

Econ 884/690

**The History of Modern Microeconomics
Spring 2023**

Lecture 6: General Equilibrium Analysis

**Steven G. Medema
Department of Economics
Center for the History of Political Economy
Duke University**

Background

- “Everything is connected to everything else.”
- The Russian Revolution (1917) and communism.
 - ❖ Defense of the competitive market system.
 - ❖ Question of replicating a Walrasian system in a planned economy.
 - ▶ Lange’s work on planning and socialist calculation.
 - ▶ “My ideal in those days was the development of economic planning, a task which I saw as synthesizing economic equilibrium theory, statistical methods, and criteria for social decision making.” (Arrow, 1984)

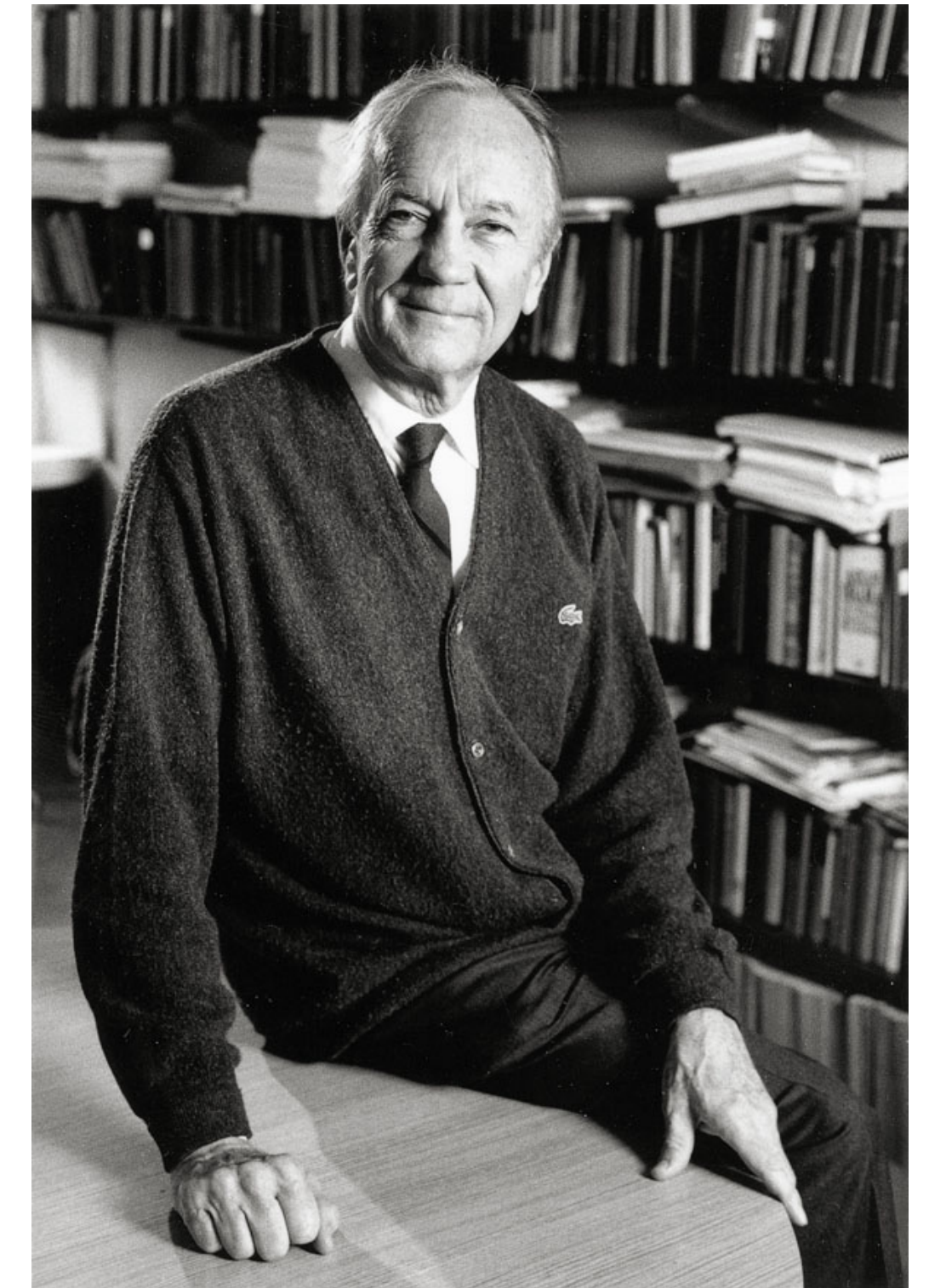
Background

- Émigré economists loom large here, too.
- Cowles Commission as a key location for research on this topic.
- Set theory (convexity analysis) as the central tool, ‘replacing’ calculus; influence of vN&M (1944), among others.
 - ❖ Fixed point theorems: Under certain conditions, a function will have at least one ‘fixed point’ — that is, a point where $f(x) = x$.
 - ▶ Brouwer, Kakutani, ...
 - ▶ Proved to be essential tools for proving the existence of equilibrium.

Rumblings ...

- Cassel, *The Theory of Social Economy* (1918, translated 1923).
- Hicks, *Value and Capital* (1937).
 - ❖ Drawing on Walras and Pareto (and Marshall!), Wicksell and Keynes (dynamics).
 - ❖ "... the place of economic theory is to be the servant of applied economics."
- Samuelson, *Foundations of Economic Analysis* (1947).
 - ❖ "Operationally meaningful theorems."
- Several scholars working on the question of 'existence.'

Simultaneous 'Discovery' II



Parallel Paths? Kenneth Arrow

- Sought to join abstract theoretical analysis and practical application, including normative criteria.
 - ❖ Cowles and RAND environments.
 - ❖ Theory as a means, not an end.
 - ❖ Like Samuelson, influenced by Hicks's *Value and Capital*.
 - ❖ Wanted to firm up the theoretical underpinnings of the economic theory of competition—that is, in the service of economics.
 - ▶ This, he believed, required a proof that there exists a set of prices that will generate an equilibrium within a competitive system.

Parallel Paths? Gerard Debreu

- More concerned with theory for its own sake, and the elegance thereof.
 - ❖ Theory as an — or the — end (Bourbakist); unconcerned with interpretations.
 - ▶ “... emptying the theory radically and uncompromisingly of all empirical reference” (Ingrao & Israel)
 - ▶ “An axiomatized theory substitutes for an ambiguous economic concept a mathematical object that is subject to entirely definite rules of reasoning.” (Debreu, quoted in Ingrao & Israel).
 - Prevents sloppiness, the application of indefinite concepts, lack of fully formulated/explicit assumptions
 - ▶ No felt need to provide “operationally meaningful theorems” (Samuelson) related to the operation of an actual market system.

A Different Trail: Lionel McKenzie

- Duke's foremost contribution to economics!
 - ❖ Escaped to Cowles to find mathematical companionship.
- Like Arrow, thinking about theory in the context of economic problems.
 - ❖ Graham's model of international trade.
- More from Professor Weintraub in due course!

Arrow–Debreu (1954); McKenzie (1954)

- Does a competitive equilibrium exist?
 - ▶ Counting equations ...
- A & D had proved the optimality of a competitive system (about which more next week). Existence thus becomes an important question.
- A-D relies heavily on advances in game theory (vN&M, Nash) in constructing a model of a *game* where the associate equilibrium is a *competitive* equilibrium.
 - ❖ A very general proof.
- McKenzie moves from an existence proof for a specific model to a demonstration of generalization.
- Who was really “first”? What does “first” mean? Who receives credit?

Divergent Subsequent Paths

- Arrow: Further developing *and applying* the theory of general equilibrium in a variety of directions.
 - ❖ Work with Hahn on *General Competitive Analysis* (1971).
 - ❖ Information, uncertainty/risk/insurance, externalities/environmental econ, health economics, growth and technical change, social choice ...
 - ❖ Parallel to Samuelson.
- Debreu: *The Theory of Value: An Axiomatic Analysis of Economic Equilibrium* (1959).
- McKenzie: Builds economics department at Rochester.

GE Everywhere (Almost)

- Across the full spectrum of economics.
 - ❖ Became the basis for much of economic theorizing about the market process.
 - ❖ Computation advances allowed for the construction of computational general equilibrium models for, e.g., tax and trade policy analysis.
 - ❖ Basis for post-1970 developments in macroeconomics.
- Marshallian vs. Walrasian approaches.
 - ❖ Chicago clinging to Marshall.
 - ❖ That pesky issue of teaching undergraduates.