

**Econ 102: Principles of Macroeconomic
Homework 2 (Page 1 out of 4)**

Announcements:

- You have two weeks to complete this homework. It is due on the following week after the first midterm exam. Problem 5 might be a bit more challenging. An example similar to this problem will be solved in class on Monday (11 Feb).
- The first midterm exam is on Feb 13 (this Wed). Make sure you arrive 10 min. early to the exam. Check your email for the information about classroom arrangement. Bring a simple calculator and a #2 pencil.
- I strongly recommend you work through this HW before the exam.

Problem 1 (Calculating Real GDP and Nominal GDP)

For this problem, it is helpful to study the example from the lecture notes 3-4 first.

The country of Zomba produces 3 goods: *apples, iPods and coconuts*. All these goods are final goods, and all the production is for the marketplace. The table below summarizes the information on production and market prices in Zomba.

Year	Variable	Good		
		Apples	iPods	Coconuts
1992	Quantity	5	20	10
	Price	\$1	\$1	\$1
1993	Quantity	6	40	11
	Price	\$3	\$1	\$2
1994	Quantity	7	80	12
	Price	\$4	\$1	\$3

- A.** Fill in the table below. For each year, compute the nominal GDP and the real GDP in constant prices (*the last three columns of the table below*: base price from year 1992, base prices from year 1993, and base prices from year 1994):

Your answer:

Year	Nominal GDP	Real GDP at constant prices from year 1992	Real GDP at constant prices from year 1993	Real GDP at constant prices from year 1994
1992	\$35	35		
1993	\$80	57	80	
1994	\$144			144

- B.** Fill in the table below (*recall*: growth rate in year 1993 means growth between the corresponding values of the variable in year 1992 and 1993):

Your answer:

Year	Growth rate of nominal GDP	Growth rate of real GDP at constant prices from year 1992	Growth rate of real GDP at constant prices from year 1993	Growth rate of real GDP at constant prices from year 1994
1993	128.6%	62.9%	45.5%	
1994	80%			

**Econ 102: Principles of Macroeconomic
Homework 2 (Page 2 out of 4)**

C. Some people claim that we should measure the real GDP using the *beginning* of period prices as base prices (called *Laspeyres* measure, third column in the table above), some, that we should rather use the *last* period prices as base prices (called *Paasche* measure, last column in the table above). Knowing that the highest output growth is registered in sectors that also happen to produce goods that become cheaper over time relative to all other goods (like iPods in B), answer which measure of the real GDP will tend to 'understate' economic growth, and which will tend to 'overstate' it. (Support your answer using the results from point B.)

□ *Your answer:*

D. Here, you will learn how to compute real GDP using the so called *chain-weighted method*. This method remedies the problem you identified in point C.

Step 1: By copying the information from the table in point B, fill in the following blank spaces:

- A. *Percentage growth rate in year 1993 according to real GDP measured in constant prices from year 1992 was62.9%..... (column 3, row 2)*
- B. *Percentage growth rate in year 1993 according to real GDP measured in constant prices from year 1993 was45.5%..... (column 4, row 2)*
- C. *Percentage growth rate in year 1994 according to real GDP measured in constant prices from year 1993 was (column 4, row 3)*
- D. *Percentage growth rate in year 1994 according to real GDP measured in constant prices from year 1994 was (column 5, row 3)*

Step 2: Using the values from step 1, fill in the following blank spaces:

- 1. *Geometric average of the two numbers you listed in spaces A and B in step 1:
answer: $\sqrt{62.9 * 45.5} = 53.5$
(Geometric average of two numbers x and y is \sqrt{xy})*

- 2. *Geometric average of the two numbers you listed in spaces C and D in step 1:
.....*

(Comment: Does not have to be this way, simple average would work too!)

Step 3: Using the numbers from the previous step (blank spaces 1 and 2), the chain-weighted real GDP for years 1992-1994 is constructed as follows:

**Econ 102: Principles of Macroeconomic
Homework 2 (Page 3 out of 4)**

- the value of the chain-weighted real GDP in year 1992 equals the nominal GDP in year 1992
- the chain-weighted GDP grows in year 1993 at the growth rate equal to the number you entered into the blank space 1 of step 2
- the chain-weighted GDP grows in year 1994 at the growth rate equal to the number you entered into the blank space 2 of step 2

Given the information above and your answer to point A, fill in the tables below:

Your answer:

Year	Chain-weighted real GDP	Real GDP at constant prices from year 1992	Real GDP at constant prices from year 1994
1992	35	35	
1993		57	
1994	Choose one: 81.7 or 70.3?		144

Your answer:

Year	Growth rate of chain-weighted real GDP	Growth rate of real GDP at constant prices from year 1992	Growth rate of real GDP at constant prices from year 1994
1993	53.5%	62.9%	38.6%
1994			

Problem 2 (Value-Added and Intermediate Goods)

A number of parties may work to get an automobile sold. It begins with buying rubber for the car's tires. It costs a tire manufacturer \$50 to purchase resources needed to make a set of four tires, then the tire company sells the tires to an automobile manufacturer for \$200. The automobile manufacturer assembles the rest of the car at its plant, and pays one of its own truckers \$75 to ship the car to an auto dealership. The dealership pays the auto company \$15,000 for the car, and then sells it to an individual for \$16,500. What is the value added at each step of the production process?

Your answer:

Tire manufacturer.....
 Automobile manufacturer.....
 Auto dealership.....

**Econ 102: Principles of Macroeconomic
Homework 2 (Page 4 out of 4)**

Problem 3 (Rule of 70)

U.S. real GDP was estimated to be at an annual rate of \$11.337 trillion for the third quarter of 2006 (in 2000 dollars, source: Bureau of Economic Analysis). Real GDP was estimated at \$11.658 trillion for third quarter of 2007 (this is an annualized value, i.e. it says how much US economy produced in a period of 1 quarter *times* the number of quarters in a year).

A. What is the percentage increase in GDP from Q3 2006 to Q3 2007?

Your answer:

B. At this rate, how many years it will take for the U.S. economy to double from its amount in Q3 2006? (Use rule of 70)

Your answer:

Problem 4 (Unemployment, investment goods and intermediate goods)

A. Give the four different categories of unemployment, and a real-life example of each of these categories.

Your answer:

**Econ 102: Principles of Macroeconomic
Homework 2 (Page 5 out of 4)**

B. For each of these examples, say whether this person is unemployed, employed or out of labor force (circle U or E or O).

- E U O A person works 10 hours a week at Wal-Mart, but wants more work.
- E U O College student does not take a job during the school year to concentrate on studies.
- E U O A person's National Guard unit is called up for Iraq, and she has to leave her job.
- E U O A person is out of work, and applies for an opening at Jimmy John's.
- E U O A parent stays at home to take care of her children--decides not to look for job.
- E U O A recent college graduate is hired in July for a teaching job that starts in August.
- E U O A landscaper is contracted to do work in spring, but has no job due to cold winter.
- E U O An individual was laid off 12 months ago, and has not looked for work since.

C. A firm purchases a product from another firm. Determine whether it is an intermediate good (I) or final good (F) (private investment).

- F I scissors and a new set of razors that a barber shop buys
- F I tires GM buys from Goodyear to include them in their offer of customized choices
- F I Software Engineering Group INC from Chicago buys a new computer system from HP for their workers

Problem 5

Zomba is a country and produces three goods: *flour*, *pizza* and *pizza ovens*. You have the following information about various transactions that took place in Zomba.

Government expenditures G, and net export NX in Zomba were equal \$0. (When something is not listed and its value does not follow from the rest of the data, assume it equals \$0.)

Millers

Payments:

- (1) Salaries \$1000 (2) Interest and dividends: \$1000

Receipts:

Revenue from sales (price x quantity sold)

- (3) \$1500

Change in the value of the inventory of unsold products:

- (4) +\$500

Pizza Oven Producers

Payments:

- (5) Salaries \$500

Receipts:

- (7) Revenue from sales \$500

Pizzerias (Pizza Producers)

Payments:

- (8) Salaries \$1000 (9) Interest and dividends \$250
- (10) Purchases of flour (from millers) \$500 (11) Purchases of new pizza ovens \$500

Receipts:

- (12) Revenue from sales \$1750

**Econ 102: Principles of Macroeconomic
Homework 2 (Page 6 out of 4)**

All the items above have a unique ID number. Refer to these ID numbers to explain your answers below.

A. Which items would you sum up to compute GDP using factor payments approach?

Your answer:

B. Which items would you sum up to compute GDP using value added approach?

Your answer:

C. What is the total value of private investment (I) and consumption expenditures (C) in this economy? (Government expenditures G, and net export NX are equal \$0.)

Your answer:

$I = \dots\dots\dots$

$C = \dots\dots\dots$

D. How much of the total value of the flour produced by this economy is sold as final good, and how much is sold as intermediate good.

Your answer:

Value of flour sold as final good.....,

Value of flour sold as intermediate good.....

Problem 6 (True/False)

For each of the following statements, circle T if the statement is true, or F if it is false.

T F GDP is the dollar value of all final goods and services produced during a given period or time for the marketplace by the nation (all US citizens).

T F GDP is the dollar value of all goods and services produced during a given period of time for the marketplace, within nation's borders.

T F Purchases of intermediate goods and some items classified as private investment are similar in nature -- both are purchased to produce output. However, unlike intermediate goods,

**Econ 102: Principles of Macroeconomic
Homework 2 (Page 7 out of 4)**

investment goods are not simply embedded in the output, but rather used to produce it over some extended period of time.

Problem 7 (Rule of 70)

Two countries start from the same level of GDP. The growth rate in country A is 7%, and growth rate in country B is 3.5%. Given that today we have year 2008, when will the GDP of country A be exactly twice as big as the GDP of country B? (Use rule of 70)

Your answer:

HINT: To answer this question it helps to fill in the following blank spaces and the table below (Some blank spaces in the table you can not fill in because you do not have data, but some you can. The ones you can fill in using the rule of 70 are enough to determine the answer.) :

GDP in country A doubles every..... years.

GDP in country B doubles everyyears.

So, GDP in

	<i>Country A</i>	<i>Country B</i>
<i>GDP now:</i>	<i>Assume = 100</i>	<i>Assume = 100</i>
<i>GDP after $70/7=10$ years</i>		
<i>GDP after $2*70/7=70/3.5=20$ years</i>		
<i>GDP after 30 years</i>		
<i>GDP after 40 years</i>		