

1.
True/False and Explain. For each question write "true" or "false" and explain why. Carefully labeled graphs may help your explanation.

1a. If investment and net exports are highly sensitive to interest rate changes, monetary policy is generally effective in stimulating aggregate demand and output. (8%)

1b. An oil price shock (increase) tends to raise the general price level and output in the short-run, but not the long-run. (7%)

2. Consider a consumer in a two-period model. Income is exogenous in each period. Income is Y_1 in period 1. Income in period 2, y_2 , is random and can take on two values (y^H, y^L) with probabilities ($p(y^H), p(y^L)$). The saving return is $1+r$ in period 2.

(a) Please write down the budget constraint and derive the Euler equation of optimal intertemporal choice problem, in which the consumer seeks to maximize

$$u(c_1) + \frac{1}{1+\rho} E(u(c_2)). \quad (5\%)$$

where E is the expectations operator, ρ is discount rate.

(b) Suppose now that instantaneous utility is quadratic: $u(c_j) = c_j - \frac{a}{2}c_j^2$ $j=1,2$,

and also assume that $\rho = r = 0$. Please solve the consumption in periods 1 and 2 as functions of actual and expected income realizations. (10%)

3. Consider a standard solow model described by the following equations:

$$Y = (1-\tau)K^\alpha(AL)^{1-\alpha} \quad 0 < \alpha < 1$$

$$\dot{K} = sY, \quad \frac{\dot{L}}{L} = n, \quad \frac{\dot{A}}{A} = g$$

Note: τ is a government tax rate on output, and all tax revenue collected by the government is spent on an ongoing war that does not contribute to either output or capital stock of the economy. We define the capital per effective worker as $k = \frac{K}{AL}$,

and output per effective worker $y = \frac{Y}{AL}$

(a) Please derive the long run equilibrium level of capital per effective worker, k^* .

(背面仍有題目,請繼續作答)

and the steady state output per effective worker y^* . (10%)

(b) If $\frac{\dot{L}}{L} = 0$ and assume that the growth rate of technology, g , is given by

$g = b(1-\tau)^{\frac{1}{\alpha}}$ where $b > 0$. That is, the tax on output also hurts individual's incentives to invent new technologies. What is the new steady state level of y^* ? What is the effect of an increase in the tax on y^* ? (10%)

4. Consider the following endogenous model:

$$Y = [(1-a)K]^{\alpha} (AL)^{1-\alpha}, \quad 0 < \alpha < 1$$

$$A = B(aK)^{\gamma}, \quad 0 < \gamma < 1, \quad B > 0$$

$$\dot{K} = sY$$

$$\frac{\dot{L}}{L} = n$$

(a) Let g_Y , g_K , g_A represent the growth rates of output (Y), capital (K), and technology (A). Please derive the growth rate g_Y , g_K , g_A . (10%)

(b) Please find the $\frac{\partial g_K}{\partial t}$, and express it by only using g_K and other constants. (5%)

5. Consider the following representative agent model. The consumer has preferences given by

$$U(c, l) = u(c, l) + v(h)$$

where c is consumption of market goods, l is leisure, and h is consumption of home-produced goods. Assume that $v(\cdot)$ is strictly increasing and strictly concave. The consumer is endowed with 1 unit of time and spends x_1 units of time working in the market, x_2 units of time working at home, and $1 - x_1 - x_2$ units of time consuming leisure. The representative firm has a technology for producing market goods, given by

$$y_1 = z_1 x_1$$

where z_1 is the productivity of labor in the market and y_1 is output of market goods. Similarly, if y_2 is production of home-produced goods, the technology available to the household is given by

$$y_2 = z_2 x_2$$

- (a) Please set up the social planner's problem by using the choice variables l, x_2 . (10%)
- (b) Please find the first order conditions. (5%)

6. Consider an open economy IS-LM model with perfect capital mobility. Assume that we extend the IS-LM model by introducing international trade. Assume furthermore that the price level is fixed (saying $P = P_0$) and that domestic and foreign bonds are perfect substitutes. The extended model is given by:

$$Y = C + I + G + X$$

$$C = C(Y - T) \quad 0 < C_{Y-T} < 1$$

$$I = I(r), \quad I_r < 0$$

$$T = T(Y) \quad 0 < T_Y < 1$$

$$\frac{M}{P} = k(Y) + l(r)$$

$$NX = X(E) - M(E, Y) * E \quad X_E > 0 \quad M_E < 0 \quad M_Y > 0$$

$$r = r^f + \frac{\dot{E}}{E}$$

where Y, C, I, G, T and r are, respectively, output, consumption, investment, government consumption, taxes, and the interest rate. Furthermore, r^f is the foreign interest rate, X is exports, M is imports, E is the exchange rate (per unit of foreign currency), and NX is net exports. Use this model to answer the following questions. Assume that the expectations regarding the exchange rate are perfectly inelastic (so that there is no speculation on the market for foreign exchange and the

$\frac{\dot{E}}{E}$ term can be put equal to zero.

- (a) Explain and derive the so-called Marshall-Lerner condition. (10%)
- (b) Why is there less scope for Keynesian countercyclical policy in an open economy with flexible exchange rate? How effective is monetary policy in such a situation? (10%)