EE325

Introductory Econometrics

Weerawat Phattarasukkumjorn

Semester 2/2020

Course details

› Schedule

Section 3: Tue, Thu 11.00 – 12.30
Moodle class code: **4142**

› Instructor

Weerawat Phattarasukkumjorn, Room no. 437
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Communication through LINE is acceptable **only in class group**!

› Evaluation

Homework and assignment	30 points
Midterm exam	30 points
Final exam	40 points

› Exam date and time

Midterm: Tue, Mar 16 from 12.00 – 14.00 (2 hours)
Final: Sat, May 29 from 09.00 – 12.00 (3 hours)

What does 'Econometrics' mean?

We, first and foremost, try to understand the topic, analyzing the morphemes.

› Econometrics = economics + metrics

› Economics: you all know what this means.

› Metrics: a system of measurement.

To conclude, *"econometrics is the application of statistical methods to economic data in order to give empirical content to economic relationships. More precisely, it is the quantitative analysis of actual economic phenomena based on the concurrent development of theory and observation, related by appropriate methods of inference".*

How can econometrics be used?

First of all, let's introduce how academics work to come up with a conclusion and policy recommendation. You are also to deal with these processes for your seminar.

› Introduction and problem statement (research question)

What question do you want to answer? How and why is it important to answer the question? What is expected to be your contribution to academic world?

› Literature review (research gap)

Have there been any other people trying to answer the same question yet? What and how other people have tried to answer this question? What are their results? What are their methods used and how they are still flawed or lacking?

› Theoretical framework (rationalize your hypothesis)

For economics, what is the rationale behind your speculation or hypothesis? Has there been anyone discover or derive any theory before? What type of explanation will you be using to couple and elaborate your results and implications.

How can econometrics be used?

› Research method (how to find the answer)

How you are going to prove your hypothesis? We have several ways to do, but mostly we can use these methods

- Qualitative methods: descriptive statistics, reviews, deduction, etc.
- Quantitative methods: forecast, quantitative simulation, econometrics, etc.

› Report results and policy implication

What are your results and findings? Moreover, what do those findings suggest? Do those results imply that we should implement which kind of policy? What is the limitation of your work and what can be possibly improved in the future?

Example of econometric process

› Research question

› Economic theory or model

› Empirical data

› Econometric modeling

› Estimation and hypothesis testing

› Forecast or prediction

› Empirical conclusion

› Policy recommendation

Strengths of econometrics

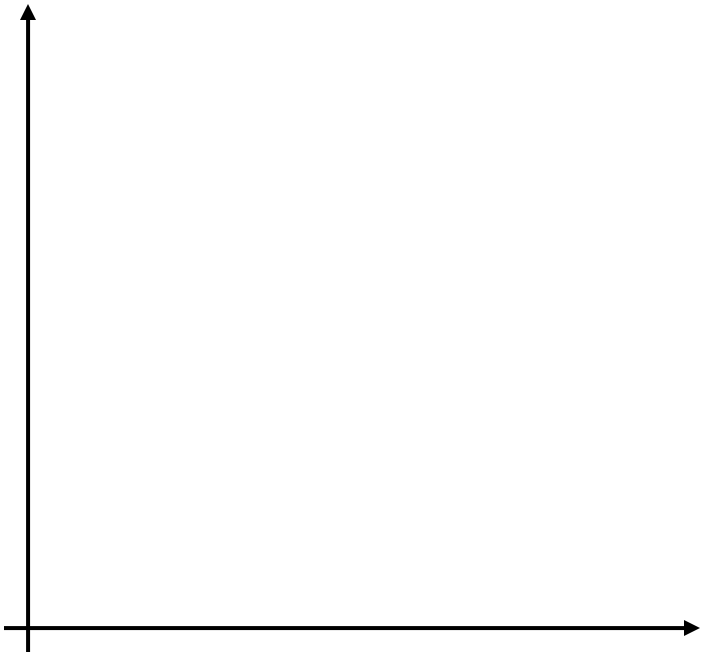
› Ability to quantify direction and magnitude of economic effects

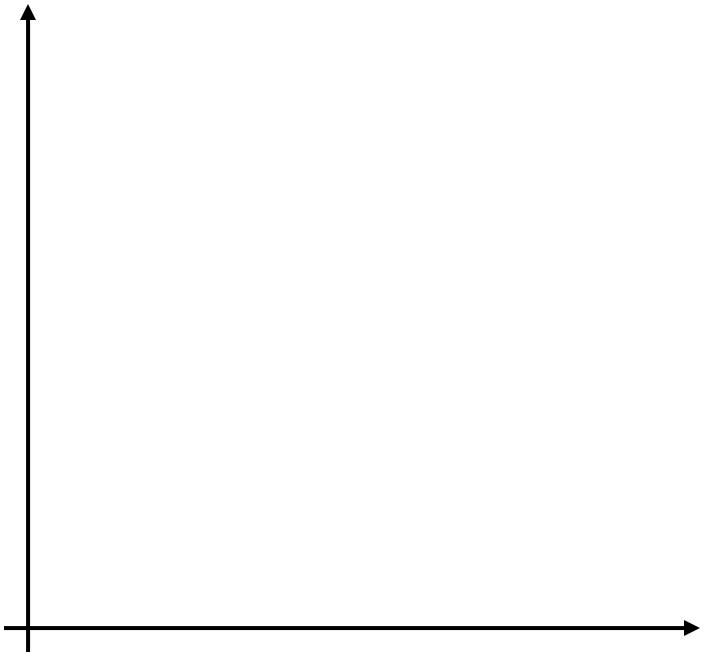
› Statistical testability

› Prediction or simulation (precise, though not always correct)

What are statistical relationships?

As a reminder, when we study mathematics, a function is usually determined. Meanwhile, studying statistics relationship is, most of the time, cannot be captured by a specific function.

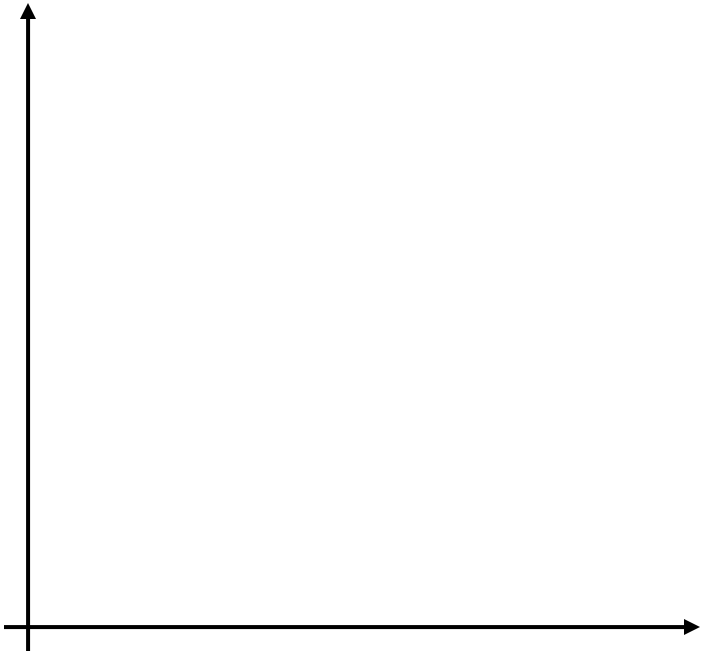


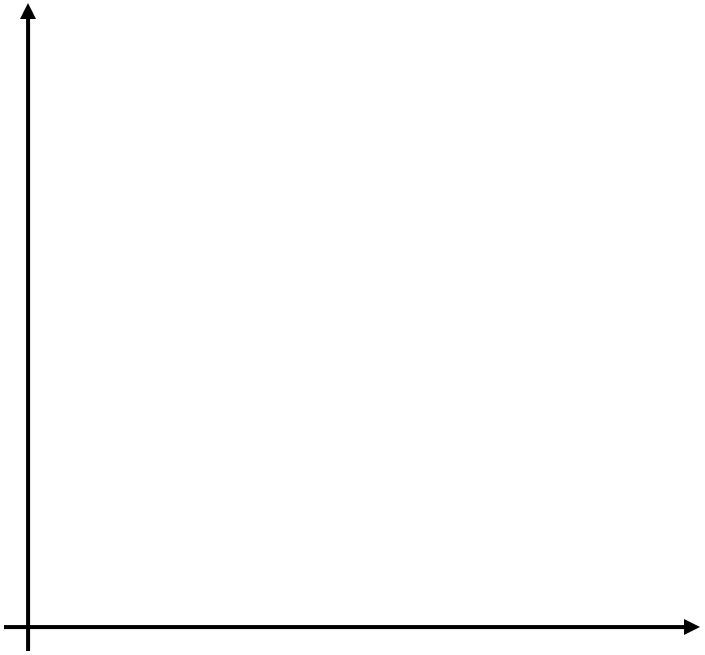


What are statistical relationships?

(1) Correlation relationship is any statistical association or the degree of association between two or more variables (pairwise, linear).

(2) Regression relationship is a relationship derived from a set of statistical processes for estimating the relationships between a dependent and one or more independent variables (linear or nonlinear).





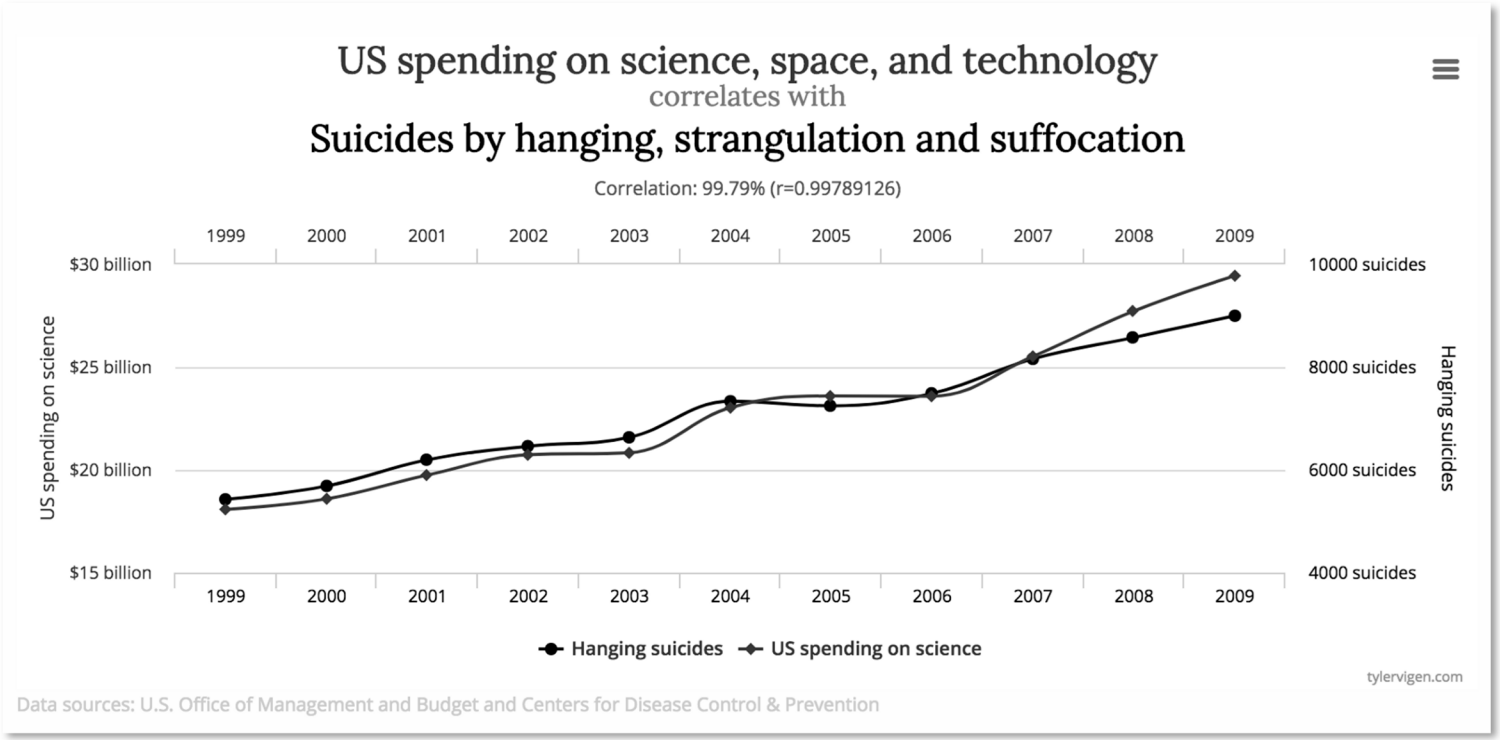
What are statistical relationships?

(3) Causal relationship is influence by which one event, process or state (a cause) contributes to the production of another event, process or state (an effect) where the cause is partly responsible for the effect, and the effect is partly dependent on the cause.

It is very difficult to draw a conclusion that two variables are causal, especially for social science. **Neither** correlation **nor** regression imply causality at all.

Most causality can be base upon economic theory and explanation. Aligning empirical results can also support for theory. Couple both can provide strong evidence, though does not reveal universal truth.

Spurious correlation



Data by collection

(1) Primary data
Collected by a researcher from first-hand sources, using methods like surveys, interviews, or experiments.

(2) Secondary data
Gathered from studies, surveys, or experiments that have been run by other people or for other researches.

Broad categorization

observations

student	GPA
student 1	GPA 1
student 2	GPA 2
student 3	GPA 3
student 4	GPA 4
student 5	GPA 5
student 6	GPA 6

(1) Cross-sectional data
A type of data collected by observing many subjects (such as individuals, firms, countries, or regions) at the one point or a period of time. The analysis has no regard to differences in time.

observations

time	GPA
t=1	GPA 1 (t=1)
t=2	GPA 1 (t=2)
t=3	GPA 1 (t=3)
t=4	GPA 1 (t=4)
t=5	GPA 1 (t=5)
t=6	GPA 1 (t=6)

(2) Time series
A series of data points indexed in time order.

Broad categorization

(3) Panel data

A set of data collected over time and over the same individuals.

student	GPA	time
student 1	GPA 1	t=1
student 2	GPA 2	t=1
student 3	GPA 3	t=1
student 1	GPA 1	t=2
student 2	GPA 2	t=2
student 3	GPA 3	t=2
student 1	GPA 1	t=3
student 2	GPA 2	t=3
student 3	GPA 3	t=3

time	student 1	student 2	student 3	student 4
t=1				
t=1				
t=3				

Broad categorization

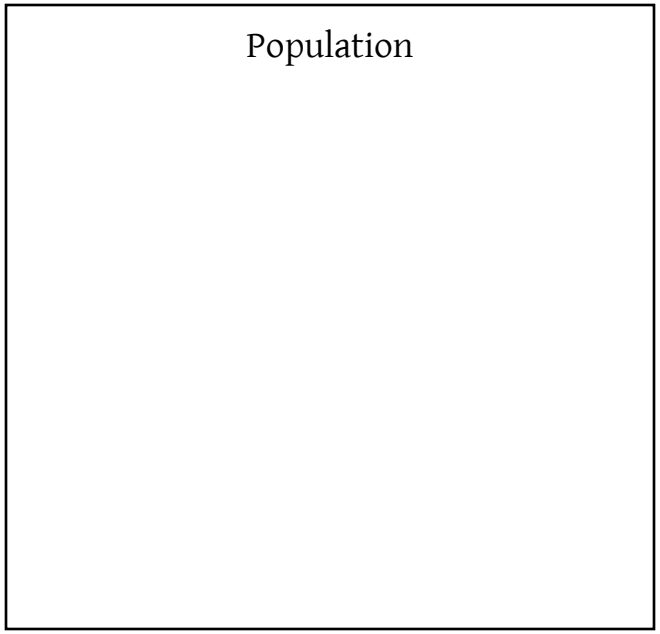
(4) Pooled cross-sectional data

A multiple cross-sectional data pooled without observing the same subject.

student	GPA	time
student 1	GPA 1	t=1
student 2	GPA 2	t=1
student 3	GPA 3	t=1
student 2	GPA 2	t=2
student 3	GPA 3	t=2
student 4	GPA 4	t=2
student 1	GPA 1	t=3
student 3	GPA 3	t=3
student 4	GPA 4	t=3

time	student 1	student 2	student 3	student 4
t=1				
t=1				
t=3				

Inferencing from sample



(1) Population
Refers to a group of observations of interest. If the data cover all the observations of interest, the set of data is called a **census**.

(2) Sample
Refers to a subset of population of interest. Most of the time they are statistically random samples which is called **survey**.

Secondary data in Thailand

(1) Cross-sectional data

Not free most of the time. University students can request from the National Statistics Office (NSO) for their project. Project proposal must be submitted.

› Household Socio-Economic Survey (SES) – income, expenditure, debt, asset (recently added), etc. Unit of analysis is household.

› Labor Force Survey (LFS) – wage, working hour, occupation, job search. Unit of analysis is individual.

› Health and Welfare Survey (HWS) – health insurance, health benefit, partial utilization, etc. Unit of analysis is individual.

› Office of the National Economic and Social Development Council (NESDC) – the NESDC takes NSO data to calculate important statistics. https://www.nesdc.go.th/more_news.php?cid=74

Secondary data in Thailand

(2) Time series data
Widely available because they are not identity specified.

› Bank of Thailand (BOT) – GDP, financial and monetary statistics, currency exchange, etc.
https://www.bot.or.th/Thai/Statistics/Pages/default.aspx

› Ministry of Finance (MOF) and Fiscal Policy Office – tax revenue and expenditure, tax disbursement, national debt, etc.
http://www.fpo.go.th/main/Statistic-Database.aspx

› Others include Ministry of Commerce (MOC), Stock Exchange of Thailand (SET), international organization such as International Monetary Fund (IMF), World Bank, United Nations (UN), OECD, etc.

Secondary data in Thailand

(3) Panel data

Very limited in Thailand. The ones that I know of are

› Panel SES (by the NSO) from 2005, 2006, 2007, 2010, 2012 – not free.

› Townsend Thai data (cooperated with UTCC and TRF) from 1997 to 2017 – request needed.
http://riped.utcc.ac.th/panel/data/townsend-thai-data

Content

› Chapter 2
Statistics revision

› Chapter 3
Simple linear regression

› Chapter 4
Multiple linear regression

› Chapter 5
Dummy variable

› Chapter 6
Relaxing some assumptions

Chapter number

Sub-chapter

How to use this handout?

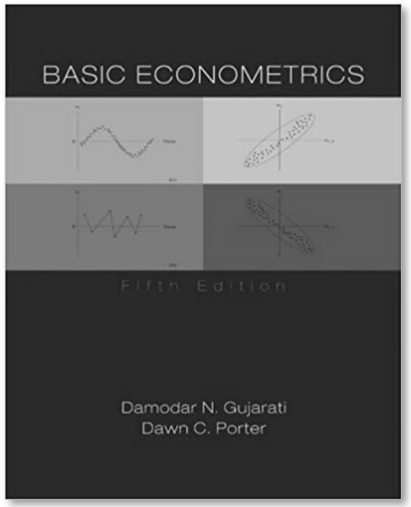
Main topic

Illustration or content

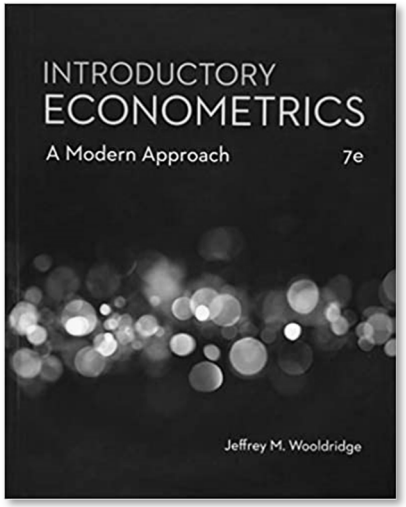
Illustration or content

Content

Main textbook



› Gujarati, D.N., and D.C. Porter, **Basic Econometrics**. 5th ed., N.Y., McGraw-Hill, 2009.



› Wooldridge, J. M. **Introductory Econometrics: A Modern Approach**. 7e ed. Thompson: South-Western, 2019.