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EE312 Macroeconomics, 1/2020 (Sec. 046401)
Problem Sets: Ch.7 A Closed Economy One-Period Macroeconomic Model

No need to submit. Self study.

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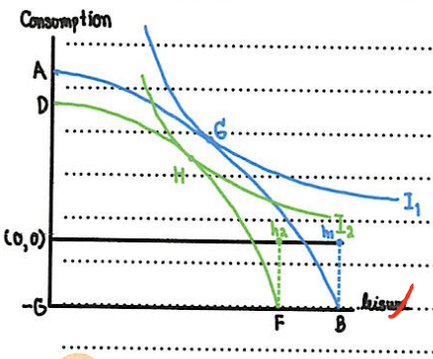
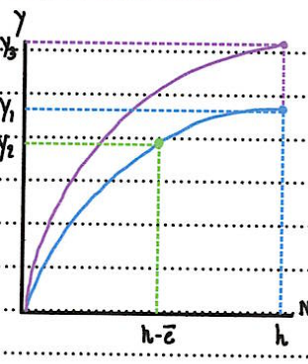
1. In one-period model, education can be represented as time spent by the representative consumer that is neither leisure nor time applied to producing output. What the economy gains in the future is that the representative consumer then has more time available, as measured in terms of effective units of labour time (adjusted for skill level, or what economists call human capital). → skill ↑ after schooling

   (a) Using the one-period model, show what effects additional education has in the present on consumption, leisure, employment, aggregate output, and the real wage.

   (b) Similarly, show the effects of the additional education that people acquire today will have in the future consumption, leisure, employment, aggregate output, and the real wage.

   (c) What does your analysis in parts (a) and (b) have to say about trade offs society makes between the present and the future in investing in education.





after effectiveness ↑ MPN ↑
max N = h

what is h_2, how it is different from h_1.

(a.) An increase in hours used for education can be shown in the graph as a decrease in h, from h_1 to h_2. This shifts the PPF to the left by amount of $h_2 - h_1$, likely the income effect to a reduction in government spending. Therefore, consumption, leisure, employment, and aggregate output will reduce, but the real wage will increase.

(b.) In the future, labor has higher productivity. Therefore, the labor will have more time available, which mean h are higher. So, the future consumption, leisure, and output will rise. On the other hand, the real wage will fall. show graph ? before education, during education, after education

(c.) Education is an investment, it will reduce leisure time and consumption. However, in the future we will have more leisure time and consumption. Whether this is worth doing depends on the preferences of households over current and future utility. explain more on all possible cases.

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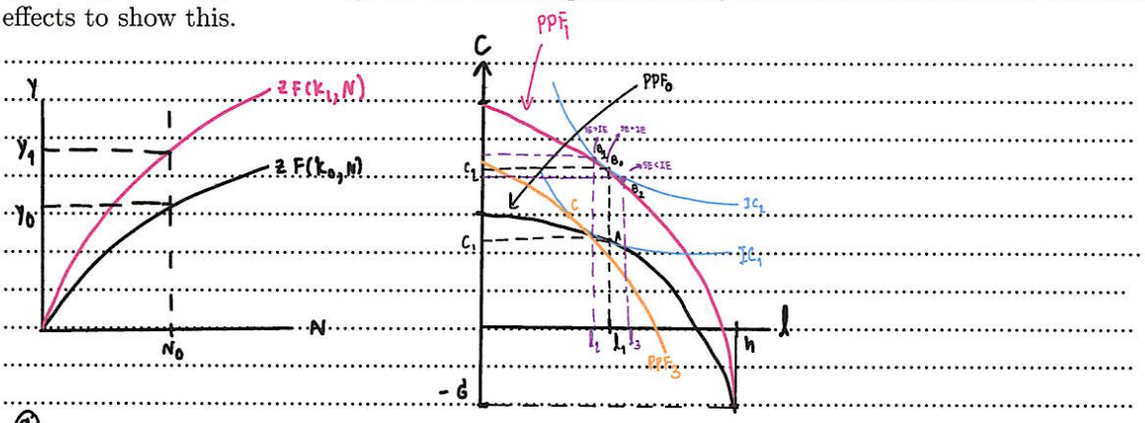
2. Suppose that government spending makes private firms more productive; for example, government spedning on roads and bridges lowers the cost of transportation. This means that there are now two effects of government spending, the first being the effects discussed in this chapter of an increase in G and the second being similar to the effect of an increase in the nation's capital stock K.

   (a) Show that an increase in government spending that is productive in this fashion could increase welfare for the representative consumer.

   (b) Show that the equilibrium effects on consumption and hours worked for an increase in government spending of this type are ambiguous but that output increases, You must consider income and substitution effects to show this.



(a)

When Government spending is increase the situation is identical to the increasing in capital (K_0 to K_1). When capital increasing is occur, the marginal product of labor increase (MP_{N_1} to MP_{N_2}); hence, firms are able to produce more and consequently output also increase from Y_0 to Y_1. Consumption also increase when output increase; therefore, PPF curve shift out ward (PPF_0 to PPF_1). As a result, IC curve change to higher utility, meaning that if government spending is increase this will make social welfare go higher.

(b)

According to the graph, we will see that output will be increase for sure, but the equilibrium effect on consumption and hours worked for an increase in government spending of this type are ambiguous. Because we will have three cases of new equilibrium which are B_0, B_1 and B_2 depend on which effect is stronger, substitution or Income, or both effects are equally affect the equilibrium.

If substitution effect is stronger, the new equilibrium will be at B_1 where N is higher but l is lower (l_1 to l_3) than original equilibrium (A).

If Income effect is stronger, the new equilibrium will be at B_2 where N is lower but l is higher (l_1 to l_2) than original equilibrium (A)

If both effect is equally affect the equilibrium, new equilibrium will be at B_0 where N and l remain the same as the original equilibrium A

separate effect

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3. Suppose there are but two countries, namely A and B. Each country is indexed by "j" for j = A and B. Both countries have no government, i.e. $G_j = T_j = 0$. Suppose the technology of both countries are linear production in labor hours. That is, $y_j = z_j N_j$ where N_j is the number of working hours in country j and z_j is the level of technology in country j. Suppose that $z_A = 2 > z_B = 1$ and preferences of consumers in both countries are identical

   (a) Assuming a fixed time endowment in both countries to be equal to 1 unit, construct the PPF of each country. Putting both PPFs in the same figure and locate all important points. Comments on the differences and similarities between the two PPFs.

   (b) Determine the competitive equilibrium in both countries. Is there any wage differentials in the equilibrium? Which one of the country is supposed to experience a higher wage? Why? How about the allocation in both countries?

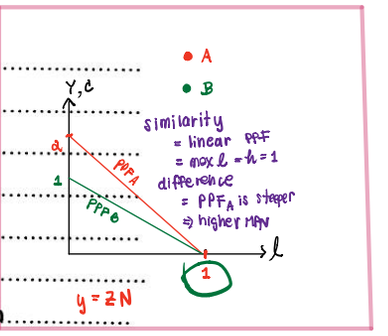
   (c) Redo the problem (a) and (b) above, but instead assume that the labor endowment in both countries are different, i.e. $h_A = 1$ and $h_B = 4$. Comment on the possible sources that generate the wage differentials, if any?

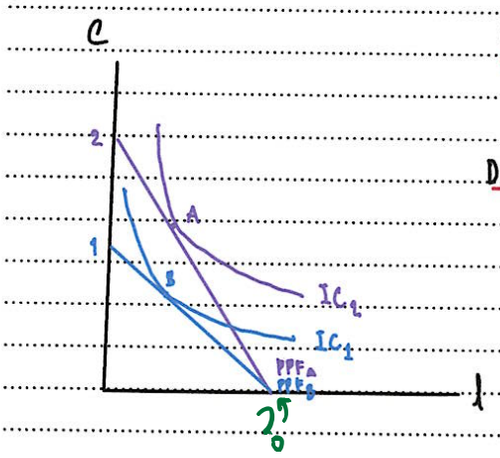
(a) if h=1 จาก PPF_A และ PPF_B

(1) G=0 แสดง Y=C [Y=C+G], N=h=1 ⇒ N=1-l

(2) จาก $Y_A = z_A N_A \Rightarrow C_A = 2N_A \Rightarrow C_A = 2(1-l_A) \Rightarrow C_A = 2-2l_A$

จาก $Y_B = z_B N_B \Rightarrow C_B = 2N_B \Rightarrow C_B = 1-l_B \Rightarrow C_B = 1-l_B$





Similarity (1) Time constraint of both country

(2) Linear PPF

Difference (1) difference technology : $z_A > z_B$ ∴ Production A > B

(2) level of consumption : $C_A > C_B$

(3) Wage difference : w = slop of PPF

(1) $C_A = 2 - 2l_A$ ∴ $\frac{dh_A}{dl_A} = -2$ ∴ wage (A) = 2

(2) $C_B = 1 - l_B$ ∴ $\frac{dC_B}{dC_B} = -1$ ∴ wage (B) = 1 ✓

(b) wage of C_A is 2 while C_B is 1. This shows us that wage of country A is higher than B due to $2 - 2l_A$ and $1 - l_B$ ($N = 1 - l$)

$\frac{dC_A}{dC_A} = -2$, $\frac{dC_B}{dC_B} = -1$

∴ Country A should have higher wage due to higher technology and consumption

From question (A) :

Wage difference = w = slop of PPF

(1) $C_A = 2 - 2l_A$ ∴ $\frac{dh_A}{dl_A} = -2$ ∴ wage (A) = 2 ✓

(2) $C_B = 1 - l_B$ ∴ $\frac{dC_B}{dC_B} = -1$ ∴ wage (B) = 1 ✓

3. Suppose there are but two countries, namely A and B. Each country is indexed by "j" for j = A and B. Both countries have no government, i.e. $G_j = T_j = 0$. Suppose the technology of both countries are linear production in labor hours. That is, $y_j = z_j N_j$ where N_j is the number of working hours in country j and z_j is the level of technology in country j. Suppose that $z_A = 2 > z_B = 1$ and preferences of consumers in both countries are identical

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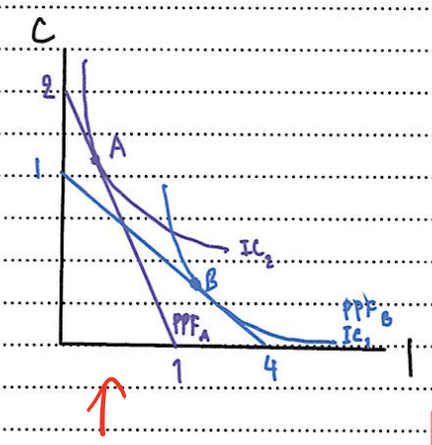
(C)



graph is wrong.

1) $Y_A = Z_A N_A$

2) $Y_B = Z_B N_B$

from $Y_A \Rightarrow Z_A N_A \Rightarrow C_A = Z_A N_A \Rightarrow C_A = 2(1-l_A)$

from $Y_B \Rightarrow Z_B N_B \Rightarrow C_B = Z_B N_B \Rightarrow C_B = 1 - l_B$

$\therefore C_A = 2 - 2l_A$

$C_B = 1 - l_B$

Technology : $Z_A > Z_B$ $\therefore$ Production A > B

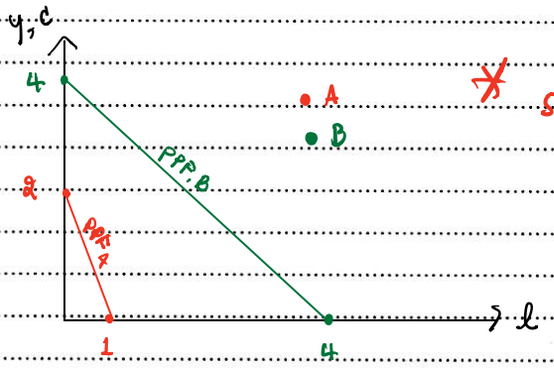
Consumption : $C_A > C_B$

Wage differential : A: $\frac{d}{dl} = -2 \Rightarrow 2$

B: $\frac{d}{dl} = -1 \Rightarrow 1$

$\therefore$ country A still have more advantages than country B due to endowme

Comment.



* source of wage differential = productivity of worker. *