

# Advanced Econometrics

## Chapter 1: Introduction

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# What is econometrics?

- Econometrics studies how statistical and mathematical methods can be used for economic data analysis.

# Purposes of econometrics

## Testing economic theories

- Economic theories are logical products of economists' minds. It is not certain that they can really explain real world. Data analysis is required to test the theories.

Example 1: Does the law of supply and demand hold?

Example 2: Is the Keynesian consumption function appropriate to explain aggregate consumption?

Example 3: Is money demand sensitive to interest rates as economic theories predict?

Example 4: Does college education induce higher wage? If so, how much?

# Purposes of econometrics

## Policy analysis

- Economic policies are implemented based on economic reasoning and theories. Effectiveness of an economic policies need to be examined by econometrics.

Example 1: How much do cigarette taxes reduce smoking?

Example 2: Does reducing class size improve elementary school education?

Example 3: Does raising interest rates cool the economy?

Example 4: Does minimum wage increase unemployment rate?

Example 5: Does gun control reduce crime?

Example 6: Does harsh sentencing reduce crime?

# Purposes of econometrics

## Forecasting

- Using data, we can forecast future courses of economic variables.

Example 1: What will be the US dollar price of the Japanese yen six months later?

Example 2: What will be the rate of inflation next year?

# Data for econometric analysis

- Cross-sectional data: data collected with respect to individuals, households, firms, cities, etc. at a given point in time.
- Time series data: data collected over time with respect to economic variables (e.g., interest rate, KOSPI index, inflation rates)
- Panel data: collection of cross-sectional data over time

# Steps for empirical research

- 1 Consider an economic model (based on economic reasoning, intuition, theory and experience)
- 2 Gather data on relevant variables
- 3 Build an econometric model and estimate it.
- 4 Check the adequacy of the econometric model of Step 3. If inadequate, repeat Step 3

# When and how did econometric start?

- See Mary Morgan (1990) *The History of Econometric Ideas*, Cambridge University Press.
- The first research agenda was to examine the law of demand and supply in the twenties.
- Large-scale econometric models, started by Jan Tinbergen (a Nobel laureate in economics) in the forties and further advanced by Lawrence Klein (a Nobel laureate in economics) in the seventies, made econometrics popular among academicians and policy-makers.
- Time series analysis, panel data and cross-section regression methods have developed much in recent decades.