Homework I - solutions

1. Prices A market-clearing model is one in which prices adjust to equilibrate supply and demand. Market-clearing models are useful in situations where prices are flexible. Yet in many situations, flexible prices may not be a realistic assumption. For example, labor contracts often set wages for up to three years. Or, firms such as magazine publishers change their prices only every three to four years. Most macroeconomists believe that price flexibility is a reasonable assumption for studying long-run issues. Over the long run, prices respond to changes in demand or supply, even though in the short run they may be slow to adjust.

2. GDP I The setup of the question gives the following information:
\[ P_{b2002} = 0.5 \quad Q_{b2002} = 4 \]
\[ P_{2007} = 1 \quad Q_{b2007} = 5 \]
\[ P_{p2002} = 1 \quad Q_{p2002} = 3 \]
\[ P_{p2007} = 1.5 \quad Q_{p2007} = 4 \]

then,
\[ \text{nominal } GDP_{2002} = P_{b2002} \times Q_{b2002} + P_{p2002} \times Q_{p2002} = 0.5 \times 4 + 1 \times 3 = 2 + 3 = 5 \]
\[ \text{nominal } GDP_{2007} = P_{b2007} \times Q_{b2007} + P_{p2007} \times Q_{p2007} = 1 \times 5 + 1.5 \times 4 = 5 + 6 = 11 \]
\[ \text{real } GDP_{2007} = P_{b2002} \times Q_{b2007} + P_{b2002} \times Q_{p2007} = 0.5 \times 5 + 1 \times 4 = 2.5 + 4 = 6.5 \]
\[ \text{GDP deflator } 2002 = \frac{\text{nominal } GDP_{2002}}{\text{real } GDP_{2002}} = \frac{5}{5} = 1 \]
\[ \text{GDP deflator } 2007 = \frac{\text{nominal } GDP_{2007}}{\text{real } GDP_{2007}} = \frac{11}{6.5} = 1.692 \]

Since the inflation rate is the percentage change in the GDP deflator, you have to use the following equation:
\[ \text{inflation}_{2007} = \left( \frac{\text{GDP deflator}_{2007} - \text{GDP deflator}_{2002}}{\text{GDP deflator}_{2002}} \right) \times 100 = \left( \frac{1.692 - 1}{1} \right) \times 100 = \frac{0.692}{1} \times 100 = 0.692 \times 100 = 69.2\% \]

3. GDP II Data on parts (i) to (vii) can be downloaded from the Bureau of Economic Analysis (www.bea.doc.gov - follow the links to GDP and related data). Most of the data (not necessarily the earliest year) can also be found in the Economic Report of the President. By dividing each component (i) to (vii) by nominal GDP and multiplying by 100, we obtain the following percentages:
Among other things, we observe the following trends in the economy over the period 1950-2015:

i. Personal consumption expenditures have been around two-thirds of GDP

ii. The share of GDP going to gross private domestic investment has been fluctuating mostly between 15% and 20% of GDP

iii. The share of GDP going to residential fixed investment was initially relatively high and had been declining until around 1990. From around 1990 until 2006 it was on the rise and then collapsed 2007-2012. From 2012 onwards, it has recovered to its usual level.

iv. The share going to government consumption purchases rose more than 6 percentage points from 1950 to 1975 and then decreased until around 2000 when it started rising again.

v. Net exports, which were positive in 1950 and roughly zero in 1980, were substantially negative since then.

vi. The share going to national defense purchases fell from 1980 to 2000 and then again rose.

vii. Imports have grown rapidly relative to GDP.

4. **GDP III** In 2012, India’s purchasing power parity (PPP) GDP per capita was $3,800, while the US PPP GDP was $51,700. This would suggest that the standard in living is, on average, 13 times greater in the United States. However, this is not necessarily the case due to the way GDP is calculated. By definition, GDP is the value of all final goods and services produced domestically. Therefore, any activity (cutting grass, for instance) should be included in the GDP. The fact that many of US citizens hire workers to cut their grass and pay for the service, means that this particular episode of mowing a lawn will enter GDP and will increase. In India, however, we can expect that less grass cutting will be performed by specialized firms, but rather by the house
owner, who does not pay to himself for the service. As such, this activity is not included in the GDP and just by looking at GDP figures, one would overestimate US level of GDP as compared to the Indian GDP. In general, less developed countries will have less chores/services performed by a firm than a more developed country and this will give an appearance that a less developed country is lagging behind a more developed country by more than it really is.

In addition, if there is a significant underground (shadow) economy present, this will give an appearance of low economic activity, when, in reality, the economic activity is being done in the informal rather than formal economy.

5. Components of GDP

a. Both Y and I increase by the full amount of the value of a computer.
b. Both Y and NX increase by the full amount of the value of a computer.
c. Both Y and G increase by the full amount of the value of a computer.
d. Both Y and C increase by the full amount of the value of a computer.
e. C increases by the full amount of the value of a computer. At the same time, NX decreases by that same amount as the computer was imported. The net effect on Y is zero. And that makes sense as the computer was not produced domestically.

6. GDP IV When a woman marries her butler, GDP falls by the amount of the butlers salary. This happens because measured total income, and therefore measured GDP, falls by the amount of the butlers loss in salary. If GDP truly measured the value of all goods and services, then the marriage would not affect GDP since the total amount of economic activity is unchanged. Actual GDP, however, is an imperfect measure of economic activity because the value of some goods and services is left out. Once the butlers work becomes part of his household chores, his services are no longer counted in GDP. As this example illustrates, GDP does not include the value of any output produced in the home. Similarly, GDP does not include other goods and services, such as the imputed rent on durable goods (e.g., cars and refrigerators) and any illegal trade.

7. GDP V As the circular flow diagram shows, when firms produce goods and services (production), those goods and services are sold to consumers, businesses, the government and the foreign sector (spending). Firms receive payments for those goods and services sold (income). Hence, production=spending=income for the economy as a whole.