

Econ 890

Special Topics: Productivity, Distortions and Aggregation

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Spring Semester, 2026

Monday 16:40 - 19:25

Social Sciences 111

Synopsis

This is a module (i.e. half semester) length class on issues in production functions, distortions and aggregation. Ever since the wide availability of producer level dataset that mirror, for the firm side, what we have gotten from large scale individual datasets like the PSID or the Census of Population, there is increasing attempts to try to understand what is going on in the firm side of the economy. In particular, this producer level data has revealed large differences in both the efficiency and size of firms that make understand differences between firms within narrowly defined geographies and industries quite important.

At the same time, there has been a development of new frameworks to aggregate micro-level decisions of firms into aggregate outcomes in a context with distortions. This had led to new research about the micro sources of aggregate outcomes, such as aggregate productivity growth.

This class will dive into the issues of i) understand the canonical production functions (Cobb-Douglas, CES, etc...) and models of investment and input choice, ii) work on the estimation of production functions, in particular, the control function methods of Olley and Pakes (1996), iii) understanding firm differences in productivity, iv) estimate different measures of distortions, and v) aggregate productivity and distortions into aggregate productivity growth. This is fundamentally a class on measurement and aggregation. Given the rich access to data these days, it is impossible to do this without theory. Thus, we will cover also theoretical aspects of the aggregation challenge.

The class will discuss application of production function estimation and data to many different parts of economics, such as international trade, development, IO, macro growth, labor, environmental economics, or as the interests of class participants lie. Given the combination of micro techniques and aggregation, the class should be useful for IO, Macro and Trade.

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The class will require the background in first year Ph.D. economics, such as dynamic models of investment, endogeneity, error-in-variables, and GMM estimation. Students will need to be familiar with both a statical package (stata or R for example), and a matrix programming language (MATLAB, Julia, R, python for instance). Students will also be provided with both the Annual Survey of Industries Data from India (1992-2020), and the World Bank Enterprise Research Data, in order to get involved in datawork as quickly as possible.

Background

I expect all of you to have micro background on the order of what is covered in 701 and econometrics background on the order of what is covered in 703. In particular, for this class having a good appreciation for a dynamic model of investment and capital appreciation is paramount. In addition, this class will require you to be able to program. From an econometrics perspective, having a good handle on GMM is critical. You are expected to have a working knowledge of MATLAB and STATA, or equivalent software (such as R, Julia, Java, Python, whatever). However, it will be advantageous for you to settle on software that is part of the current equilibrium in economics.

There is no textbook for this class, but we will be utilizing the lecture notes and various handbook chapters:

- Akerberg, Daniel, C. Lanier Benkard, Steven Berry, and Ariel Pakes. "Econometric tools for analyzing market outcomes." *Handbook of econometrics* 6 (2007): 4171-4276. (Akerberg, Benkard, Berry, and Pakes, 2007)
- De Loecker, Jan, and Chad Syverson. "An industrial organization perspective on productivity." In *Handbook of industrial organization*, vol. 4, no. 1, pp. 141-223. Elsevier, 2021. (De Loecker and Syverson, 2021)

Assessments

1. Participation: the papers mentioned in each section need to be read before class. This paper will be discussed in class and an inability to discuss the paper will reflect badly on you and, more importantly, you will not get much from the class. You are expected to actively participate in the class.
2. Presentation: You will be asked to present a paper during the class. The presenter will be chosen randomly at the start of class — anyone who has presented gets exempted in the future. I am expecting 4 presentations. The papers that you need to prepare are highlighted below. Presentations are aimed to last 30 minutes, so they have to be concise and to the point. The presentation should also have final slides with comments, in a referee-report spirit.
3. Problem Sets: 2 problem sets will be given. To really understand a topic, you need to be able to replicate some of the work. Students can work on problem sets in groups with at most 2 members.
4. Research proposal: I would like you to use the datasets provided for the class to assemble a research proposal on whatever topic interests you.

Schedule

The schedule is tentative and subject to change.

1. **March 2** Estimation of Production Function Part 1

Factor Share Approaches, Simultaneity Problem of OLS, Control Function Approaches.

Readings:

- Marschak and Andrews (1944)
- Levinsohn and Petrin (2003).
- Akerberg, Caves, and Frazer (2015).
- Akerberg, Benkard, Berry, and Pakes (2007) on control function estimation.
- Gandhi, Navarro, and Rivers (2020).

2. **March 16** Estimation of Production Function Part 2

Control functions ctd, measurement error and control functions.

Readings:

- Collard-Wexler and De Loecker (2021).
- De Loecker (2011).
- Pavcnik (2002).
- Rubens (2023).
- Demirer and Karaduman (2023)

Present: Demirer (2020).

3. **March 23** Estimation of Production Function Part 3: Markups

Readings:

- Loecker and Warzynski (2012).
- De Loecker, Eeckhout, and Unger (2020).

Present: Doraszelski and Li (2025).

4. **March 30** Misallocation, reallocation and dynamics

Readings:

- Hsieh and Klenow (2009)
- Collard-Wexler and De Loecker (2015)
- Syverson (2004)
- Asker, Collard-Wexler, and De Loecker (2014)

Present: Oberfield and Raval (2021).

Problem Set 1 Due: Production Function Estimation.

5. April 6 Aggregation and Distributional Concerns

Readings:

- Baqaee and Farhi (2020)
- Baqaee and Farhi (2024)
- Atkin, Bernadac, Donaldson, Garg, and Huneus (2024)

Present: Baqaee and Burstein (2026).

6. April 13 Research Proposal Presentation and Topics left over

Problem Set 2 Due: Aggregate Productivity.

References

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- ATKIN, D., B. BERNADAC, D. DONALDSON, T. GARG, AND F. HUNEEUS (2024): “The Incidence of Distortions,” .
- BAQAEI, D., AND A. BURSTEIN (2026): “Aggregate Productivity with Heterogeneous Agents,” .
- BAQAEI, D. R., AND E. FARHI (2020): “Productivity and Misallocation in General Equilibrium*,” *The Quarterly Journal of Economics*, 135(1), 105–163.
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- COLLARD-WEXLER, A., AND J. DE LOECKER (2015): “Reallocation and technology: Evidence from the US steel industry,” *American Economic Review*, 105(1), 131–171.
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