CES Lectures

Topics in the Economics of Automation

Andreas Irmen*
University of Luxembourg and CESifo, Munich

The recent wave of technological advances in robotics and artificial intelligence has sparked renewed interest in the economics of automation. These lectures provide an advanced introduction to this rapidly evolving literature. We begin with a brief historical overview of the field, before developing the analytical tools and conceptual framework needed to study the microeconomic and macroeconomic causes and consequences of automation. Particular attention is devoted to the effects of automation on wages, labor demand, the functional distribution of income, and long-run economic growth. The course concludes with a dynamic application that links automation to the challenges posed by population aging.

Cambridge, December 5, 2025

*Address: Department of Economics and Management (DEM), University of Luxembourg, Campus Kirchberg (Bloc G), 6, Rue Richard Coudenhove-Kalergi, L-1359 Luxembourg, email: andreas.irmen@uni.lu

Three Lectures

Lecture 1: Historical background and basic concepts of the Economics of Automation

Readings: Mokyr, Vickers, and Ziebarth (2015), Irmen and Tabaković (2017), Susskind (2020), Acemoglu and Johnson (2023), Irmen (2024)

Lecture 2: Automation and the task-based approach of Daron Acemoglu and Pascqual Restrepo

Readings: Acemoglu and Restrepo (2018a), Acemoglu and Restrepo (2018b), Acemoglu and Restrepo (2026), Irmen (2025)

Lecture 3: How does population aging affect economic growth and factor shares in times of increasingly automatable production processes?

Readings: Heer and Irmen (2014), Irmen (2017), Irmen (2021), Boppart and Krusell (2020), Acemoglu and Restrepo (2022)

References

Acemoglu, D., and S. Johnson (2023): *Power and Progress - Our Thousand-Year Struggle Over Technology and Prosperity*. PublicAffairs, New York.

Acemoglu, D., and P. Restrepo (2018a): "Artificial Intelligence, Automation, and Work," in *Economics of Artificial Intelligence*, NBER Chapters. National Bureau of Economic Research, Inc.

——— (2018b): "The Race between Man and Machine: Implications of Technology for Growth, Factor Shares, and Employment," *American Economic Review*, 108(6), 1488–1542.

——— (2022): "Demographics and Automation," *The Review of Economic Studies*, 89(1), 1–44.

——— (2026): "Automation and Rent Dissipation: Implications for Wages, Inequality, and Productivity," *Quarterly Journal of Economics*, forthcoming.

Boppart, T., and P. Krusell (2020): "Labor Supply in the Past, Present, and Future: A Balanced-Growth Perspective," *Journal of Political Economy*, 128(1), 118–157.

Heer, B., and A. Irmen (2014): "Population, Pensions, and Endogenous Economic Growth," *Journal of Economic Dynamics and Control*, 46, 50–72.

Irmen, A. (2017): "Capital- and Labor-Saving Technical Change in an Aging Economy," *International Economic Review*, 58(1), 261–285.

——— (2021): "Automation, Growth, and Factor Shares in the Era of Population Aging," *Journal of Economic Growth*, 26, 415–453.

——— (2024): "Economic Foundations of Automation: Micro- and Macroperspectives," *draft,* Department of Economics and Management, University of Luxembourg.

——— (2025): "The Economics of Automation: Jargon and Conjectures," *draft,* Department of Economics and Management, University of Luxembourg.

Irmen, A., and A. Tabaković (2017): "Endogenous Capital- and Labor-Augmenting Technical Change in the Neoclassical Growth Model," *Journal of Economic Theory*, 170, 346–384.

Mokyr, J., C. Vickers, and N. L. Ziebarth (2015): "The History of Technological Anxiety and the Future of Economic Growth: Is This Time Different?," *Journal of Economic Perspectives*, 29(3), 31–50.

Susskind, D. (2020): *A World Without Work: Technology, Automation and How We Should Respond*. Penguin Books Ltd., London.