Student ID.....

EE312 Macroeconomics, 2/2016 (Sec. 046402)

Problem Sets 1

Please submit at the BE office, 5th floor department of Economics building.

Deadline of submission : January 19, 2018, before 15.00 hrs.

Late submission will not be accepted.

1. Consider the following economy that is producing onlygoods A (apples) and goods B (bananas). Prices and quantities for 2005 and 2017 are displayed in the following table:

Goods	2005			2017		
	P	Q	P_tQ_t	P	Q	P_tQ_t
A (Apples)	40	125	5,000	60	100	6,000
B(Bananas)	100	50	5,000	80	75	6,000
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

   (b) Calculate the Nominal GDP, the Real GDP (using 2017 prices) and the GDP deflator in each year;

2. Chain-Volume-Measure GDP - CVM. Given the following information, calculate DI, CI and CVM GDP in 2009, 2010, 2011, 2012 and 2013. The base year is 2009.

Nominal GDP each year
Real GDP (previous yr price)

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: $	GDP (2013's Price) $\sum_i P_{i,2013}Q_{i,t}$ unit: $
2009	201	206	215	225	232
2010	204	212	221	230	234
2011	210	223	224	242	245
2012	220	230	244	262	262
2013	225	235	250	266	272

1 a) Nominal $GDP_{2005} = \sum_i P_t^i Q_t^i = \sum_i P_{2005}Q_{2005} = 10{,}000$

5 Nominal $GDP_{2017} = \sum_i P_t^i Q_t^i = \sum_i P_{2017}Q_{2017} = 12{,}000$

Real $GDP_{2005} = \sum_i P_{base}Q_t = \sum_i P_{2005}Q_{2005} = 10{,}000$

Real $GDP_{2017} = \sum_i P_{base}Q_t = \sum_i P_{2005}Q_{2017}$

$= (40 \times 100) + (100 \times 75) = 11500$

$$\text{GDP Deflator}_{2005} = \frac{\text{Nominal GDP}_{2005}}{\text{Real GDP}_{2005}} \times 100 = \frac{10000}{10000} \times 100 = 100$$

$$\text{GDP Deflator 2017} = \frac{\text{Nominal GDP}_{2017}}{\text{Real GDP}_{2017}} = \frac{12000}{11500} \times 100 = 104.34$$

b) $$\text{Nominal GDP}_{2005} = \sum_i P_t^i Q_t^i = \sum_i P_{2005} Q_{2005} = 10{,}000$$

$$\text{Nominal GDP}_{2017} = \sum_i P_t^i Q_t^i = \sum_i P_{2017} Q_{2017} = 12{,}000$$

$$\text{Real GDP}_{2005} = \sum_i P_{base} Q_t = \sum_i P_{2017} Q_{2005}$$

$$= (80 \times 125) + (80 \times 50) = 11500$$

$$\text{Real GDP}_{2017} = \sum_i P_{base} Q_t = \sum_i P_{2017} Q_{2017} = 12000$$

$$\text{GDP Deflator}_{2005} = \frac{\text{Nominal GDP}_{2005}}{\text{Real GDP}_{2005}} \times 100 = \frac{10{,}000}{11500} \times 100$$

$$\text{GDP Deflator 2017} = \frac{\text{Nominal GDP}_{2017}}{\text{Real GDP}_{2017}} = \frac{12000}{12000} \times 100 = 100$$

2.

2. Chain-Volume-Measure GDP - CVM. Given the following information, calculate DI, CI and CVM GDP in 2009, 2010, 2011, 2012 and 2013. The base year is 2009.

Nominal GDP each year
Real GDP (previous yr price)

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: \$	GDP (2013's Price) $\sum_i P_{i,2013}Q_{i,t}$ unit: \$
2009	201	206	215	225	232
2010	204	212	221	230	234
2011	210	223	224	242	245
2012	220	230	244	262	262
2013	225	235	250	266	272

$$\text{CVM GDP}_{2009} = \text{Nominal GDP}_{2009} = \sum_i P^i_{2009} Q^i_{2009}$$

$$\text{Real GDP}_{2009} = 201$$

$$\text{CVM GDP}_{2010} = \text{CVM GDP}_{2009} \times \left(\frac{\sum_i P^i_{2009} Q^i_{2010}}{\sum_i P^i_{2009} Q^i_{2009}} \right)$$

$$= 201 \times \frac{204}{201}$$

$$= 201 \times DI_{2010}$$

$$\times CI_{2010}$$

$$\text{CVM GDP}_{2011} = \text{CVM GDP}_{2009} \times \left(\frac{\sum_i P^i_{2009} Q^i_{2010}}{\sum_i P^i_{2009} Q^i_{2009}} \right) \times \left(\frac{\sum_i P^i_{2010} Q^i_{2011}}{\sum_i P^i_{2010} Q^i_{2010}} \right)$$

$$= 201 \times \frac{204}{201} \times \frac{223}{212}$$

$$DI_{2010} \times DI_{2011}$$

$$\Downarrow$$

$$CI_{2011}$$

$$\text{CVM GDP}_{2012} = \text{CVM GDP}_{2011} \times \left(\frac{\sum_i P^i_{2009} Q^i_{2010}}{\sum_i P^i_{2009} Q^i_{2009}} \right) \times \left(\frac{\sum_i P^i_{2010} Q^i_{2011}}{\sum_i P^i_{2010} Q^i_{2010}} \right)$$

$$\times \left(\frac{\sum_i P_{2011} Q_{2012}}{\sum_i P_{2011} Q_{2011}} \right)$$

$$= 201 \times \frac{204}{201} \times \frac{223}{212} \times \frac{244}{234}$$

$DI_{2010} \times DI_{2011} \Rightarrow CI_{2011}$

CI_{2012}

$$CVM\ GDP_{2012} = CVM\ GDP_{2011} \times \left(\frac{\sum_i p^i_{2009} q^i_{2010}}{\sum_i p^i_{2009} q^i_{2009}} \right) \times \left(\frac{\sum_i p^i_{2010} q^i_{2011}}{\sum_i p^i_{2010} q^i_{2010}} \right) \times \left(\frac{\sum_i p_{2011} q_{2012}}{\sum_i p_{2011} q_{2011}} \right) \times \left(\frac{\sum_i p^i_{2012} q^i_{2013}}{\sum_i p^i_{2012} q^i_{2012}} \right)$$

$$= 201 \times \frac{206}{201} \times \frac{223}{212} \times \frac{244}{234} \times \frac{166}{262}$$

$DI_{2010} \times DI_{2011} \times DI_{2012} \times DI_{2013}$

$DI_{2010} \times DI_{2011} \Rightarrow CI_{2011}$

CI_{2012}

CI_{2013}