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1. Assume that money demand takes the form

$$\frac{M}{P} = Y\left[1 - \left(r + \pi^e\right)\right]$$

where M is the money supply, P is the price level, Y is real GDP, r is real interest rate, and π^e is expected inflation. Given that Y = 1,000 and r = 0.1, answer the following questions:

　(1) Assume that, in the short run, π^e is constant and equal to 25%. Calculate the amount of seigniorage if the rate of money growth is 50%. **(5 points)**

　(2) In the medium run, $\pi^e = \pi = \Delta M / M$, compute the amount of seigniorage if the rate of money growth is 50%. **(5 points)**

　(3) Explain why the answer in (2) differs, if any, from that in (1). **(5 points)**

2. Given the open economy goods market equilibrium condition, money market equilibrium condition, and interest-parity condition in following equation (a), (b) and (c):

$$(a)\ Y = C(Y-T) + I(Y,i) + G + NX(Y,Y^*,E)$$

$$(b)\ \frac{M}{P} = YL(i)$$

$$(c)\ E = \frac{E^e}{1+i+i^*}$$

where Y, P, M are as specified in question 1 and other symbols in this question are specified as:

　　T: lump-sum tax,　　　　　I: investment,

　　G: government purchase,　　NX: net exports,

　　i: interest rate,　　　　　L: liquidity preference of money demand,

　　E: spot exchange rate,　　E^e: expected future exchange rate.

　　Variables denoted with asterisk (*) signiy foreign variables.

Answer the following questions:

　(1) Derive the IS and LM equations for this open economy. **(5 points)**

　(2) Show the effects of a decrease in foreign output, Y^*, on domestic output, Y. Explain in words with the aids of either graphical or mathematical illustration. **(10 points)**

　(3) Show the effect of an decrease in the foreign interest rate, i^*, on domestic output. Again, explain in words with the aids of either graphical or mathematical illustration. **(10 points)**

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3. Consider an economy with the following behavioral equations:

$$Production: \ Y = AN$$
$$Price \ setting: \ P = (1+m)(W / A)$$
$$Wage \ setting: \ W = A^e P^e (1-u)$$
$$Employment: \ N = (1-u)L$$

where m is the price markup ratio; L is labor force; u is unemployment rate; N represents labor employed and A represents productivity. Variables denoted with superscript e represent expected values of that variable.

(1) Derive the aggregate supply curve. Explain the role of each variable in the supply curve. **(10 points)**

(2) Suppose that actual productivity, A, increase but expected productivity, A^e, does not change. Explain the effect of this change on the aggregate supply curve. **(10 points)**

4. Suppose that the economy's production is given as

$$Y = \sqrt{K}\sqrt{NA}$$

where Y, K, N, and A are aggregate output, capital stock, labor input and productivity respectively. Assume that the saving rate (s) is equal to 16% and that the rate of depreciation (δ) is equal to 10%. Further, suppose that the number of workers grows at 2% per annum and that the rate of technological progress is 4% per year. Answer the following questions:

(1) Find the steady-state value of (a) the capital stock per effective worker, (b) output per effective worker, (c) the growth rate of output per effective worker, (d) the growth rate of output per worker, and (e) the growth rate of output. **(10 points, 2 points each)**

(2) Now suppose that the technological progress is still equal to 4% per year, but the number of workers now grows at -1% per year due to the impacts of population aging on the labor market. Recompute the answers in part (1). What policy implication(s) can you draw from this demographic impact? **(15 points)**

5. Consider the Keynesian model with a flexible price level and fixed money wage. Assume that the money wage is at a level that leads to equilibrium in the labor market when the expected price level is equal to 100.

(1) Assume that aggregate demand unexpectedly falls. Provide a graph of the labor market and the AD/AS market and illustrate what happens. **(10 points)**

(2) If the economy was operating at the level of potential output before this change in aggregate demand, what is true about equilibrium income now? **(5 points)**