ECON4538 - Syllabus

Prof. Joseph Mullins

This is an advanced undergraduate course in Labor Economics. Please read below for the course outline and syllabus.

Class Times

Lectures

Mondays and Wednesdays, 9:45am - 11am, Blegen Hall 240

Recitations

Fridays, 10:10am - 11am, Blegen Hall 215

Email and Office Hours

You will find details on how to contact me and sign up for office hours on the course Canvas page.

Course Overview and Objectives

In this class we will address questions at the forefront of modern economic policy. What factors drive economic inequality over the life-cycle? How are these evolving over time? What are the potential costs and benefits to collective provision of insurance and redistribution? What policies are effective in creating equal opportunity?

To answer these questions you will learn the basic tools of modern quantitative economics. We will be interested in understanding the models and tools that economists have developed to understand labor market inequality, as well as in using these models to analyze the welfare implications of various government interventions. Topics to be covered include: dynamic

programming, solution methods of general equilibrium models, heterogeneous-agent macroeconomic models, models of human capital formation, and modern empirical evidence on the nature human capital.

Student Learning Outcomes

On successfully completing this course, students should be familiar with some of the core concepts in modern quantitative economics. Students should be able to formalize an appropriate dynamic, stochastic, general equilibrium model to analyze a question of interest. Students should be able to solve and simulate such a model on a computer, for the purpose of interpreting data and conducting policy experiments.

Course Prerequisites

I will assume that you are comfortable with micro concepts at the level of Econ 3101, 3102, such as the utility maximization problem and its related topics. I will also assume that you are comfortable with basic econometrics such as multivariate regression techniques as well as statistics at the level of Stat 3011. With regards to your math background, I will take as granted that you know how to work with calculus (derivatives). Students should be willing to invest time in learning a computer programming language such as `julia`.

Textbook

We will use some chapters and problem sets from *Recursive Macroeconomic Theory* (Ljungqvist and Sargent 2012, 3rd edition) available online via the University Library. We will also make use of Journal Articles. I have provided links to electronic versions of the textbook and journal articles are available on the "Library Course Page".

Additional Readings

You may also find some of the following books useful.

- John Stachurski, Economic Dynamics: Theory and Computation, 2nd edition, (2022).
- Christopher Pissarides, Equilibrium Unemployment Theory, 2nd edition, (2000).
- Jérôme Adda and Russell Cooper, Dynamic Economics: Quantitative Methods and Applications, (2003).
- Mario Miranda and Paul Fackler, Applied Computational Economics and Finance, (2002).
- Kenneth Judd, Numerical Methods in Economics, (1998).

Course Software and Resources

We will demonstrate and develop the computational tools you are learning using the `julia` programming language, which is well-suited for scientific computation and data analysis. LATIS provides a copy of `julia` on AppstoGo, but we recommend installing your own version, since it is completely free and open source. See the website for more details on the language and installation instructions.

Throughout the course, you may find the QuantEcon `julia` course (by Tom Sargent, John Stachurski, and Jesse Perla) a useful additional resource.

Assessment

The course will be graded based on 6 problem sets (each worth 7%, 42% total), a midterm exam (20%), and a final exam (38%).

Submission Guidelines

It is your responsibility to submit neat and legible solutions to the problem sets. Your TA may deduct marks for illegible submissions. Please follow these guidelines:

- All homework assignments must be submitted as a `Quarto` or `jupyter` notebook rendered as an html or pdf, with code and output showing all required results. You will be introduced to these notebooks through recitation materials.
- For questions requiring mathematical solutions, you may submit handwritten solutions if you prefer, but they must be submitted as a pdf using a scanner or scanning app on your phone.

Course Outline

Dynamic Programming and Applications

An important set of mathematical tools for solving dynamic models. Topics include:

- Bellman's principal of optimality and contraction mappings
- Mathematical and computational exposition (using julia) of dynamic programming tools, applied to:
  - Models of job search
  - Infinite horizon and life-cycle models of savings

Reading: Ljungqvist and Sargent (2012) Chapters 3-6.

Savings and incomplete markets

Review of the main theoretical models describing savings and self-insurance of agents under uncertainity and incomplete markets.

- Main savings problems
- Incomplete markets models as Huggett (1993), Aiyagari (1994), Krusell and Smith (1998)
- Consumption inequality and income uncertainity.

Reading: Ljungqvist and Sargent (2012) Chapters 17-18. Deaton (1991), Blundell and Preston (1998), Huggett (1993), Aiyagari (1994), Krusell and Smith (1998)

Facts about Inequality

We review and replicate facts about labor market inequality in the United States. Topics include:

- Documenting income inequality (Moffitt and Gottschalk 2011; Heathcote, Perri, and Violante 2010; Heathcote et al. 2023; Guvenen et al. 2021)
- Estimation of income risk (Moffitt and Gottschalk 2011; Meghir and Pistaferri 2004; Low, Meghir, and Pistaferri 2010; Guvenen 2009)
- Welfare implications of income inequality (Storesletten, Telmer, and Yaron 2004)
  - Redistribution vs Insurance
- The Intergenerational Elasticity of Earnings (Corak 2013; Mazumder 2018)
- Skills and Inequality (James J. Heckman, Stixrud, and Urzua 2006; F. Cunha and Heckman 2008a; F. Cunha and Heckman 2009)

Theories of Human Capital and Inequality

We introduce textbook theories of human capital formation and examine their empirical content. We develop computational tools to bring these theories to data. Topics include:

- The Becker-Tomes model of intergenerational inequality via human capital investment (Becker and Tomes 1979, 1986)
  - Policy implications of the model (efficiency and redistribution)
- Debates on the empirical and conceptual merits of the Becker-Tomes model (Goldberger and Becker 1989; Mulligan 1999; J. J. ;. L. Cunha Flavio ;. Heckman 2006; F. Cunha and Heckman 2007)
- Quantitative and theoretical extensions of the baseline model (Lee and Seshadri 2019; Caucutt and Lochner 2020)

Connecting Human Capital Theory with Evidence

We survey some empirical work that connects the theory with data. Topics include:

- A review of econometric methods for causal inference
- Evidence of the effect of social programs on child skill formation and long-run outcomes [Dahl and Lochner (2012); Barr, Eggleston, and Smith (2022); Bastian and Michelmore (2018); Carneiro et al. (2021); Bailey et al. (2024);]
- Evidence of the effect of early childhood education on skill formation and long-run outcomes (James J. Heckman et al. 2010; García et al. 2020; Kline and Walters 2016)
- Evidence of the effect of parenting and home interventions on skill formation and long-run outcomes (Attanasio, Meghir, and Nix 2020; Walker et al. 2022; Carneiro et al. 2024)
- Estimating the technology of skill formation. (F. Cunha and Heckman 2008b; Attanasio, Meghir, and Nix 2020)

Grading, Policies, and Procedures

Please see the course Canvas page for the department grading scale and a statement of University policies and procedures.

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Barr, Andrew, Jonathan Eggleston, and Alexander A. Smith. 2022. "Investing in Infants: The Lasting Effects of Cash Transfers to New Families." *The Quarterly Journal of Economics*, no. 4: 2539–83. https://doi.org/10.1093/qje/qjac023.

Bastian, Jacob, and Katherine Michelmore. 2018. "The Long-Term Impact of the Earned Income Tax Credit on Children's Education and Employment Outcomes." *Journal of Labor Economics*, no. 4: 1127–63. https://doi.org/10.1086/697477.

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Cunha, Flavio, and James Heckman. 2007. "The Technology of Skill Formation." *The American Economic Review*, no. 2: 31–47. https://doi.org/10.1257/aer.97.2.31.

———. 2008a. "A New Framework for the Analysis of Inequality." *Macroeconomic Dynamics*, no. S2: 315–54. https://doi.org/10.1017/S136510050807034X.

Cunha, Flavio, and James J. Heckman. 2008b. "Formulating, Identifying and Estimating the Technology of Cognitive and Noncognitive Skill Formation." *The Journal of Human Resources*, no. 4: 738–82. https://doi.org/10.1353/jhr.2008.0019.

———. 2009. "The Economics and Psychology of Inequality and Human Development." *Journal of the European Economic Association*, no. 2: 320–64. https://doi.org/10.1162/JEEA.2009.7.2-3.320.

Cunha, James J. ;. Lochner, Flavio ;. Heckman. 2006. "Chapter 12 Interpreting the Evidence on Life Cycle Skill Formation." In, 1:697–812. Handbook of the Economics of Education. Elsevier B.V. https://doi.org/10.1016/S1574-0692(06)01012-9.

Dahl, Gordon B., and Lance Lochner. 2012. "The Impact of Family Income on Child Achievement: Evidence from the Earned Income Tax Credit." *The American Economic Review*, no. 5: 1927–56. https://doi.org/10.1257/aer.102.5.1927.

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García, Jorge Luis, James J. Heckman, Duncan Ermini Leaf, and María José Prados. 2020. "Quantifying the Life-Cycle Benefits of an Influential Early-Childhood Program." *The Journal of Political Economy*, no. 7: 2502–41. https://doi.org/10.1086/705718.

Goldberger, Arthur S., and Gary S. Becker. 1989. "Economic and Mechanical Models of Intergenerational Transmi." *The American Economic Review*, no. 3: 504.

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Guvenen, Fatih, Fatih Karahan, Serdar Ozkan, and Jae Song. 2021. "WHAT DO DATA ON MILLIONS OF u.s. WORKERS REVEAL ABOUT LIFECYCLE EARNINGS DYNAMICS?" *Econometrica*, no. 5: 2303–39. https://doi.org/10.3982/ecta14603.

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Low, Hamish, Costas Meghir, and Luigi Pistaferri. 2010. "Wage Risk and Employment Risk over the Life Cycle." *The American Economic Review*, no. 4: 1432–67. https://doi.org/10.1257/aer.100.4.1432.

Mazumder, Bhashkar. 2018. "Intergenerational Mobility in the United States: What We Have Learned from the PSID." *The Annals of the American Academy of Political and Social Science* 680 (1): 213–34.

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