FACULTY OF ECONOMICS STUDY AIDS 2021

ECT1 Paper 2 Macroeconomics

The Faculty Board has agreed to release outline solutions to the 2021 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.

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

UNIVERSITY OF CAMBRIDGE

ECT1
ECONOMICS TRIPOS PART I

XXXXXX 2021 X:00-XX:00

Paper 2

MACROECONOMICS *** ANSWERS ***

Answer **ALL SIX** questions from Section A and **TWO** questions from Section B.
Section A and B will each carry 50% of the total marks for this paper.
Each question within each section will carry equal weight.

Write your **candidate number** (not your name) on the cover of each booklet.

Candidates are asked to note that there may be a reduction in marks for scripts with illegible handwriting.

If you identify an error in this paper, please alert the **Invigilator**, who will notify the **Examiner**. A **general** announcement will be made if the error is validated.

STATIONERY REQUIREMENTS
20 Page booklet x 1
Rough work pads
Tags

SPECIAL REQUIREMENTS TO BE SUPPLIED FOR THIS EXAMINATION
Calculator - students are permitted to bring an approved calculator

You may not start to read the questions printed on the subsequent pages of this question paper until instructed that you may do so by the Invigilator

SECTION A

1. What is Okun's law? Is it related to cyclical or the long run (natural rate of) unemployment? Expain.

   ANSWER: *Okun's law describes the negative correlation between a % change in output and a % change in unemployment. The approximate relationship is that a 2% increase in output is associated with 1% decline in cyclical unemployment. This depends on the country. The law is related to the cyclical unemployment.*

2. Suppose that the central bank requires commercial banks to hold one tenth of customers' deposits as reserves. It is also estimated that the currency deposit ratio is 0.2%.

   (a) Calculate the money multiplier.
   (b) What will happen to the money multiplier if individuals decide to keep more cash at home instead of depositing it into their bank accounts? Explain.

   ANSWER: *The money multiplier is:*

   $$m = \frac{cr + 1}{cr + rr} = \frac{0.002 + 1}{0.002 + 0.1} = 9.8235$$

   If cr increases then there is less money in circulation and the multiplier decreases.

3. Can the following be negative? If yes, under what circumstances? If no, explain why.

   (a) Nominal interest rate;
   (b) real interest rate;
   (c) inflation rate.

   ANSWER: *Nominal interest are generally not negative (some ECB rates, and other central bank rates e.g. Denmark and Switzerland can be negative, but so long as economies use cash, it is difficul to go very negative). Real interest rates can be negative if nominal rates are low and inflation higher than the nominal rates. This is not compatible with the classical theory though, since* $r = MPK > 0$ *(assuming zero depreciation). Inflation can be negative, if prices are falling (= deflation)*

4. In the context of the AS-AD model, illustrate how the macroeconomic response to a cost-push shock would differ under rational expectations, relative

to adaptive expectations.

ANSWER: *Rational expectations imply that expected inflation is given by the value at which LRAS intersects AD. Response to a cost-push shock is faster relative to adaptive – where inflation expectations are increased by the shock, only falling back gradually. Students should draw AS-AD model and explain differences in long-run adjustment for first-class marks.*

5. In a model of global trade with perfectly flexible prices, explain whether you would typically expect to see current account deficits in richer or poorer countries.

ANSWER: *Poorer countries might be expected to exhibit higher returns to capital, and so attract capital inflows – implying a current account deficit.*

6. By reference to the IS-MP model, explain what is meant by 'secular stagnation', and why it might imply that a higher inflation target is desirable.

ANSWER: *Secular trends in components of aggregate expenditure give rise to a lower long-term real interest rate. This implies the ZLB is more likely to bind in IS-MP, even absent shocks. A higher inflation target could help, if it raises inflation expectations – and thus slackens the ZLB constraint.*

SECTION B

7. Consider the following model of economic growth. Generating output requires only one input, namely capital K. The production function is given by $Y = AK$, where A is a constant productivity parameter describing the amount of output produced for each unit of capital used in production. In each period, a fraction s of aggregate output is saved and a fraction of δ of aggregate capital is lost due to depreciation. There is neither population growth, nor technological progress in this economy.

   (a) Is the production function neoclassical? Explain.
   (b) Write the equations of motion for both aggregate capital K and for capital per capita $k \equiv K/L$ and explain carefully what they describe.
   (c) Does this economy have a steady state? If yes, derive steady state expressions for capital and output per capita as functions of the model parameters A, s and δ. If not, show why mathematically or graphically.
   (d) Explain under what conditions this economy will grow perpetually. What is the 'engine of growth' in this case?
   (e) How do the predictions of this model compare to those of the standard Solow growth model with neither population growth nor technological progress?

   ANSWER:
   (a) *No. The function has constant returns to scale but not diminishing marginal returns.*
   (b) $\Delta K = sAK - \delta K$ and $\Delta k = sAk - \delta k$
   (c) *Solving* $\Delta k = 0$ *yields one solution only, i.e.* $k^* = 0$ *which is the trivial solution that always exists. This is not a meaningful steady state in the economic sense. So, the answer is that there is no steady state.*
   A careful good answer should distinguish cases for the parameter values. If for example $sA = \delta$*, then there is a infinite number of steady states, because the two lines of investment and depreciation coincide. In that case, the amount of capital in the long run is indeterminate, because with any initial value of capital* K_0*, investment is just enough to keep up with what is lost due to depreciation and* $K^* = K_0$*. As long as* $sA \neq \delta$*, there is only the trivial solution* $k^* = 0$*.*
   (d) *If* $sA > \delta$ *the economy will grow perpetually. If* $sA < \delta$ *then the economy shrinks to zero. The engine of growth is therefore investment.*
   (e) *This is the AK model which a very simple model of endogenous growth. The fact that returns to capital are not diminishing implies perpetual growth without the need of exogenous technological progress.*

   Marking notes: Correct answers with little explanation of insights should achieve scores around 60-65/100. To obtain more than 70/100 answers

should discuss the special parameter case $sA = \delta$, the assumptions of the model and the interpretation of the variable capital K which here should not be thought of in the narrow way of physical capital (machines, factories, etc.) but perhaps as including human capital, knowlegde, intangible/technology capital, etc.

8. Discuss the role that the housing and mortgage markets in the US and UK played for the financial crisis and the Great Recession in 2008-09. Do you think similar mechanisms are present during the current recession caused by the COVID-19 pandemic? Explain your answer.

ANSWER: *This is an essay in two parts. The first part (2008-09) is straightforward and students should write up an essay going over the key points from Lecture 16 from Michaelmas. The second part is more open-ended and a lot of possible answers would be interesting. Primarily the students should highlight that the two recessions are quite different but more subtle answers could include a view that with very low interest rates and reduced consumption of the wealthy, it's possible to have an increased demand for housing as an investment and perhaps a new housing bubble forming. Others may point out that as many people lose jobs, more defaults on mortgage payments are likely, but also explaining that there are many more (fiscal) policies in place now (compared to 2008-09) to prevent such defaults, e.g. furlough scheme.*

Marking notes: Essays that cover the first part well but do not contribute much to the second part will score around 65/100. Those who do a good job in the second part as well will get marks over 70/100.

9. The UK government is considering the following alternative macroeconomic policy options for raising output and employment in the wake of the COVID-19 pandemic:

(a) a direct income transfer to all households;
(b) an increase in infrastructure expenditure;
(c) an expansion of the Bank of England's quantitative easing policy.

Critically assess the likely effects of these policies, both in the short and the long run. Which, if any, would you most recommend in the present circumstances?

ANSWER: *A relatively open-ended essay question. Students should illustrate the effects of all three policies, either in AS-AD or IS-MP/LM. First-class answers should provide formal sketches of the different policies (algebra or diagrams), but then go beyond a generic, textbook description and relate current circumstances to the likelihood that they will be successful. For instance:*

Will an income transfer result in higher current expenditure, or is MPC low at present? Is infrastructure expenditure a good idea at a time when work patterns are changing so considerably? Will QE be successful in raising investment, given uncertainty?

10. Brittania is a small open economy with flexible prices. The quantities of goods that it exports and imports are characterised, in turn, by the following expressions:

$$X(\varepsilon, \theta) = \bar{X} \cdot \theta^{-\gamma} \cdot \varepsilon^{-\frac{\eta}{\theta}}$$

$$M(\varepsilon, \theta) = \bar{M} \cdot \theta^{-\gamma} \cdot \varepsilon^{\frac{\phi}{\theta}}$$

where ε is the real exchange rate, i.e. the price of a basket of domestic goods relative to a basket of foreign goods, and θ is a variable that measures the strength of symmetric trade barriers between Brittania and its neighbours, with higher θ values implying greater barriers to both imports and exports. $\bar{X}$, $\bar{M}$, γ, η and ϕ are all positive parameters.

(a) Provide an economic interpretation of the role played by θ in the expressions for exports and imports.
(b) Write down an expression for the value of Brittania's net exports, and solve for the value of ε that implies balanced trade, in terms of θ and the parameters.
(c) Starting from a position of trade balance, what parameter values would imply that a depreciation increases Brittania's net exports?
(d) Suppose that the government of Brittania takes policy decisions that imply an increase in θ. Explain in detail what impact you would expect this to have on the volatility of Brittania's real exchange rate.

ANSWER:

(a) *Higher trade barriers reduce both imports and exports directly, with the parameter γ controlling the extent of this. They also reduce the sensitivity of trade to the real exchange rate, through the term in the exponent on ε. This could be, for instance, because non-tariff barriers make trade in certain goods impossible, irrespective of price changes.*
(b) *As covered in lectures*

$$\begin{aligned} NX &= X - \frac{1}{\varepsilon} M \\ &= \bar{X} \cdot \theta^{-\gamma} \cdot \varepsilon^{-\frac{\eta}{\theta}} - \bar{M} \cdot \theta^{-\gamma} \cdot \varepsilon^{\frac{\phi}{\theta} - 1} \end{aligned}$$

With balanced trade:

$$\begin{aligned}\bar{M}\cdot\theta^{-\gamma}\cdot\varepsilon^{\frac{\eta}{\theta}-1} &= \bar{X}\cdot\theta^{-\gamma}\cdot\varepsilon^{-\frac{\eta}{\theta}}\\ \varepsilon^{\frac{\eta+\phi}{\theta}-1} &= \frac{\bar{X}}{\bar{M}}\\ \varepsilon &= \left(\frac{\bar{X}}{\bar{M}}\right)^{\frac{\theta}{\eta+\phi-\theta}}\end{aligned}$$

(c) *Taking a derivative in the expression for NX:*

$$\frac{dNX}{d\varepsilon} = -\frac{\eta}{\theta}\frac{X(\varepsilon,\theta)}{\varepsilon} - \left(\frac{\phi}{\theta}-1\right)\frac{M(\varepsilon,\theta)}{\varepsilon}$$

Since, at balanced trade, $X = M > 0$, $\frac{dNX}{d\varepsilon} < 0$ *iff:*

$$\frac{\eta}{\theta}+\frac{\phi}{\theta}-1>0$$

This is a version of the usual Marshall-Lerner condition, with the elasticities augmented by θ*.*

(d) *The earlier results show that net exports are less sensitive to* ε *as* θ *increases. This implies a steeper* $NX(\varepsilon)$ *schedule, which means that* ε *should become more sensitive in response to fluctuations in the components of aggregate demand that drive savings and investment. A good answer here should illustrate this, with reference to the Classical model. A strong answer to part (d) is necessary for first-class marks.*

END OF PAPER