

EE312 Macroeconomics, 2/2013 (Sec. 046402)

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

Solution Guidance

1. For a country, give a brief reason why Gross National Product (GNP) is greater than Gross Domestic Product(GDP).

Answer. “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.

*Note that “net factor income” from abroad is not equal to “net export”. Net export = total foreign spending on goods and services - the value of imported goods and services. Net export is recorded in the “trade account” in the “balance of payment account”. “Net factor income from abroad” is recorded in the “income account” of the balance of payment account.

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 statistical GDP and GNP data (at current price, nominal GDP) for Thailand in 2012 from the internet. Which one is higher, Thailand’s GDP or Thailand’s GNP?

Thailand’s GDP for 2012 is equal to11.38 (billion Baht, million million Baht).....

Thailand’s GNP for 2012 is equal to.....10.92 (billion Baht, million million Baht).....

According to the data, Thailand’s GDP in 2012 ishigher..... (higher or lower) than Thailand’s GNP in 2012.

Source: ...www.nesdb.go.th(a student may use a different source of data)...

Thailand’s GDP for 2012 is equal to366 billion dollars.....

Thailand’s GNP for 2012 is equal to..... 348 billion dollars.....

According to the data, Thailand’s GDP in 2012 ishigher..... (higher or lower) than Thailand’s GNP in 2012.

Source: ...www.worldbank.org(a student may use a different source of data)...

Note: The question asks for GNP and GDP at current price, current dollars, or nominal value. A student may use “PPP dollars”. However, both GDP and GNP must be measured in “PPP dollars”; otherwise they are not comparable.

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

$$\begin{aligned} C &= c_0 + c_1 Y \\ I &= i_0 + i_1 Y \end{aligned}$$

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. Identify which constituent part(s) of GDP (if any) the following items belong.

	C	I	G	NX	Not counted in GDP
C.P. pay Bht. 2,000 million to expand its plant (C.P. is a large company in Thailand)		✓			
You buy some heroin for your personal use					✓ (illegal activities)
You buy Bht1,000 rice to cook at home	✓				
You buy 100 shares of PTT (PTT is a Thai oil and gas company registered in the Stock Exchange of Thailand)					✓ (financial activities, non-productive indirect investment)
The government pays salary to government officers			✓		
The government pays social benefits to old people					✓ (transfer payment (R), non-productive government expense)
You buy Bht.100,000 of a French handbag	(✓)*			✓	
You buy a sofa at a garage sale*					✓ (second-hand goods, non-productive)

*You buy Bht.100,000 of a French handbag. This item can be counted as consumption because it is consumer's expenditure. However, since the handbag is produced abroad, it is not counted in our GDP. We count it as import as well. Therefore the two entities canceled out in calculating GDP.

1. 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)	50	100	5,000	60	50	3,000
B(Bananas)	100	50	5,000	90	100	90,000
total			10,000			12,000

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

$$\begin{aligned}
rGDP^{2005} &= \sum_i P_i^{2005} Q_i^{2005} \\
&= (...50... \times ..100...) + (...100.. \times ..50...) \\
&=10,000.....
\end{aligned}$$

$$\begin{aligned}
rGDP^{2013} &= \sum_i P_i^{2005..} Q_i^{...2013..} \\
&= (...50... \times ...50...) + (...100... \times ..100...) \\
&=12,500.....
\end{aligned}$$

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

$$\begin{aligned}
GDP \text{ deflator}_{2013} &= \frac{\text{Nominal GDP}_{2013}}{\text{real GDP}_{2013}} \times 100 \\
&= ..\frac{12000}{12500} \times 100 = 96...
\end{aligned}$$

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

2013 = base year

$$\begin{aligned}
rGDP^{2005} &= \sum_i P_i^{..2013...} Q_i^{2005..} \\
&= (...60... \times ...100.....) + (...90... \times50...) \\
&=10500.....
\end{aligned}$$

$$\begin{aligned}
rGDP^{2013} &= \sum_i P_i^{..2013.....} Q_i^{...2013...} \\
&= (...60..... \times ...50.....) + (...90.... \times100....) \\
&= ...12,000.....
\end{aligned}$$

$$\begin{aligned}
GDP \text{ deflator}_{2005} &= \frac{GDP_{2005}}{\text{real GDP}_{2005}} \times 100 \\
&= ... \frac{10,000}{10,500} = 95.24....
\end{aligned}$$

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

2. 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	108	115	125
2010	105	110	120	130
2011	110	121	125	140
2012	120	130	150	160

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

Direct Index (DI)

$$DI_{2010} = \frac{\sum_i P^{2009....} \times Q^{2010....}}{\sum_i P^{2009....} \times Q^{2009....}} = \frac{105}{100} \dots = 1.05$$

$$DI_{2011} = \frac{\sum_i P^{2010....} \times Q^{2011....}}{\sum_i P^{2010....} \times Q^{2010....}} = \dots \frac{121}{110} \dots = 1.10$$

$$DI_{2012} = \frac{\sum_i P^{2011....} \times Q^{2012....}}{\sum_i P^{2011....} \times Q^{2011....}} = \dots \frac{150}{125} \dots = 1.20$$

Chain Index (CI)

$$CI_{2010} = \dots DI_{2010} \dots = \dots 1.05 \dots$$

$$CI_{2011} = \dots DI_{2010} \times DI_{2011} = 1.05 \times 1.10 = 1.155 \dots$$

$$CI_{2012} = \dots DI_{2010} \times DI_{2011} \times DI_{2012} = 1.05 \times 1.10 \times 1.20 = 1.386 \dots$$

Chain Volume Measure (GDP)

$$CVMGDP_{2010} = \dots GDP_{2009} \dots \times \dots CI_{2010} \dots = \dots 100 \dots \times \dots 1.05 = 105 \dots$$

$$CVMGDP_{2011} = \dots GDP_{2009} \dots \times \dots CI_{2011} \dots = \dots 100 \dots \times \dots 1.155 \dots = \dots 115.5 \dots$$

$$CVMGDP_{2012} = \dots GDP_{2009} \dots \times \dots CI_{2012} \dots = \dots 100 \dots \times \dots 1.386 \dots = 138.6 \dots$$

- Note: Please kindly notify me if there is any mistake I made in this solution guidance. I do apologize for such a mistake.