

[← Working Papers](#)

The Learning Curve and Optimal Production Under Uncertainty

Saman Majd & Robert S. Pindyck

SHARE



WORKING PAPER 2423

DOI 10.3386/w2423

ISSUE DATE October 1987

This paper examines the implications of the learning curve in a world of uncertainty. We consider a competitive firm whose costs decline with cumulative output. Because the price of the firm's output evolves stochastically, future production and cumulative output are unknown, and are contingent on future prices and costs. We derive an optimal decision rule that maximizes the firm's market value: produce when price exceeds a critical level, which is a declining function of cumulative output. We show how the shadow value of cumulative production, as well as the total value of the firm, depend on the volatility of price and other parameters. Over the relevant range of prices, uncertainty reduces the shadow value of cumulative production, and therefore increases the critical price required for the firm to begin producing.

[Download a PDF](#)

[Information on access](#)

Acknowledgements and Disclosures



Citation and Citation Data



Published Versions

Rand [Journal of Economics](#), vol. 20, no. 3, pp. 331-343, Autumn, 1989. citation courtesy of
[RePEc](#)

Related

TOPICS

[Econometrics](#)
[Financial Economics](#)

PROGRAMS

[Monetary Economics](#)

More from the NBER

In addition to [working papers](#), the NBER disseminates affiliates' latest findings through a range of free periodicals — the [NBER Reporter](#), the [NBER Digest](#), the [Bulletin on Health](#), and the [Bulletin on Entrepreneurship](#) — as well as online [conference reports](#), [video lectures](#), and [interviews](#).



Martin Feldstein Lecture, Summer Institute 2025
The Fiscal Future

N. Gregory Mankiw, Harvard University and NBER
July 10, 2025

2025, 17th Annual Feldstein Lecture, N. Gregory Mankiw, "The Fiscal Future"

FELDSTEIN LECTURE

PRESENTER: N. GREGORY MANKIW

N. Gregory Mankiw, Robert M. Beren Professor of Economics at Harvard University, presented the 2025 Martin Feldstein...



Methods Lecture, Summer Institute 2025
**Uncovering Causal Mechanisms:
Mediation Analysis and
Surrogate Indices**

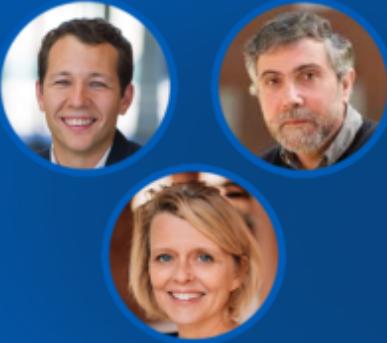
Raj Chetty, Harvard University and NBER
Kosuke Imai, Harvard University
July 24, 2025



**2025, Methods Lecture, Raj Chetty and Kosuke Imai, "Uncovering Causal Mechanisms:
Mediation Analysis and Surrogate Indices"**

PRESENTERS: [RAJ CHETTY](#) & [KOSUKE IMAI](#)

SlidesBackground materials on mediation Imai, Kosuke, Dustin Tingley, and Teppei Yamamoto. (2013). "Experimental Designs..."



International Trade and Macroeconomics, Summer Institute 2025

Panel on The Future of the Global Economy

Oleg Itskhoki, Harvard University and NBER

Paul Krugman, City University of New York and NBER

Linda Tesar, University of Michigan and NBER

July 8, 2025

2025, International Trade and Macroeconomics, "Panel on The Future of the Global Economy"

PANEL DISCUSSION

PRESENTERS: [OLEG ITSKHOKI](#), [PAUL R. KRUGMAN](#) & [LINDA TESAR](#)

Supported by the Alfred P. Sloan Foundation grant #G-2023-19633, the Lynde and Harry Bradley Foundation grant #20251294...

National Bureau of Economic Research

Contact Us

1050 Massachusetts Avenue

Cambridge, MA 02138

[617-868-3900](tel:617-868-3900)

info@nber.org

webaccessibility@nber.org

Accessibility Policy

Diversity Policy

Privacy Policy

FOLLOW



© 2026 NATIONAL BUREAU OF ECONOMIC RESEARCH. ALL RIGHTS RESERVED.