



ECT1
ECONOMICS TRIPOS PART I

Friday 7 June 2019 9:00am – 12:00pm

Paper 2

MACROECONOMICS

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 *Answer all six questions from this Section*

1. How does the job separation rate s and the job finding rate f affect the natural rate of unemployment? Explain what happens to s and f , and consequently to the natural rate of unemployment, in the following cases:
 - (a) Minimum wages in UK increase from £7.83 to £7.93 per hour.
 - (b) The industrial sector shifts from using manual labour to using robots and IT.
2. Consider the Solow model of growth and set $A = 1$ without loss of generality. The production function is $Y = F(K, L) = K^{1/3}L^{2/3}$. Suppose that the savings rate s equals 40%, depreciation δ is 10%, and the population growth rate n is 1%. Is this economy dynamically efficient or inefficient? Explain.
3. Consider two countries in the long-run, Humland and Funland, both of which have real GDP that has been growing on average at the same yearly rate. However, the annual rate at which money grows in Funland is twice as much as the rate of money growth in Humland.
 - (a) Which of the two countries has higher inflation in the long run?
 - (b) Assuming that the law of one price holds, does the Hum dollar appreciate or depreciate against the Fun dollar? And by how much?
4. Using aggregate supply-aggregate demand analysis, explain the short-run and long-run implications of a decision by the central bank to reduce its inflation target.
5. Explain why it is easier to use capital controls to sustain an undervalued rather than an overvalued exchange rate.
6. Using the IS-MP model, analyse the effects of:
 - (a) Increased business uncertainty.
 - (b) A reduction in inflation expectations.

SECTION B *Answer only two questions from this Section*

7. You are given the following data from Eurostat: First, the GDPs at current prices in millions of euros for Ireland, Greece and Finland in 1995 were 52,944.6, 104,662.1, and 102,650.9 respectively. You also know that this measure of GDP for the three countries has been growing at an average rate of about 8.5% (Ireland), 2.7% (Greece) and 3.7% (Finland) per year during the period 1995-2017. Finally, during the same period, prices in the three countries have been growing at an average rate of 2.4% (Ireland), 1.8% (Greece) and 1.4% (Finland) per year.
- (a) What are (approximately) the GDPs at current prices in millions of euros for Ireland, Greece and Finland in 2017?
 - (b) What is approximately the average annual growth rate of real GDP of the three countries, for the period 1995-2017?
 - (c) Using the data given, rank the three economies in 1995 and 2017. Discuss how the three economies compare and suggest explanations for the ranking and their economic performance during these two decades.

8. Consider the following variant of the model of money supply. Money supply M consists of currency C held by the public and demand deposits D . Let B be the monetary base, composed of currency and the part of deposits that the banks hold as reserves TR . Let $cr = C/D$ be the fraction of currency the public holds relative to their deposits and $tr = TR/D$ be the fraction of deposits banks hold as reserves.
- (a) Which variable(s) in this model is/are exogenous? Which is/are endogenous?
 - (b) Show that money supply is proportional to the monetary base, i.e. that $M = mB$ and derive an expression for the money multiplier m as a function of exogenous variables and parameters of the model. Is the money multiplier larger or smaller than 1?

Next, let us decompose reserves TR into required reserves RR (reflecting the reserves that banks must hold as instructed by the central bank) and excess reserves ER (reflecting any additional reserves banks hold, over and above required reserves), and define $rr = RR/D$ and $er = ER/D$ to be the required-reserves ratio and excess reserve ratio respectively.

- (c) What is the relationship between tr , rr and er ? Do you generally expect er to be large or small relative to rr ? Why, and in what situations?
- (d) In light of your answer to (c), discuss to what extent it is reasonable to treat the money multiplier m as exogenous. Explain your reasoning.

9. The money market in a small open economy with fixed nominal prices is described by the following pair of equations:

$$\begin{aligned}\left(\frac{M}{P}\right)^d &= \alpha Y - \beta r^* \\ \left(\frac{M}{P}\right)^s &= \gamma + \delta(e - e^*)\end{aligned}$$

where $\left(\frac{M}{P}\right)^d$ and $\left(\frac{M}{P}\right)^s$ are the demand and supply of real money balances respectively, Y is real income, r^* is the exogenous world real interest rate, and e is the nominal exchange rate. α , β , γ and δ are positive parameters, and e^* is an exogenous constant. The expected inflation rate is zero.

- (a) Discuss intuitively why the money supply schedule might plausibly take this form.
- (b) Explain diagrammatically the equilibrium relationship between income and the nominal exchange rate implied by this money market, given r^* . How does this relationship depend on the parameter δ ?

The components of aggregate expenditure in the economy are described by the following equations:

$$\begin{aligned}C &= \bar{C} + cY \\ I &= a - br^* \\ NX &= \bar{N} - \eta e\end{aligned}$$

where C is consumption, I is investment and NX is net exports. There is no government spending. \bar{C} and \bar{N} are exogenous, and a , b , c and η are positive parameters, with $c < 1$.

- (c) Derive the equilibrium response of income in this economy to an increase in the world real interest rate r^* . Comment intuitively on the role of δ in this.

10. Consider an economy where firms and workers bargain in advance over a nominal wage \bar{W} , which is then fixed irrespective of changes to the nominal price level. During the bargaining process, firms and workers believe that the price level will equal a value P^e . Workers have market power in the bargaining process, and demand a real wage $\frac{\bar{W}}{P^e}$ that satisfies:

$$\frac{\bar{W}}{P^e} = \frac{1 + \mu}{\eta} L,$$

where L is the anticipated level of employment, and μ and η are positive parameters. Larger values for μ correspond to greater worker bargaining power. Firms would like to set the real wage equal to the marginal product of labour (MPL), which implies the following condition:

$$\frac{\bar{W}}{P^e} = (1 - \alpha) L^{-\alpha} \bar{K}^{\alpha},$$

where \bar{K} is a fixed capital stock and $0 < \alpha < 1$.

- (a) Show that the bargained nominal wage is given by:

$$\bar{W} = (1 - \alpha)^{\frac{1}{1+\alpha}} \left(\frac{1 + \mu}{\eta} \bar{K} \right)^{\frac{\alpha}{1+\alpha}} P^e.$$

After the bargaining process is over, prices take a value P , which may differ from P^e . Firms would now like to employ until the MPL equals $\frac{\bar{W}}{P}$. Workers are willing to supply labour L^s according to the condition:

$$L^s = \eta \frac{\bar{W}}{P}.$$

- (b) Show that if $P = P^e$ there will be involuntary unemployment, and express its magnitude in terms of η , μ and $\frac{\bar{W}}{P^e}$.
(c) Does worker bargaining power improve the plausibility of the sticky-wage model for aggregate supply?

END OF PAPER