

## Problem set #1

**Question 1:** Place each of the following transactions in one of the four components of expenditure: C, I, G, NX.

- a) Boeing sells an airplane to the Air Force. This is government purchases (G).
- b) Boeing sells an airplane to Jet Blue. Assuming the plane is new, this is private investment (I).
- c) Boeing sells an airplane to the British Airways. Assuming the plane is new, this is net exports (NX).
- d) Boeing sells an airplane to Francesc Ortega. Assuming the plane is new, this is consumption (C).
- e) Boeing builds an airplane but fails to sell it this year. This is private investment (I) as it increases inventories.

**Question 2:**

Consider an economy that produces bread and cars. In year 2000 this economy produced 100 cars and 500,000 breads, at prices \$50,000 and \$10, respectively. In year 2010 the quantities produced were 120 and 400,000, at prices \$60,000 and \$20.

- a) Using year 2000 as base year, compute GDP, constant-price GDP, the implicit price deflator, and the CPI (the average family consumes 1 car and 50 breads each year).
- b) What has been the inflation rate for this 10-year period? Compare your answers using the GDP price deflator and the CPI.

	QUANTITIES		PRICES	
YEAR	y_cars	y_breads	p_car	p_bread
2000	100	500,000	50,000	10
2010	120	400,000	60,000	20

  

base year 2000				
YEAR	GDP	CP_GDP	Deflator	Deflator Inflation
2000	10,000,000	10,000,000	1	n.a.
2010	15,200,000	10,000,000	1.52	52.00%

  

basket: 1 car, 50 breads		
YEAR	CPI	CPI inflation
2000	100	n.a.
2010	121	20.79%

**Question 3**

Consider the data for a fictional economy producing only two (final) goods in the next page. Fill in the tables with your answers. You may find helpful to use Excel for your calculations.

It will help you to follow these steps:

- a) Compute the GDP for each year.
- b) Compute the constant-price GDP for each year and the GDP price deflator, using 2005 as base year. Report the annual growth rates of both variables.
- c) Compute the chain-weighted GDP for each year, using 2005 as the reference year. Follow the following steps: 1) Calculate the growth rates for chain-weighted GDP using a moving base year (t-1) as in class. 2) Build an index taking the value 100 for year 2005. 3) Build the chain-weighted GDP initializing the series at 2005, that is, set the chain-weighted GDP in 2005 equal to the (nominal) GDP. From then onward apply the growth rates for the chain-weighted GDP that you calculated earlier.
- d) Compare the annual growth rates for real GDP and the Price deflator obtained from the constant-price GDP and the chain-weighted GDP. Provide a brief comparison. In particular, comment on whether the growth rates for real GDP and inflation are similar or not using the two methods.

SEE NEXT PAGE.

### Data

	quantities		prices	
year	y1	y2	p1	p2
2002	6	6	1	2
2003	6	4	1	4
2004	5.5	3.5	1	5
2005	5	3	1	6
2006	4.5	3	1	8
2007	5	2.5	1	9

### GDP

year	gdp
2002	18
2003	22
2004	23
2005	23
2006	28.5
2007	27.5

### Constant-price GDP

	cp_gdp	deflator	growth rate cp_gdp	growth rate deflator
base year	2005	2005	2005	2005
year	cp_gdp	deflator	growth rate	growth rate
2002	42	0.43	n.a	n.a
2003	30	0.73	-0.29	0.71
2004	26.5	0.87	-0.12	0.18
2005	23	1.00	-0.13	0.15
2006	22.5	1.27	-0.02	0.27
2007	20	1.38	-0.11	0.09

### Chain-weighted GDP

base t-1	growth rate	index	chain_gdp	deflator	growth rate
reference year 2005	chain_gdp	chain_gdp	chain_gdp	deflator	deflator
year	chain_gdp	chain_gdp	chain_gdp	deflator	deflator
2002	n.a	166.81	38.37	0.47	n.a.
2003	-0.22	129.74	29.84	0.74	0.57
2004	-0.11	115	26.45	0.87	0.18
2005	-0.13	100	23	1.00	0.15
2006	-0.02	97.83	22.50	1.27	0.27
2007	-0.12	85.81	19.74	1.39	0.10

Note: Given last year's value of X and its annual growth rate we can easily compute this year's value of X:  $X(t) = X(t-1) * (1+g(t))$ .

Clearly, the same formula can be used to find last year's value if we know the current value and the annual growth rate between the two periods:

$$X(t-1) = X(t) / (1+g(t)).$$

**Question 4:**

Read the NYT article “The rise and fall of the GDP”. Briefly answer the following questions:

a) When was GDP invented? Which influential economist is credited with being the “father” of GDP?

GDP was born in the 1930s. Simon Kuznets is credited as being its (intellectual) father.

b) Do you think high-GDP-man is happier than low-GDP-man? Who would you like to be? Briefly say why.

Most likely low-GDP man is happier. His consumption levels (food, home services, books, etc) and leisure time are at least at the same level as high-GDP man. This suggests he experiences at least as high utility (well being) as high-GDP man. Moreover, he seems to be in better physical and medical health. I'd rather be low-GDP man because what matters to me is my utility (or well-being) in the present and in the future, and not so much what is my contribution to the economy's GDP.

c) What is the HDI? What are the main differences between the HDI and the GDP?

The Human Development Index (HDI) is a measure of aggregate well-being in a country. It is an average of three variables: the level of economic activity (GDP), the average education of the population (literacy and school enrolment), and the average health level of the population (life expectancy).

d) Briefly summarize the automobile metaphore that the Stiglitz-Sen-Fitoussi Commission used to explain why policymakers should not solely rely on one economic indicator (namely, GDP).

Suppose running the economy is like driving a car. Basing policy decisions solely on GDP is like driving a car whose dashboard only reports the speed. Clearly, you are missing other relevant information such as how much fuel is left (sustainability). To pick the best policies you need much more information than the latest GDP figure.

e) Briefly say what “State of the USA” is. What is the medical analogy used by Stiglitz to explain why it may be useful to policymakers?

State of the USA is a panel of over 300 indicators that will be providing reliable and timely information on the economy, health, education, the environment, crime, and so on. It will be accessible to all over the internet and overseen by the National Academy of Sciences.

It is aimed at providing politicians with a comprehensive set of information in order to make more informed policy-making decisions. It's like a doctor that has access to hundreds of statistics when diagnosing a patient's problem.

**Question 5:** Read the NYT article “On Economy, Raw Data Gets a Grain of Salt”. Briefly summarize its main points.

The first point brought up in the article was the government announcement in April 2011 concerning economic growth of the first quarter. The announcement was “that the economy had growth at a moderate annual pace of 1.8 percent.” Three months later the government revised their previous statement to state that the economy only expanded at a pace of 0.4 percent. This revision was due to an underestimation made by the Bureau of Economic Analysis dealing with the value of vehicles remaining on the lots of dealerships, and a new valuation method of imported oil.

The article's main point is that the economic information released by the government “should be taken with a grain of salt”, particularly the early release of the data. The reason is that some of the figures used in the calculation are estimates or projections that will be replaced by definitive figures in the months to come.

One way to obtain a more reliable estimate is by looking both at the GDP estimates based on the income approach and on the expenditure approach. Be skeptical when the two measures do not agree closely.

**Question 6:**

Read the 4 pages of the article by Charles Jones and Peter Klenow (*Beyond GDP?*). Answer the following questions **very briefly**.

a) *What are the main limitations and criticisms on GDP?*

GDP is an imperfect measure of economic welfare. Leisure, inequality, mortality, morbidity, crime, and a pristine environment all affect living standards and are absent or underrepresented in GDP.

b) *What are the main conceptual differences between the new measure of welfare proposed by Jones and Klenow and GDP?*

The new welfare metric would take into account more factors of well being in a country such as health, environmental, and social aspects. This information is measured as a “consumption equivalent”, that is, as the amount of consumption that would equalize the level utility (welfare) between two countries, or for a given country between two time periods.

c) *What are the main findings uncovered by using the new measure of welfare? Focus on the US-France comparison, China, South Africa and Singapore.*

When the new welfare measurement was used in an example involving the U.S. and France the GDP gap that existed between the countries quickly became more of a crack than a gap. Simply using traditional GDP, France is only 66 percent of the U.S. value. After taking into account France’s higher leisure time, longer life expectancy, and lower inequality, wellbeing in France was now 94 percent of the U.S. value.

Most developing countries including much of sub-Saharan Africa, Latin America, Southern Asia, and China are revealed to have much lower levels of wellbeing under the new measure than when we simply look at their GDP per person. In the particular case of South Africa the sharp drop in welfare with the new measure reflects the human cost of the AIDS epidemic.

Regarding Singapore, its GDP per capita in year 2000 was about 82 percent of the value of the US. However, taking consideration of Singapore’s extremely high investment rate, which reduces consumption for a given level of income, Singapore’s wellbeing falls to only 39 percent when using the new welfare metric.