Thanasak Jenmana
Office 466, Faculty of Economics, Thammasat University
Office hours: Mondays 9-11 am by appointment
email: jenmana@econ.tu.ac.th

Problem Set I: Solution

EE212 — Principles of Macroeconomics

Semester 2/2018

Total mark: 20 points

Due date: Friday 7 February 2020 **before midnight** to jenmana@econ.tu.ac.th.

For any late submission, one point will be deducted per half an hour.

Please submit in pdf form, and not word document.

Problem I: Macroeconomic concepts (2 points)

Answer to these questions in **a few sentences.**

1. What does GDP per capita measure?

   GDP per capita is an indicator for economic well-being in an economy. It represents the average level of output per inhabitant.

2. Why are we interested in real GDP?

   We are interested in real GDP because prices vary over time. Hence, in order to capture purely the changes in the level of economic productivity, we need to get rid of the price effects in the GDP measurement.

3. What is the discouraged-worker effect? How does it affect the unemployment rate?

   Discouraged-worker effect is when a jobseeker becomes "discouraged" and hence stopped looking for a job. Since our definition of the unemployed is those who without a job, but are looking for one, unemployment rate will decrease when someones become discouraged.

4. What is transfer payment? and why is it not included in the GDP?

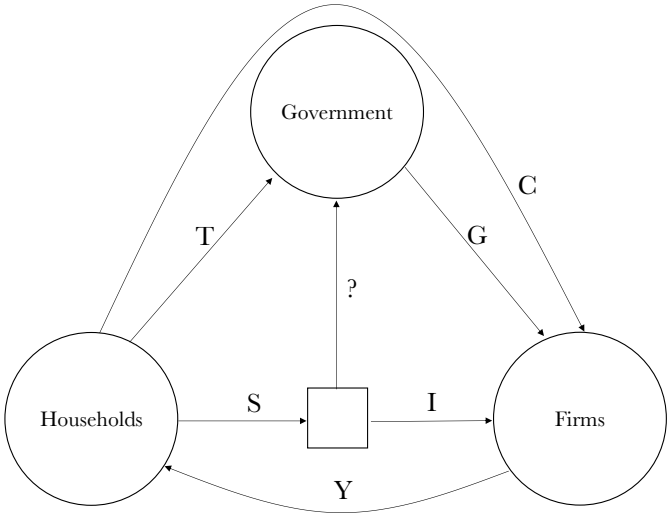
   Transfer payment are the lumpsum flow of money to the household from ongoing social policies (such as unemployment benefits, and so on). It is not included in the GDP since (i) it is not a direct factor of economic production; (ii) the fraction of transfer payment spent on household consumption is captured in household consumption in the GDP (through final sales, and so on).

5. Using market exchange rates, per capita income in Switzerland exceeds that in Canada, but when PPP rates are used the situation is reversed. Why?

   This is because the PPP rates capture the cost of living in each of the countries. Despite the implication that the Swiss are richer in terms of exchange rate determined by the foreign exchange market, in terms of cost of living, an average person in Canada can enjoy a higher level of living standards.

Problem II: flows in a closed economy (5 points)

Assume that the circular flow of a closed economy is described by the figure below.



Suppose that in period, household consumption (C) is 4,000, and they save (S) 2,500. The firms invest (I) 2,000, and government spends (G) 1,500.

A) Find the values for the rest (T and Y), include the question mark. What market is the box, and how can we interpret the question mark. Then write out the identity function of the GDP by using the consumption and income approach. (1 point)

Answer: The rectangle represents the financial market. The question mark is public borrowing. Since savings is 2,500 and private investment is 2,000, we know that the government borrows 500. We then can calculate the tax.

$$\begin{aligned} T+? &= G \\ T+500 &= 1,500 \\ \therefore T &= 1,000 \end{aligned}$$

Knowing this, we can use the income approach to determine Y:

$$\begin{aligned} Y &= C+S+T \\ &= 4000+2500+1000 \\ &= 7500 \end{aligned}$$

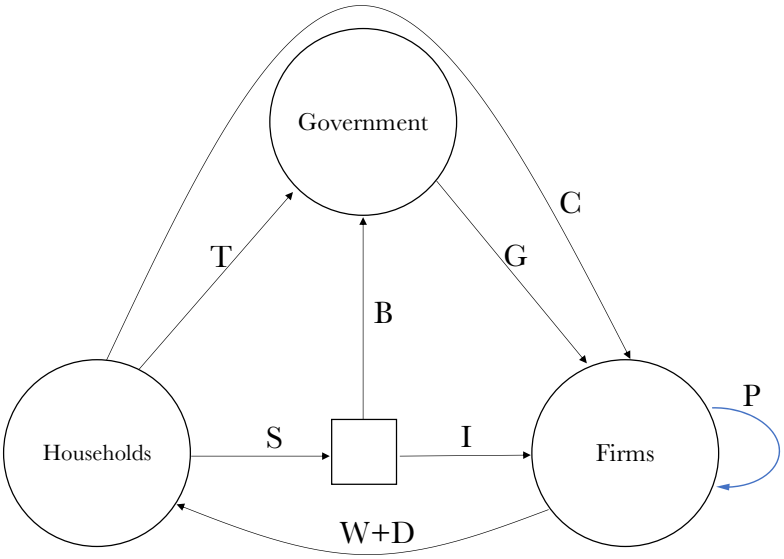
And based on the expenditure approach:

$$\begin{aligned} Y &= C+I+G \\ &= 4000+2000+1500 \\ &= 7500 \end{aligned}$$

Another way to quickly find Y and T is by using the fact that the two approach should equate:

$$\begin{aligned} Y_{inc} &= Y_{Exp} \\ C+S+T &= C+I+G \\ \Rightarrow T &= I+G-S = 2000+1500-2500 = 1000 \\ \text{and } Y &= 7,500 \end{aligned}$$

B) We still consider the same close economy, but now we introduce firms' ability to **immediately** self-finance, designated by P. We also introduce compensation of employees, W, and paid dividends D. Reconfigure the circular flow above (scan them for submission).
We now assume that $C = 4000$, $I = 2000$, $G = 1500$, $W = 4800$, $D = 1800$, $T = 1000$. Estimate the missing elements of the circular flow. What is the GDP?
Write out the same two identity functions for the GDP as before, but using the new variables. What is the aggregate profit in the economy. (2 points)
Tip: Y, household income, is replaced.
Answer:



Based on the expenditure approach:

$$\begin{aligned} Y &= C+I+G \\ &= 4000+2000+1500 \\ \therefore Y &= 7500 \end{aligned}$$

We know that based on the income approach, we have wages and profits (no rent in this model). Aggregate profits are $D+P$. The income approach is:

$$\begin{aligned} Y &= W+(D+P) \\ 7500 &= 4800+1800+P \\ \therefore P &= 900 \end{aligned}$$

Therefore the aggregate profit $= D+P = 1800+900 = 2700$.

Next, we estimate the rest of the missing elements. Household income and expenditure is given by

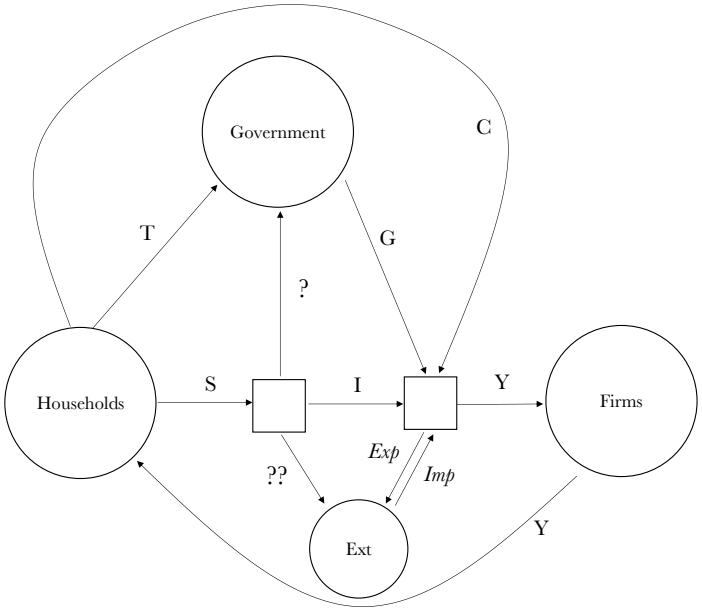
$$\begin{aligned} W + D &= C + S + T \\ 4800 + 1800 &= 4000 + S + 1000 \\ \Rightarrow S &= 1600 \end{aligned}$$

Let B stands for government borrowing/lending. We know that out of $I = 2000$, the firms use $P = 900$ from its own profit. Then, for the financial market:

$$\begin{aligned} S &= B + (I - P) \\ 1600 &= B + (2000 - 900) \\ \therefore B &= 500 \end{aligned}$$

That is, the government is running a budget deficit of 500, financed by domestic borrowing.

C) Now, we consider an open economy characterised by the circular flow below.



We know that $Y = 8100, C = 4000, I = 2000, G = 1500, T = 1000, Exp = 1500$. Determine the values of the other aggregates. What are the budget balance, the trade balance, aggregate savings? Interpret these results. Is such a situation sustainable? Is it condemnable? (2 points)

Answer: The single question mark represents public borrowing/lending – just as before. The double question mark signifies net capital outflow to the rest of the world. Based on the expenditure approach we have:

$$\begin{aligned} Y &= C + I + G + (Exp - Imp) \\ 8100 &= 4000 + 1000 + 1500 + (1500 - Imp) \\ \therefore Imp &= 900 \end{aligned}$$

We thus know immediately that the trade balance is $Exp - Imp = 1500 - 900 = 600$. The budget deficit is $G - T = 1500 - 1000 = 500$ and this is entirely financed through domestic borrowing. Aggregate savings is

given by:

$$\begin{aligned} Y &= C + S + T \\ \therefore S &= Y - C - T = 3100 \end{aligned}$$

Since private borrowing in the form of investment is 2000, we have:

$$\begin{aligned} S &= I{+}?{+}?? \\ 3100 &= 2000 + 500{+}?? \\ \Rightarrow ?? &= 600 \end{aligned}$$

Therefore, we are an outflow of 600 to the rest of the world. This situation is quite peculiar. We have a setting in which aggregate savings is much larger than private investment and the budget deficit. The leftover savings has thus translated into foreign outflow, while it could be translated into higher production and employment at home – perhaps a more equitable overall outcome.
In this case, we therefore implicitly have a deterioration in the budget balance, while on the other hand either the external debt is reducing or we are a creditor to the rest of the world. This situation may be excusable if the economy is running a high external debt, and the foreign outflow is due to debt repayment.

Problem III: The CPI and The GDP Deflator (6 points)

1. The nominal GDP per capita of Thailand in 2000 and 2018 are 80,534 baht and 235,010 baht respectively. Given that the GDP deflator = 100 only in 2010, and equals to 73.49 and 116.59 in 2000 and 2018 respectively, calculate the real GDP per capita of Thailand in the year 2000 and 2018. What is the base year? What is the cumulative price increase between 2000 and 2018? between 2010 and 2018? (2 points)

   Answer: The base year is 2010. Let y_t denotes the real GDP per capita. We have:

$$\begin{aligned} y_{2000} &= \frac{80534}{(73.49/100)} = 109,585 \text{ constant 2010 Baht.} \\ \text{and } y_{2018} &= \frac{235010}{(116.59/100)} = 201,570 \text{ constant 2010 Baht.} \end{aligned}$$

   This means that – net of inflation – GDP per capita has increased 83.94% between 2000 and 2018. This means an average annual growth rate of

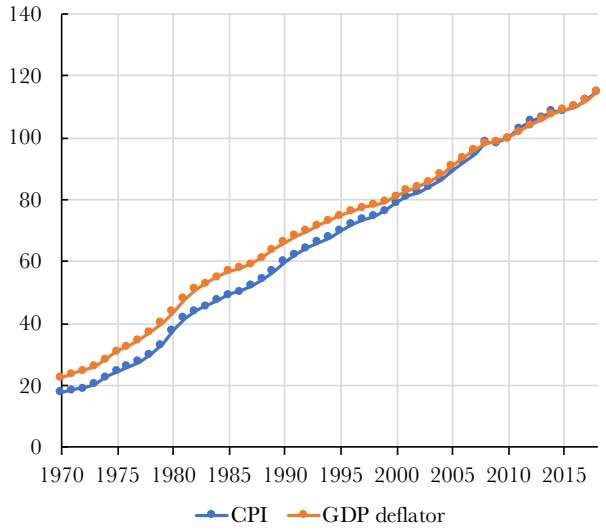
$$\left(\frac{201570}{109585}\right)^{\frac{1}{18}} - 1 = 3.44\% \text{ per year for 18 years}$$

   The cumulative price increases, denoted by π, are:

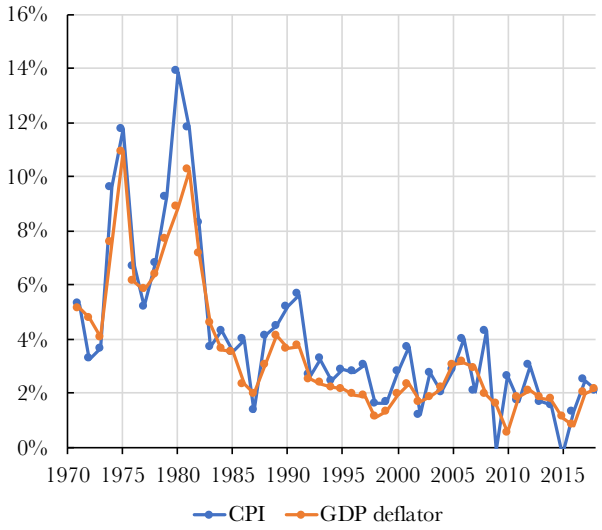
$$\begin{aligned} \pi^{2018}_{2000} &= \frac{116.59 - 73.49}{73.49} = 58.65\% \\ \text{and } \pi^{2018}_{2010} &= \frac{116.59 - 100}{100} = 16.59\% \end{aligned}$$

2. Based on the figure below for the US, the main difference in the evolution of the series for the CPI and the GDP deflator takes place in 1974-75 and 1979-1982.

(a) Values of CPI and GDP deflator



(b) Inflation calculated based on CPI and GDP deflator



Source: Lecturer's calculation based on world bank data.

   What could explain this pattern? (2 point)

   Hint: think about the likely impact of an oil crisis on the price of imported goods and, in particular, on your own transport and fuel bills.

   Answer: First thing to note is that CPI is much more volatile that the GDP deflator. This can be explained by the fact that (i) CPI uses the basket of goods which includes imports and their prices; and

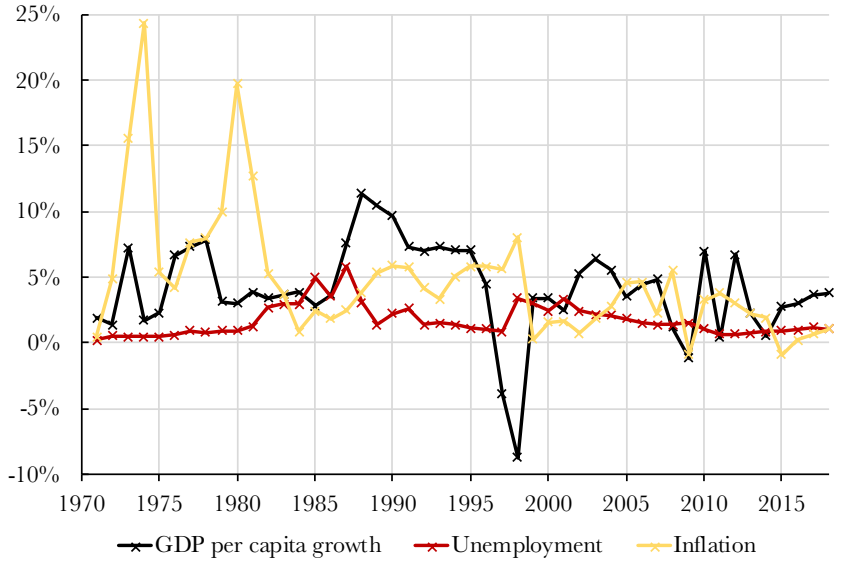
(ii) the way CPI is calculated is based on predetermined (fixed) basket of goods that is determined to be typical of the consumers. Meanwhile, the GDP deflator allows for basket of goods to change, since it captures *all* goods and services produced in the economy in each year, and it also excludes imports (while including exports).

In terms of trends, we can observe two things. One is that inflation seems to be manageable and decreasing since the 1990s. The second is that we observe two specific peaks in the periods mentioned. In the second half of the 20th century after the WWII, there were four economic recessions (downturns) and two energy price crises.

The first peak coincides with the 1973-1975 recession in the US economy – marked by an unprecedented oil price crisis. This was caused by an Arab oil embargo that started in October 1973. The inflation remained high, and another oil price crisis in 1979 was brought upon by the Iranian revolution.

3. Write a short summary on the evolution of inflation, unemployment, and the real GDP per capita growth rate over the same period based on the figure below. (2 points)

Figure 2: Real GDP per capita growth rate, unemployment, and inflation in Thailand, 1970-2018



Answer: Potential talking points:

- Economic growth was exceptionally high between 1985-1996 – until the 1997 Asian Financial Crisis (AFC). Afterwards, the Thai economy seems to have settled down with lower average overall growth rate.
- Unemployment in Thailand has been exceptionally low, based on the internationally recognised definition. You can use the knowledge from the mandatory readings and the first short essays.
- In terms of inflation, we see two large spikes (just like in the US) during the oil price crises. Economists, Thais and foreigns alike, consider this period between 1974-1985 as a period of uncertainty in the Thai economy (politically, we had the 14 Oct '73 and 6 Oct '76 events).
- The Thai economy was not that affected by the first oil shock (look at GDP per cap growth), while the second oil crisis seems to hit hard.
- Positive correlation between economic growth and unemployment