

14.02 – Fall 2018

Recitation 1

Andrea Manera
(PhD Student, MIT)

September 14, 2018

Announcements

- Problem set posted today, due next **Friday 9/21**
- Submission is through **GradeScope only**. Everyone is automatically enrolled, check your email and touch base with Michele for issues.
- Watch related YouTube video for further submission instructions (on GradeScope channel);
- **No recitation next week**

Part 1: Review

Lecture 2

GDP Measurement

GDP measurement

Three ways (useful to check correct computations).

- ① The *sum of incomes*:
Wages + profits;
- ② The *sum of value added*:
Revenues - Intermediate goods purchases ;
- ③ The *value of final good and services*:
revenues from goods that *are not purchased by other firms*.

Example: An Economy with three firms

Steel Company		Oil Company	
Revenue from sales	\$130	Revenue from sales	\$200
Expenses	\$50	Expenses	\$180
Wages	\$10	Wages	\$70
Oil Purchases	\$40	Steel Purchases	\$110
Profit	\$80	Profit	\$20

Car Company	
Revenue from sales	\$500
Expenses	\$400
Wages	\$220
Steel Purchases	\$20
Oil Purchases	\$160
Profit	\$100

Nominal v. Real GDP

- **Nominal**: sum of good prices in *each year* times quantities produced *each year*.
Hard to compare across years... is it prices or quantities that changed?
- **Real**: sum of good prices in **base** year times quantities produced *each year*.
Can be compared across years, measure usually reported in the news about GDP growth.
- The **GDP deflator** is defined as $\text{Nominal} / \text{Real}$;
- One measure of **inflation** is given by the percent change in the **GDP deflator**.

Example: A two-goods economy

Year	Cars		Phones	
	Quantity	Price	Quantity	Price
2014	5	\$2,000	10	\$200
2015	10	\$1,000	20	\$400
2016	12	\$1,200	30	\$200

- 1 Compute Nominal GDP in each year
- 2 Compute Real GDP with base 2015
- 3 Compute the inflation rate (with base 2015)

Part 1: Review

Lecture 3

The Goods Market

Variables and Parameters

Model equations contain:

- Variables
 - Endogenous:
 - *We wish to explain them*
 - Examples: consumption, output, investment
 - Exogenous:
 - *We take them as given*
 - These variables do not depend on other variables in the model
 - Examples: government spending, interest rate target
- Parameters
 - Numbers capturing the way endogenous and exogenous variables interact with each other. Needed to make functional forms more explicit.

The important distinction is Endogenous vs. Exogenous/Parameters

Types of Equations

In 14.02 (and all economic models in general), we deal with three types of equations:

- Identities
 - Used to define a certain variable in terms of others
 - Example: $Z \equiv C + I + G$, Production = Income.
- Equilibrium Conditions
 - Requiring balance between two sides of a market
 - Example: Production = Demand, later in the class Money supply = Money Demand
- Behavioral Equations
 - Describing how (endogenous and exogenous) variables are related to each other
 - Grounded in the way agents behave, hence the name
 - Underlying economic intuition is key

The Goods Market Model

The standard version of the model is characterized by:

- ① *Definition of **Demand** (Identity):*

$$Z \equiv C + I + G$$

- ② *Definition of **Disposable income** (Identity):*

$$Y^d \equiv Y - T$$

- ③ *Behavioral Equation for **Consumption***

$$C = c_0 + c_1 Y^d$$

- ④ *Equilibrium condition for goods market (aka Supply=Demand)*

$$Y = Z$$

- Endogenous: C, Y, Y^d, Z
- Exogenous/Parameters: I, G, T, c_0, c_1

The typical exercise asks to solve for endogenous variables to answer a policy question.

Investment = Savings

Define:

$$S_p \equiv Y - T - C \quad S_g \equiv T - G \quad S \equiv S_p + S_g$$

- Endogenous: $C, Y, Y^d, Z, S_p, S_g, S$
- Exogenous/Parameters: I, G, T, c_0, c_1

Note:

$$Y = C + I + G$$

$$Y - T - C = I + G - T$$

$$S_p = I - S_g$$

$$S = I$$

Part 2: Exercises

Lecture 3

The Goods Market

Tips for Exercises

When solving an exercise:

- Correctly distinguish between endogenous and exogenous/parameters
 - Exercises will generally declare exogenous variables explicitly
- Answering a question “what is the effect of (exogenous) on (endogenous)”
 - This exercise is called **comparative statics**: keep everything the same but the value of one exogenous variable and see what happens to endogenous variables
 - With algebra: manipulate expressions to get endogenous of interest in terms of only exogenous/parameters
 - With graph: make sure to move all lines in the correct direction

Ex 8, Chapter 3 - Investment and Income

8.a

- The economy is described by:

$$C = c_0 + c_1 Y^d$$

$$I = b_0 + b_1 Y$$

$$Y^d = Y - T$$

Government spending G , taxes T are exogenous. Solve for equilibrium output Y .

Ex 8, Chapter 3 - Investment and Income

8.b

- What is the value of the (government spending) multiplier?
- What condition should we impose on $c_1 + b_1$ for the multiplier to be positive?

8.c

- What happens if this condition is violated?

8.d

- Suppose b_0 , called business confidence, increases:
 - What happens to equilibrium output?
 - Will investment increase by more or less than the increase in b_0 ?
Why?
 - What happens to national saving?

Ex 10, Chapter 3 - Avoiding the Recession

Investment I is exogenous.

10.a

- In 2009, U.S. output was \$15 trillion. A 3% fall corresponds to \$450 billion lost.

10.b and .d

- if $c_1 = 0.5$, by how much did c_0 fall to generate the recession?
- by how much should G have increased so as to keep output from dropping?
 - with a budget deficit
 - with a balanced budget

10.c

- if $c_1 = 0.5$, by how much T should have decreased to keep output from dropping, with a budget deficit?