Measures of Economic Activity

Measures of Economic Activity

- Recall, there are three ways to measure the value of aggregate output, suggested by the circular flow income model, all giving rise to the same results

- **1) Expenditure Approach:** adds up all spending to buy final goods and services produced within a country over a period.

  - **GDP = C + I + G + (X − M)**

- **2) Income Approach:** adds up all income earned by the factors of production that produce all goods and services within a country over a time period.

  - **GDP = W + I + R + P**

- **3) Output Approach:** calculates the value of all final goods and services produced in a country over a time period.

Distinction between GDP & GNP

- **Gross domestic product (GDP):** is the market value of all final goods and services produced in a country over a time period, usually a year.
  - **GDP = C + I + G + (X − M)**
- **Gross national product (GNP/GNI):** is the value of all final goods and services produced by the factors of production supplied by a country's residents regardless of where the factors are located.
  - **GNP = GDP + Income from abroad − Income sent abroad**
    = GDP + Net income from abroad
- **Green GDP:** is an adjustment of traditional GDP, deducting resource and environmental costs in economic activities.
  - **Green GDP = GDP − Value of environmental degradation**

Calculating GDP

- **Example;** The table below shows the spending components for the United States national income in 2013.

Component	***Value (in trillions)***
Consumption (C)	$11.5
Investment (I)	$2.67
Government Spending (G)	$3.13
Exports (X)	$2.10
Imports (M)	$2.67

  - **GDP = C + I + G + (X − M)**

    = $11.5 + $2.67 + $3.13 + ($2.10 − $2.67)

    = $16.73 trillion

Calculating GNP

- **Example;** Suppose in 2013, Canada's GDP was $1,821 billion; Income earned abroad and sent home to Canada was $110 billion; Income earned in Canada and sent abroad was $29 billion. What was Canada's 2013 GNP?

  - **GNP = GDP + Net income from abroad**
    = $1,821 + ($110 − $29)
    = $1,902 billion

- Since **GNP > GDP** it indicates that Canada has significant foreign presence, in either workers or companies.

Real GDP & Nominal GDP

- **Nominal GDP:** is measured in terms of current output valued at current prices, which does not account for changes in prices.

- **Real GDP:** is a measure of economic activity that has eliminated the influence of changes in prices.

    - It measures the value of current output valued at constant prices so a relative comparison can be made to the base year

    - It is important to use real values when GDP is being compared over time

Example; Real GDP & Nominal GDP

Calculating Nominal GDP

	2001			2002			2003		
Item	Quantity	Price	Value	Quantity	Price	Value	Quantity	Price	Value
Burgers	37	$3	$111	40	$4	$160	39	$5	$195
Haircuts	15	$18	$270	17	$20	$340	18	$21	$378
Tractors	10	$50	$500	11	$60	$660	10	$65	$650
Nominal GDP			$881			$1160			$1223

Calculating Real GDP (Base year- 2001)

	2001			2002			2003		
Item	Quantity	Price	Value	Quantity	Price	Value	Quantity	Price	Value
Burgers	37	$3	$111	40	$3	$120	39	$3	$117
Haircuts	15	$18	$270	17	$18	$306	18	$18	$324
Tractors	10	$50	$500	11	$50	$550	10	$50	$500
Real GDP			$881			$976			$941

GDP Deflator

- The GDP deflator is a price index that is an indicator of price changes for all good and services produced in the economy
  - **GDP Deflator = (Nominal GDP ÷ Real GDP) × 100**
  - The index number for the base year is always 100, for all indices
  - An increasing GDP deflator indicates rising prices on average, while a decreasing GDP deflator indicates falling prices.

Year	Nominal GDP	Real GDP	GDP Deflator
2001	$881	$881	100
2002	$1160	$976	118.8
2003	$1223	$941	130

GDP Deflator & Real GDP

- The GDP deflator is a price index that is commonly used to covert nominal GDP to real GDP.
  - **Real GDP = (Nominal GDP ÷ GDP Deflator) × 100**
    = (Nominal GDP ÷ CPI) × 100
- **Example;** Suppose the nominal GDP was $7,850 billion in 2001; $9,237 billion in 2002; and $10,732 billion in 2003. The GDP deflator was 100 in 2001; 118.8 in 2002; and 130 in 2003.
  - **Real GDP$_{2001}$ = ($7,850 ÷ 100) × 100**
    = $7,850 billion
  - **Real GDP$_{2002}$ = ($9,237÷ 118.8) × 100**
    = $7,775 billion
  - **Real GDP$_{2003}$ = ($10,732 ÷ 130) × 100**
    = $8,255 billion

Calculating Economic Growth

- Recall, economic growth refers to an increase in real GDP over time.
    - It is usually expressed as a percentage change in real GDP over a specified period of time.
    - $\%\Delta GDP = (GDP_{NEW} - GDP_{OLD}) \div GDP_{OLD}$
- It is important to distinguish between a decrease in GDP and a decrease in GDP growth
    - A decrease in GDP involves a fall in the value of output produced, which gives rise to a negative growth rate
    - A decrease in GDP growth, involves falling rates of growth, but the rates may be positive

Example; Economic Growth

- **Example;** Given the values for real GDP we can calculate the growth rates between successive years.

Year	Real GDP ($ Billion)	Growth Rate	Description
2010	210	–	–
2011	215.5	2.6%	Increasing GDP
2012	219.5	1.9%	Falling GDP growth
2013	223.1	1.6%	Falling GDP growth
2014	217.0	−2.7%	Negative GDP growth

Keynesian Multiplier

- **Keynesian Multiplier (k):** tells us the amount by which a particular injection of government spending, investment, or export spending will increase the nation's total GDP

- The spending multiplier is a function of the marginal propensity to consume and is determined from the formula,

  - **k = Change in Real GDP ÷ Initial Change in Expenditure**
    = 1 ÷ (1 − MPC)
    = 1 ÷ (MPS + MPT + MPM)

- Recall, that **MPC + MPS + MPT + MPM = 1** since if national income increases fractions of the funds will be consumed, saved, taxed and spent on imports

- The larger the **MPC** and the smaller the leakages from the spending stream, the greater the value of the multiplier

- The change in GDP (**ΔGDP**) resulting from an initial change in expenditures (**ΔE**) is,

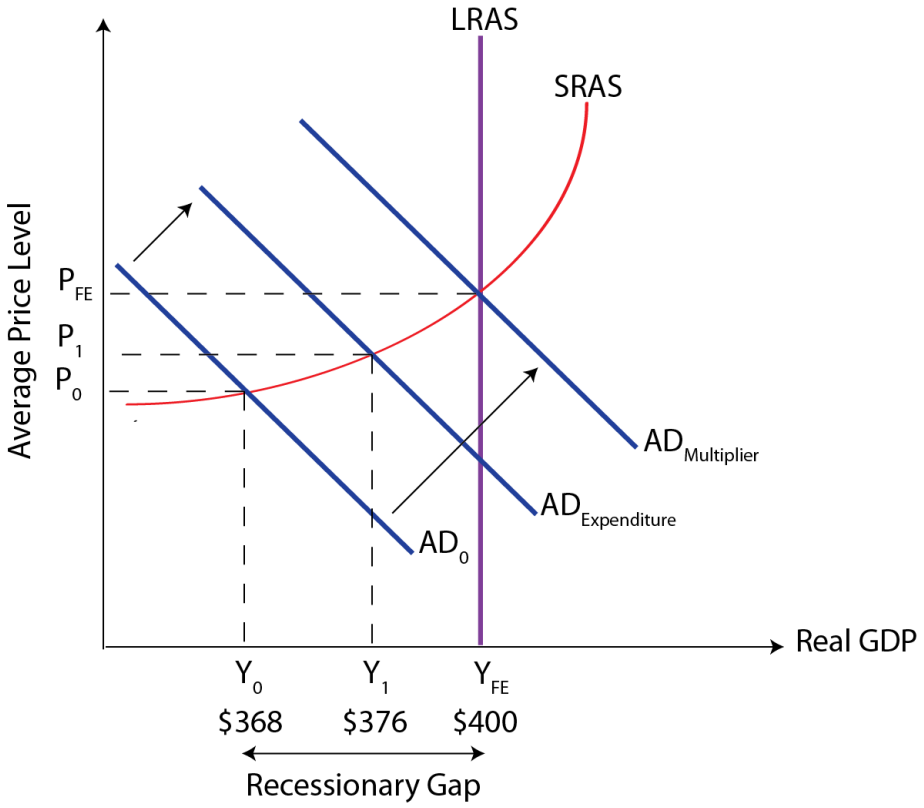
  - $\Delta GDP = k \times \Delta E$

- **Example;** Suppose the economy is in a recession and the government increases expenditures by $8 million. Assuming the MPC = 0.75 we can determine the value of the multiplier and change in real GDP.

Round	ΔGDP ($ million)	ΔConsumption ($ million)
1	8	$0.75 \times 8 = 6$
2	6	$0.75 \times 6 = 4.5$
3	4.5	$0.75 \times 4.5 = 3.38$
4	3.38	$0.75 \times 3.38 = 2.5$
Total	32	$0.75 \times 32 = 24$

- The Keynesian multiplier, $\mathbf{k = 1 \div (1 - MPC)}$
  $\mathbf{= 1 \div (1 - 0.75)}$
  $\mathbf{= 4}$

- Real GDP increases more than proportionally and the government expenditure of \$8 million increases real GDP by \$32 million.



$\mathbf{\Delta GDP = k \times \Delta E}$
$= 4 \times \$8$
$= \$32$ million

Study Questions

- **1.** You are given the following information on an imaginary country called Lakeland.

Year	2006	2007	2008	2009	2010
Nominal GDP	19.9	20.7	21.9	22.6	22.3
GDP Deflator	98.5	100	102.3	107.6	103.7

- **A.** Which year is the base year
- **B.** Calculate real GDP for each of the five years in the table

- **2.** Calculate nominal GDP, given the following information from the national accounts of Flatland (all figures are in billions). Consumer spending $125; Government spending $46; Exports of $12 and imports of $17.