Universitat Pompeu Fabra Barcelona

Topics in Macroeconomics I:

The Data Economy and Production Networks

2023-24 Academic Year

Master of Research in Economics, Finance, and Management

1. Description of the subject

- Topics in Macroeconomics I — Code: 32080
- Total credits: 3 ECTS — Workload: 75 hours
- Type of subject: Optative — Term: 1st
- Department of Economics and Business — Teaching team: **Isaac Baley / Mishel Ghassibe**

2. Teaching guide

Introduction

Production processes in modern economies are characterized by (i) the collection, use, and trade of huge amounts of *data* and (ii) production organization through largely interconnected *networks*. This course introduces new theories, methods, and applications that study how *data* and *networks* shape firms' decision-making and their implications for macroeconomic dynamics. The course is aimed at students interested in conducting research in macroeconomics, finance, international trade, and industrial organization.

Part I, taught by Isaac Baley, starts from the premise that data is digitized information that facilitates prediction and reduces uncertainty. The course introduces information-related tools from statistics, macroeconomics, and finance to model and measure data economies. These tools are used to investigate how firms source data, process data, and use data for prediction and how individual data-driven choices affect aggregate outcomes. At the core lies the *data feedback loop*—a self-reinforcing dynamic that arises when firms produce data as a by-product of economic activity.

Part II, taught by Mishel Ghassibe, centers around *network interconnectedness* and *granularity*: how shocks and frictions originating at the level of individual firms and sectors can have aggregate consequences. The course first derives key theoretical aggregation results, which relate changes in macroeconomic aggregates, such as GDP or total factor productivity (TFP), to microeconomic shocks and frictions. The key theoretical principles are then applied to central questions, such as the origins of business cycles, as well as monetary stabilization of fluctuations driven by granular shocks. The final part of the course studies the formation of production networks and how the shape of input-output relationships may vary over the business cycle.

Requirements

Students taking the course must have successfully completed the Advanced Macro sequence (or a similar sequence if they are visiting students). Students from the Barcelona School of Economics can take this course if authorized by the instructors.

Students must take both parts of the course.

Contents

Part I: The Data Economy

The main reference will be the book **"The Data Economy: Tools and Applications"** (Baley and Veldkamp, 2023). A draft of the book will be provided. Other key papers are noted below.

1. The Data Economy
    - Book Chapter 1
    - Veldkamp, L., and Chung, C. (2019). Data and the aggregate economy. *Journal of Economic Literature*, forthcoming.
    - Goldfarb, A. and Tucker, C. (2019). Digital economics. *Journal of Economic Literature*, 57 (1), 3-43.
2. Statistical Tools
    - Book Chapter 2
    - Baley, I. and Veldkamp, L. (2023). Bayesian learning. *In Handbook of Economic Expectations*, 717-748.
3. Data Sources
    - Book Chapter 3
    - Mankiw, G. and Reis, R. (2002). Sticky information versus sticky prices: A proposal to replace the new Keynesian Phillips curve. *Quarterly Journal of Economics*, 117, 1295–1328.
    - Sims, C. A. (2003). Implications of rational inattention. *Journal of Monetary Economics*, 50(3), 665-690.
4. Data-Driven Predictions and Aggregate Outcomes
    - Book Chapter 4
    - Baley, I., Figueiredo, A., and Ulbricht, R. (2022). Mismatch cycles. *Journal of Political Economy*, 130(11), 2943-2984.
    - Lucas, R. E. (1972). Expectations and the neutrality of money. *Journal of Economic Theory*, 4 (2), 103–124
    - Baley and Blanco (2019), Firm Uncertainty Cycles and the Propagation of Nominal Shocks. *American Economic Journal: Macroeconomics,* 11 (1), 276–337.
    - Mackowiak, B. and Wiederholt, M. (2009). Optimal sticky prices under rational inattention. *American Economic Review*, 99 (3), 769–803.
5. Using Data in Strategic Settings
    - Book Chapter 5
    - Morris, S. and Shin, H. S. (2002). Social value of public information. *American Economic Review*, 92 (5), 1521–1534.
    - Woodford, M. (2003). Imperfect common knowledge and the effects of monetary policy. *Knowledge, Information, and Expectations in Modern Macroeconomics: In Honor of Edmund S. Phelps*, 25.
    - Venkateswaran, V. (2014). Heterogeneous information and labor market fluctuations. Available at SSRN 2687561.
    - Hellwig, C. and Veldkamp, L. (2009). Knowing what others know: Coordination motives in information acquisition. *The Review of Economic Studies*, 76, 223–251.
    - Hellwig, C., Kohls, S. and Veldkamp, L. (2012). Information choice technologies. *American Economic Review*, 102 (3), 35–40.
6. Data in Production and Data Feedback Loop
    - Book Chapter 9
    - Farboodi and Veldkamp (2022), A model of the data economy, *NBER Working Paper* 28427.
    - Jones, C. I. and Tonetti, C. (2020). Nonrivalry and the economics of data. *American Economic Review*, 110 (9), 2819–58.
    - Fajgelbaum, P.D., Schaal, E. and Taschereau-Dumouchel, M. (2017). Uncertainty traps. *The Quarterly Journal of Economics*, 132(4), pp.1641-1692.

Part II: Production Networks

1. Micro to Macro I: Linear aggregation

    - Baqaee, D. and Farhi, E. (2020). Productivity and Misallocation in General Equilibrium. *The Quarterly Journal of Economics*, 135(1), 105-163.
    - Bigio, S. and La'O, J. (2020). Distortions in Production Networks. *The Quarterly Journal of Economics*, 135(4), 2187-2253.
    - Baqaee, D. and Rubbo, E. (2023). Micro Propagation and Macro Aggregation. (In preparation for the *Annual Review of Economics*)

2. Micro to Macro II: Non-linear aggregation

    - Baqaee, D. and Farhi, E. (2019). The Macroeconomic Impact of Microeconomic Shocks: Beyond Hulten's Theorem. *Econometrica,* 87(4), 1155-1203.
    - Baqaee, D. and Rubbo, E. (2023). Micro Propagation and Macro Aggregation. (In preparation for the *Annual Review of Economics*)

3. Application I: Network origins of aggregate fluctuations

    - Gabaix, X. (2011). The Granular Origins of Aggregate Fluctuations. *Econometrica*, 79(3), 733-772.
    - Acemoglu, D., Carvalho, V.M., Ozdaglar, O. and Tahbaz-Salehi, A. (2012). The Network Origins of Aggregate Fluctuations. *Econometrica*, 80(5), 1977-2016.

4. Application II: Network implications for monetary policy

    - Rubbo, E. (2023). Networks, Phillips Curves and Monetary Policy. *Econometrica*, 91(4), 1417-1455.
    - La'O, J. and Tahbaz-Salehi, A. (2022). Optimal Monetary Policy in Production Networks. *Econometrica*, 90(3), 1295-1336.
    - Ghassibe, M. (2021). Monetary Policy and Production Networks: An Empirical Investigation. *Journal of Monetary Economics*, 119, 21-39.
    - Pasten, E., Schoenle, R. and Weber, M. (2020). The Propagation of Monetary Policy Shocks in a Heterogeneous Production Economy. *Journal of Monetary Economics*, 116, 1-22.

5. Looking ahead: Endogenous production networks

    - Acemoglu, D. and Azar, P. D. (2020). Endogenous Production Networks. *Econometrica*, 88(1), 33-82.
    - Ghassibe, M. (2022). Endogenous Production Networks and Non-Linear Monetary Transmission. Working Paper: *https://ghassibem.github.io/Ghassibe_endognet_.pdf.*
    - Kopytov, A., Mishra, B., Nimark, K. and Taschereau-Dumouchel, M. (2022). Endogenous Production Networks under Supply Chain Uncertainty. Working Paper.

3. Teaching methodology

The course will be based on lectures that will convey the core knowledge for each topic, supplemented by reading key articles by students.

Weekly problem sets will be assigned, and answers will be discussed in class, not for grading purposes.

4. Grading system

Final exam (100%)