

考試科目	總體經濟學 21612	所別	經濟學系 2161	考試時間	3月1日(星期日)第2節
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- (20%) 1. Consider Alex' s preference for leisure (l) and other goods (Y) is $U(l, Y) = \sqrt{l} + \sqrt{Y}$. Alex' s wage rate is w and the consumption good has the price $P_Y = \$1$. Alex has the endowment of time (T) equal to 1 that the time endowment can be used for leisure or labor.
- (2%) Write down Alex' s utility maximization condition.
 - (2%) Find Alex' s supply of labor. Show that Alex' s supply of labor is backward bending or not?
 - (2%) Explain the result in (b) why you have or may not have the backward bending labor supply curve of Alex.
 - (2%) Now suppose that 10,000 Alex-like agents live in the economy. Besides, the representative firm produces by the technology: $Y = 10N^{0.5}$ where N is total employment in the firm. Compute the equilibrium wage rate w^* .
 - (2%) Base on part(c), solve the equilibrium employment N^* and output Y^*
 - (5%) Suppose now the government enforces the law to promote more leisure and requires all the workers to have leisure $0 < l^* < l < 1$. Discuss the policy effect here on the equilibrium wage rate w^* , employment N^* and output Y^* .
 - (5%) Utilize the results in f. to argue why the government would promote the five-day work week and the potential impact on industry.

- (30%) 2. In Taiwan the following capital input K and labor input N were reported in four different years:

Year	K	N
1	200	1000
2	250	1000
3	250	1250
4	300	1200

The production function in this economy is: $Y = K^{0.3}N^{0.7}$ where Y is total output. The depreciation rate is 0.1, and the population growth rate is 0.05. Saving is $S_t = 0.3Y_t$, where S_t is the total national saving and Y_t is total output.

- (2%) Find total output, the capital-labor ratio, and output per worker in each year. Compare year 1 with year 3, and year 2 with year 4. Can this production function be written in per-worker form? If so, write algebraically the per-worker form of the production function.
- (2%) What are the steady-state values of the capital-labor ratio, output per worker, and consumption per worker?
- (2%) Repeat part (a) but assume now that the production function is $Y = K^{0.3}N^{0.8}$.

備

註

- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。

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- d. (2%) According to part(c), what are the steady-state values of the capital-labor ratio, output per worker, and consumption per worker?
- e. (4%) Repeat part (b) and part (d) for a saving rate of 0.4 instead of 0.3.
- f. (4%) Repeat part (b) and part (d) for a population growth rate of 0.08 (with a saving rate of 0.3)
- g. (4%) Repeat part (b) and part (d) for a production function of: $Y = K^{0.5}N^{0.5}$. Assume that the saving rate and the population growth rate are at their original values.
- h. (10%) Summarize from a.to g. and analyze what are the key economic growth drivers in this simple economy. Argue whether the “Malthusian Theory of Population” holds or not here in this economy.



備

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3. Consider the following Keynesian economy with flexible exchange rates:

($>5\%$) Desired consumption: $C^d = 25 + 0.7(Y - T) - 100r$,

Desired investment: $I^d = 100 - 75r$,

Taxes: $T = 40 + 0.1Y$,

Net export: $NX = 25 - 0.03Y + 0.15Y_{FOR} - 25r - 1.5e$,

Real money demand: $L = 0.5Y - 10i$,

Full-employment output: $\bar{Y} = 500$,

Government purchases: $G = 50$,

Nominal money supply: $M = 25000$,

Balance-of-payments: $10 - 0.02Y + 0.01Y_{FOR} + 10r - 35r_{FOR} - e = 0$,

Expected inflation: $\pi^e = 0.15$,

Foreign output: $Y_{FOR} = 400$,

Foreign real interest rates: $r_{FOR} = 0.2$,

Foreign price level: $P_{FOR} = 100$,

where Y (Y_{FOR}) is domestic (foreign) output, r (r_{FOR}) is the domestic (foreign) real interest rate, i is the domestic nominal interest rate, P (P_{FOR}) is the domestic (foreign) price level, the real exchange rate e is the price of domestic goods relative to foreign goods, and the nominal exchange rate is defined as units of the foreign currency per unit of domestic currency.

- (1) Calculate the general equilibrium (that is, long-run) values of domestic output, the domestic real interest rate, the real exchange rate, the nominal exchange rate, and the domestic price level. (10%)
- (2) Use the diagram to analyze the effect on the domestic and foreign economy of an expansionary monetary policy in both the short and long run. (10%)
- (3) What is the beggar-thy-neighbor effect of exchange rates? (5%)

4. Consider the following dynamic AD-AS model:

($>5\%$) The demand for goods and services: $Y_t = \bar{Y}_t - 0.5(r_t - \rho) + \varepsilon_t$,

The Fischer equation: $r_t = i_t - E_t \pi_{t+1}$,

The Phillips curve: $\pi_t = E_{t-1} \pi_t + 0.5(Y_t - \bar{Y}_t) + v_t$,

Adaptive expectations: $E_t \pi_{t+1} = \pi_t$,

The monetary-policy rule: $i_t = \pi_t + \rho + 0.5(\pi_t - \pi_t^*) + 0.5(Y_t - \bar{Y}_t)$,

where Y_t is output, \bar{Y}_t is the natural level of output, r_t is the real interest rate, i_t is the nominal interest rate, ρ is the natural rate of interest, π_t is inflation rate, $E_t \pi_{t+1}$ is the expected inflation, π_{t-1} is the previous period's inflation (assume that $\pi_{t-1} = \pi_t^*$), π_t^* is the central bank's target for inflation, ε_t is a shock to the demand for goods and services, v_t is a shock to the aggregate supply.

- (1) What is the economic intuition for the monetary-policy rule? (5%)
- (2) Assume that $\bar{Y}_t = 100$, $\pi_t^* = 2$, and $\rho = 2$. Derive the short-run equilibrium for the dynamic AD-AS model. (4%)
- (3) Use the output-inflation diagram to analyze the effect on the economy of a temporary adverse supply shock in both the short and long run. (8%)
- (4) Show how a one-time adverse supply shock ($v_t = 1, v_{t+j} = 0, \varepsilon_t = 0, \varepsilon_{t+j} = 0, j = 1, 2, 3, \dots$) affects the dynamic responses (i.e. impulse response functions) of the output and inflation. (8%)