Session 7: Introduction to Macroeconomics and Consumption Theory

Professor: Alessandro Dario Lavia

alessandro.lavia@unito.it

ESCP - Macroeconomics EF01
Academic Year: 2025-2026
Monday March 9th 2026

Introduction

Why Study Macroeconomics?

Macroeconomics studies the behavior of the economy as a whole.

Key questions:

- Why do economies grow over time?
- Why do recessions occur?
- Why does inflation rise or fall?
- How do interest rates affect consumption and investment?

Why it matters for managers:

- Interest rates affect borrowing and investment decisions.
- Inflation affects pricing strategies.
- Business cycles affect demand and employment.
- Government policies shape the economic environment firms operate in.

The Macroeconomic Environment

Firms operate within a macroeconomic environment shaped by several key actors:

- **Consumers** decide how much to consume and save.
- **Firms** decide how much to invest and produce.
- **Governments** set fiscal policy through spending and taxation.
- **Central Banks** control interest rates and influence inflation.

Understanding how these actors interact is the core goal of modern macroeconomics.

Macroeconomics in This Course

In this module we study the foundations of modern macroeconomics.

Main topics we will cover:

1. Aggregate Demand
2. Aggregate Supply
3. Economic Fluctuations and Business Cycles
4. Monetary Policy
5. Fiscal Policy

Main objective:

- Understand how macroeconomic policies affect
  - output
  - inflation
  - interest rates

Macroeconomics Block: Course Roadmap

Sessions Covered in the Macroeconomics Part

- **Session 7: Introduction and Consumption Theory**
  - Short vs long run
  - Intertemporal choice and consumption behavior
- **Session 8: Investment and Government Spending**
  - Firms' investment decisions
  - The role of fiscal policy and public spending
- **Session 9: The IS-MP Model**
  - Interaction between output and interest rates
  - Monetary policy rule
- **Session 10: Aggregate Demand**
- **Session 11: Aggregate Supply**
- **Session 12: International Trade**

These topics will allow us to understand how output, inflation, and policy interact in modern macroeconomics.

Suggested Readings

The course is mainly based on modern macroeconomic textbooks.

Main Reference:

- Olivier Blanchard – *Macroeconomics*

Additional Introductory References:

- Greg Mankiw – *Principles of Economics*

These books provide complementary perspectives and additional examples for the concepts discussed in class.

Lecture slides and exercises will cover all required material for the exam.

Session 7 Outline

Today's Topics:

1. Short vs Long Run
2. Nominal vs Real Interest Rate
3. Components of Demand:
   3.1 Consumption

Useful information:

- Assessment: MCQ and PS (available this Friday on Blackboard).
- Online Exercise Session I: TBD.
- OH: after class and via email (Zoom or in person).

Short vs Long Run

Long Run

- The long-run economy is determined by its **potential output** (Y^*), which is the level of output if all inputs (capital, labor, technology) were utilized at their sustainable levels.

- Potential output is driven by factors such as:
  - The stock of capital and labor.
  - Technological progress and productivity.
  - Institutional and policy frameworks that shape long-term growth.

- Inflation in the long run is primarily determined by monetary policy and expectations.

Short Run Deviations: Actual vs. Potential Output

- In the short run, actual output (Y_t) may deviate from potential output (Y^*) due to business cycle fluctuations.

- These deviations are influenced by:
  - Demand shocks (e.g., fiscal and monetary policy, consumer sentiment).
  - Supply shocks (e.g., oil price shocks, productivity changes).
  - Rigidities in prices and wages.

- Short-run fluctuations lead to variations in employment, inflation, and economic stability.

Trends and Fluctuations

- The economy experiences both:
  - *Long-run trends:* steady growth in output, driven by capital accumulation, labor force growth, and technological progress.
  - *Short-run fluctuations:* deviations from trend due to economic shocks.

- The distinction between short- and long-run models helps policymakers balance stabilization and long-term growth.

- Over time, actual output tends to return to potential output, but the adjustment process can take time due to price and wage stickiness.

Trends and Fluctuations: Decomposing Actual Output

$$Y_t = \underbrace{\text{long-run trend}}_{\bar{Y}_t} + \underbrace{\text{short-run fluctuations}}_{\text{depends on } \tilde{Y}_t} \tag{1}$$

- $\bar{Y}_t$ represents *potential output*, the sustainable level of output in the economy.
- $\tilde{Y}_t$ represent temporary percentage deviations from $\bar{Y}_t$ due to economic shocks.

Key Insight:

- The economy experiences business cycles, where actual output Y_t fluctuates around its potential level $\bar{Y}_t$.

Short-Run Fluctuations: Detrended output

$$\tilde{Y}_t \equiv \frac{Y_t - \bar{Y}_t}{\bar{Y}_t} \tag{2}$$

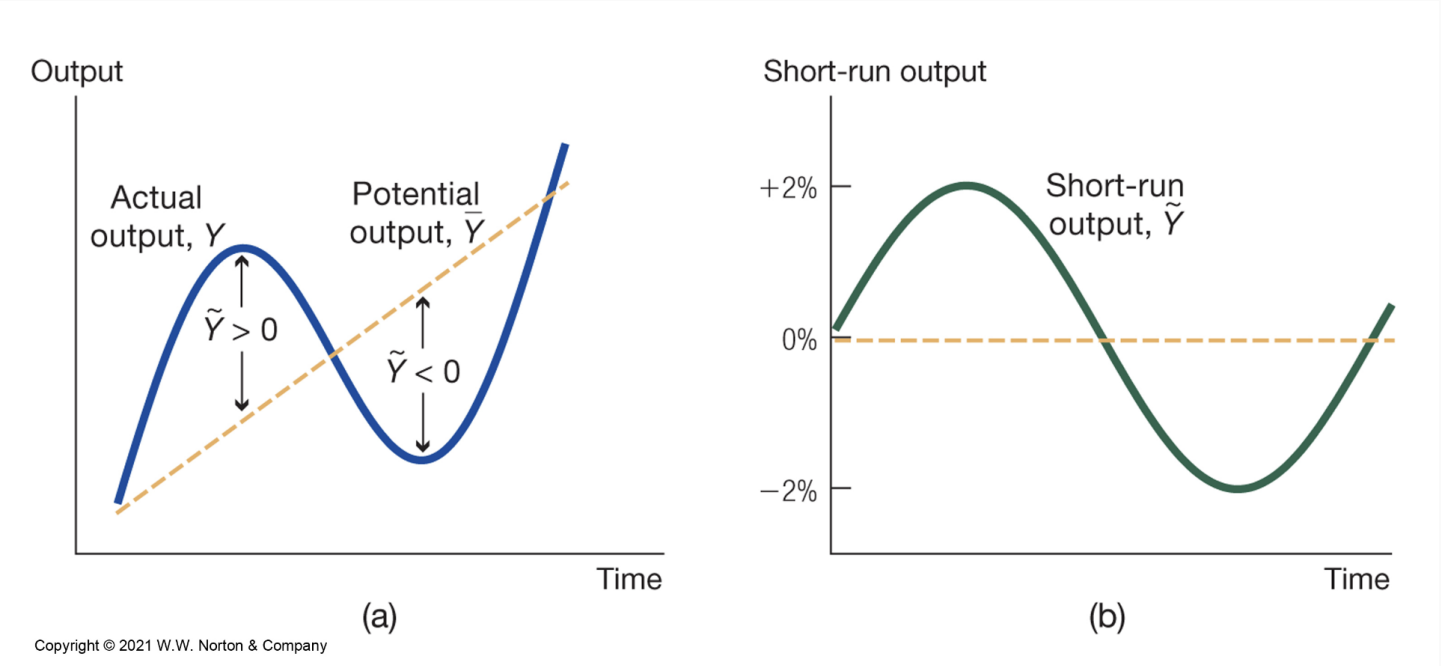

Figure 1: Short-run output fluctuations

Nominal vs Real Interest Rate

Nominal Interest Rate

- To save across periods, agents invest in **risk-free bonds**.
- The **nominal interest rate** i_t is the return on these bonds.
- If an agent invests savings S_t in period t, she gets:

$$S_t(1 + i_t) \quad \text{in period } t + 1 \tag{3}$$

Real Interest Rate - Concept

- When an individual saves money, they want to know the true return on their savings.
- The nominal interest rate i_t tells how much money grows, but it does not account for inflation.
- The real interest rate r_t tells how much purchasing power increases over time.

Key Idea: The real interest rate measures how many goods an individual can buy in the future with today's savings.

$$1 + r_t = \frac{1 + i_t}{1 + \pi_{t+1}} \tag{4}$$

where π_{t+1} is the inflation rate.

Real Interest Rate - Example

- Suppose an individual has one unit of currency in period t.
- She invests at the nominal interest rate i_t.
- By period $t+1$, the amount grows to:

$$(1 + i_t) \text{ units of currency} \tag{5}$$

How many goods can she buy next period?

- If the price of goods today is P_t, and the future price is P_{t+1}:

$$\frac{(1 + i_t)P_t}{P_{t+1}} \tag{6}$$

Conclusion: The real return depends on both the nominal interest rate and inflation.

Nominal vs Real

- The **real interest rate** determines incentives to **save vs consume today**.

- The **Fisher equation** approximates:

$$r_t \approx i_t - \pi_{t+1} \tag{7}$$

- **Saving is attractive when nominal rates are high.**
- **Saving is unattractive when inflation is high.**

Small Checkup - Interest Rates

Question 1: Assume the nominal interest rate is 4%, and inflation is 5%. What is the real interest rate (in percentages)?

Think about:

- How does inflation impact the true return on savings?
- What is the difference between nominal and real interest rates?
- The Fisher equation is useful for approximation.

Hint: If inflation is higher than the nominal interest rate, what happens to purchasing power?

Small Checkup - Interest Rates (Solution)

Question: Assume the nominal interest rate is 4%, and inflation is 5%. What is the real interest rate (in percentages)?

Answer: The real interest rate is equal to -1.

Concept Review:

- The real interest rate measures purchasing power growth.
- It is approximated by the Fisher equation:

$$r_t \approx i_t - \pi_{t+1} \tag{8}$$

- Since $i_t = 4\%$ and $\pi_{t+1} = 5\%$, we get:

$$r_t = 4 - 5 = -1\% \tag{9}$$

- The real rate is negative when inflation is higher than the nominal rate.

Small Checkup - Fisherian Effect

Question 2: The Fisherian effect suggests that inflation rises and cancels any increase in nominal rates. This is more likely if:

a. The real rate is independent from nominal variables.
b. Prices are rigid.
c. Inflation is high.
d. Debt is high.

Think about:

- What happens to real interest rates when inflation increases?
- How does inflation expectation influence central bank policies?
- Does a higher nominal rate always mean better returns?

Hint: Consider what happens in economies with persistently high inflation.

Small Checkup - Fisherian Effect (Solution)

Question 2: The Fisherian effect suggests that inflation rises and cancels any increase in nominal rates. This is more likely if inflation is high.

Concept Review:

- The Fisher equation suggests that expected inflation influences nominal rates.
- If inflation is persistently high, central banks must raise nominal rates just to maintain the real rate.

$$i_t = r_t + \pi_{t+1} \tag{10}$$

- In economies with high inflation, even a high nominal rate may not translate to a high real return.

Components of Demand

Components of Demand

In a market economy, spending decisions are made by:

- Consumption.
- Investment.
- Government.
- Exporters and Importers.

Government spending is decided by policymakers. Because it can be chosen independently from the general income level, it is fully autonomous.

In this course, we will focus on consumers and firms and take the decisions of exporters and importers as exogenous.[1]

[1] For our purposes, we could also have made the stronger assumption that the economy is closed, that is, exports and imports are zero.

Components of Demand: Consumption

Consumption

Why do consumers save?

- To substitute present goods by future goods.

What determines the substitution?

- The (real) interest rate $r \ldots$
- $\ldots$ which represents the market preference for the future.

What else determines the substitution?

- Income today and tomorrow.

Consumption Decisions: Intuition

Given their preferences, how much consumers decide to spend is determined by:

- Their real income today (Y_t).
- Their real income in the future ($Y_{t+1}, Y_{t+2}, \dots$).

$\rightarrow$ **Both expectations and variability matter.**

Given their anticipated income profile, the decision to consume can be seen as an arbitrage between consumption today and consumption tomorrow.

This arbitrage depends on the real intertemporal interest rate r_t.

The two short-term determinants of consumption should then be Y_t and r_t.

Consumption: Ricardian vs. Keynesian Households

Ricardian Households

Can reallocate consumption intertemporally, choosing to save today to consume more tomorrow.

Keynesian Households

Face credit constraints, consuming as much as possible in the current period.

We begin with Ricardian agents, whose choices stem from microeconomic foundations.

Ricardian Consumers: Optimization Problem

Let's model the intertemporal choice of a Ricardian household. They are rational decision-takers but have a preference for the present. To simplify exposition, we assume they live for two periods only.

Denote by C_1 and C_2 consumption today and tomorrow.

A representative consumer maximizes her utility:

$$U(C_1, C_2) = \log(C_1) + \beta \log(C_2) \tag{11}$$

where the discount factor $\beta < 1$ denotes the fact that consumption today is preferred. β is typically close to 1.

Of course, this optimization is not free, it is subject to a budget constraint.

Ricardian Consumers: Budget Constraint

Denote today's price level by P_1 and future price level by P_2. Then current nominal income is $P_1 Y_1$ and future nominal income is $P_2 Y_2$.

In period 1, a Ricardian household freely chooses to consume C_1 in period 1 at price P_1 for a total amount $C_1 P_1$.

Income left[2], i.e. $Y_1 P_1 - C_1 P_1$, is saved at nominal rate $1 + i$.

Tomorrow's budget constraint is:

$$C_2 P_2 \leq Y_2 P_2 + (Y_1 P_1 - C_1 P_1)(1 + i) \tag{12}$$

[2]The formula is exactly the same whether the agent saves ($C_1 P_1 < Y_1 P_1$) or borrows ($C_1 P_1 > Y_1 P_1$).

Ricardian Consumers: Budget Constraint

The last equation can be rewritten as:

$$C_1 P_1(1+i) + C_2 P_2 \leq Y_1 P_1(1+i) + Y_2 P_2 \tag{13}$$

Dividing by P_2, we get:

$$C_1 \frac{P_1}{P_2}(1+i) + C_2 \leq Y_1 \frac{P_1}{P_2}(1+i) + Y_2 \tag{14}$$

Recognizing that $1+\pi = \frac{P_2}{P_1}$, we obtain:

$$C_1 \frac{1+i}{1+\pi} + C_2 \leq Y_1 \frac{1+i}{1+\pi} + Y_2 \tag{15}$$

Ricardian Consumers: Budget Constraint

Eventually, the intertemporal budget constraint reads:

$$\underbrace{C_1(1+r)+C_2}_{\text{Consumption expenditures}} \quad \leq \quad \underbrace{Y_1(1+r)+Y_2}_{\text{Intertemporal income (total wealth)}} \tag{16}$$

$\rightarrow (1+r)$ **can be understood as the price of today's consumption goods.**

What is the effect of a higher real interest rate?

- Consumption today is more expensive: **substitution effect**.
  - Higher consumption of future goods, less consumption in the present.
- Today's income is more valuable: **direct wealth effect**.
  - More consumption of both goods.

Ricardian Consumers: Optimal Consumption

A consumer solves:

$$\max_{C_1, C_2} \log(C_1) + \beta \log(C_2) \tag{17}$$

subject to:

$$C_1(1+r) + C_2 \leq Y_1(1+r) + Y_2 \tag{18}$$

With some math, we obtain the optimal (desired) consumption in period 1:

$$C_1 = \frac{1}{1+\beta}\left(Y_1 + \frac{1}{1+r}Y_2\right) \tag{19}$$

Interpreting the Optimal Formula

$$C_1 = \frac{1}{1+\beta} \underbrace{\left(Y_1 + \frac{1}{1+r} Y_2 \right)}_{\text{Permenent Income}} \tag{20}$$

Permanent Income:

- Represents the total lifetime income a consumer expects to earn, discounted to present value.
- Similar to Net Present Value (NPV) used in finance.
- Ricardian households allocate consumption smoothly over time.
- The fraction of income consumed in period 1 depends on β (patience).

Ricardian Households: Interest Rate

$$C_1 + \Delta C = \frac{1}{1+\beta}\left(Y_1 + \frac{1}{1+r+\Delta r}Y_2\right) \tag{21}$$

- The effect of a an increase in Δr will be equal to [3]:

$$\frac{\Delta C}{\Delta r} = -\frac{1}{1+\beta}\frac{1}{(1+r)^2}Y_2 < 0 \tag{22}$$

Interpretation:

- Higher real interest rates make future consumption more attractive.
- Consumption today decreases as households save more.

[3] Taylor expansion wrt r.

Ricardian Households: Income Shocks

$$C_1 + \Delta C = \frac{1}{1+\beta}\left(Y_1 + \Delta Y + \frac{1}{1+r}Y_2\right) \tag{23}$$

- The response to a temporaty income shock ΔY will be equal to [4]:

$$MPC_{\mathrm{R}} = \frac{\Delta C}{\Delta Y} = \frac{1}{1+\beta} \ll 1 \tag{24}$$

Interpretation:

- Ricardian households save most of a temporary income increase.
- Their consumption adjusts only slightly in response to a shock.

[4] Assume a two period economy, to simplify exposition

Keynesian Households

- Keynesian households have the same preferences as Ricardian households.
- However, they face a borrowing constraint that prevents them from smoothing consumption.

Key Implication:

- A pure Keynesian agent (who cannot borrow at all) faces the simple constraint:

$$C_1 \leq Y_1 \tag{25}$$

  Since they consume as much as possible, this implies:

$$C_1 = Y_1 \tag{26}$$

Interpretation:

- Keynesian households spend their income entirely in the current period, rather than allocating it over time.

Keynesian Households: Income Shocks

$$C_1 + \Delta C = Y_1 + \Delta Y \tag{27}$$

- The response to a temporary income shock ΔY will be equal to:

$$MPC_{\text{K}} = \frac{\Delta C}{\Delta Y} = 1 \tag{28}$$

Interpretation:

- Keynesian households cannot borrow, so they must consume all of their current income.
- Any increase in income translates fully into higher consumption.

Ricardian vs. Keynesian Consumption Behavior

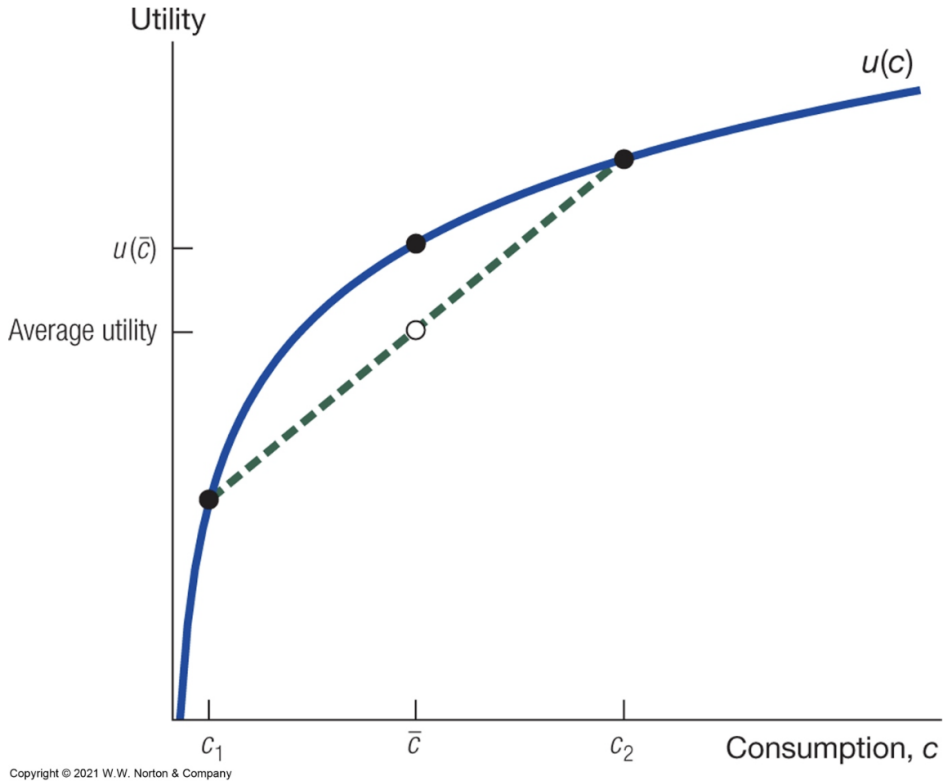

Figure 2: Consumption Smoothing

Consumption Smoothing vs. Keynesian Households

Understanding the Graph:

- The **solid blue curve** represents the utility function $u(c)$, which is concave.
- The **dashed green line** represents the average utility when consumption fluctuates between c_1 and c_2 instead of being smoothed.

Key Takeaways:

- A household that can smooth consumption at $\bar{c}$ achieves a higher utility $u(\bar{c})$ than the average utility of fluctuating consumption.
- Keynesian households, who are credit-constrained, consume all their income in each period, leading to fluctuations between c_1 and c_2.
- Since utility is concave, the average utility from fluctuating consumption is lower than from smooth consumption.
- This highlights the welfare benefit of consumption smoothing, which Ricardian households can achieve but Keynesian households cannot.

Consumption: Mini Quiz

Question 3: Which of the following agents is more likely Keynesian?

1. A student considering a loan offer from the bank to cover university fees.
2. A middle-class household reducing food expenditure to repay an outstanding loan.
3. A low-income worker in the U.S. who doesn't have a credit card.
4. A stock-market trader.

Consumption: Mini Quiz (Solution)

The low-income worker in the U.S. who doesn't have a credit card. Option 3 is the most likely to be Keynesian.

Concept Review:

- Keynesian households are liquidity-constrained and cannot borrow to smooth consumption.
- Their spending is highly dependent on current income.
- A student considering a loan (Option 1) and a middle-class household adjusting expenditures (Option 2) might have access to credit, making them less strictly Keynesian.
- A stock-market trader (Option 4) likely has access to financial markets, making them more Ricardian.

Conclusion

Key Insights from Today's Lecture

Main Takeaways

- In the short run, output can deviate from its potential due to demand shocks, rigidities, and financial constraints.
- Consumption depends on income, interest rates, and expectations, with different behaviors for Ricardian and Keynesian households.

Open Questions

- How do interest rates affect demand and output in a dynamic setting?
- What role does inflation play in short-run economic fluctuations?

Looking Ahead: IS-MP and AS-AD Models

Connecting Today's Concepts to Next Lecture

- Components of Demand: Investment and Government.
- The IS-MP model extends the basic demand framework by linking output to interest rates.
- The AS-AD model introduces inflation dynamics, showing how supply and demand interact over different time horizons.
- We will analyze how central banks adjust interest rates in response to macroeconomic shocks and how their actions influence output and inflation.
- Understanding these models will help us examine policy decisions in different economic environments, from normal times to crisis periods.

Next class, we will develop these models step by step, starting with the IS curve and monetary policy reaction function.