

# Introduction

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# Introduction

What conveys the study of econometrics?

The unification of three main areas:

1. Statistics
2. Economic theory
3. Mathematics

“Econometrics conveys application of mathematical statistics and the tools of statistical inference to the empirical measurement of relationships postulated by an underlying theory.”

# The practice of econometrics

Theoretical econometrics vs. applied econometrics

This course is designed for the applied economist.

Applied econometric methods will be used for estimation of important quantities, analysis of economic outcomes such as policy changes, markets or individual behavior, testing theories, and for forecasting.

# Econometric Modeling

Consider the Keynesian consumption function:  $C = f(X)$ , where  $X$  is disposable income.

Theoretical postulates:  $dC/dX$  is positive and  $0 < dC/dX < 1$ .

Implications:

1.  $MPC > 0$
2.  $APC = C/X$  falls with income
3.  $d(C/X)/dX = (MPC - APC)/X < 0 \rightarrow MPC < APC$

# Keynes' Consumption Function

How do we test this theory?

Estimate the equation  $C = \alpha + \beta X$  and test whether  $\alpha > 0$  and  $0 < \beta < 1$ .

Some points to note:

1. Notice the behavioral aspect of the model.
2. The model states an unambiguous and deterministic relationship between the dependent and independent variables.
3. Models are only simplifications of reality; we need a stochastic element.
4. A probabilistic model is less precise but more robust!

# Keynes' Consumption Function

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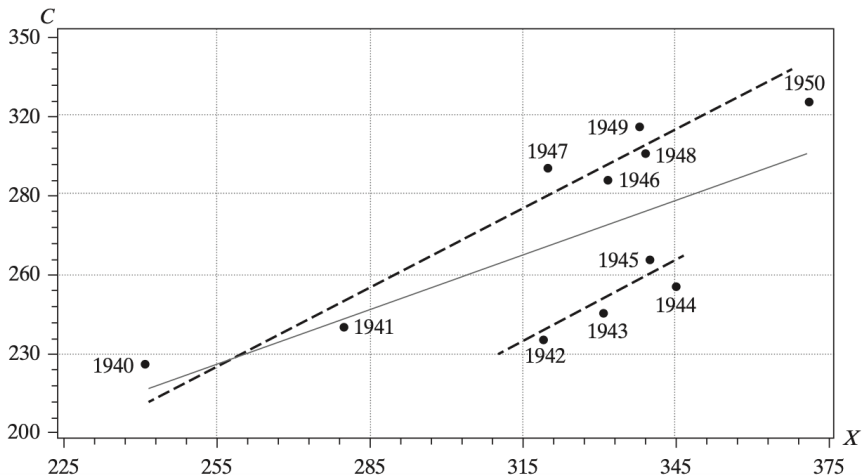
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# From the Model to the Real World

**FIGURE 2.1** Consumption Data, 1940–1950.



# From the Model to the Real World

The next step is to include a random component:  $C = F(X, \varepsilon)$

We usually assume an additive relationship.

We also need to consider the wartime period into the empirical model.

Here's an empirical model:

$$C = \alpha + \beta X + d_{waryears} \delta_W + \varepsilon$$



## Another Example

How would you model the function  $\textit{earnings} = f(\textit{education})$ ?

# The Big Data Revolution: Into a new paradigm?

Traditional econometrics: Measuring and testing theoretical relationships

Can Big Data replace theory?

# Table of Contents

## Econometrics

- Intro

- The practice of econometrics

- Econometric Modeling