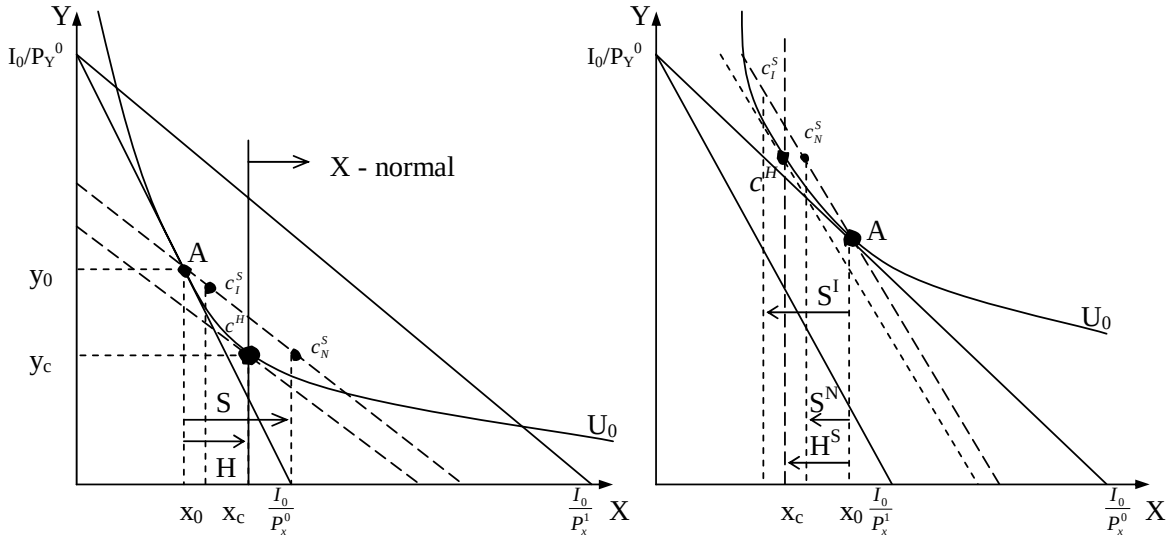
Answer Set 2

Question 1

(1) In answering this question you were expected to demonstrate command of decomposing the effects of a price change. This requires both an ability to draw the income and substitution effects as well as an understanding that real income is a matter of convention.

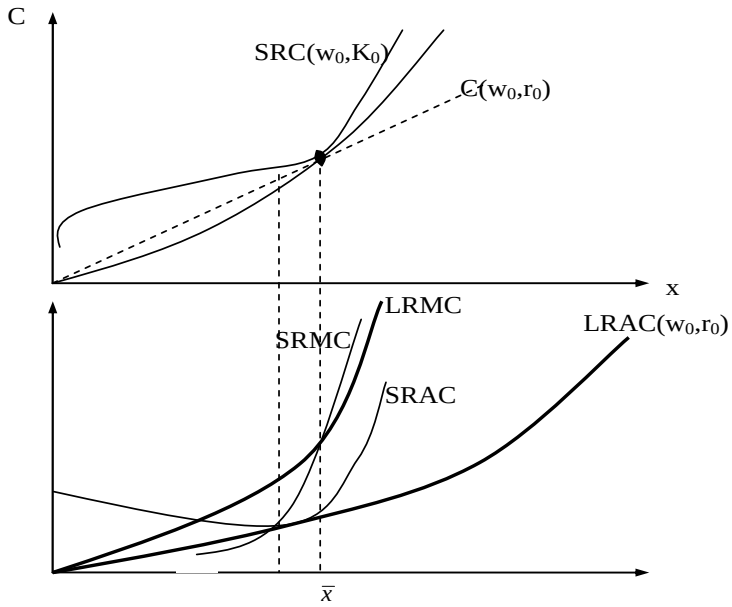


In the left hand diagram we analyse the case of a fall in the price of x. In such a case, the Hicksian substitution effect is represented by the move from point A to C^H.

According to the Slutsky definition we must establish how much money would be needed to purchase the original bundle (A). This is the heavy line in the diagram. We now distinguish between two cases. Firstly, if x is a normal good, the optimal choice under the new budget line (going through A) will have to to the right of point C^H (as there is a Hicksian real income effect as we move away from C^H). Thus, if x is normal, when the price of x falls, the substitution effect under slutsky will be greater. If, however, x is inferior, from C^H we shall have to move to the left (point $C^S{}_I$). The substitution effect under Slutsky will thus be smaller.

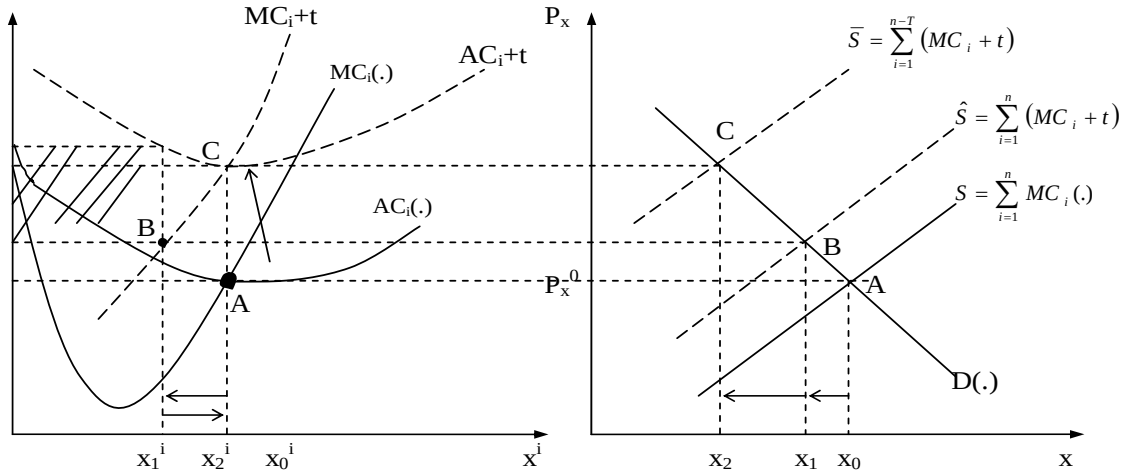
In the right hand diagram we describe an increase in the price of x. At first, following Hicks, we move to C^H which denotes the Hicksian substitution effect. If x is normal, the optimal choice on the budget line which goes through A will be to the right of C^H ($C^S{}_N$). The Hicksian substitution effect will be greater than that under the Slutsky definition of real income. Had x been inferior, it is clearly the case where the substitution effect under Slutsky will be greater.

(2) We expected the following diagrams:



The short run cost function will always be tangent to the long run cost function as the short run expansion path always intersects the long run expansion path. In other words, any particular combination of inputs could constitute an optimal choice even if we cannot vary one of them.

(3) A unit tax on a competitive industry:

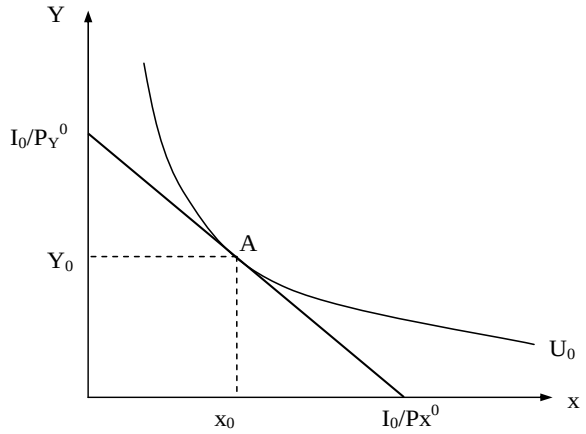


As both marginal and average costs are affected by the unit tax, profit maximizing firms would want to adjust their sales to the level of output where price equals the new marginal costs. Thus, in the short run, there will be excess demand for the good in the market and the price will increase (the move from A to B). At this price, firms are still making losses and some would leave the market. This will reduce supply further and equilibrium will be achieved at point C where fewer firms are in the market and each one of them is producing as much as before the tax. The outcome is inefficient as the price no longer equals the marginal costs, which is the bench mark for efficiency

Question 2

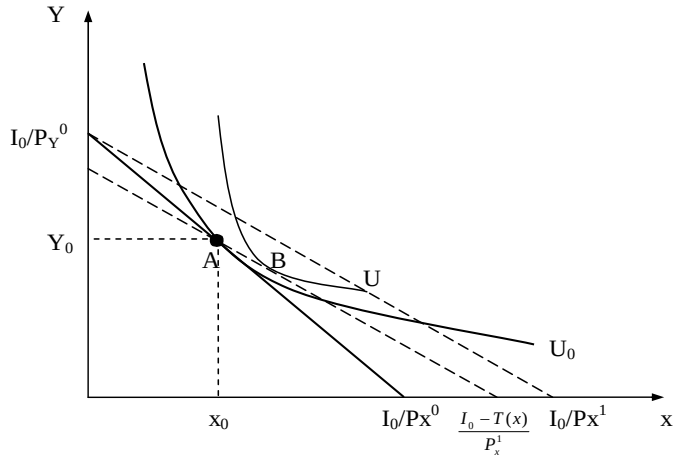
In this question we wanted to see how well you command the model of individual's choice. The implicit issue here is the general question of whether it is in the public benefit to receive cheaper public utilities and to pay a tax to cover the losses that may ensue as a result of this (due to the natural monopolistic nature of such industries). Let x represent the public utility and y all other goods.

(a) The initial choice of how much of the public utility to consume is given below:



(b) We know that the initial price $p_x{}^0$ is the breakeven price (namely, $p_x{}^0 = AC(x_0)$). By offering the good at a lower price the government will incur losses. Suppose that the government chooses to offer the good at a price $p_x{}^1 < p_x{}^0$ and to calculate the loss per unit as the difference between the average costs and the actual price: $p_x{}^1 = p_x{}^0 - l = AC(x_0) - l$. The actual loss for the government would, of course, be $L = [AC(x) - p_x{}^1]x$. Had the individual continued to consume the same amount of x the total loss would be $l \cdot x_0$. The government then proposes to tax the individual according to this loss:

$T(x) = l \cdot x = (p_x{}^0 - p_x{}^1)x$:



The first question we must ask ourselves is whether the new budget constraint would go through the original point A. Intuitively this is quite obvious. If the government cuts the price and then takes away the difference, the same amount of money will remain to consume the other goods. Formally, it will go as follows: At A, the consumers choose A=(x_0, y_0). There is a new price for x as well as compensation, will A be on the new budget constraint?

$$At \quad A: \quad p_x{}^1 x_0 + p_y{}^0 y_0 = I_0 - l \cdot x_0 = I_0 - (p_x{}^0 - p_x{}^1)x_0$$

$$p_x{}^1 x_0 - p_x{}^1 x_0 + p_x{}^0 x_0 + p_y{}^0 y_0 = \mathrm{I}_0$$

This means that individuals would be better off (at point B), and they would consume more of the public utility.

(c) If the loss per unit is greater than the difference between the two prices we will have the following situation:

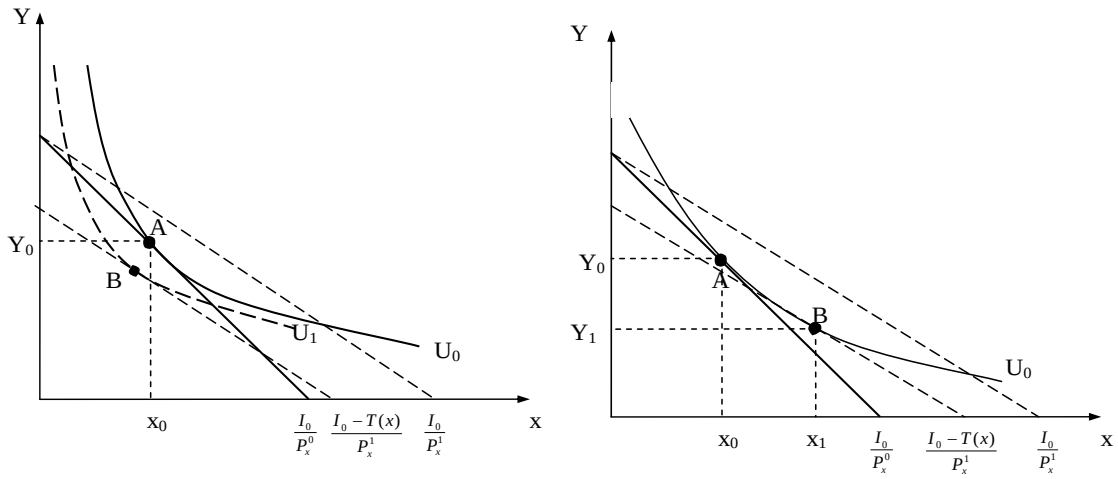
$$p_x{}^1 + l > p_x{}^0$$

$$At \quad A: \quad p_x{}^1 x_0 + p_y{}^0 y_0 \overset{?}{=} I_0 - l \cdot x_0$$

$$p_x{}^1 x_0 + l x_0 + p_y{}^0 y_0 \overset{?}{=} \mathrm{I}_0$$

$$(p_x{}^1 + l)x_0 + p_y{}^0 > p_x{}^0 x_0 + p_y{}^0 y_0 = I_0$$

This means that we need more money that we have to carry on consuming bundle A:

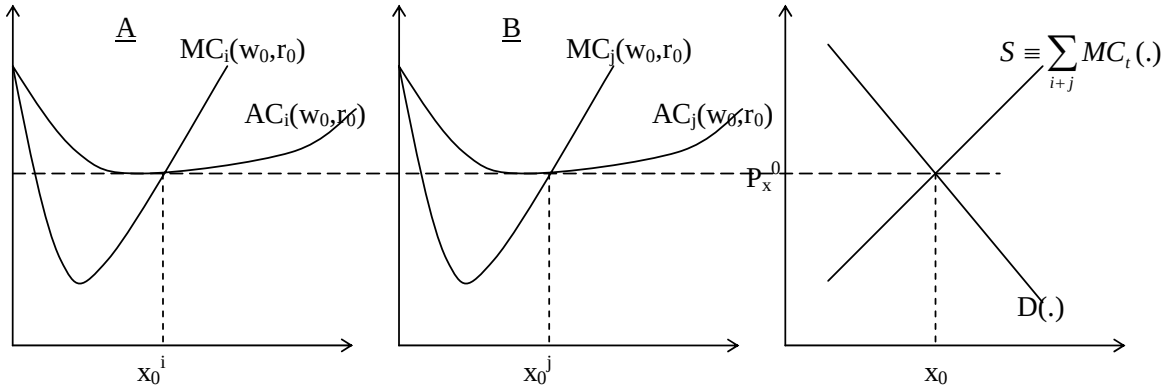


On the left hand diagram we depict the case where the individual became worse off but on the right hand diagram, it is evident that this does not necessarily mean that the individual would become worse off.

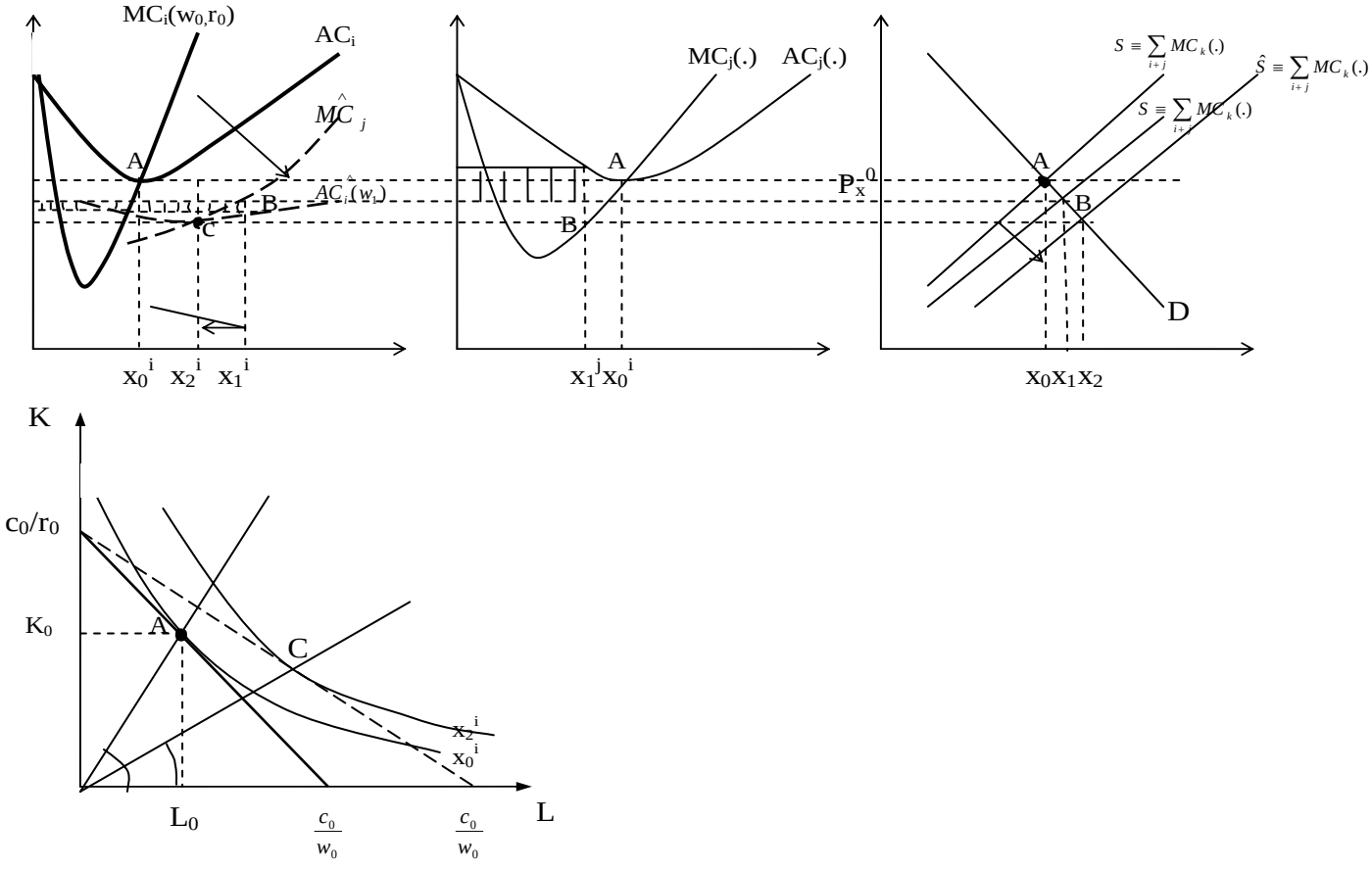
Question 3

In this question we examine the application of competitive market analysis. A market is supplied by two regions (A and B) which are equidistance from it and where transportation costs are the same. Region A borders another country where political upheaval has left many skilled workers without employment. The immigration agreement reached by the two countries allows workers from the troubled country to work in this country but not to live in it. Hence, workers can only work in border regions (in this case, region A).

(a) Here is the initial set-up of the industry:



(b)+(c)+(d) As workers cannot move easily across regions, the influx of foreign workers will cause a fall in region A's wage level.



Both average and marginal cost in region A will shift downwards.

Short Run: Firms in region A would want to adjust their output to the profit maximising level of it. This means that firms in region A will increase their supply at the given price. This, in turn, will cause a fall in equilibrium price in the market. As a result of this change, firms in region A will now be making profits while firms in region B will be making losses (the move from A to B).

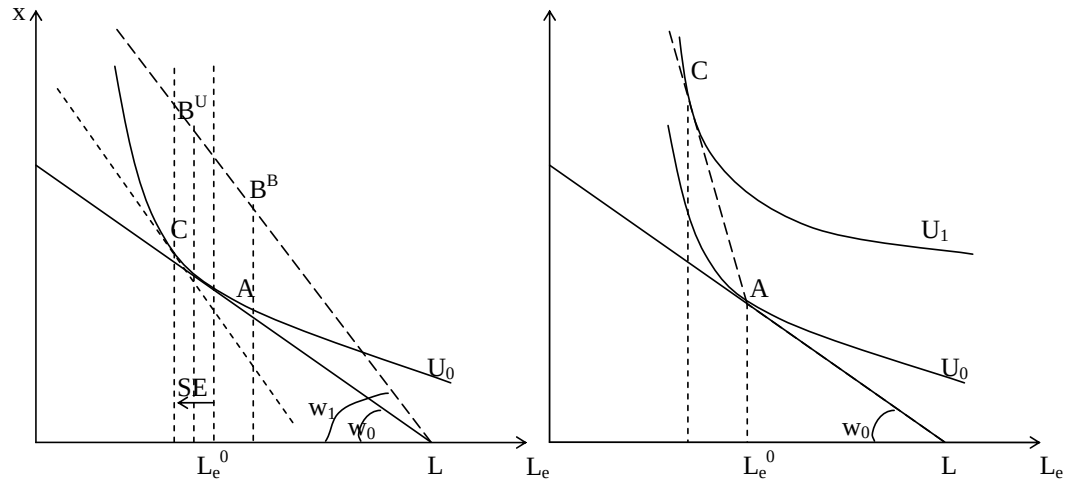
Long Run**:** Firms from region B will now want to move to region A (we assume zero relocation costs). As they do, they increase the demand for workers in this region. What will happen in the long run depends on the relative strengths of the increase in demand for workers and the increase in their supply (the influx of workers). If at first, the flow of migrants is stronger, wages will fall further increasing the lure of profitability in the region. This is so as the price will not vary much from B as the increase in output by firms from region A (motivated by fall in marginal costs) will be offset by the departure of firms from region B. At some stage, the flow of workers will stop. Then, as the region generates profits above the normal, all the firms from region B would move to region A. If the influx was sufficiently large, this would not be sufficient for the process to end and new firms will enter the industry in region A. In such a case, the process will end at C.

As firms entered the industry, the wages would be pushed back up. How far up depends on the co-ordinated movement of equilibrium price (influenced by the number of firms) and the responsiveness of wages. If we end up at C then it means that the influx was sufficiently strong to bring down wages in the region. In such a case, there will be a shift towards labour intensive technology in region A.

It is equally possible that the influx was much smaller and the movement of a few firms from B to A could be sufficient to offset the decline of wages. In such a case, wages will subsequently rise back to the original level and we may end up at the same level of price where region A has now the greater share of the market and capital to labour ratio returned to normal.

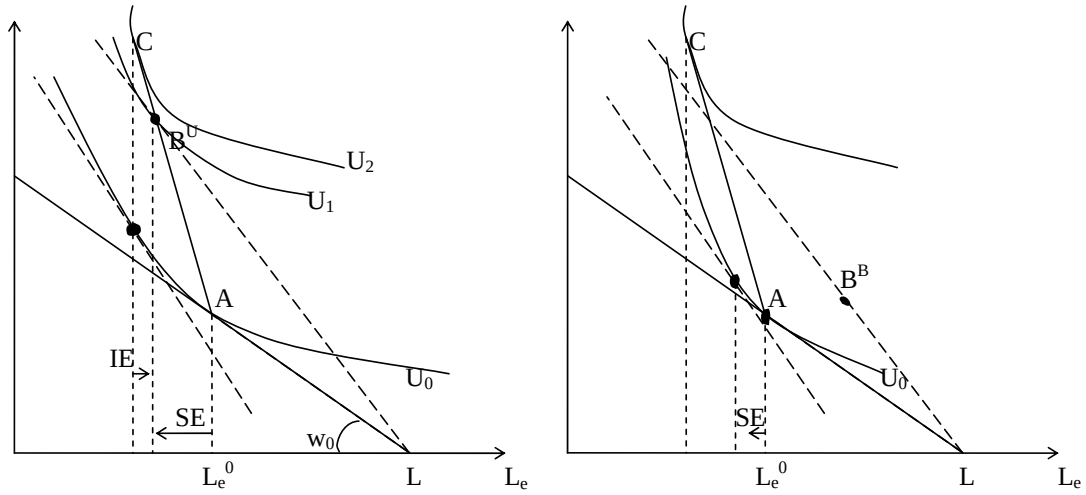
Question 4:

This is a rather simple question regarding the labour supplied by an individual. It is not a question about the shape of the labour supply and it must therefore be analysed in the context of an individual's choice of leisure.



The left hand diagram depicts option (i) while the right hand diagram represents option (ii). The information with regard to $B>(\acute{w}_1 - \acute{w}_0)$ simply suggests that the increase in hourly wages beyond L_0 is greater than the increase in the hourly wage under option (i).

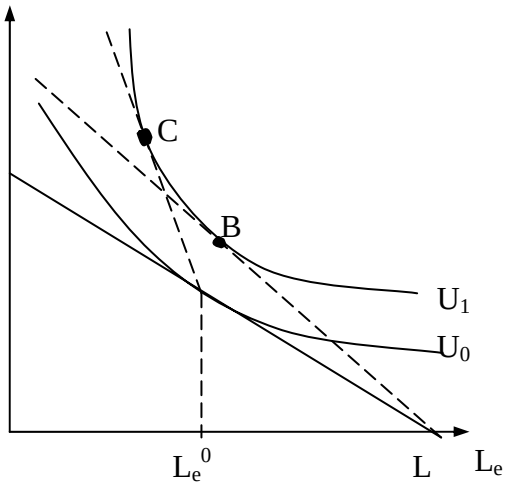
(a)+(b)



The left hand diagram represents the case when labour supply is upward sloping. The substitution effect is greater than the income effect. Hence, the workers response to option (i) will be point B where the individual chooses to have less leisure and supply more labour time. The worker is more likely to be better off with option (ii) but his, or her, supply of labour will not be that much different under the two options.

In the right hand diagram we have the case where wages are at the backward bending segment of the labour supply. Here, income effect exceeds (in absolute values) the substitution effect. Hence, we end up at point B. Again, the individual is likely to prefer option (ii) but here, his supply of labour under this option is clearly greater (point C).

(c) Can the individual be indifferent between the two options?



This is clearly possible. In such a case, his supply of labour hours will be much greater if offered option (ii) than if he were to be offered option (i).

Question 5

(1) We have here two economies with the following multipliers:

Economy 1:

$$\frac{1}{1 - c - g_1 + m}$$

Economy 2:

$$\frac{1}{1 - c(1 - t) - g_2 + m}$$

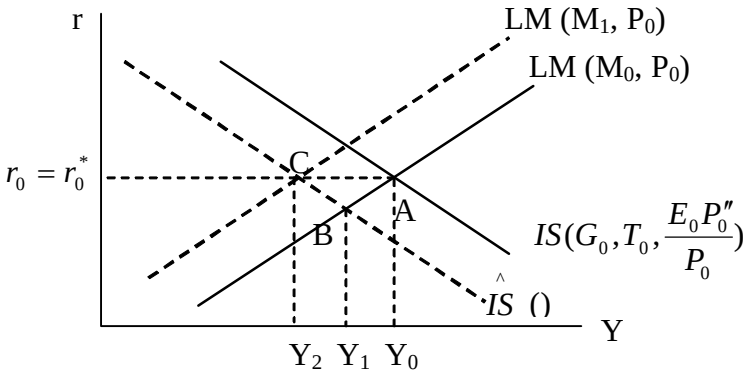
For the multiplier of economy 1 to be greater than the multiplier of economy 2, the denominator of 2 must be greater than the denominator of 1. (note that c and m are identical in both economies. Hence:

$$1 - c(1 - t) - g_2 + m > 1 - c - g_1 + m$$

$$ct > g_2 - g_1$$

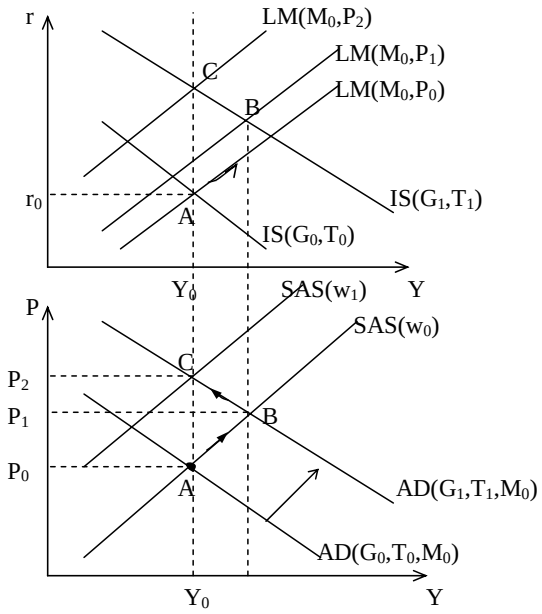
As g_2 is negative, this relationship will always hold. Thus, the multiplier of economy 1 will be greater than that of economy 2.

(2) An open economy with capital mobility and a flexible exchange rate:



The 'paradox of thrift' suggests that increase in savings will cause a fall in income and a subsequent fall (or no change in)savings. An increase in the propensity to save means a fall in demand for consumption. IS shifts to the left. National income and domestic interest rate fall. There will be an outflow of capital and an excess demand for foreign currency. With a flexible exchange rate this will mean an increase in nominal exchange rate and a subsequent increase in demand for NX. Hence, IS will shift back to its original position.

(3) A closed economy with flexible wages and prices. There is an increase in government spending which is financed by an equal increase in taxation:



From the analysis of balanced budget multipliers we know that because of the difference in the marginal propensity to consume and the government marginal propensity to spend, even when there is an increase in taxation of the same magnitude as the increase in spending, there will still be a residual increase in aggregate demand. Hence, the IS shifts to the right.

This corresponds to a shift in the AD curve which will increase prices to p_1. Hence, the supply of real balances will fall and the LM shifts upwards. We are now in equilibrium at point B. This also implies a fall in real wages and when wage negotiations re-open workers will demand a compensation in accordance with the expected further increase in price that will follow their negotiation. With correct expectations, the economy will move to point C where there will be crowding out of investment to pay for that part of the increase in public spending which had not been financed by taxes. The answer, therefore, is: false, investment will not fall by the full increase in public spending.

(4) First we have to have an idea of wealth in this context. For simplicity sake we shall assume that there are only liquid assets in the economy. The wealth of the public is the difference between assets and liabilities. Namely:

W = [PC + D] - [L]

where PC is cash held by the public, D and L are the total amount of deposits and loans respectively. From the analysis of liquid assets supply we know that D = K (1/α) where K is the actual money deposited in commercial banks and α is the reserve ratio.
At the same time we know that L= K[(1/α)-1].
Hence:

W = [PC + (K (1/α))] -K[(1/α)-1]
W = PC + K(1/α) - 1/α + 1) = PC + K

which means that W, in such a world, equals to the money base and will not be affected by the change in reserve ratios.

(5) A cut in the rate of proportional tax will increase the multiplier. The slope of the IS in a closed economy should be derived in the following way:

$$IS: \quad AE(Y,r,) = Y$$

$$\hat{A} + [\,c_1(1-t)\,]Y - I_1 r = Y$$

$$I_1 r = \hat{A} + Y[\,c_1(1-t) - 1]$$

$$r = \frac{\hat{A}}{I_1} + Y[\,\frac{c_1(1-t)\ -1}{I_1}\,]$$

$$\frac{dr}{dY} = \frac{c_1(1-t)\ -1}{I_1}$$

Hence, a fall in t will make the IS flatter (a smaller absolute value).

Question 6

We begin by noting the information given in the question. We consider a closed economy where:

(i) Profits constitute the fraction α of national income (i.e. αY);
(ii) There is a corporate tax (which is proportional, t_c), which means that after tax profits are (1- t_c)αY;
(iii) A fraction β of net profits is distributed to shareholders;
(iv) The remaining profits are invested;
(v) There is a regular tax rate t;

The issue: the government considers cutting corporation tax to encourage investment.

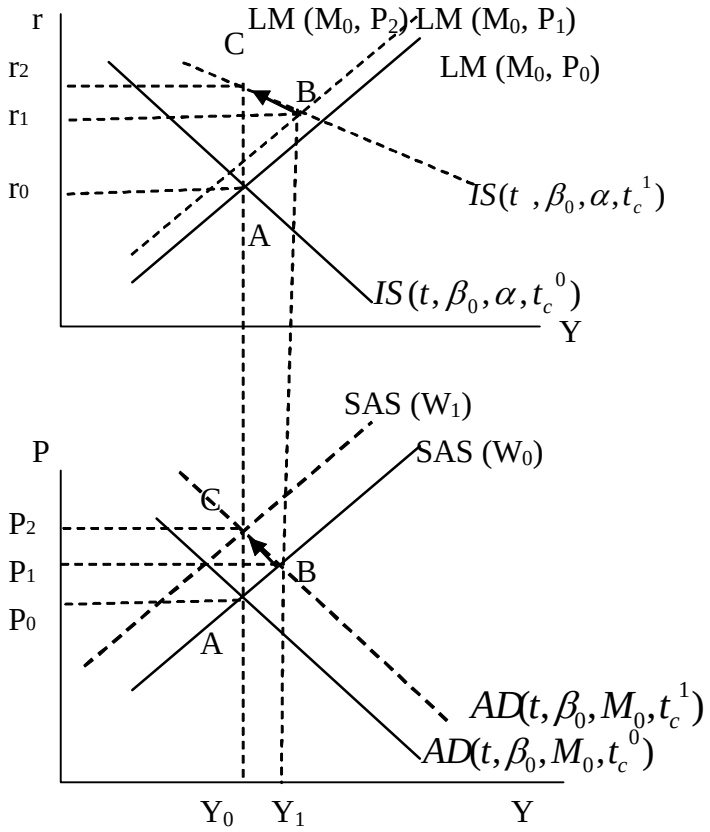
The initial set-up is therefore as follows:

$$C(Y) = C_0 + c_1(1-t)[Y(1-\alpha) + \beta(1-t_c)\alpha Y]$$
$$I(r) = I_0 - I_1 r + (1-\beta)(1-t_c)\alpha Y$$
$$G = G_0$$
$$\Rightarrow [C_0 + I(r) + G_0] + [c_1(1-t)((1-\alpha) + \beta(1-t_c)\alpha) + (1-\beta)(1-t_c)\alpha]Y = Y$$
$$Y = A(r)\frac{1}{1-[c_1(1-t)((1-\alpha) + \beta(1-t_c)\alpha) + (1-\beta)(1-t_c)\alpha]} = A(r)\frac{1}{1-[M]}$$

(a) The government considers a reduction in the corporate tax. Clearly this will have a positive effect on the aggregate demand as both demand for investment and demand for consumption will increase:

$$\frac{\partial M}{\partial t_c} = -c_1(1-t)\alpha\beta - (1-\beta)\alpha < 0$$

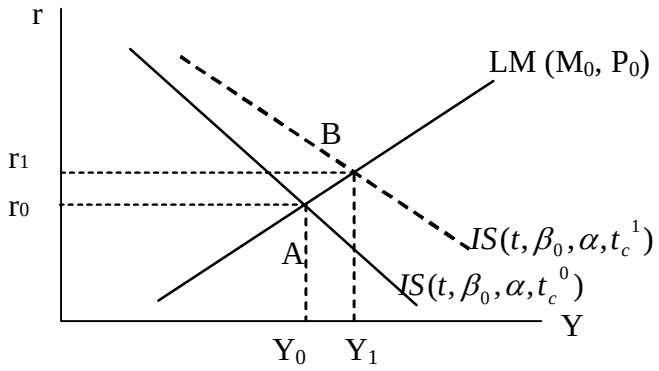
This means that the multiplier will increase as the rate of corporate tax falls and that for any given level of interest rate, there will be equilibrium in the goods market at a higher level of income (IS shifts to the right AND it becomes flatter). The consequences of this policy in a closed economy with flexible wages and prices will be:



There will be a short run expansion in output but in the long run, prices and nominal wages will increase to bring the economy back to its original position in terms of output but at a higher level of prices and interest rates. This means that the cut in corporate tax would end up with crowding out of investment.

In the question we asked whether there is an ambiguity in the result. As you can see from above, there is no ambiguity in the effects of the cut in corporate tax on the multiplier. The reason why we asked this question is that originally, there was another element in the question which somehow slipped away during the long process of editing the paper. This element was the assumption that the government has a balanced budget policy and that it adjusts its spending to its tax revenues. In such a case, it is easy to see that the cut in corporate tax would have reduced government spending. This would have created a potential ambiguity. The only real implication of this for the marking of the paper is that section (c) is somewhat meaningless and we shall ignore it in the allocation of marks.

(b) The case of fixed prices is straightforward:



A cut in corporate tax would shift the IS to the right and make it flatter. Output will increase and so will the rate of interest. However, as investment is a function of income, we cannot deduce from this that there will be any crowding out whatsoever.

Question 7

Due to the deterioration in security around the world and the rise in recurring epidemics, the public chooses to holiday at home rather than travel abroad. This is basically a very simply story. In terms of the model it simply means a fall in the marginal propensity to import which could be accompanied by a rise in the marginal propensity to consume locally. Either way the effects are unambiguous. This means an increase in the multiplier and thus a shift of the IS to the right and it should also become flatter.

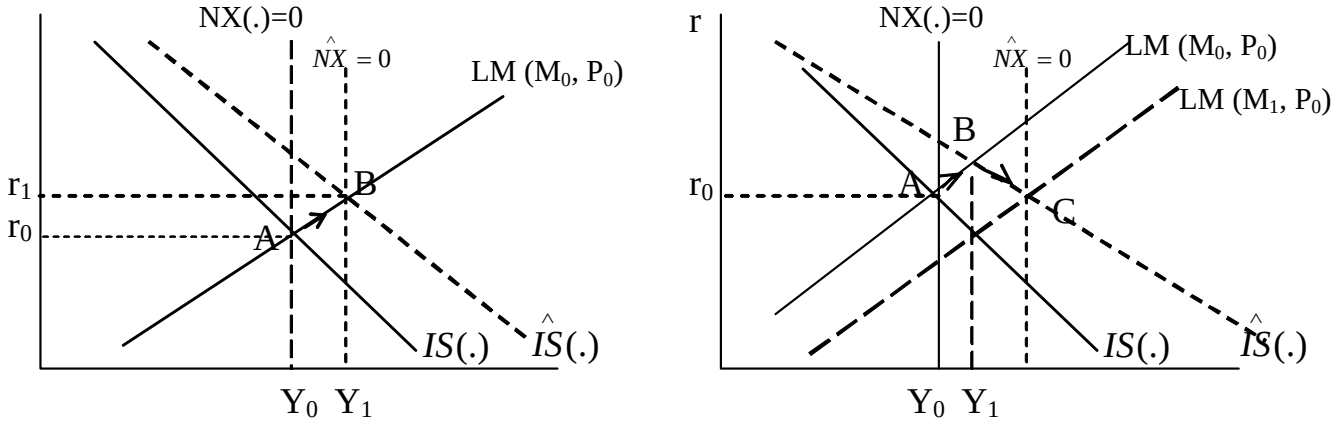
(a) The multiplier:

Before the change:

$$C(Y) = C_0 + c_1(1-t)Y$$
$$I(r) = I_0 - I_1 r$$
$$G = G_0$$
$$X(\frac{E \cdot P^*}{P}) = X_0(\frac{E_0 P^*_0}{P_0})$$
$$IM(\frac{EP^*}{P}, Y) = IM_0(\frac{E_0 P^*_0}{P_0}) + m_1 Y$$
$$\Rightarrow AE(Y, r, \frac{EP^*}{P}) = [C_0 + I(r) + (X_0 - IM_0)(\frac{E_0 P^*_0}{P_0})] + (c_1(1-t) - m_1)Y = Y$$
$$Y = A(r, \frac{EP^*}{P})\frac{1}{1-[c_1(1-t)-m_1]} = A(r, \frac{EP^*}{P})\frac{1}{1-M}$$

Clearly $\frac{\partial M}{\partial m_1} < 0$ means that a decrease in the marginal propensity to import will increase the multiplier.

(b) An open economy without capital mobility and a fixed exchange rate:



On the one hand, the increase in the multiplier will shift the IS to the right and make it flatter. Equally, a fall in demand for imports will require higher levels of income to offset the initial net export (NX=0 shifts to the right):

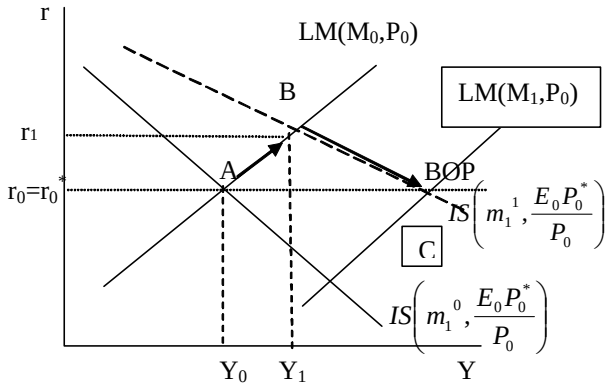
$$NX(\frac{E_0 P^*_0}{P_0}, Y) = (X_0 - IM_0)(\frac{E_0 P^*_0}{P_0}) - m_1 Y = 0$$

$$Y^{NX=0} = \frac{(X_0 - IM_0)(\frac{E_0 P^*_0}{P_0})}{m_1} \quad \Rightarrow \frac{dY^{NX=0}}{dm_1} = -\frac{(X_0 - IM_0)(\bullet)}{m_1^2} < 0$$

As in the past we accept in such cases a straight move from A to B as is depicted in the left hand diagram. If, however, a students describes the whole process whereby NX shifts, say, further to the right (for the same level of interest rate) as is depicted in the right hand diagram, we expect the full adjustment story. Namely, that the initial move is to equilibrium at B where output increased to accommodate the increase in demand for home holidays.

However, at this level there will still be a surplus in the current account and as a result, there will be excess supply of foreign currency. Given the exchange rate policy, the central bank will buy the excess supply and cause an increase in the supply of liquid assets. This, in turn, will shift the LM downwards and the economy will expand further until a new equilibrium at point C.

(c)+(d) This is the case of perfect capital mobility:



The initial change in this case is simply the shift of the IS to the right. (A to B). This will raise local interest rates above the international level of return rates on assets and subsequently, cause an inflow of capital (foreigners wishing to hold local assets). This, in turn, will cause excess supply of foreign currency. In the case of a flexible exchange rate, E will decrease (appreciation) and the demand for net export will diminish. The IS will shift back to its original position at A. where the increase in government spending has crowded out export.

In the case of a fixed exchange rate, the excess supply of foreign currency will be absorbed by the Central Bank and cause an increase in the supply of liquid assets. LM will shift downwards and the new equilibrium will be at point C.