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EC106 Macroeconomics
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Problem Set 1 Solutions

(1) What macroeconomic issues have been in the news lately? List three for the UK, two for other European countries, two for America and two for other countries.
Answer: Look at any of the media resources mentioned in the module handbook.

(2) Are the following variables stock or flow variables?
Income, GDP, money supply, the money in your wallet, the money in your bank account, unemployed people, the number of people losing jobs, consumption, wealth, Microsoft stocks, government debt, investment, government expenditure, exports, the Bank of England's gold reserves, the government's budget deficit.
Answer: Stock: Money supply, the money in your wallet, the money in your bank account, unemployed people, wealth, Microsoft stocks, government debt, the Bank of England's gold reserves; flow: Income, GDP, the number of people losing jobs, consumption, investment, government expenditure, exports, the government's budget deficit.

(3) Consider the national income accounts identity

$$Y = C + I + G + NX \tag{1}$$

In addition, define net exports as the difference between exports and imports

$$NX = X - M \tag{2}$$

(a) The economy had a zero trade balance in 2009 but a deficit equal to 3% of GDP in 2010. GDP grew by 3% between the two years. Show that domestic demand (i.e. $C + I + G$) grew by 6% (to a close approximation). What is the exact number?
Answer: The exact growth rate is 6.09%.
(b) Consumers' expenditure was equal to 65% of GDP in 2009 and grew by 2% between 2009 and 2010. Government expenditure was equal to 20% of GDP in 2009 and grew by 1.5%. What was the growth rate of investment?
Answer: Investment grew by 29.933%.
(c) Why do imports have a negative sign in the GDP identity when you combine equations (1) and (2)?
[Note: These are all fictitious numbers. They are not UK data.]
Answer: Imports are not produced by the domestic economy and thus do not generate income. They are rather like a liability.

(4) Show that the Cobb-Douglas production function discussed in the lecture

$$Y = AK^{\alpha}L^{1-\alpha}$$

exhibits constant returns to scale.
Answer: As in the lecture notes, multiply the left-hand and the right-hand sides by a positive constant z and verify that the equality still holds. Don't forget to give this result an economic interpretation. Contrast it with decreasing and increasing returns to scale.

(5) Consider an economy described by the following equations

$$\begin{aligned} Y &= C + I + G \\ Y &= 5,000 \\ G &= 1,000 \\ T &= 1,000 \\ C &= 250 + 0.75(Y - T) \\ I &= 1,000 - 50r \end{aligned}$$

(a) In this economy, compute private saving, public saving and national saving (see Mankiw, chapter 3.4).
Answer: Private saving ($= Y - T - C$) is 750. Public saving ($= T - G$) is zero. National saving is therefore 750.
(b) Find the equilibrium interest rate.
Answer: $r = 5$
(c) Now suppose that G rises by 25%. Compute private saving, public saving and national saving.
Answer: Private saving does not change. Public saving is now -250. National saving is therefore 500.
(d) Find the new equilibrium interest rate.
Answer: $r = 10$. Give this an economic interpretation. Why did the interest rate go up?

(6) Comparative statics: Based on the material discussed in the lecture and the final pages in chapter 3 of the Mankiw textbook, show graphically the effect on the interest rate r of
(a) a decrease in taxes $\overline{T}$,
Answer: A decrease in taxes raises disposable income and thus consumption. As Y and G are fixed exogenously, the increase in C must be compensated by a fall in investment I. For investment to fall, the interest rate r must rise. Hence, a reduction in taxes, like an increase in government purchases, crowds out investment and raises the interest rate.
(b) an increase in the demand for investment.
Answer: An increase in the demand for investment can be modelled as an increase in the intercept of the investment equation given in question (5), i.e. a rightward shift in the investment schedule. As saving is not affected by the increase in the demand for investment (vertical saving supply curve, i.e. fixed amount of saving), the

increase in investment demand raises the interest rate r while leaving the equilibrium amount of investment unchanged.

(7) [This is food for thought. You don't have to answer this question.]
In a speech that Senator Robert Kennedy gave when he was running for president in 1968, he said the following about GDP:
"[It] does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our courage, nor our wisdom, nor our devotion to our country. It measures everything, in short, except that which makes life worthwhile, and it can tell us everything about America except why we are proud that we are Americans."
Was Robert Kennedy right? If so, why do we care about GDP?
What does David Cameron mean by "GWB - general well-being"? Do you agree?
Answer: Look at the lecture notes. Think about Amartya Sen's counterexample. Does it imply that politicians should no longer focus on GDP?