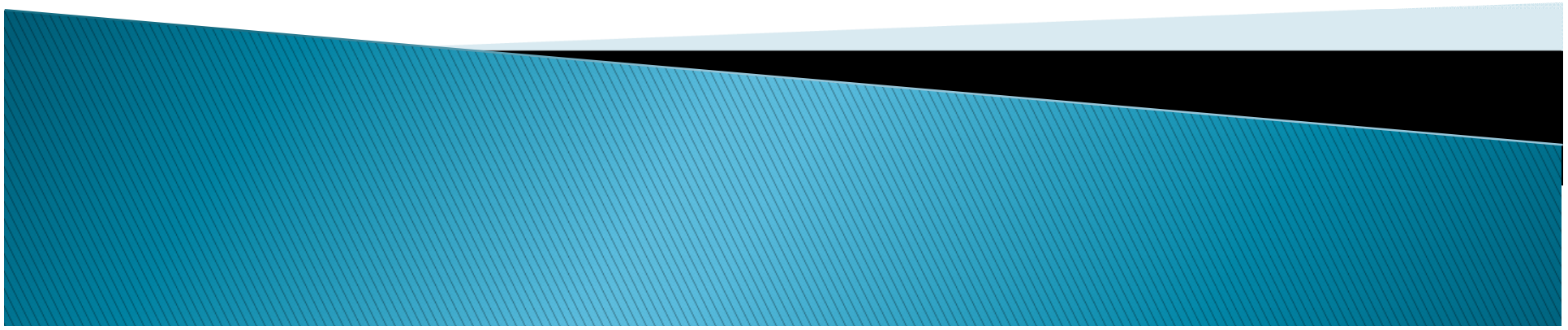
EE 325

Introductory Econometrics



Introductory Econometrics

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Course Description

Application of statistical and economic theories in analyzing economic data, with emphases on parameter estimation techniques and applications of simple and multiple regression models to economic analyses. Use of computer application in practice is also covered.

Required Textbooks

*Gujarati, Damodar. N. and Porter, Down C. (2009) **Basic Econometrics**. 5th ed. Singapore, McGraw-Hill/Irwin. (HB139 .G8 2009a) [Hereafter, **GP**]

Wooldridge, Jeffrey M. (2009) ***Introductory Econometrics: A Modern Approach.*** 4th ed. Mason, Ohio : South-Western Cengage Learning. (HB139 .W66 2009) [Hereafter, **W**]

*Main Text

Recommended Texts for Further Study

- Jame H. Stock and Mark W. Watson, ***Introduction to Econometrics***, 2nd Edition, Boston: Pearson Addison Wesley (2007)
- William E. Griffiths, R. Carter Hill and George G. Judge, ***Learning and Practicing Econometrics***, John Willey & Sons (1993 or latest edition)
- Jeffrey M. Wooldridge, ***Econometric Analysis of Cross Section and Panel Data***, MIT Press; 1 edition (October 1, 2001) ISBN-10: 0262232197 ISBN-13: 978-0262232197
- Joshua D. Angrist and Jörn-Steffen Pischke, ***Mostly Harmless Econometrics: An Empiricist's Companion***, Princton University Press (2009) ISBN-13: 978-0-691-12035-5
- Marno Verbeek, ***A Guide to Modern Econometrics***, Wiley (May 27, 2008) ISBN-10: 0470517697 ISBN-13: 978-0470517697
- Studenmund, A. H. ***Using Econometrics: A Practical Guide***, Harper Collins Publishers (2006 or Latest Edition)
- Wooldridge, Jeffrey M. (2009) ***Introductory Econometrics: A Modern Approach.*** 4th ed. Mason, Ohio : South-Western Cengage Learning. (HB139 .W66 2009

Assessment

Homework Assignments and Quizzes	20 points
Midterm Exam	35 points
Final Exam	45 points

Introduction and the Nature of Regression Analysis

- What is Econometrics?

- Methodology of Econometrics

What is Econometrics?

Econometrics means “economic measurement”

Econometrics based upon the development of statistical methods for estimating economic relationships, testing economic theories, and evaluating and implementing government and business policy

Example

- The effects of political campaign expenditures on voting outcomes
- The effect of school spending on student performance in the field of education
- The rate of change of money wages in relation to the unemployment rate (Phillips curve)
- The demand for the company's product is related to advertising expenditure

Methodology of Econometrics

8 Steps in Empirical Economic Analysis

1. Statement of Theory or Hypothesis
2. Specification of Mathematical Model of the Theory
3. Specification of the statistical, or econometric, model
4. Obtaining the data
5. Estimation of the parameters of the econometric model
6. Hypothesis testing
7. Forecasting or prediction
8. Using the model for control or policy purposes

Statement of Theory or Hypothesis

Example

Keynes postulated that the marginal propensity to consume (MPC), the rate of change of consumption for a unit change in income, is greater than zero but less than 1

Specification of Mathematical Model of the Theory

$$Y = \beta_1 + \beta_2 X \qquad 0 < \beta_2 < 1$$

Where Y = consumption expenditure

X = income

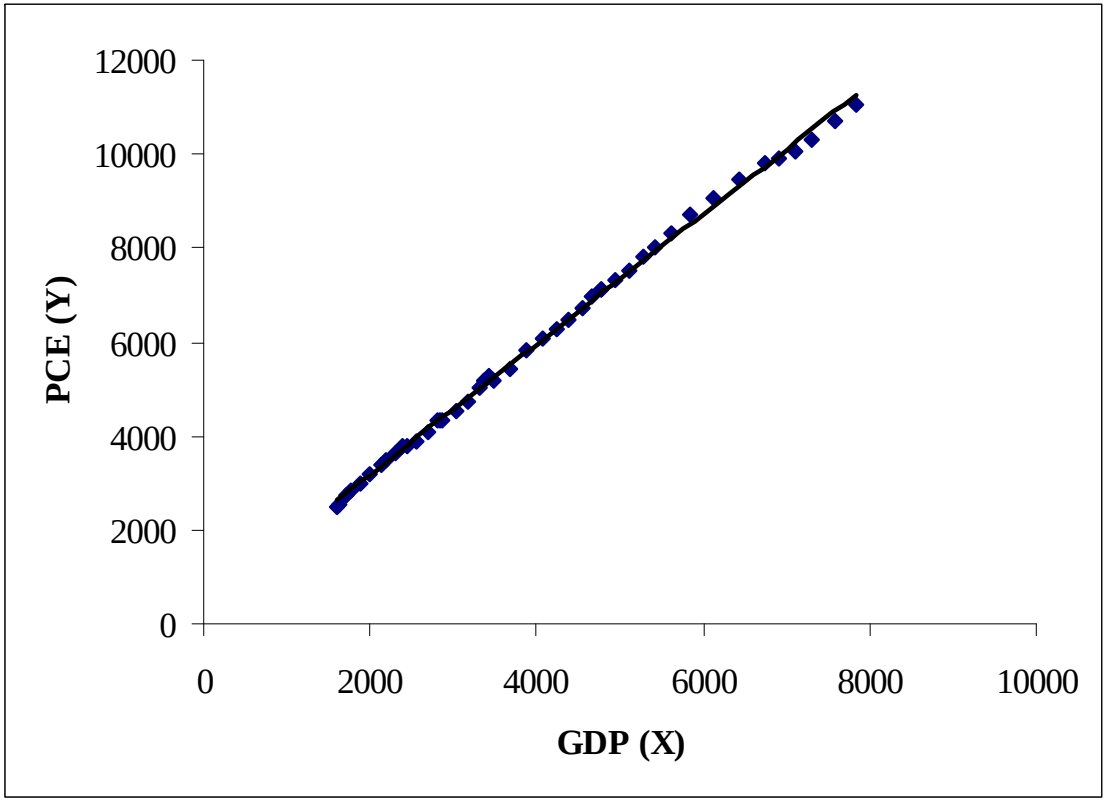
Specification of the statistical, or econometric model

$$Y = \beta_1 + \beta_2 X + u$$

u known as the disturbance or error term

Obtaining the data

- Aggregate personal consumption expenditure and gross domestic product from period 1960-2005 in the United States measured in billion dollars.
- The data are in real terms. They are measured in constant (2000) prices


12000
10000
8000
6000
4000
2000
0
PCE (Y)
0
2000
4000
6000
8000
10000
GDP (X)

Estimation of the parameters of the econometric model

$$\hat{Y}_t = -299.5913 + 0.7218 X_t$$

MPC was about 0.72 – For the sample period an increase in real income of one dollar led, on average, to an increase of about 72 cents in real consumption expenditure

Hypothesis testing (Statistic Inference)

We must enquire whether this estimate is sufficiently below unity to convince us that this is not a chance occurrence of the particular data we have used.

In other words, is 0.72 statistically less than 1?

Forecasting or prediction

To illustrate, suppose we want to predict the mean consumption expenditure for 2006. The GDP value for 2006 was 11319.4 billion dollars. We obtain:

$$\hat{Y}_{2006} = -299.5913 + 0.7218(11319.4)$$

$$= 7870.7516$$

Thus, given the value of the GDP, the mean, forecast consumption expenditure is about 7870 billion dollars.

The actual value of the consumption expenditure reported in 2006 was 8044 billion dollars. The estimated model thus **under predicted** the actual consumption expenditure by about 174 billion dollars. We could say that **forecast error** is about 174 billion dollars.

Suppose the president decides to propose a reduction in the income tax. What will be the effect of such a policy on income and thereby on consumption expenditure and ultimately on employment?

As macroeconomic theory shows, the change income, a dollar's worth of change in investment expenditure is given by the income multiplier, which defined as

$$M = \frac{1}{1 - MPC}$$

MPC =0.72, M=3.57

An increase (decrease) of a dollar in investment will eventually lead to more than a threefold increase (decrease) in income.

Using the model for control or policy purposes

Suppose we have the estimated consumption function given in

$$8750 = -299.5913 + 0.7218(GDP_{2006})$$

$$\hat{Y}_t = -299.5913 + 0.7218 X_t$$

Suppose further the government believes that consumer expenditure of about 8750 billion dollars will keep the unemployment rate at its current level of about 4.2% (early 2006). What level of income will guarantee the target amount of consumption expenditure?

An income level of about 12537 billion dollars, given an MPC of about 0.72, will produce an expenditure of about 8750 billion dollars.

By appropriate fiscal and monetary policy mix, the government can manipulate the **control variable X** to produce the desired level of the **target variable Y**

Source

Gujarati, D.N. (2009) Basic Econometrics. 5th ed. Singapore, McGraw-Hill.