Economics Honors Exam 2009 Solutions: Macroeconomics, Questions 6-7

Question 6 (Macroeconomics, 30 points). Please answer each question below. You will be graded on the quality of your explanation.

a. **(6 points) True/False/Uncertain.** Long run equilibrium of the good market determines the real interest rate, that of the money market determines the price level. Explain.

Answer:
TRUE - In a closed economy in the long run (where factors of productions are fully employed and inflation expectations are constant), we can represent the goods and money markets in the following way:

$$\overline{Y} = F(\overline{K}, \overline{L}) = C(\overline{Y}, T) + I(r) + G$$

$$L(\overline{Y}, r + \pi^e) = \frac{M^S}{P}$$

Therefore, the goods market pins down r, and the second market pins down P. This also implies that prices will move one to one with money supply, which is the standard result of long-run neutrality of money.

Points:
1 point for noting the statement is "true".
2 points for showing that goods market pins down r.
2 points for showing that money market determines P.
1 point for a well-illustrated answer.
Partial credit at the grader's own judgement.

b. **(6 points)** What clears the good market in an open economy?

Answer:
We can write the good market's equilibrium in a small open economy as:

$$\overline{Y} = C + G + I(r^*) + NX(\epsilon)$$

Here the interest rate is pinned down by the international one, so now the goods market will need NX (net exports) to adjust in order for the market to clear. In turn, this requires the real exchange rate ϵ to adjust.

Points:
3 points for noting that NX and ϵ adjust to clear goods market in SOE.
3 points for a well-illustrated answer.
Partial credit at the grader's own judgement.

c. **(6 points) True/False/Uncertain.** The AK growth model predicts club convergence in per capita GDP across countries. Explain.

Answer:
FALSE. The AK model can be represented by the following equation for capital accumulation:

$$\frac{\dot{k}}{k} = sA - \delta - n$$

where s is the savings rate, δ is depreciation rate and n is population growth. k is capital per capita. Note that $\frac{\dot{y}}{y} = \frac{\dot{k}}{k}$. This equation says that as long as for a country $sA > \delta + n$, capital and output per capita are going to keep growing forever at the rate $sA - \delta - n$. The model predicts divergence: two identical countries that start out at different levels of capital will never converge to the same level, so there can't be club convergence in this model.

Points:
1 point for noting the statement is "false".
1 point for noting that the model actually predicts divergence.
4 points for a well-illustrated answer, while usage of equations is a big plus.
Partial credit at the grader's own judgement.

d. **(6 points) True/False/Uncertain.** Trade liberalization and deunionization explain the recent upsurge in wage inequality. Explain.

Answer:
UNCERTAIN. Unionization: this is a possible explanation for the increase in wage inequality: as stronger unions raise the wage of low-skilled workers, they lead to wage compression. Therefore, de-unionization should contribute to a reduction in the compression, and as a consequence to an increase in wage inequality. However, the theory does not fit the data well: in the UK wage inequality started to rise in the mid 1970s, while union density was increasing until 1980. In the US instead deunionization began in the 50s but wage inequality didn't rise until much later.

Trade liberalization: this also could work as an explanation for the increase in wage inequality. A globalization boom should drive up the demand for skilled labor in the developed countries, where skilled labor is cheap relative to developing countries, and it should drive down the relative demand for unskilled labor, which is relatively expensive in developed countries. However, Krugman shows that trade with non-OECD countries is only 2% of GDP, too little to be the driving force behind wage inequality. Second, this explanation would imply a fall in prices of less skill-intensive goods relative to prices of more skill-intensive goods in developed countries, but empirical studies find little evidence of this in either the United States or Europe during the 1980s. A third implication of the trade explanation is that labor should be reallocated from low-skill to high-skill industries, or from those sectors in developed countries that are most exposed to international competition to the other sectors, and this is also contradicted by the data.

Points:

1 point for noting the statement is "uncertain".

5 points for a well-illustrated answer, while correct citation of empirical data and observations is a big plus.

Partial credit at the grader's own judgement.

e. **(6 points)** How can one escape the Malthusian trap?

Answer:

The Malthusian trap happens because production is constrained by the limited availability of land, a central element in the agricultural production function. A country can escape the Malthusian trap if it shifts towards a technology which doesn't require land, but just capital and labor, which can both grow over time. In particular, suppose both technologies are available. When the amount of L is low enough and the productivity of manufacturing A is low, it is more efficient to use the technology that exploits the available land. However, as A and L grow, it becomes convenient for entrepreneurs to switch to the manufacturing technology, and this way the country can free itself from the land constraint. Another way to escape the trap is to have the fertility function $n(y)$ decline over time, so that the endogenous population growth will be eating away less and less of the increase in income.

Points:

1 point for correctly defining the Malthusian trap.

3 points for a well-illustrated first way to escape the trap.

2 points for the second way to escape the trap.
Partial credit at the grader's own judgement.

Question 7 (Macroeconomics, 30 points). True/False/Uncertain.

Please answer each question below. You will be graded on the quality of your explanation.

a. **(7.5 points)** In general, corporate investment and real interest rates move together.

Answer:
Uncertain. All else equal, a higher real interest rate means that fewer projects have a positive net present value, so corporate investment would decline. However, the (low-risk government) real interest rate is endogenous to the business cycle. In the US and other developed countries, the monetary authority maintains with some success a pro-cyclical real interest rate (though in economic upturns, the real interest rate faced by corporations may be counter-cyclical). Thus, at times when the real interest rate is high, productivity also tends to be high (increasing demand for investment) and credit tends to be freer. Overall, the real interest rate on government debt is positively correlated with investment (though the correlation is negative in less-developed countries).

Points:
1.5 points for noting that the statement is "uncertain".
2 points for noting the negative relationship between r and corporate investment.
2 points for noting that r is endogenous to the business cycle.
2 points for a well-illustrated answer.
Partial credit at the grader's own judgement.

b. **(7.5 points)** If nominal wages are sticky, then a high inflation rate tends to be associated with low real wages.

Answer:
Uncertain. Once the inflation rate has risen, wage adjustments may occur either more frequently as the costs of not-adjusting may be higher, or the adjustments may be larger in magnitude when they occur. These effects may be tempered by strategic complementarity (e.g. when others have sticky wages stuck at "low" levels, firms may not want to raise wages too much). The overall relationship between inflation and real wages depends on the specifics of the assumed setup.

Points:

1.5 points for noting that the statement is "uncertain".

2 points for noting that higher inflation rate may cause wage adjustment to occur more frequently or be larger in magnitude.

2 points for noting that this may be tempered by strategic complementarity.

2 points for a well-illustrated answer.

Partial credit at the grader's own judgement.

c. **(7.5 points)** Raising government expenditure raises GDP at least dollar for dollar.

Answer:

Uncertain. Each unit of goods and services demanded by the Government directly increases GDP one unit. In turn, consumer demand, which is typically considered an increasing function of GDP (i.e. positive marginal propensity to consume) increases boosting GDP further. This is referred to as the government spending multiplier. However, government spending may push the interest rate up and thereby lowers investment spending in a closed economy (crowding out); or it may result in an appreciation of the home currency, thereby lowers net exports. Therefore, the net effect of an expansion in government expenditure on GDP is ambiguous. An extreme case would be a vertical LM curve in the IS-LM model (or simply the Mundell-Fleming model, where LM* is always vertical), then an outward shift in IS (or IS* in Mundell-Fleming) caused by a rise in G does not have an effect on equilibrium output.

Points:

1.5 points for noting that the statement is "uncertain".

2 points for noting the multiplier effect.

2 points for noting the crowding out effects.

2 points for a well-illustrated answer.

Partial credit at the grader's own judgement.

d. **(7.5 points)** Households spend some constant fraction of their paycheck and save the rest.

Answer:

False. There are several reasons to believe that households do not spend a constant fraction of their paycheck. One is the fact that the aggregate consumer savings rate has varied greatly over time. Another is that consumers may have a desire to

consumption smooth following the permanent income hypothesis; increasing savings in boom times when they have a low marginal utility of consumption and dissaving in bust times when they have higher marginal utility of consumption. Many also face large consumption commitments such as mortgage, car loan, or tuition payments and have limited ability to shift consumption when income rises or falls. Also, some consumers are liquidity constrained; essentially saving as little as possible. When it becomes more difficult to borrow, as it has recently, consumer savings tend to rise.

Points:

1.5 points for noting that the statement is "false".

6 points for a well-illustrated answer. The more valid arguments are provided, the better.

Partial credit at the grader's own judgement.