

Networks in Micro- and Macroeconomics

Lecturers

Prof. Andrei Levchenko

Department of Economics, University of Michigan, United States.

Email: alev@umich.edu

URL: <https://alevchenko.com/>

Andrei Levchenko is the John W. Sweetland Professor of International Economics at the University of Michigan, Editor-in-Chief of IMF Economic Review, and the Director of the International Trade and Macroeconomics program of the Central Bank Research Association. He is also a Research Associate at the National Bureau of Economic Research, a Research Fellow at the Centre for Economic Policy Research, and a member of the editorial boards of the Economic Journal, Journal of International Economics and Journal of Comparative Economics. Previously, he was an Economist at the International Monetary Fund, and has held visiting positions at the Universities of Chicago, Lausanne, and Zurich. He received a Ph.D. in Economics from MIT in 2004. Prof. Levchenko's current research focuses on the propagation of macroeconomic shocks in economic networks. His research has been funded by several agencies including the US National Science Foundation and the UK Department for International Development, and has appeared in a variety of journals including American Economic Review, Econometrica, Journal of Political Economy, Quarterly Journal of Economics, and Review of Economic Studies.

Prof. Michael D. König

Department of Spatial Economics, School of Business and Economics, Vrije Universiteit Amsterdam, The Netherlands.

Email: m.d.konig@vu.nl

URL: <https://research.vu.nl/en/persons/michael-konig>

Michael D. König is associate professor at the Department of Spatial Economics at VU Amsterdam. He is also a research fellow at the Tinbergen Institute, the Centre for Economic Policy Research (CEPR) and the Swiss Economic Institute (KOF). Prior to joining the VU Amsterdam he was a senior research associate at the University of Zurich, a visiting scholar at Bocconi University, the Stanford Institute for Economic Policy Research (SIEPR) and the Department of Economics at Stanford University. His research focuses on the economics of innovation and technical change, and how these affect and are being affected by networked relationships between various economic actors, ranging from individuals, firms, sectors to countries. His research combines both, theoretical as well as empirical methods, and he uses these methods to evaluate real world policy instruments.

Course Description

Networks play an increasingly dominant role in many social, business, and economic environments. Moreover, network data becomes increasingly important and available due to the rise of online digital data sources. This course offers a concise introduction into the most recent economic models and econometric methods developed for processing, visualizing and learning from network data. We provide a comprehensive approach for analyzing networks, both, from microeconomic as well as macroeconomic perspectives. This will provide course participants with a generic network analysis toolbox that can then be applied to particular environments and applications, depending on idiosyncratic needs and interests. To further aid the understanding of network concepts and methods the course will combine lectures with

hands-on empirical and programming exercises.

Learning Objectives

Upon successful completion of the course, participants will:

- become acquainted with different methodologies for analyzing networks while learning how to see these different methodologies complementing each other.
- learn to model network problem situations mathematically, and adapt the methods learned to new situations at hand.
- be able to recognize, understand, and analyze societal and business problems in which networks are central.
- learn how networks affect demand and supply in markets, how this leads to market failures, and how government policies can address these.

Reading List

All relevant material will be covered in the lecture slides. The slides will be made available to the students on the course website before the start of the course. The following literature is complementary to the course slides and covers some additional relevant material for further reading:

- Bramoulle, Yann, Andrea Galeotti, and Brian Rogers. *The Oxford Handbook of the Economics of Networks*. Oxford University Press, 2016.
- Eaton, Jonathan and Sam Kortum (2005) *Technology in the Global Economy: A Framework for Quantitative Analysis*.
- Goyal, S. *Networks: An Economics Approach*. MIT Press, 2023.
- Graham, Bryan, and De Paula, Aureo. *Econometric Analysis of Network Data*. Elsevier, 2020.
- Jackson, Matthew. O. *Social and Economic Networks*. Princeton University Press, 2010.
- Kolaczyk, Eric, *Statistical Analysis of Network Data: Methods and Models*, Springer, 2009.

Tutorials and Exercises

The course consists of five days in which you will practice the material of the lectures in the mornings with tutorials in the afternoons using exercises that will be implemented in Matlab or Stata. During the tutorials, you are required to complete an exercise which will build on the skills you have obtained in the lectures. You can complete the exercises in groups of two or three students (in work groups or remotely), but are required to submit the solutions individually by the 31st of July 2023. Exercise solutions and assignments should be submitted via email to: m.d.konig@vu.nl. If you successfully completed the exercises you obtain a certificate for this course.

Grading

Tutorial and programming exercises: 100%

Daily Course Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
	Introduction to Networks	Microeconomics of Networks		Macroeconomics of Networks	
09:30-10:30	Lecture 1: Networks - Basic Definitions and Characterizations	Lecture 3: Modeling Interactions in Networks	Lecture 5: Coevolution of Networks and Behavior	Lecture 7: International Business Cycle 1	Lecture 9: Propagation of shocks through networks 1
10:30-11:00	Break				
11:00-12:00	Lecture 2: Games on Networks – It's All About Centrality!	Lecture 4: Network Formation	Lecture 6: Network Panel Estimation & Big Data Meets Networks	Lecture 8: International Business Cycle 2	Lecture 10: Propagation of shocks through networks 2
12:00-14:00	Lunch Break				
14:00-15:00	Tutorial 1: Visualizing Networks and Fitting Degree Distributions	Tutorial 2: SAR Model and Logistic Regression	Tutorial 3: Double Metropolis-Hastings (DMH) Algorithm	Tutorial 4: Topic Selection and Preparation of Student Presentations	Tutorial 5: Student Presentations
15:00-17:00	Work groups				