Neumann University, Spring 2024

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Office hours: Online, by appointment

Description. This course teaches you how to build an economic model and take it to micro data. First, we cover the principles of empirical economic modeling and illustrate them through the lens of foundational papers in various fields of economics. Second, you hone your own modeling skills by writing and presenting an original piece of research in empirical economics.

Learning outcomes. By the end of this course, you will be able to:

- build a model of economic behavior;
- quantify economic models using observational micro data;
- assess the quality of empirical economics papers; and
- write and present original, independent research.

Logistics. The course is run in two stages. First, I give lectures on the principles of economic modeling and several illustrative examples. Second, you write and present a term paper using these modeling principles; I encourage you to work in teams.

The lectures are delivered in person during an intensive course on the first week. The purpose of the lectures is to guide your project work in the second stage; I will make the slides and all supporting material available online. You will not be tested on the material per se, but you are expected to use the modeling principles in your own work. Attendance is mandatory.

For the rest of the semester, you work on your projects independently. You may work in teams of up to 4 people: you must notify me about your team by the end of week 2. You also may work on your own, but rarely will you ever do so once you graduate so I encourage you to practice teamwork. The main deliverables for the course are (i) a term paper and (ii) a 10-minute presentation. The term paper is expected to propose an economic model and quantify (estimate or calibrate) it on micro data. You can choose the topic and data, as long as I approve it: you must propose a topic and data set by the end of week 3. You are expected to submit the code for your empirical analysis: you may use any software you like, but I can only help with code written in Stata, Matlab, Julia, or R. The paper has no length requirement and is due on the last day of the exam period, together with the code for generating your results. Each team will give a 10-minute presentation of their project towards the end of the semester (date TBD, potentially online). Attendance on presentation day is mandatory. I will be available to meet online throughout the semester: the purpose of these meetings is to keep you on track with your project work. Meeting with me at least 2 times during the semester is mandatory; if you work in teams, all team members must attend. I am available for more than 2 meetings by appointment if needed.

The language of the course is English. You are expected to interact with, and potentially contribute to, research done by an international scientific community. Take this opportunity to practice communicating your ideas in English.

Assessment. Term paper and code (70%); presentation (30%); lecture attendance (MR); at least 2 online meetings (MR); presentation day attendance (MR).

Items marked by MR are minimum requirements. If you are unable to make it to the lectures, meetings, or presentation day, you must notify me 2 hours in advance. Missing them without letting me know will result in a failing grade.

I will evaluate the term paper and the presentation on the basis of its originality, the appropriateness of the used methods, and the quality of writing and presentation. You must adhere to student conduct and community standards, especially regarding plagiarism. [Here is a specific example.](#) Your paper will be algorithmically checked for plagiarism: all members of an offending team will receive a failing grade.

Prerequisites. There are no formal prerequisites to the course. You are expected to be familiar with calculus (derivation/integration) and basic econometrics (distributions, cross-sectional and panel regression, instrumental variables). If you need to brush up on your skills, you can consult these standard references:

- Calculus: Sydsæter, Knut, Peter Hammond, Arne Strøm and Andrés Carvajal (2021). *Essential Mathematics for Economic Analysis*, 6th Ed. Pearson.
- Econometrics: Wooldridge, Jeffrey M. (2020). *Introductory Econometrics: A Modern Approach*, 7th Ed. Cengage Learning.

You are also expected to write code for your empirical analysis. Therefore, some coding experience is required. You may use any software you like, but I can only help with code written in Stata, Matlab, Julia, or R.

Tentative schedule.

Week 1	Lectures
Week 2—11	Project work/online meetings (at least 2 times)
End of week 2	Team announcements due
End of week 3	Topic and data proposals due
Week 12 (date TBD)	Presentation day
Last day of exam period	Term paper due

Tentative lecture topics. Here is what we intend to cover during the lectures in the first week.

1. Structural vs. experimentalist modeling
 - History: the Cowles Commission
 - Modern structural work (Rust, 1987 ECMA)
 - The credibility revolution (Angrist, 1990 AER)
 - “The Great Reunification” (Méndez and Van Patten, 2022 ECMA; Bilal, 2023 QJE)
2. Labor
 - Earnings decompositions (Abowd, Kramarz and Margolis, 1999 ECMA; Bonhomme, Lamadon and Manresa, 2019 ECMA)
 - Search frictions and amenities (Sorkin, 2018 QJE; Taber and Vejlín, 2020 ECMA; Gyetvai, 2023 WP)
 - Things we do not cover: human capital formation/education, networks, minimum wage debate, labor market power
3. IO
 - Production function estimation (Olley and Pakes, 1996 ECMA; Levinsohn and Petrin, 2003 REStud; Akerberg, Caves and Frazer, 2015 ECMA; Gandhi, Navarro and Rivers, 2020 JPE)
 - Demand estimation (Berry, Levinsohn and Pakes, 2004 JPE)
 - Things we do not cover: market entry, industry dynamics, games (Sergey Lychagin’s syllabus)
4. Macro
 - Growth and firm dynamics (Midrigan and Xu, 2014 AER)
 - Government, fiscal and monetary policy (TBD)
 - Things we do not cover: uncertainty, information, polarization (Matthias Kehrig’s syllabus), asset pricing, optimal taxation (Nic Kozeniauskas and László Tétényi’s syllabus), micro-to-macro evidence (Adrien Couturier, Ben Moll and Rui Sousa’s collection of papers)
5. Trade
 - Ricardian model (Eaton and Kortum, 2002 ECMA)
 - Intra-industry trade (Melitz, 2003 ECMA)
 - Things we do not cover: gravity models, trade wars, inequality (Rafael Dix-Carneiro’s syllabus)
6. Public
 - Income/wealth taxation (Güvönen, Kambourov, Kuruscu, Ocampo and Chen, 2023 QJE)
 - Behavioral distortions (Chetty, Looney and Kroft, 2009 AER)
 - Things we do not cover: social insurance programs, local public finance
7. Miscellaneous
 - Potential outcomes framework
 - RCTs (Cohen and Dupas, 2010 QJE)
 - Intro to numerical methods
 - Selection biases
 - How to read and write economics papers
 - Where to find data

References. Sorted by order of appearance above.

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- Angrist, Joshua D. (1990). Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Administrative Records. *American Economic Review* 80(3), 313-336.
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- Bilal, Adrien (2023). The Geography of Unemployment. *Quarterly Journal of Economics* 138(3), 1507-1576.
- Abowd, John M., Francis Kramarz and David N. Margolis (1999). High Wage Workers and High Wage Firms. *Econometrica* 67(2), 251-333.
- Bonhomme, Stéphane, Thibaut Lamadon and Elena Manresa (2019). A Distributional Framework for Matched Employer Employee Data. *Econometrica* 87(3), 699-739.
- Sorkin, Isaac (2018). Ranking Firms Using Revealed Preference. *Quarterly Journal of Economics* 133(3), 1331-1393.
- Taber, Christopher and Rune Vejlin (2020). Estimation of a Roy/Search/Compensating Differential Model of the Labor Market. *Econometrica* 88(3), 1031-1069.
- Gyetvai, Attila (2023). The Option Value of Occupations. Working Paper.
- Olley, Steve and Ariel Pakes (1996). The Dynamics of Productivity in the Telecommunications Equipment Industry. *Econometrica* 64(6), 1263-1297.
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- Berry, Steven, James Levinsohn and Ariel Pakes (2004). Differentiated Products Demand Systems from a Combination of Micro and Macro data: The New Car Market. *Journal of Political Economy* 112(1), 68-105.
- Midrigan, Virgiliu and Daniel Yi Xu (2014). Finance and Misallocation: Evidence from Plant-Level Data. *American Economic Review* 104(2), 422-458.
- Eaton, Jonathan and Samuel Kortum (2002). Technology, Geography, and Trade. *Econometrica* 70(5), 1741-1779.
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- Guvenen, Fatih, Gueorgui Kambourov, Burhan Kuruscu, Sergio Ocampo and Daphne Chen (2023). Use It or Lose It: Efficiency and Redistributive Effects of Wealth Taxation. *Quarterly Journal of Economics* 138(2), 835-894.
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- Cohen, Jessica and Pascaline Dupas (2010). Free Distribution or Cost-Sharing? Evidence from a Randomized Malaria Prevention Experiment. *Quarterly Journal of Economics* 125(1): 1-45.