QUEEN MARY, UNIVERSITY OF LONDON

M.Sc.(Economics), M.Sc. Financial Economics

Macroeconomics B - ECOM009

Date: 21 May 2007, 2:30 p.m.
Duration: 2 hours and 15 minutes (This includes 15 minutes reading time)

Answer one question from Section A and two questions from Section B.

You are not permitted to start reading this question paper until instructed to do so by an invigilator.

Complete all rough workings in the answer book(s) and cross through any work that is not to be assessed.

Calculators are permitted in this examination provided they are not programmable. Please state the name and type of calculator on your answer book.

Section A

1. (60 points) Assume consumers have infinite lifetimes and maximize the utility function

$$U_t = E_t \sum_{s=t}^{\infty} \beta^s \left(c_{t+s} - \frac{\gamma}{2} c_{t+s}^2 \right), \tag{1}$$

where c_{t+s} is consumption at time $t+s$, $\beta > 0$ is the subjective discount rate and E_t is the expectation operator conditional on all information available to consumers at time t. The coefficient γ is a positive parameter large enough for the marginal utility of consumption to be always positive. Consumers can freely borrow and lend at a constant riskless rate r such that $\beta(1+r) = 1$.

Labour income y_t follows the stochastic process

$$y_t = y_{t-1} - \lambda y_{t-2} + \varepsilon_t, \tag{2}$$

with $\lambda > 0$ and ε_t a white-noise process.

(a) Write down the consumer's optimization problem in recursive form and the Euler equation.

(b) Derive the consumption function and the response of consumption to a current innovation in labour income ε_t.

(c) Derive the saving function. Discuss whether the response of saving to a current innovation in labour income ε_t is larger or smaller than if the income process had the form

$$y_t = y_{t-1} + \varepsilon_t. \tag{3}$$

Why?

2. (60 points) Consider an economy in which firms are identical and produce output Y_t using capital K_t according to the production function $Y_t = K_t^{\alpha}$, where $0 < \alpha < 1$ is a constant parameter. The firm can freely borrow and lend at the market interest rate r. Capital does not depreciate. Investment in capital is subject to convex adjustment costs $C(I_t) = I_t^2/2$, where I_t is the flow of investment at time t.

(a) Write down the firm's optimization problem. Derive the differential equation which describes the evolution of Tobin's marginal q_t.

(b) Use a phase diagram in the (K_t, q_t) to analyse the qualitative properties of the equilibrium path of investment and capital starting from an initial stock of capital above its steady state level.

(c) Suppose that the economy is in steady state equilibrium. At time t_0 firms revise their expectations about the future value of the parameter α in the production function. They expect it to increase to $\alpha' > \alpha$ - with $1 > \alpha' > 0$ - at time $t_1 > t_0$ and remain at its new level for ever after. Derive the effect of the shock on the equilibrium paths of K_t and q_t from time t_0 onwards.

3. (60 points) Consider a simple search model of equilibrium unemployment in which the flow cost of posting a vacancy is c per unit of time, the interest rate is constant and equal to r, and z is the non-market value of leisure. The size of the labour force is one. Unemployed workers and unfilled vacancies are matched according to the function $m(u, v) = u^\lambda v^{1-\lambda}$ with $0 < \lambda < 1$. If a firm and a worker form a match they produce a flow of y units of output per period. Productive matches are destroyed at an exogenous rate s and wages are determined according to the axiomatic Nash bargaining solution. The parameter indexing workers bargaining power is $\beta > 0$. Assume that if the job is destroyed the firm has to incur a cost $F > 0$.

   (a) Write down the steady-state equilibrium vector.

   (b) Solve for the steady-state equilibrium. What is the effect of a reduction in F on the steady-state equilibrium values of unemployment and market tightness?

   (c) Suppose that the cost F is wasted to the aggregate economy. This implies that it reduces the aggregate flow of consumable resources by an amount equal to the flow of job losers times its size F. Consider the case in which the interest rate r equals zero and $\beta = \lambda$. Can the government improve efficiency, relative to the decentralized equilibrium, by taxing or subsidizing job creation?

Section B

4. (20 points) The life cycle theory of consumption implies a causal relationship from high growth rates to high aggregate saving rates. Explain the economic mechanism underlying this prediction and discuss the relevant empirical evidence.

5. (20 points) What are the equity premium and risk-free rate puzzles? Discuss whether accounting for taxation and the transaction costs associated with equity investment helps solving these puzzles.

6. (20 points) What empirical regularities have motivated the recent renewed interest in theories of frictional unemployment? Which of these regularities can and which cannot be reconciled with theories of involuntary unemployment that rely on real wage rigidities?

7. (20 points) The H.M. Treasury's 'Code for Fiscal Stability' states that "...over the economy cycle, the [UK] government will only borrow to invest..." Discuss the desirability of such a commitment in the light of the neoclassical theory of debt.

End of examination
Dr. G. Fella