ECONOMICS TRIPOS PART IIB

Tuesday 25 May 2010 13:30-16:30

Paper 2

ECONOMIC PRINCIPLES AND PROBLEMS II

*Answer **FOUR** questions.*

Answer all parts to the question.

Each question will carry equal weight.

*Write your **number** not your name on the cover sheet of each booklet.*

STATIONERY REQUIREMENTS
20 Page booklet x 1
Rough work pads
Tags

SPECIAL REQUIREMENTS
Approved calculators allowed

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

1 Can greater financial integration in the European Union contribute to the economic growth of member countries?

2 Explain what is meant by *international contagion* of currency crises, distinguishing carefully between the various propagation channels of contagion.

3 Consider the Solow growth model with non-renewable resources as an input in production. Can technological progress steer the economy out of any resource constraint, so that the long run growth in per capita income is positive? In other words, can economic activity increase forever? Explain.

4 What does tax smoothing imply for the conduct of fiscal policy over time? To what extent does a model of tax smoothing explain observed fiscal outcomes? Outline two other possible modelling frameworks that might explain what we observe.

5 Are prices in asset markets good predictors of recessions? Was the recent financial crisis a cause or a symptom of the current recession?

6 Consider the following model of conflicting policy objectives in countries i and j under flexible exchange rates. Policy makers in each country care about deviations of inflation and the output gap from their targets, $\pi^* = 0$ and $x^* \equiv y^* - \overline{y} = 0$. The targets are assumed the same in both countries. Country i's inflation rate and real exchange rate change are given by:

$$\pi_i = \alpha\, m_i + (1-\alpha)\, m_j,\ 0 \leq \alpha \leq 1, \tag{1}$$

$$\Delta q_i = m_i - m_j, \tag{2}$$

where m_i and m_j are the growth rates of i and j's money supplies, respectively. Country i's output gap is given by:

$$x_i = \gamma\, [(m_i - m_i^e) + \omega \Delta q_i] - u,\ \gamma > 0,\ \omega > 0, \tag{3}$$

where m_i^e is expected money growth and $u \sim iid\ (0, \sigma_u)$ is a global supply shock. Country i's welfare losses are:

$$L_i = (x_i - x^*)^2 + \theta \pi_i^2 + \phi \Delta q_i\ ,\ \phi > 0, \tag{4}$$

and similarly for country j.

(a) Provide an economic interpretation of equations (1)-(4), stating carefully any assumptions that you make.

(b) Assuming no coordination of monetary policies, show that the optimal money growth in countries i and j is:

$$m_i = m_j = \frac{\gamma}{\gamma^2 + \frac{\alpha\theta}{1+\omega}}\ u - \frac{\phi}{2\alpha\theta}.$$

(c) Now assume an output distortion, $x^* = k > 0$. Find the optimal money growth rate in countries i and j.

(d) Comment on the implications of this model for emerging market economies' monetary and exchange rate policies.

7 Consider the following continuous-time Solow growth model with human capital accumulation. The production technology is given by a constant returns to scale Cobb-Douglas function

$$F(K, L) = K^{\alpha}(huL)^{1-\alpha}, \quad \alpha \in (0, 1),$$

where K denotes the capital stock, which depreciates at rate δ; L is raw labour that grows at a constant rate n; h is the per capita human capital; and u corresponds to time spent at work. Human capital evolves according to:

$$\dot{h} = B(1-u)h^{\beta} - \delta_h h, \; B > 0,$$

where $(1-u)$ is time spent accumulating skill. Households save a constant fraction of income, $0 < s < 1$. The economy is closed which implies that investment equals savings. There is no technological progress. Assume that $\beta > 0$.

For parts (a) and (b) assume that $\beta < 1$.

(a) Derive an expression for $\dot{k}$, where $k = \frac{K}{L}$. Using $\dot{k}$ and $\dot{h}$, derive equations that describe the set of combinations of $\dot{k} = 0$ and $\dot{h} = 0$. Sketch these in the (h, k) space. What is the growth rate of output per capita in the steady-state equilibrium? Explain.

(b) Suppose that the efficiency of the human capital accumulation equation increases, i.e. there is an increase in B. Show in a graph the transition dynamics of output per capita to the new steady state equilibrium.

For parts (c) and (d) assume that $\beta = 1$.

(c) Repeat the analysis as in part (a) and find what the growth rate of output per capita is. Explain.

(d) Suppose that there is an increase in B. Show in a graph the transition dynamics of output per capita to the new steady state equilibrium. Compare your answer to that in part (b). Which version of the model fits the data better? Explain.

8 Output and inflation evolve according to:

$$y_t = -\lambda(r_t - \pi_t) + \eta_t,$$

$$\pi_t = \pi_t^e + \beta y_t + \varepsilon_t,$$

where y_t is output, r_t is the nominal interest rate, π_t is the inflation rate, π_t^e is the expected inflation rate, and η_t and ε_t are *iid* stochastic shocks to demand and supply, respectively. The target inflation rate, π_t^*, is zero and the policy maker observes the current period shocks η_t and ε_t perfectly. The policy maker minimises the quadratic loss function

$$L_t = \delta y_t^2 + {\pi_t}^2.$$

(a) Suppose that expectations are formed rationally so $\pi_t^e = 0$. What is the optimal feedback rule for the policy maker? Comment on your result.

(b) Suppose now we add a demand for money relationship to our model:

$$m_t = y_t - \theta r_t + \varepsilon_t,$$

where m_t is the real demand for money and ε_t are shocks to velocity. How does this change how the policy maker responds to shocks?

(c) Next, suppose that the relationship for output is:

$$y_t = -\lambda(r_t^m - \pi_t) + \eta_t,$$

where r_t^m is the rate of interest on loans. The rate of interest on loans is related to the policy rate, r_t, by

$$r_t^m = \alpha + r_t + \psi_t,$$

where ψ_t are *iid* stochastic shocks. Provide an interpretation for ψ_t. What is the optimal feedback rule in this case? Explain.

9 The output gap depends on surprises to inflation:

$$y_t = \theta(\pi_t - \pi_t^e) + \varepsilon_t,$$

where π_t is the inflation rate, π_t^e is the rationally expected inflation rate and ε_t is an *iid* random variable, with variance, σ_ε^2. Assume the Government can control the inflation rate. The loss function of the policy maker is:

$$L_t = E_t \left[\pi_t^2 + \delta(y_t - y^*)^2\right],$$

where E_t is the expectations operator.

(a) What is the equilibrium process for output and inflation? Comment on your answer. What does this imply for the volatility of output and inflation?

(b) Suppose, now, that the Government decides to delegate the conduct of monetary policy to a Central Banker and asks the electorate to decide on who the Central Banker is to be. Voters have heterogeneous preferences and the loss function of voter i is given by:

$$L_{it} = E_t \left[\pi_t^2 + \delta_i(y_t - y^*)^2\right].$$

What sort of Central Banker will be chosen? What is the equilibrium for output and inflation now? What does it imply for the volatility of output and inflation?

(c) If the economy entered a period of moderation in macroeconomic activity, what sort of Central Banker would the electorate prefer? If a serious financial crisis increases the volatility of output, would the electorate want to replace the Central Banker?

10 Consider the following model. There is a continuum of households, and each owns a monopolistically competitive firm. Household i maximises its utility

$$C_i - \frac{1}{\theta} L_i^{\theta},$$

subject to its budget constraint, where C_i is consumption and L_i is labour. The production function of a firm i is $Q_i = L_j$ where L_j is labour provided by household j. We assume that demand for the good produced by firm i is given by

$$Q_i = Y R_i^{-\eta},$$

where Y is the aggregate output and R_i is the relative price of firm i. Finally let aggregate demand be $Y = M/P$, where M is a monetary shock and P is the aggregate price index.

(a) Suppose that each household works for its own firm, i.e. that $Q_i = L_i$. Write the budget constraint for the household, and derive the equilibrium relative price R_i for firm i, as well as the equilibrium aggregate output Y.

(b) Now suppose that household i works for firm other than its own, e.g. firm j. What is the budget constraint for the household in this case? What is the equilibrium relative price and aggregate output? Compare your answer to that in part (a).

(c) Explain why money is neutral in the cases of (a) and (b). What is the role of relative prices for generating money non-neutrality? What additional model features could we add so that monetary shocks may have an effect on real output?

END OF PAPER