

Lecture 46: Simultaneous equations models; endogenous, exogenous and predetermined variables

Econometrics ■ Unit IV: Simultaneous equations models

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Unit IV: Simultaneous equations models

Lecture 46 begins Unit IV: Simultaneous equations models.

Today

- Simultaneous equations models
- Endogenous, exogenous and predetermined variables

- In single-equation models the causation runs one way: from the explanatory variables to y .
- In many economic problems, variables are determined *jointly*.
- In a market, price affects quantity demanded and supplied, and at the same time the equilibrium price depends on demand and supply.
- Such situations need a system of equations, called a **simultaneous equations model**.

1. *Demand and supply.* Quantity and price are determined together by a demand equation and a supply equation.
 2. *Keynesian income determination.* $C_t = \alpha + \beta Y_t + u_t$ and $Y_t = C_t + I_t$. Consumption depends on income, and income includes consumption.
- Each equation of the system describes one economic relation and is called a **structural equation**.
 - Its coefficients are **structural parameters**.

- **Endogenous variables** are determined within the system (price and quantity in a market; C_t and Y_t in the Keynesian model). They are correlated with the disturbances.
- **Exogenous variables** are determined outside the system (income of consumers in a market model, rainfall, investment I_t in the Keynesian model). They are assumed uncorrelated with the disturbances.
- **Predetermined variables** are the exogenous variables together with lagged endogenous variables (such as Y_{t-1}), whose values are already fixed when the current period begins.

A system has as many equations as endogenous variables.

Practice

- Exercise 7.1 (Exercises and Solutions booklet).

Next lecture

Lecture 47: A demand–supply system: structural and reduced forms.