Long Run Macroeconomics

Prof. Giacomo Rondina
University of California, San Diego
Spring, 2023

Lecture 2
(note: this lecture will be recorded)

Plan for Lecture 2

- the two-period consumption model
- measuring the value created in the economy

Econ 110A: Important Info

Wednesday Discussion Session Time Change

Due to a conflict with the TA's graduate classes, we need to change the time of the Wednesday Discussion session.

New Time and Place: **Wed 6 pm – 6:50 pm in CSB 001**

Remember:

- you are free to attend the Monday or Wednesday discussion (they will cover the same material)
- discussions will be recorded and posted on Canvas

Office Hours

- GR: Tue and Thu, 5:30 pm – 6:30 pm Econ 226 and Zoom
- TA's:

  John: Friday, 10:00 am – noon

  Carlos: TBA

Grades

- Weekly Reflection Notes (10%)
- Midterm (40%)
- Final Exam (50%)

Weekly Reflection Notes

- due every week on Sunday at 11:59 pm
- only 8 out of 10 will count
- 3 questions:

1) What were the most important 1-2 new things you learned from the lectures this week that you did not know before? Describe one way in which what you learned connects to either a different subject/topic you are interested in or a personal experience.

2) What are 1-2 points discussed in class this week that you are still confused/unclear about and would like some further clarification on?

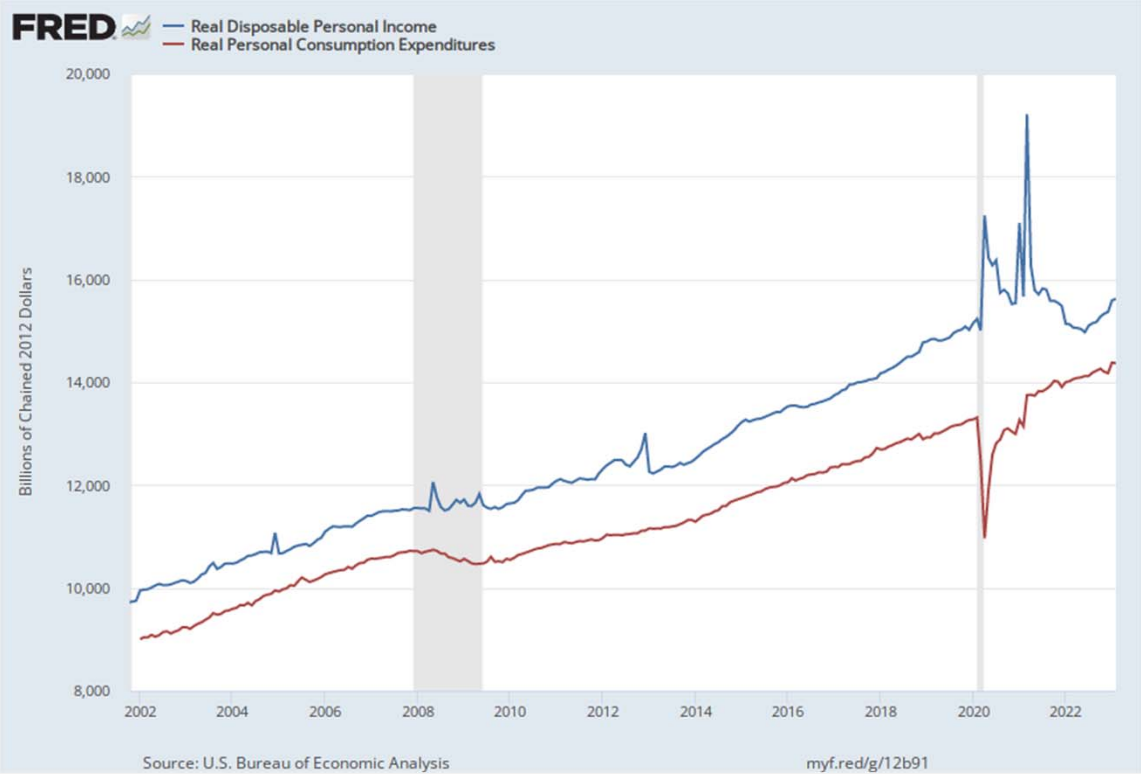
3) What topics/questions would you like to learn more about or discuss more based on the content covered this week?

Practice Problem Sets

- First one will be posted today
- Not to be submitted
- Essential practice for deeper understanding and exams

Plan for Lecture 2

- the two-period consumption model
- measuring the value created in the economy



recall: from data we noted that income is usually more volatile than consumption

we thus set out to develop a model of income and consumption that can "explain" **why consumption is smoother than income**

Two-Period Neoclassical Consumption Model

1. The economy consists of a representative consumer who only lives for two periods: today (period 1), and the future (period 2).
2. The consumer earns income in both periods; can save (or borrow) and receives (or pays) some interest.

Y_1: income in period 1

Y_2: income in period 2

S: savings (borrowing)

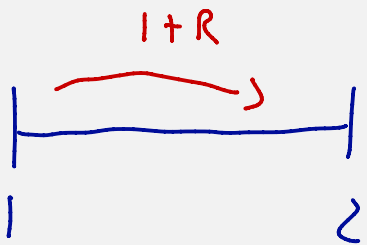
C_1: consumption in period 1

C_2: consumption in period 2

$1 + R$: gross interest rate

$$Y_1 = C_1 + S$$

$$Y_2 + S(1+R) = C_2$$



note: $S = \dfrac{C_2 - Y_2}{1+R}$

so

$$Y_1 = C_1 + \frac{C_2 - Y_2}{1+R}$$

Two-Period Neoclassical Consumption Model

- Intertemporal Budget Constraint

$$C_1 + \frac{C_2}{1+R} = Y_1 + \frac{Y_2}{1+R}$$

lifetime value of consumption today

lifetime value of income today

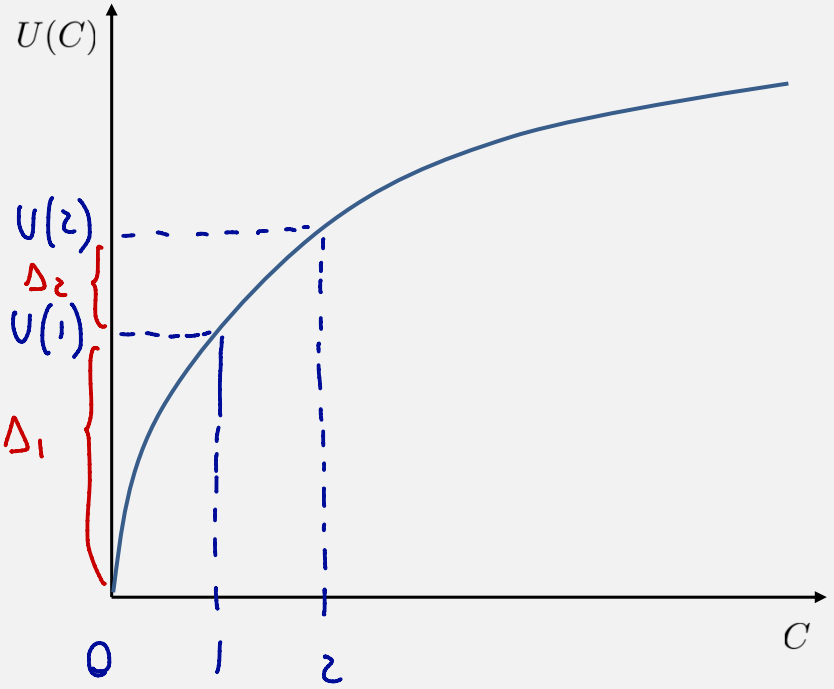
$\frac{1}{1+R}$: price of consumption in the future in terms of consumption today

$1+R$: ?

Two-Period Neoclassical Consumption Model

3. In each period, consumer receives utility from consumption measured by the utility function $U(C)$, which displays diminishing marginal utility.

$\Delta_2 < \Delta_1$



Two-Period Neoclassical Consumption Model

4. Total lifetime utility is the weighted sum of flow utility in both periods.

$$U(C_1) + \beta U(C_2) \qquad \beta \in [0, 1]$$

Δ_1 : ice cream now

$\beta \Delta_1$: ice cream future

β : "degree of patience"

ex:

$\beta = 0$: very impatient

$\beta = 1$: patient

Two-Period Neoclassical Consumption Model

5. The consumer maximizes lifetime utility subject to the intertemporal budget constraint

$$\max_{C_1, C_2} \; U(C_1) + \beta U(C_2) \quad \text{such that} \quad C_1 + \frac{C_2}{1+R} = Y_1 + \frac{Y_2}{1+R}$$

recall: $S = Y_1 - C_1$

solution: $U'(C_1) = \beta (1+R) U'(C_2)$

"Euler equation"

$$U'(C) = \frac{\partial U(C)}{\partial C}$$

suppose $U'(C_1) > \beta (1+R) U'(C_2)$

$U'(C_1) < \beta (1+R) U'(C_2)$

Two-Period Neoclassical Consumption Model

Example: logarithmic utility

$$U(C) = \ln C \qquad U'(C) = \frac{1}{C}$$

Euler: $\frac{1}{C_1} = \beta(1+R)\frac{1}{C_2} \Rightarrow \frac{C_2}{C_1} = \beta(1+R)$

define: $W \equiv Y_1 + \frac{Y_2}{1+R}$

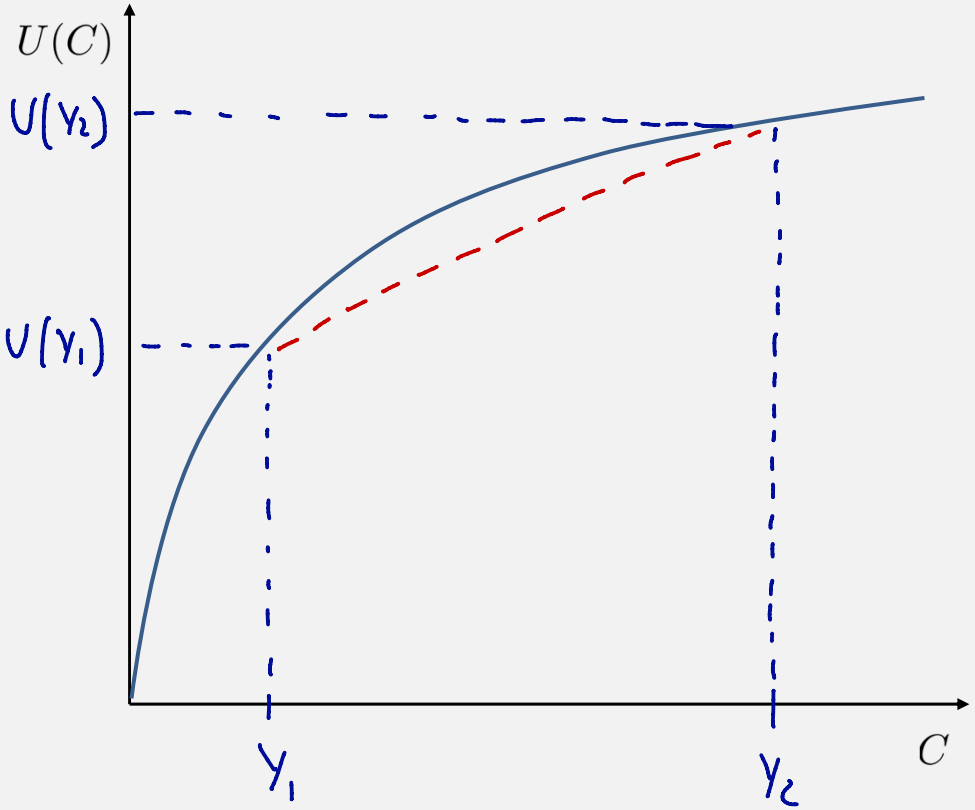
one can show:

$$C_1 = \frac{1}{1+\beta} W \qquad C_2 = \frac{\beta}{1+\beta}(1+R) W$$

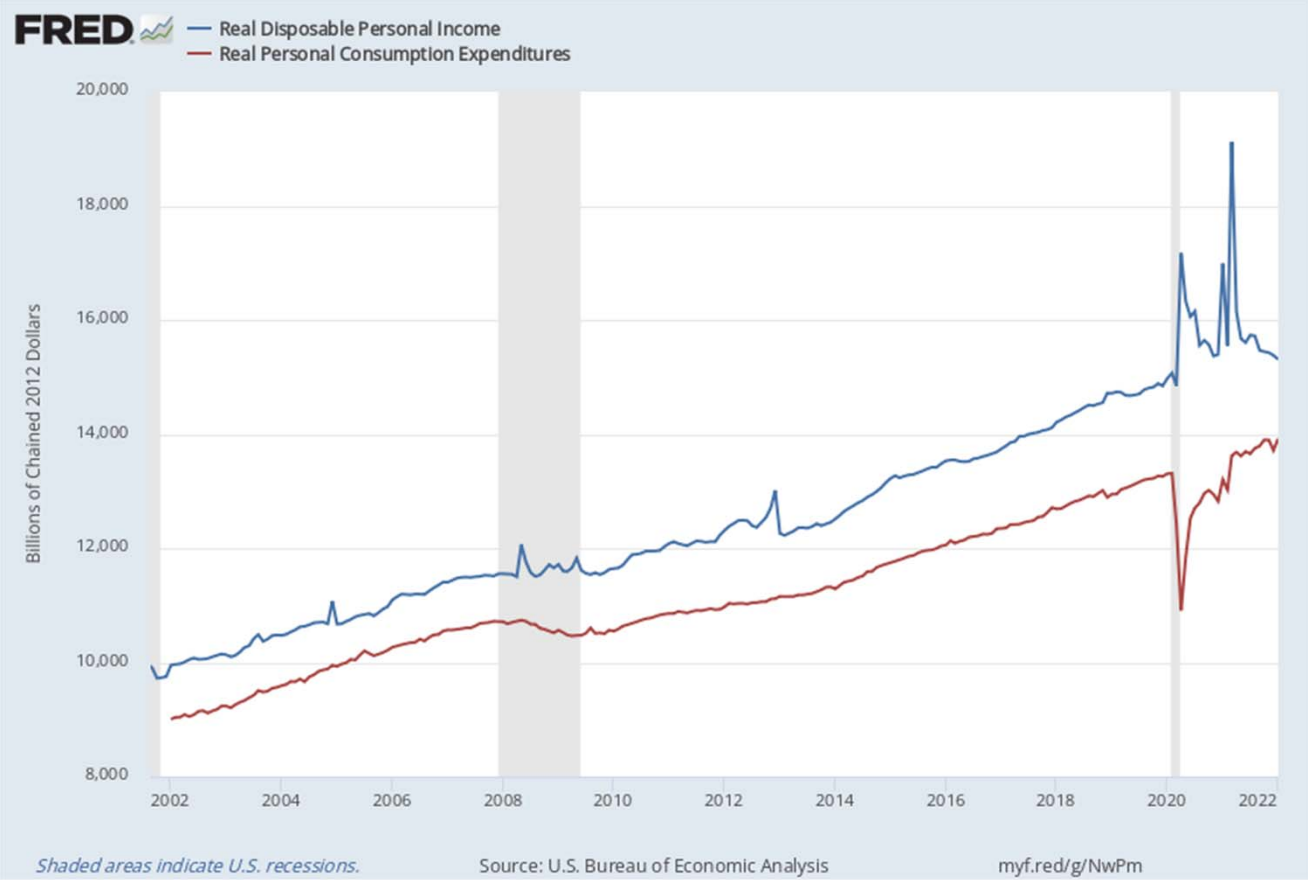
Two-Period Neoclassical Consumption Model

Numerical example with logarithmic utility

Consumption smoothing: why?



Question: why is consumption smoother than income?



Plan for Lecture 2

- the two-period consumption model

- measuring the value created in the economy

What are examples of value that has been created in the U.S. economy in the month of March?

electrical power

water

cars

taxes

Taylor Swift's concert

purchase of house

wheat

change of Fed interest rate

military equipment

haircut

pizza

education

microchips

Plan for Lecture 2

- the two-period consumption model

- measuring the value created in the economy
  - GDP: Production, Income, and Expenditure Approach
  - GDP: The role of Prices

Gross Domestic Product

Simon Kuznets (1901-1985)

In the 1940's, developed the notion and the tools to compute the **Gross Domestic Product** to "measure the economy."

Gross Domestic Product

Market value of the final goods and services produced in an economy over a certain period of time.

Gross Domestic Product

Market value of the final goods and services produced in an economy over a certain period of time.

1. Market value – *allows to add things up*
2. Final – *avoids double counting*
3. Goods and Services – *tangibles and intangibles*
4. Produced – *not all sales are GDP: used cars/houses, assets…*
5. In an Economy – *within certain boundaries (physical, political)*
6. Certain Period of Time – *GDP is a flow, not a stock*

How can we measure GDP?

Production = Income = Expenditure

"Fundamental National Accounting Identity"

Production: value added produced

Income: remuneration to factors of production

Expenditure: end-use of value added produced

Example: the economy of Truckopia

In Truckopia there are only two companies: *SteelCo* and *TruckCo*. *SteelCo*: extracts ore, turns it into steel. *TruckCo* buys steel from SteelCo, turns it into trucks, sells trucks.

Eco. Acc. SteelCo		Eco. Acc. TruckCo	
Wages	70	Wages	250
Cost of Inputs	0	Cost of Inputs	100
Profits	30	Profits	150
Sales	100	Sales	500

How much was GDP for the economy of Truckopia?

600?

500?