

Econometrics 1 *Applied Econometrics with R*

Lecture 1: Introduction

黄嘉平

中国经济特区研究中心 讲师

办公室：文科楼1726

E-mail: huangjp@szu.edu.cn

Tel: (0755) 2695 0548

Office hour: Mon./Tue. 13:00-14:00

A news

<http://society.people.com.cn/n1/2016/0829/c1008-28671625.html>

2016年8月29日 京华时报 《社科院报告：中国缩小收入差距成绩显著》

...

《减少不平等与可持续发展》在研究中利用中国家庭追踪调查的微观家庭调查数据，从微观层面来系统性研究中国减少不平等以及推进可持续发展的实践、经验和成效，数据详实，内容丰富，论证严密，结构完整。根据收入数据，把家庭分成最低20%、较低20%、中等20%、较高20%和最高20%五档，2012年这五档对应的家庭平均收入分别为3400元、15700元、30200元、49500元和110200元，2014年这五档对应的家庭平均收入分别为4500元、19100元、35200元、56000元和117600元，这两年这五类家庭收入增长率分别为32.8%、22%、16.4%、13.1%和6.6%。这说明2012年到2014年之间，中国家庭中收入最低的20%和倒数第二低的20%的家庭，平均收入增长率要显著高于其他家庭，说明中国在减少社会不平等、缩小家庭收入差距上取得了不错的成绩。

...

	(a) 0% - 20%	(b) 20% - 40%	(c) 40% - 60%	(d) 60% - 80%	(e) 80% - 100%
2012	3,400	15,700	30,200	49,500	110,200
2014	4,500	19,100	35,200	56,000	117,600
increment	1,100	3,400	5,000	6,500	7,400
increment %	32.4%	21.7%	16.6%	13.1%	6.7%
difference between groups	-	(b) - (a)	(c) - (b)	(d) - (c)	(e) - (d)
2012	-	12,300	14,500	19,300	60,700
2014	-	14,600	16,100	20,800	61,600
increment	-	2,300	1,600	1,500	900

What is your conclusion?

Question: Why are you studying economics?

- What do you want to be?
career design (1, 5, 10, 20 years after graduation)
- What are you going to do here?

Whatever your answers are, you are supposed to become an economist

⇒ You need to learn economics

⇒ You need to learn econometrics

What you are supposed to do here

- You have three years, longer than almost all foreign graduate students
- Study, conduct research, write papers, (get published), finish your dissertation
- Study : research = 1 : (1 + a)

What is economics?

Typical economic problems

- There are three questions that any society has to face:
 - What goods and services should be produced?
 - How should these goods and services be produced?
 - Who should get the goods and services that have been produced?

Economics

- Resources are scarce, therefore people have to make choices.
- **Economics** is the study of how society manages its scarce resources and attempts to answer the three key questions.
- Economists are interested in:
 - How people make decisions
 - How people interact with one another
 - How the economy as a whole works

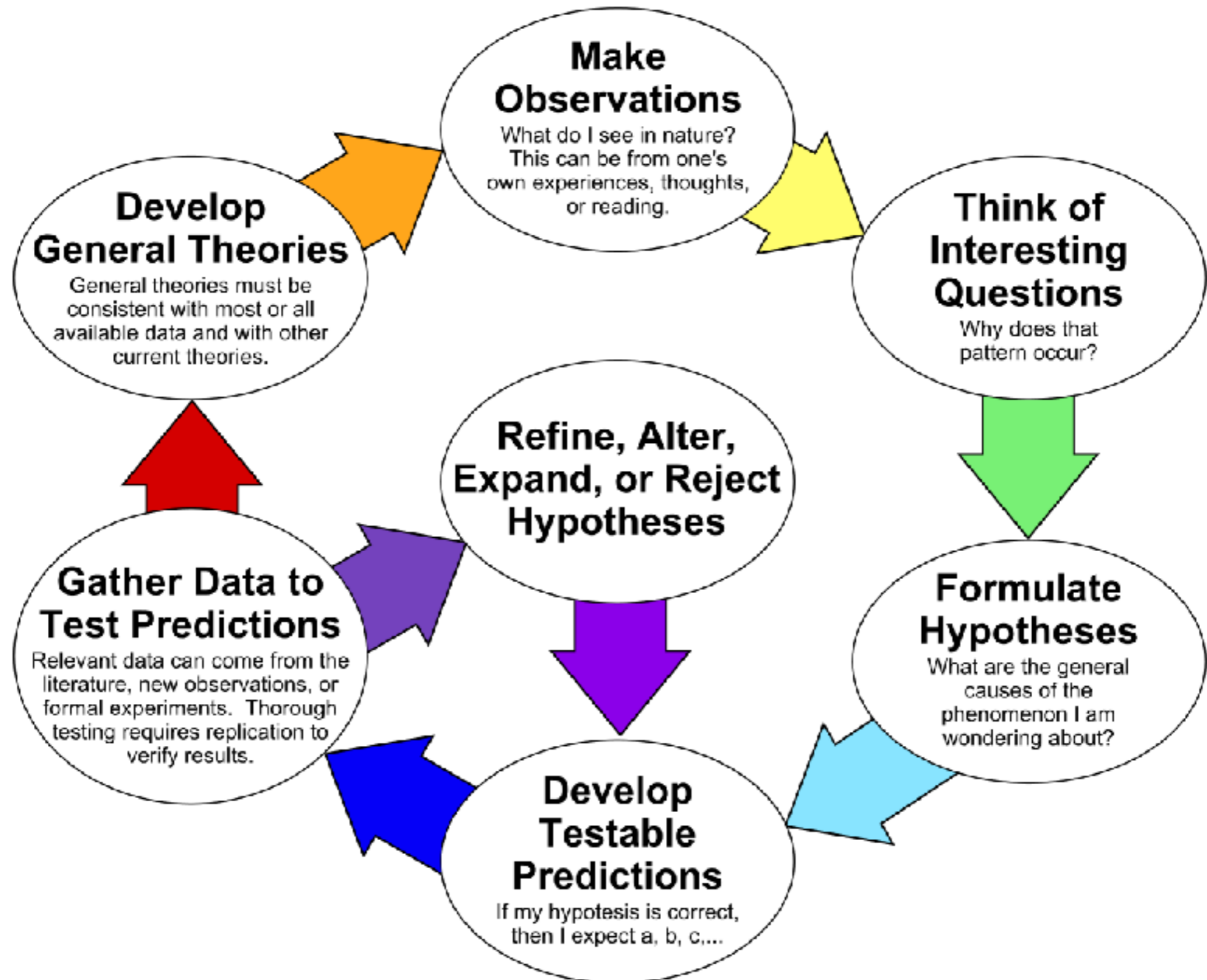
Faces of economics

- The economist as scientist
 - They devise theories, collect data, and then analyze these data in an attempt to verify or refute their theories.
- The economist as policy advisor

Economist as scientist

- Empiricism
 1. Gathering information
 - by observation, experience, or experimentation
 2. Formulate a hypothesis
 - either through observation/experience of phenomena, or through a theory
 3. Test the hypothesis
 4. Draw conclusions

The Scientific Method as an Ongoing Process



Economist as policy advisor

- Positive statements versus normative statements
 - *S1: Minimum wage laws cause unemployment*
 - *S2: The government should raise the minimum wage*
- Positive statements are descriptive, making a claim about how the world **is**. (Testable)
- Normative statements are prescriptive, making a claim about how the world **ought to be**. (Include opinions)

Economists often disagree

- Differences in scientific judgements
 - ⇒ will lead to different positive views
- Differences in values
 - ⇒ will lead to different normative views

Critical thinking

- “创造性从哪里来？我认为有三个基本元素，那就是好奇心、想象力和批判性思维。”
- “批判性思维就是善于对被广泛接受的结论提出疑问和挑战，而不是无条件地接受专家和权威的意见。同时，批判性思维又不是对一切命题都否定，而使用分析性、创造性、建设性的方式对疑问和挑战提出新解释，做出新判断。”

—— 钱颖一、《大学的改革 第一卷·学校篇》、中信出版社、2016

Economy, 经济, 以及经世济民

- The word *economy* comes from the Greek word *oikonomos*, means ‘one who manages a household’.
- “经世济民”一词源自东晋葛洪《抱朴子·内篇》中“经世济俗”，意为治理天下、救济百姓。隋朝王通《中文子》中有“皆有经济之道，谓经世济民”，首次提出了“经济”一词。“经济”一词原意涵盖政治、统治、行政等国家治理中的每个方面。
- 1862年日本堀達之助编《英和对译袖珍辞书》中把“经济学”作为西方古典经济学中的political economy的译文，特指国家层面的经济运营。后来“经济”作为包含国家及个人、企业两个层面的词逐渐普及。此用法又被梁启超引入汉语。
- 因此，现在中文的“经济”和英文的economy都不等同于“经世济民”。

What is **econometrics**?

Econometricians may give different answers!

- Econometrics is the science of testing economic theories.
- Econometrics is the set of tools used for forecasting future values of economic variables.
- Econometrics is the process of fitting mathematical economic models to real-world data.
- Econometrics is the science and art of using historical data to make quantitative policy recommendations in government and business.

Econometrics is the *science* and *art* of using economic theory and statistical techniques to analyze economic data.

Typical questions considered by econometricians

- Does reducing class size improve elementary school education?
- Is there racial discrimination in the market for home loans?
- How much do cigarette taxes reduce smoking?
- What will the rate of inflation be next year?

- Quantitative questions need quantitative answers
- A quantitative answer is always accompanied by a measure of how precise the answer is

Sources and types of data

- Sources
 - Experimental data versus observational data
- Types
 - Cross-sectional data
 - Time series data
 - Panel data (longitudinal data)

Cross-sectional data

TABLE 1.1 A Cross-Sectional Data Set on Wages and Other Individual Characteristics

obsno	wage	educ	exper	female	married
1	3.10	11	2	1	0
2	3.24	12	22	1	1
3	3.00	11	2	0	0
4	6.00	8	44	0	1
5	5.30	12	7	0	1
.
.
.
525	11.56	16	5	0	1
526	3.50	14	5	1	0

Time series data

TABLE 1.3 Minimum Wage, Unemployment, and Related Data for Puerto Rico

obsno	year	avgmin	avgcov	prunemp	prgnp
1	1950	0.20	20.1	15.4	878.7
2	1951	0.21	20.7	16.0	925.0
3	1952	0.23	22.6	14.8	1015.9
.
.
.
37	1986	3.35	58.1	18.9	4281.6
38	1987	3.35	58.2	16.8	4496.7

Panel data

TABLE 1.5 A Two-Year Panel Data Set on City Crime Statistics

obsno	city	year	murders	population	unem	police
1	1	1986	5	350000	8.7	440
2	1	1990	8	359200	7.2	471
3	2	1986	2	64300	5.4	75
4	2	1990	1	65100	5.5	75
.
.
.
297	149	1986	10	260700	9.6	286
298	149	1990	6	245000	9.8	334
299	150	1986	25	543000	4.3	520
300	150	1990	32	546200	5.2	493

The purpose of this course

- Learn introductory econometrics

Basic theories (models) and how to apply them.

- Learn how to use R both as an analyzing tool and a programming language
- Develop your ability of understanding, criticizing, and conducting economic studies

Reading, presenting, and discussing papers.

The contents of this course

- Basic R programming
- Probability & statistics
- Estimation
- Hypothesis testing
- Linear regression
 - one regressor
 - multiple regressor
- Nonlinear regression
- Binary dependent variables
- Instrumental variables
- Advanced reading
- Advanced R programming

Grading

- Attitude + assignments + oral presentation + final test/report
 - Attitude 10%
 - Assignments 20%
 - Oral presentation 20%
 - Final test/report 50%

Support website of the course

<http://huangjp.szu.edu.cn/aer.html>

Reference books and websites

1. Stock, J. H. and Watson, M. M., *Introduction to Econometrics*, 3rd Edition, Global Edition, Pearson, 2012. (《计量经济学导论》第三版国际版, 译者: 张涛、巩书欣, 中国人民大学出版社、2014)
2. Studenmund, A. H., *Using Econometrics: A Practical Guide*, 6th Edition, Pearson, 2011.
3. Kleiber, C. and Zeileis, A., *Applied Econometrics with R*, Springer, 2008.
4. Heiss, F., *Using R for Introductory Econometrics*, 2016.
5. Dennis, B., 《R语言初学指南》, 译者: 高敬雅、刘波, 人民邮电出版社, 2016.
6. Kabacoff, R. I., 《R语言实战》第二版, 译者: 王小宁等, 人民邮电出版社, 2016.
7. Quick-R, <http://www.statmethods.net/>

Questions and discussion

References

1. Mankiw, N. G. and Taylor, M. P., *Macroeconomics*, 3rd Edition, Cengage Learning, 2014.
2. Stock, J. H. and Watson, M. M., *Introduction to Econometrics*, 3rd Edition, Global Edition, Pearson, 2012.
3. Kleiber, C. and Zeileis, A., *Applied Econometrics with R*, Springer, 2008.