

FACULTY OF ECONOMICS STUDY AIDS 2018

ECT1 Paper 2 Macroeconomics

The Faculty Board has agreed to release outline solutions to the 2018 examinations as a study aid for exam revision. They are abridged solutions, and not 'definitive', and should therefore not be considered as an exemplar for 'complete' answers.

Also note that the Faculty will not respond to any queries regarding these solutions.

SECTION A

1. Explain why periods of war are associated with high long run real interest rates.

ANSWER:

Students should use a graph to explain their answer, of the loanable funds market. During wars, increased government spending for the military reduces public saving (curve in loanable funds market shifts left). This results in higher equilibrium real interest rates and a crowding out of investment.

2. Define the two main measures of the price level in an economy, namely the GDP deflator and the Consumer Price Index. What are the main differences between the two measures? Which of the two is a better measure of the cost of living in an economy?

ANSWER:

GDP defl = Nom GDP / Real GDP.

CPI = weighted average of the prices of a selected basket of typical consumption goods

Deflator contains all prices of domestically produced goods, while CPI only some. It changes over time (weights change), but CPI basket does not (fixed weights). CPI takes into account imported goods, while deflator does not.

In economies that are open and rely heavily on imports, CPI is more appropriate for measuring cost of living. But generally it is not clear whether one is better than the other. Also mostly the two indices do not differ much.

3. The natural rate of unemployment in the UK dropped from around 11% in the early 1980s to 5% by 2005.
 - (a) Assuming that the separation rate during this period has been the same, at a level of 1%, calculate the change in the finding rate that generates this drop in the unemployment rate.
 - (b) Provide one possible explanation for why the finding rate in the UK during this period changed.

ANSWER:

- (a) In early 80s, the unemployment rate was $u = 0.11$ and $s = 0.01$

$$u = \frac{s}{s + f} \implies 0.11 = \frac{0.01}{0.01 + f} \implies f = 0.08$$

and in 2005 $u = 0.05$

$$0.05 = \frac{0.01}{0.01 + f} \implies f = 0.19$$

Therefore the finding rate almost doubled from 8% to 19%.

- (b) This may have been due to a variety of reasons (one only is required by the students): less sectoral shifts, decline in union membership, changes in unemployment benefit system, improved policies for job matching, etc.

4. Describe *two* policy measures that may be expected to increase aggregate output in an economy, while the nominal interest rate is constrained at the zero lower bound.

ANSWER:

Examples include fiscal policy, [higher inflation target, QE, forward guidance] – latter group being ‘some means to increase inflation expectations’.

5. Explain how each of the following affects the size of the equilibrium fiscal multiplier:

- (a) The investment decisions of firms depend on the level of output.
- (b) There is increased uncertainty about macroeconomic policy management.

ANSWER:

- (a) Raises multiplier in Keynesian Cross, passed on to IS-MP and AS-AD. Should be straightforward.
- (b) Harder: would imply steeper SRAS in Lucas supply model, mentioned in lectures. For stronger students to spot.

6. Explain what is meant by the ‘Balassa-Samuelson effect’.

ANSWER:

Straightforward: higher price of non-tradeables in richer economies, implying higher real exchange rate.

SECTION B

7. The Central Bank of Nilland reports that current money supply in the economy is 120 billion Nil Dollars. The Central Bank requires a 20% reserve-deposit ratio from all commercial banks and estimates that the currency deposit ratio is approximately 0.5%. Suppose that the Central Bank considers implementing a policy that will double the money supply, by increasing the monetary base.
- (a) If they implemented the policy, by how many Nil Dollars would the Central Bank increase the monetary base? Explain your answer carefully.
 - (b) What is the long run impact of this proposed change in the money supply on prices and the inflation rate of Nilland?
 - (c) Why does the Central Bank not have an exact figure for the currency deposit ratio? How important is it for the Central Bank to have a good estimate of the currency deposit ratio?

ANSWER:

- (a) The approximate money multiplier is

$$m = \frac{cr + 1}{cr + rr} = \frac{1.005}{0.205} = 4.902$$

Then, we need that

$$\Delta M = M_2 - M_1 = 2M_1 - M_1 = 120 \text{ billion}$$

thus

$$\begin{aligned}\Delta M &= m\Delta B \\ 120 &= 4.902 * \Delta B \\ \Delta B &= \frac{120}{4.902} = 24.480\end{aligned}$$

Therefore they would have to increase the monetary base by 24.480 billion Nil Dollars. *Students are expected to lay down the model details carefully, i.e. define the variables and do the derivations that lead to the money multiplier expression.*

- (b) Doubling the money supply (other things equal) will imply a doubling of the price level in the long run, i.e. an inflation rate of 100%! Some students may comment here about whether this is a reasonable policy or not.
- (c) They don't know the exact figure because they do not control it directly. This ratio (cr) depends on individuals' and households' preferences of how much cash to hold relative to their total wealth and cannot be known exactly (there are also the black economy considerations, which can be sizeable). It is important to have a relatively precise estimate of it; but students should note that if it is known that cr is a relatively small number, precision matters less, since its effect on the multiplier

is very small. For example, consider a case where the bank estimates $cr = 0.5\%$ while in reality it is twice as much, i.e. $cr = 1\%$. Then the actual multiplier is

$$m = \frac{cr + 1}{cr + rr} = \frac{1.01}{0.21} = 4.809$$

implying

$$\Delta B = \frac{120}{4.809} = 24.950$$

which translates to having to issue 470 million Nil dollars more than what the original calculation shows. This is not very large in comparison to the actual size of this economy. If however their estimate is much higher than the actual one, e.g. because illegal cash is held out of deposits, then this has more substantial implications. Good students may point out that the actual policy itself (of doubling the money supply) may eventually have a long run impact on the currency deposit ratio.

Notes for marking: good/correct answers to (a)-(b) should secure a solid 2.i. Additional insightful answers to (c) will secure a mark above 70-75.

8. Consider an economy described by the Solow growth model: The production function is

$$Y = F(K, L) = \bar{A}K^\alpha L^{1-\alpha},$$

where \bar{A} is the productivity parameter, Y is total output, K is capital stock and L is the population which is equal to the labour force. The saving rate is s and the depreciation rate is δ . Neither technology nor population grow over time. Suppose that the economy is initially at its steady state.

For each of the two situations below, explain with the help of the Solow diagram, how the economy behaves over time. Comment on the evolution of both capital and output per capita (k and y respectively), as well as the levels of capital and output in the economy.

- (a) Severe weather conditions cause major damage to the country's transport infrastructure.
- (b) A influenza epidemic results in many deaths and poor health of the general population.

ANSWER:

- (a) This has an effect on both the capital stock (drops on impact since the bad weather destroys roads, railroads, etc.) and productivity (also drops because commuting of workers becomes harder, also transporting capital goods becomes harder, etc.). The effect on capital stock is small and temporary (there is no mention here of direct damage to factories/production units), and as the economy evolves, overall capital will build up again endogenously until it reaches a steady state. However the change in productivity may be very prolonged if no direct intervention is taken to repair the transport infrastructure, or no improvements do not take

place. In that case, capital per worker will converge to a new lower steady state. The level and per worker capital will initially drop, and will then move towards a new steady state which is below the original one (since productivity \bar{A} has fallen). Whether it will be increasing or decreasing towards the steady state will depend on how large the initial drop in capital is. Students may note that if there is an effort to repair the transport infrastructure, the economy may eventually return to its original steady state.

- (b) Many deaths result in a lower population (i.e. number of workers) and the poor health lowers productivity. If only \bar{L} drops permanently, then K^* and Y^* reduce to a lower level, but capital and output per worker increase on impact and return to the original steady states. If additionally \bar{A} goes down, steady state capital and output per worker will eventually decrease to a lower steady state and the total long run capital and output will fall by a lot.
9. Aggregate expenditure in a closed economy with no government is characterised by the following relationships:

$$\begin{aligned} C &= \theta + \phi Y + \varepsilon \\ I &= \alpha - \beta r \end{aligned}$$

where C is consumption, I is investment, Y is aggregate income, α , β , θ and ϕ are positive parameters with $\phi < 1$, and ε is a mean-zero permanent random shock to aggregate consumption.

The real interest rate r is chosen by the central bank according to the rule:

$$r = \bar{r} + \mu (\pi - \pi^T)$$

where π is the inflation rate, $\mu > 0$ is a parameter, π^T is a target inflation rate, and \bar{r} is the central bank's assessment of the natural real interest rate. Aggregate supply is described by:

$$\pi = \pi_{-1} + v (Y - \bar{Y})$$

where π_{-1} is lagged inflation, \bar{Y} is a measure of potential output, and $v > 0$ is a parameter.

- (a) Suppose first that \bar{r} is defined as the interest rate that would equilibrate savings with investment in the absence of both price rigidities and shocks.
- Express \bar{r} as a function of the model's parameters and \bar{Y} .
 - Solve for the output gap $(Y - \bar{Y})$ and inflation rate π in terms of the consumption shock ε in both the *short* run (assuming that $\pi_{-1} = \pi^T$) and the *long* run.
- (b) Now suppose that, after observing the consumption shock, the central bank has the freedom to change its policy rule. How, if at all, would

you recommend that the policy rule should be changed? Discuss the implications of your answer for the overall macroeconomic significance of aggregate demand shocks.

ANSWER:

(a) We have

i. Solving out gives:

$$\bar{r} = \frac{\bar{C} + \alpha - (1 - \phi)\bar{Y}}{\beta}$$

ii. Short run: Using value for \bar{r} above:

$$\begin{aligned} (Y - \bar{Y}) &= \frac{1}{1 - \phi + \beta\mu v} \varepsilon \\ \pi &= \pi^T + \frac{v}{1 - \phi + \beta\mu v} \varepsilon \end{aligned}$$

Long run: In this case $Y = \bar{Y}$ by definition, and:

$$\pi = \pi^T + \frac{\varepsilon}{\beta\mu}$$

(b) The outcome in (a)(ii) (long run) implies inflation that is permanently above target. This happens because the ‘neutral’ real interest rate has not been adjusted to account for the higher level of consumption, and hence lower equilibrium level of savings in the flex-price economy. This could be corrected by increasing \bar{r} by an amount $\frac{\varepsilon}{\beta}$. But if this was done on impact, then the policy would not have any impact on the aggregate economy! Thus AD shocks can be viewed as only having significant effects on macroeconomic variables to the extent that the policy response to them is delayed.

10. How desirable is it for countries that are pegging their exchange rates to restrict the cross-border flow of capital, goods and services?

ANSWER:

Plenty to discuss, based on Lecture 16 in the course. Capital controls can help an economy to achieve more effective AD management, but only if the exchange rate is set at a sufficiently depreciated level to avoid the need for capital inflows (i.e., the current account must be in surplus). Countries with overvalued exchange rates still need to fund their CA deficits, and controls + official flows do not help to this end. Trade restrictions could allow deficit countries to move closer to trade balance, but only under the (unlikely?) assumption of no retaliation. Important ‘microeconomic’ costs due to resource misallocation would be important to bring in.

END OF PAPER