

Name:
Student No.:

SPP/Econ 556
Macroeconomics
Final Exam
April 26 & 29, 1999

Answer all questions, on these sheets in the spaces or blanks provided. In questions where it is appropriate, **show your work**, if you want partial credit for an incorrect answer. Point values of the questions are shown; there are a total of 85 points possible.

1. (10 points) In the long-run, closed-economy model of Mankiw's Chapter 3, compare the effects on GDP, Y , and on the real interest rate, r , of the policies listed below. That is, consider the model whose components are:

$$\text{Production Function:} \quad Y = F(\bar{K}, \bar{L}) \quad (1)$$

$$\text{Wage:} \quad W = MPL = F_L(\bar{K}, \bar{L}) \quad (2)$$

$$\text{Consumption:} \quad C = C(Y - \bar{T}) \quad (3)$$

$$\text{Investment:} \quad I = I(r) \quad (4)$$

$$\text{Goods Market Equilibrium:} \quad Y = C + I + \bar{G} \quad (5)$$

with endogenous variables Y , W , C , I , and r and exogenous variables $\bar{K}$, $\bar{L}$, $\bar{T}$, $\bar{G}$ and implicit shift parameters for each of the functions. (Assume, as is explicit above but may seem odd below, that the capital stock, $\bar{K}$, is *not*, in the time horizon of the model, changed by investment, I .)

Now determine the effects on Y and r of the following four policies:

Policy 1: Government increases its purchases, $\bar{G}$, by \$1 m, spending this on environmental cleanup. That is $\Delta \bar{G} = 1$ and $\Delta \bar{K} = \Delta \bar{L} = \Delta \bar{T} = 0$.

Policy 2: Government decreases taxes, $\bar{T}$, by \$1 m. That is $\Delta \bar{T} = -1$ and $\Delta \bar{K} = \Delta \bar{L} = \Delta \bar{G} = 0$.

Policy 3: Government offers a tax credit to firms, causing them to increase their level of investment, I , by \$1 m for any given level of the interest rate. (Remember, this investment does *not* change the level of the capital stock, $\bar{K}$.) That is $\Delta \bar{I} = 1$ and $\Delta \bar{K} = \Delta \bar{L} = \Delta \bar{T} = \Delta \bar{G} = 0$.

Policy 4: Government spends \$1 m directly increasing the capital stock, $\bar{K}$, but having done so, continues with its levels of purchases and taxes unchanged. That is $\Delta \bar{K} = 1$ and $\Delta \bar{L} = \Delta \bar{T} = \Delta \bar{G} = 0$.

In the space below, use the above model and your knowledge of the functions involved to rank these policies, relative both to each other and to zero, in terms of their effects on Y and r . Record your answers either as strings of inequalities and equalities (e.g., $?x_3 > ?x_1 = ?x_2 = 0 > ?x_4$), or by filling in the tables at the bottom of the page with the signs $>$, $<$, or $=$. If you don't fill in the tables, we will do it for you, based on your strings of inequalities and equalities. If you do fill in the tables, we will grade that, not the strings. You will get one-half point for each cell of the table that is filled in correctly (by you or by us). You need not show your work on this one, and your credit will not be affected by it if you do.

>=<		>=<		>=<		>=<	
? Y_1	? Y_2	? Y_1	? Y_3	? Y_1	? Y_4	? Y_1	0
		? Y_2	? Y_3	? Y_2	? Y_4	? Y_2	0
				? Y_3	? Y_4	? Y_3	0
						? Y_4	0

>=<		>=<		>=<		>=<	
? r_1	? r_2	? r_1	? r_3	? r_1	? r_4	? r_1	0
		? r_2	? r_3	? r_2	? r_4	? r_2	0
				? r_3	? r_4	? r_3	0
						? r_4	0

2. (10 points) Below are shown Solow-style diagrams for analyzing the growth of three economies, A, B, and C. All share the same production function, $f(k)$, the same 10% depreciation rate for capital, and the same initial condition: the capital-labor ratio k_0 . They differ, however, in their savings propensities, s_i , and their population growth rates, n_i . Country A has a 50% savings rate and a 4% population growth rate. Country B has the same population growth rate as A, but a lower savings rate, 0.3. Country C has the same savings rate as A, but a zero population growth rate. Identify the following:

- a. Which country(ies) has the highest steady state capital labor ratio?

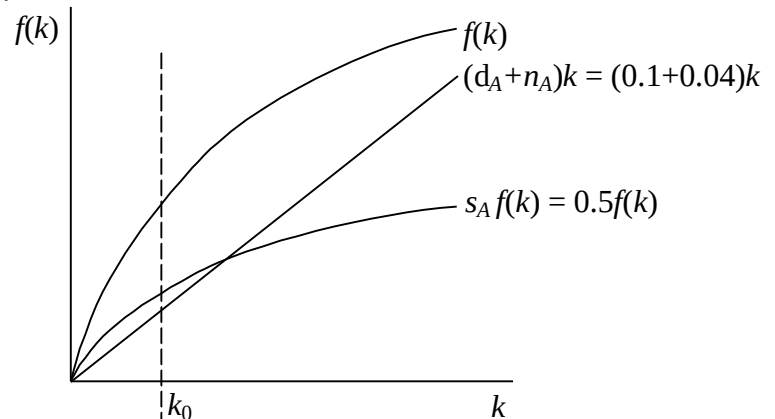
- b. Which country(ies) has the highest level of per capita consumption in steady state?

- c. Which country(ies) has the highest growth rate of total (not per capita) income in steady state?

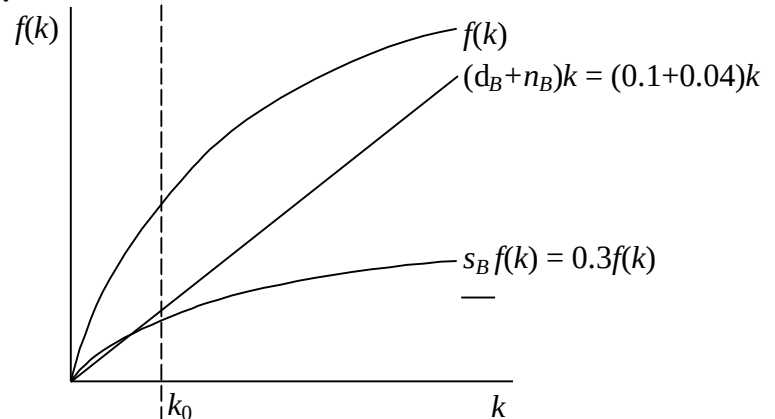
- d. Which country(ies) has the highest growth rate of the capital-labor ratio, k , initially?

- e. Which country(ies), if any, could increase its steady-state per capita consumption by saving less?

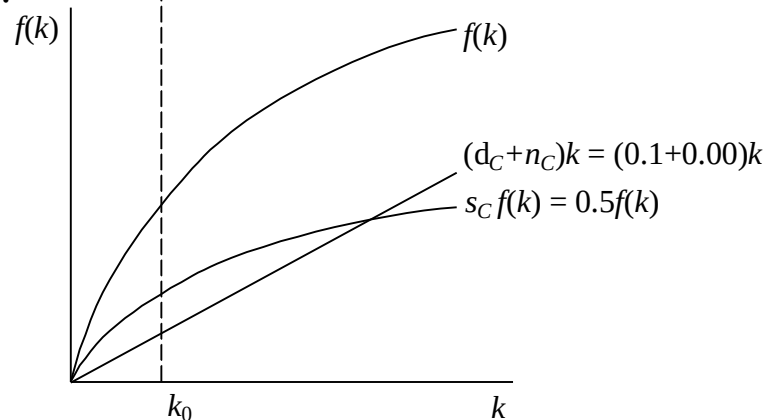
A:



B:



C:



3. (10 points) Mankiw's Open-Economy Long-Run Model is

- | | |
|----------------------------|---|
| $Y = F(\bar{K}, \bar{L})$ | (1) Production Function, fixed factor endowments |
| $C = C(Y - \bar{T})$ | (2) Consumption Function, fixed taxes,
$0 < C' < MPC < 1$ |
| $I = I(r)$ | (3) Investment Function, $I' < 0$ |
| $Y = C + I + \bar{G} + NX$ | (4) Supply and demand for goods |
| $r = r^*$ | (5) Real interest rate pegged to world capital market |
| $NX = NX(\epsilon)$ | (6) Net exports depend negatively on real exchange
rate, $NX' < 0$ |

Suppose that the consumption function now shifts down, due perhaps to a worsening of consumer confidence. That is, for every level of disposable income, consumers want to consume less. Work out *and explain* the direction of the effect of this change on each of the following variables of the model:

Y :

C :

I :

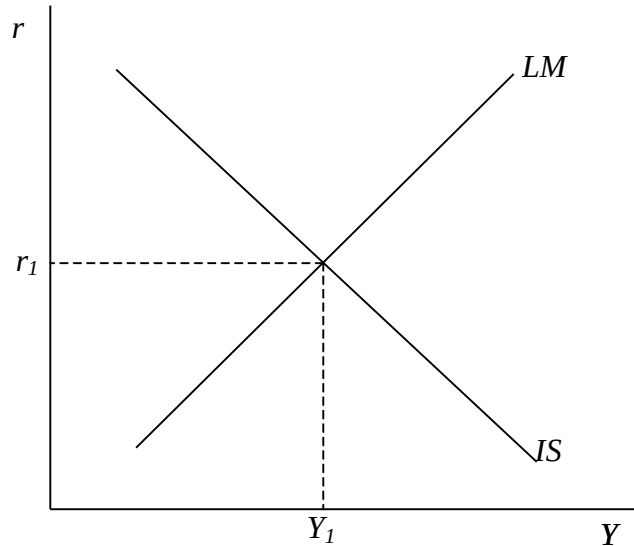
r :

NX :

ϵ :

4. (15 points) In each case below, you are given the IS-LM diagram with an initial equilibrium. Show how one or both of the curves change for the following exogenous changes in the model. Then, from that and the rest of the model, determine the qualitative changes (+,−,0,?) in the indicated variables. Give reasons for your results, where asked.

- a. An increase in taxes. (S below refers to national savings, while PS refers to private savings.)



Y _____

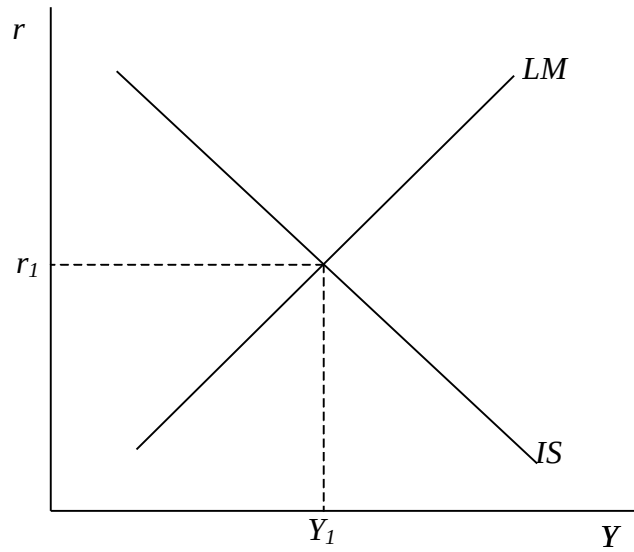
r _____

C _____ Why?

S _____ Why?

PS _____ Why?

b. A fall in the price level.



Y _____

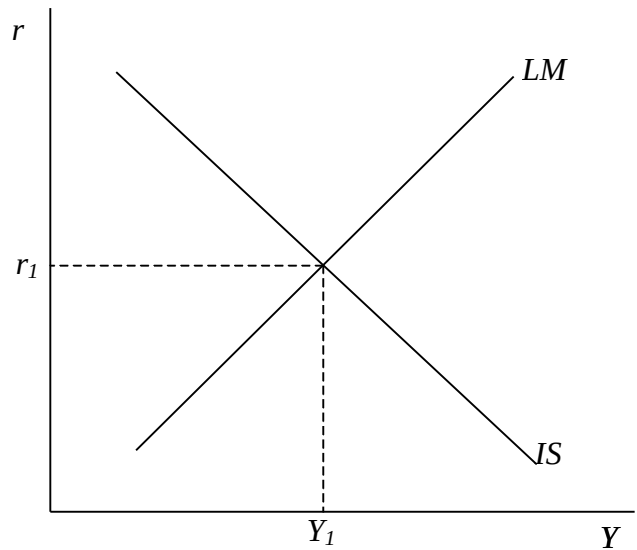
r _____

I _____ Why?

C _____ Why?

L _____ Why?

- c. An increase in government purchases *together with* an increase in the money supply, the two calibrated so that together they prevent any change in the interest rate. (S below refers to *national savings*.)



Y _____

r _____

C _____ Why?

S _____ Why?

L _____ Why?

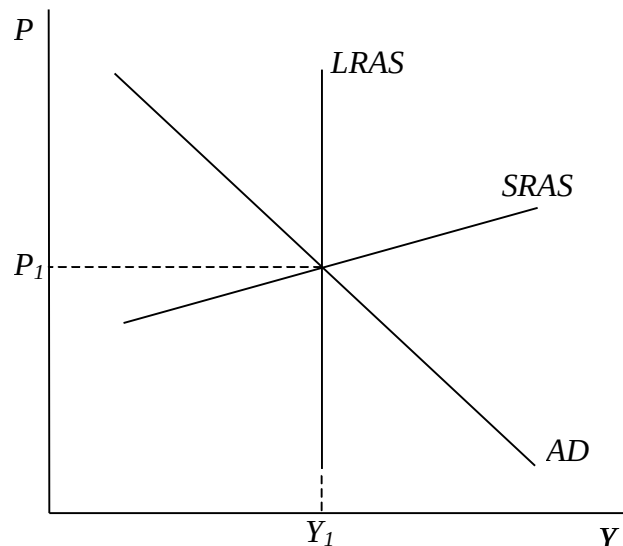
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- The diagram shows an IS-LM model. The vertical axis is labeled e and the horizontal axis is labeled Y . A downward-sloping line is labeled IS^* and a vertical line is labeled LM^* . The intersection of the two lines is marked with dashed lines extending to the axes at e_1 and Y_1 .

- a. The exchange rate. (Explain the mechanism here.)
- b. National Savings
- c. Central bank reserves
- d. The money supply

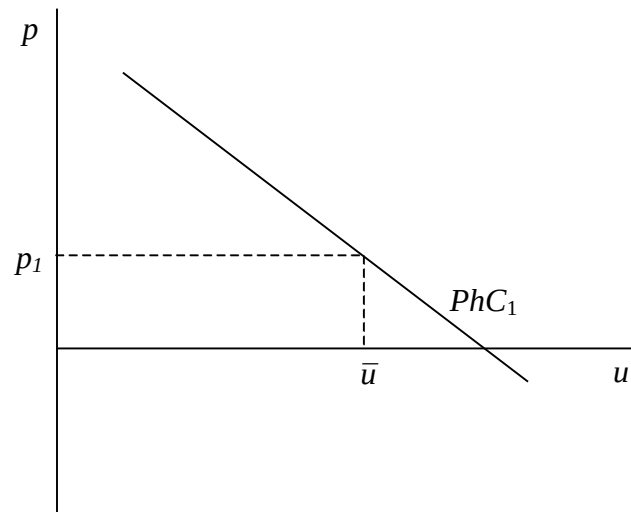
6. (10 points) Using first the aggregate supply and demand framework, and then the expectations-augmented Phillips Curve, show the effects of an initially unexpected, once-and-for-all increase in
- The level of the money supply (using AD-AS), and
 - The rate of growth of the money supply (using PhC).

In both cases, starting from the long-run equilibrium shown in the diagrams, show where the economy goes in the diagram, in both the short run and in the long run, clearly labeling both the location of the economy and any shifts of curves. In addition, in the spaces beneath the diagrams write a short paragraph describing what happens and why. Be sure to explain the role of expectations in the adjustment process in both cases.

- a. An increase in the level of the money supply:



- b. An increase in the rate of growth of the money supply:



7. (20 points) TRUE-FALSE-WHY: For each of the following statements, say whether it is true or false, and write a single sentence or phrase indicating why.
- a. Gross domestic product does not include the value of the housing provided by homes that families own themselves.
 - b. The Consumer Price Index is thought to overstate the rate of inflation.
 - c. An Efficiency Wage refers to the wage that is paid in a competitive labor market, equal to the value of the marginal product of labor.
 - d. According to the quantity theory of money, the rate of inflation must equal the rate of growth of the nominal money supply.
 - e. In combination, the IS-LM model together with the AS-AD model imply that while a monetary expansion will raise the price level, a fiscal expansion will reduce it in the short run.

- f. According to the Mundell-Fleming Model, monetary policy is more effective under a floating exchange rate than under a pegged exchange rate.

- g. In Mankiw's "sticky-price model," the slope (dP/dY) of the short-run aggregate supply curve depends positively on the amount by which some firms increase their prices in response to an increase in the economy's output.

- h. Lags in the effects of macroeconomic policies provide an argument for active policy rather than passive policy, since if you wait passively until problems have arisen, it will be too late to solve them.

- i. In March of this year, wages finally began to rise faster than they had in previous months, signaling that the Phillips Curve is continuing to operate.

- j. Time inconsistency would be illustrated, if I didn't have a GSI for this course, by my commitment to grade this exam. I promised to grade it, so that you would study for it and work hard in taking it, but after you are done these motives no longer apply and I would rather not grade it. You knew this, and hence you didn't believe me and didn't take the exam seriously.