

Answer for Homework 1: Modern Macroeconomics I*

1. Answer the following questions.

(a) What is GDP?

Answer GDP is the gross sum of the value added of each product measured by market prices in a country during a period.

(b) GDP includes the imputed rent on owner-occupied houses. But, the owner of a house must buy it before owning. It has been already priced. Isn't it double counting? What is your answer to this question?

Answer The answer is no. When the owner buys new house, the value of the house is added in that year's GDP. While the owner does not pay a landlord for housing service, we can interpret that the owner enjoys housing services served by himself. GDP includes the rent that house owners pay to themselves. Since the housing service and the original purchase create two different values, both values should be included in GDP. Therefore, there is no double counting.

(c) The total expenditure in a country is said to be equal to the total income in the country. But, if a company cannot sell many products this year, the statement seems to be wrong. Why is the previous statement true in GDP accounting?

Answer If a company cannot sell part of products, two cases happen. The product is spoiled and need to be thrown it away. Then it does not produce any value. So it is not counted as part of GDP. But if we can store the product and sell during the next period, it produces additional value during the next period. In this case, National Income Accounting system treats the inventory as the sale of goods to themselves during this period. Hence it is counted as part of GDP of this period. When the product is sold during the next period, it can be seen as the transfer of used goods from the firm to consumers. Hence it does not affect GDP of the next period. Because of this treatment of inventories, all goods produced are purchased by somebody. Therefore, total income always equals total expenditure in a country.

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- (d) If we add the market value of all goods or services produced in Japan in 2004, is it equal to Japanese GDP in 2004? Explain your answer.

Answer GDP is the gross sum of the value added of each product measured by market prices in a country during a period. Hence, if we add the market value of all goods and services, the value of intermediate goods would join in GDP. Therefore answer of this problem is no.

- (e) Is inventory a part of GDP? Explain the logic of your answer?

Answer If a good can be stored and sold during the next period, National Income Accounting system treats the inventory as the sale of goods to themselves during this period. It is counted as part of GDP of this period.

- (f) What is a difference between GDP and GNP?

Answer GDP measures the total income in a country not by residents of the country.

$$\text{GNP} = \text{GDP} + \text{factor payments from abroad} - \text{factor payments to abroad} .$$

- (g) What is a difference between GNP and NNP?

Answer The main difference between GNP and NNP is whether to subtract the depreciation of capital or not. More precisely,

$$\text{NNP} = \text{GNP} - \text{Depreciation}$$

- (h) What is a difference between real GDP and nominal GDP? Why do we need to examine real GDP to understand a change in the standard of living?

Answer Nominal GDP uses current prices to measure the value of goods and services. On the contrary, real GDP uses prices of based year to do it. Because if there exist price fluctuation, GDP can not be a suitable measure of economic well-being. Therefore we need to eliminate the impact of price fluctuation.

- (i) Why do some researchers think that GDP per worker is the better measure of richness than GDP per capita in order to compare income differences across countries?

Answer Many industries are not developed in a developing countries: restaurants, maintenance of machine etc. Since GDP can not measure the value of home production, GDP per capita may underestimate well-being of developing countries. Since GDP does not value home production, it may be reasonable to divide it by the number of labor force.

- (j) What is the consumer price index?

Answer Consumer price index is the price of a basket of goods and services purchased by a typical consumer relative to the price of same basket in

some base year. Let 2006 be the base year. Then, the CPI is defined as follows:

$$\text{CPI in 2006} = 1$$

$$\text{CPI in 2007} = \frac{\sum_{i=1}^N \text{Number of product } i \times \text{Price of product } i \text{ in 2007}}{\sum_{i=1}^N \text{Number of product } i \times \text{Price of product } i \text{ in 2006}},$$

where the number of product i represents the number of product purchased by the typical consumer. There are three differences between two indexes.

- (k) How is a GDP deflator estimated? How is a consumer price index estimated? Explain the difference between two indices.

Answer GDP deflator is the ratio of nominal GDP to real GDP and is defined as

$$\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}}$$

- 1 The GDP deflator measures the price of all goods and services produced; CPI measures the prices of only the goods and services bought by consumers.
- 2 The GDP deflator includes only goods produced in a country. It excludes imported goods. CPI includes imported goods if consumers buy the goods.
- 3 The CPI assign fixed weights to the prices of different goods; the GDP deflator allows the basket of goods to change over time as the composition of GDP changes.

- (l) How is an unemployed worker defined?

Answer People who are older than 16 years are called unemployed when

- 1 They don't have a paid job.
- 2 They conducted a job seeking activity.
- 3 If there is a job, they can do it soon (They are available).

Therefore, unemployed means that they don't involuntarily have a job.

- (m) What is the labor force participation rate?

Answer

$$\text{Labor force participation rate} = \frac{\text{labor force}}{\text{adult population}} \times 100.$$

The labor force participation rate is the percentage of adult population (16 years and older) that is in the labor force.

- (n) Explain a difference between the unemployment rate and the labor force participation rate.

Answer The definitions of each rate are respectively,

$$\text{Unemployment rate} = \frac{\text{number of unemployed persons}}{\text{labor force}} \times 100, \text{ and}$$

$$\text{Labor force participation rate} = \frac{\text{labor force}}{\text{adult population}} \times 100.$$

The unemployment rate is the percentage of labor force who is unemployed. People is unemployed when they do not have a paid job, they conducted a job seeking activity, and if there is a job, they can do it soon. On the other hand the labor force participation rate is the percentage of adult population (16 years and older) that is in the labor force.