

Lecture 1: Introduction Course and Macroeconomics

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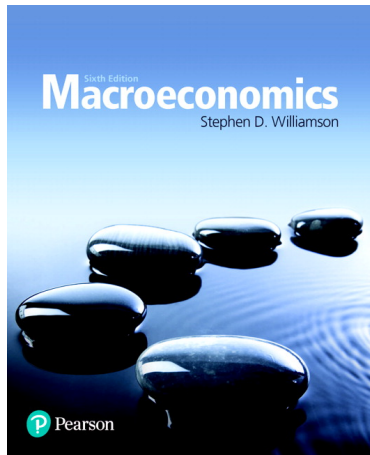
Your Instructor

- My name is [Hui-Jun Chen](#), you can call me HJ for convenience.
- I am interested in [housing](#), [used capital market](#), and their macroeconomics implications.
- In my leisure time, I also like to investigate the [Linux](#) system.
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Syllabus

Expectation

- **Participation:** can ask question anytime during the lecture
- **Prerequisites:** [Principle of Economics](#) (ECON 2001 & 2002), Basic Algebra, Calculus
- **Calculus:** better to remember in advance, but will learn via video series [The Essence of Calculus](#)



Recommended but not required textbook

Course Plan

■ **Module 1:** Measurement (Week 1)

- stylized facts about Economics growth and business cycle

■ **Module 2:** One-period (*static*) model (Week 2-6)

- micro foundation: consumers and firms
- macro implication: equilibrium, efficiency, resource allocation w/ data

■ **Module 3:** Two-period (*dynamic*) model (Week 8-12)

- module 2 + time: *intertemporal substitution*

■ **Module 4:** TBA

List of Possible Module 4 Content

- Economics Growth: Exogenous Growth Model (Solow Model)
- Labor / Employer Bargain: 1-sided / 2-sided label search model
- Finance: Asset Pricing model
- Coding and algorithm to solve RBC model

What is Macro?

- “macro is a method”
- Models (theory) + Data (empiric) = explanation to macro events
 - w/o models: only correlation
 - w/o data: only imagination
 - Friedman's critique: models are judged by prediction power
- Macro events in this class: long-run growth and business cycle
 - what drives long-run trend in US GDP?
 - what causes the fluctuation in GDP growth?
- Macro connects with micro
 - individual decisions (micro) \Rightarrow aggregates (macro)

Data Example: GDP per capita

- **Definition:** Gross Domestic Product **per individual**
 - quantity produced of **goods + services** w/i country **border** at given **period of time**
- **Measurement:** 3 possible approaches
 - Product, Expenditure, Income
 - Source: National Income and Product Accounts (NIPA)
- **Analysis:** separation data into **trend** and **business cycle**

Real GDP per capita, 1900-2014

Figure 1.1: Per Capita Real GDP (in 2009 dollars) for the United States, 1900–2014

Y

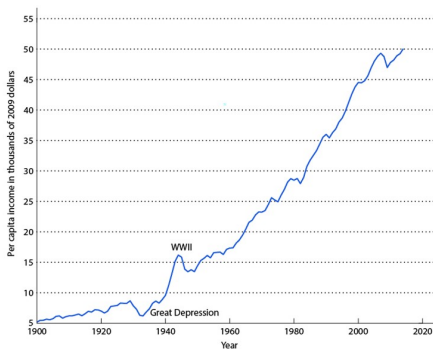
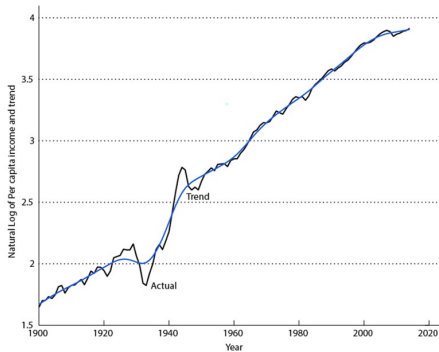


Figure 1.3: Natural log of Per Capita Real GDP and trend, 1900–2014

$$y = \ln(Y), \text{trend} = \text{HPFilter}(y)$$



Business Cycle: Deviation from Trend

Figure 1.4 Percentage Deviation from Trend in Per Capita Real GDP
actual - trend

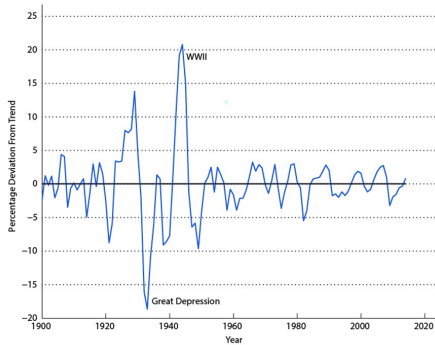
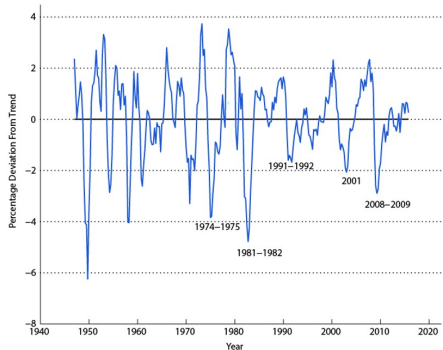


Figure 1.13 Percentage Deviation From Trend in Real GDP
same transform as 1.1, 1.3, 1.4, not per capita



Using Macro Model to Understand Data

- Economics is a **scientific pursuit** involving the formulation and **refinement of theories** that can help us better understand **how economies work** and **how they can be improved**
- **Data**: **how economies work**, e.g. GDP example
- **Theory**: cannot do experiment, only way for **scientific pursuit**
- **Policy**: understand **how economies can be improved** by **policies**

Structure of Macro Model: 4 elements

- ① **agent**: who is involved?
 - e.g. consumers, firms, governments, etc.
- ② **preferences**: how and what is consumed/valued/invested?
 - e.g. consumers' utility function on goods
- ③ **resources**: availability and distribution
 - e.g. Wealth, time, talents, natural resources
- ④ **technology**: objective limitation at given period of time
 - firms' production, market structure

Analysis on Macro Model: 3 steps

- ① **Equilibrium:** how do all the forces balanced?
 - e.g. competitive equilibrium
- ② **Assessment:** what's model prediction, and how different from data?
 - relationship between consumption and output
- ③ **Refinement:** how do changes in model alter its prediction?
 - different technology, one-period \rightarrow two-period

Just Micro?

Yes! Macro models need micro foundation, because

- aggregate behavior is the sum of individual decisions
- Lucas' critique: structures of economies **change** w/ policies b/c **individual decision** changed
- Need to know effect on **individual behavior** to know the aggregate effect!
- E.g. Two force of COVID stimulus policy:
 - ① \Rightarrow workers have **less** incentive to work \Rightarrow unemployment $\uparrow \Rightarrow$ exacerbate recession
 - ② \Rightarrow funding $\uparrow \Rightarrow$ firms have **more** incentive to hire workers \Rightarrow mitigate recession