

EE312 Macroeconomics, 1/2014 (Sec. 046402)

Problem Sets 1 : Ch.1 Introduction and Ch 2. Measurement

Solution Guidance

1. For a country, give a brief reason why Gross Domestic Product(GDP) is higher than Gross National Product (GNP). (For example, GDP of a country is 120 million dollars and GNP is 100 million dollars.)

“The difference between GDP and GNP is given by the Net factor payments or net factor income from abroad.

$$GNP = GDP + \text{net factor income from abroad}$$

Net factor income from abroad = income earned in foreign countries by the residents of a country – income earned by non-residents in that country.

GNP is greater than GDP if net factor income from abroad is positive.

Possible reasons why GNP may exceed GDP:

- Country has done a lot of investment overseas and is earning lots of income from these foreign investments (income on nationally-owned capital located abroad).
- A significant number of citizens have left the country to work overseas (their income is counted in GNP, not GDP). This is probably true for Philippines.

Possible reasons why GDP may exceed GNP:

- Foreigners have done a lot of investment in the country (income earned by foreign-owned domestically-located capital). This is most likely why Mexico and Argentina's GDP > GNP.
- Country has a large immigrant labor force”

2. Find the latest statistical GDP and GNP data for Thailand from the internet. Which one is higher, Thailand's GDP or Thailand's GNP?

Thailand's GDP for 2013.... is equal to11,898,710 million Baht.....

Thailand's GNP for 2013.... is equal to.....11,099,624 million Baht.....

According to the data, Thailand's GDP in 2013... is ...higher... (higher or lower) than Thailand's GNP in 2013.....

Source:<http://www.nesdb.go.th>.....

3. Exogenous variables and Endogenous variables. Consider a closed economy described by the following equations(DAE model);

$$C = c_0 + c_1 Y$$

$$I = i_0 + i_1 Y$$

Equilibrium is defined where $Y = C + I$. At equilibrium, $Y = \frac{1}{(1 - c_1 - i_1)}(c_0 + i_0)$.

(a) What are the exogenous variables in this model? (underline: C , I , Y , $\underline{c_0}$, $\underline{c_1}$, $\underline{i_0}$, $\underline{i_1}$).

(b) What are the endogenous variables in this model?(underline: $\underline{C}$, $\underline{I}$, $\underline{Y}$, c_0 , c_1 , i_0 , i_1).

4. Consider the following economy that is producing only goods A (apples) and goods B (bananas). Prices and quantities for 2005 and 2013 are displayed in the following table:

Goods	2005			2013		
	P	Q	$P_t Q_t$	P	Q	$P_t Q_t$
A (Apples)	40	125	6,000	60	100	6,000
B (Bananas)	100	50	5,000	80	75	6,000
total			11,000			12,000

- (a) Calculate the Nominal GDP, the Real GDP (using 2005 prices) and the GDP deflator in each year;

2005 = base year

$$\begin{aligned}
 rGDP^{2005} &= \sum_i P_i^{2005} Q_i^{2005} \\
 &= (40 \times 125) + (100 \times 50) \\
 &= 11,000
 \end{aligned}$$

$$\begin{aligned}
 rGDP^{2013} &= \sum_i P_i^{2005} Q_i^{2013} \\
 &= (40 \times 100) + (100 \times 75) \\
 &= 11,500
 \end{aligned}$$

$$\begin{aligned}
 GDP \text{ deflator}_{2005} &= \frac{GDP_{2005}}{real GDP_{2005}} \times 100 \\
 &= 100
 \end{aligned}$$

$$\begin{aligned}
 GDP \text{ deflator}_{2013} &= \frac{GDP_{2013}}{real GDP_{2013}} \times 100 \\
 &= 104.35
 \end{aligned}$$

- (b) Calculate the Nominal GDP, the Real GDP (using 2013 prices) and the GDP deflator in each year;

2013 = base year

$$\begin{aligned}
rGDP^{2005} &= \sum_i P_i^{..2013...} Q_i^{..2005..} \\
&= (.60... \times .125...) + (...80... \times ...50...) \\
&= ...11,500..... \\
rGDP^{2013} &= \sum_i P_i^{..2013.....} Q_i^{..2013...} \\
&= (...60... \times .100...) + (...80.. \times ..75....) \\
&= ..12,000.... \\
GDP \text{ deflator}_{2005} &= \frac{GDP_{2005}}{\text{real GDP}_{2005.}} \times 100 \\
&=104.5..... \\
GDP \text{ deflator}_{2013} &= \frac{GDP_{2013}}{\text{real GDP}_{2013.}} \times 100 \\
&=100.....
\end{aligned}$$

5. Chain-Volume-Measure GDP - CVM. Given the following information, calculate CVM GDP in 2009, 2010, 2011 and 2012. The base year is **2009**. Show how to calculate.

t	GDP (2009's Price) $\sum_i P_{i,2009} Q_{i,t}$ unit: \$	GDP (2010's Price) $\sum_i P_{i,2010} Q_{i,t}$ unit: \$	GDP (2011's Price) $\sum_i P_{i,2011} Q_{i,t}$ unit: \$	GDP (2012's Price) $\sum_i P_{i,2012} Q_{i,t}$ unit: \$
2009	100	105	115	125
2010	104	110	120	130
2011	110	122	125	140
2012	120	130	145	160

CVM GDP 2009 = nominal GDP 2009 = real GDP (2009's price) =100....

Direct Index (DI)

$$DI_{2010} = \frac{\sum_i P^{2009} \times Q^{2010.}}{\sum_i P^{2009} \times Q^{2009}} = ... \frac{104}{100}$$

$$DI_{2011} = \frac{\sum_i P^{2010} \times Q^{2011}}{\sum_i P^{2010} \times Q^{2010.}} = ... \frac{122}{110}$$

$$DI_{2012} = \frac{\sum_i P^{2011} \times Q^{2012}}{\sum_i P^{2011} \times Q^{2011.}} = \frac{145}{125} ...$$

Chain Index (CI)

$$CI_{2010} = \dots DI_{2010} \dots = \dots \frac{104}{100} \dots$$

$$CI_{2011} = \dots DI_{2010} \times DI_{2011} = \dots \frac{104}{100} \times \frac{122}{110} \dots$$

$$CI_{2012} = \dots DI_{2010} \times DI_{2011} \times DI_{2012} = \dots \frac{104}{100} \times \frac{122}{110} \times \frac{145}{125} \dots$$

Chain Volume Measure (GDP)

$$CVMGDP_{2010} = \dots GDP_{2009} \dots \times \dots CI_{2010} \dots = \dots 100 \dots \times \dots \frac{104}{100} = 104 \dots$$

$$CVMGDP_{2011} = \dots GDP_{2009} \dots \times \dots CI_{2011} \dots = \dots 100 \dots \times \dots \frac{104}{100} \times \frac{122}{110} \dots = \dots 115.35 \dots$$

$$CVMGDP_{2012} = \dots GDP_{2009} \dots \times \dots CI_{2012} \dots = \dots 100 \dots \times \dots \frac{104}{100} \times \frac{122}{110} \times \frac{145}{125} \dots = \dots 133.80$$