

$$9 + 10 + 7 = 26/30$$

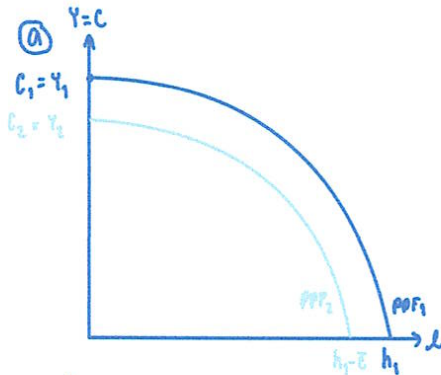
EE312 Homework

Submitted by

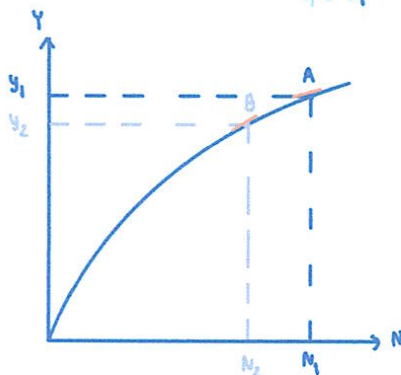
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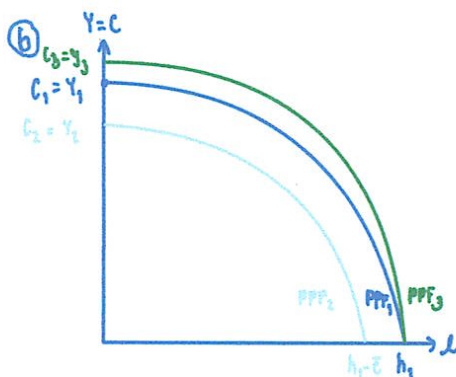
1. In one-period model, education can be represented as time spent by the representative consumer that is neither leisure nor time applied to producing output. What the economy gains in the future is that the representative consumer then has more time available, as measured in terms of effective units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



In the current period, since consumers spend time for the education, the PPF rotates downward from PPF_1 to PPF_2 that the consumers cannot work at full-time same as before. The consumers have to allocate some time for education. The maximum hour of working will decrease from h_1 to h_1-E . Also, when hour of working decreases, the maximum consumption and maximum output decrease.

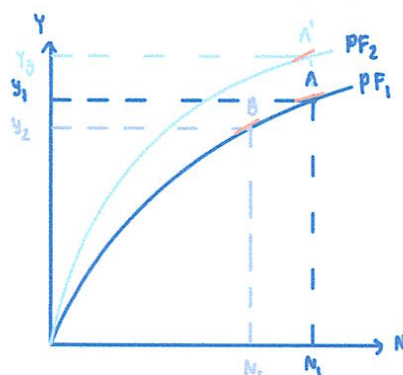


Since hour of working decreases, the number of labor decreases from A to B. As the slope of PPF equals to real wage. At point B, the slope of PPF is steeper than at A. Therefore, the real wage at point B is greater than at point A. Finally, we can imply that when consumers increase consumption, the real wage increases.



In the future period, since the consumers terminate the education. The PPF rotates upward from PPF_2 to PPF_3 . The maximum working hour comes back to the initial maximum working hour which is at h_1 . Since consumers have more education, the productivity will increase. Now the maximum consumption and output will increase to C_3 and Y_3 .

$C^*?$ $L^*?$ $W?$
new equilibrium?



Since the productivity increases, the production function will rotate upward from PF_1 to PF_2 . Compared between A and A' which the number of labor is equal between these two points, the slope at point A' is steeper than A meaning that the real wage after consumers gain education increases.

© From A and B, we sacrifice our consumption and output from $C_1 = Y_1$ to $C_2 = Y_2$ and leisure from h_1 to $h_1 - \bar{e}$ in the present to make labor have more education. In the future, when the labors are educated, the productivity of labor increase. The consumption and output would increase from $C_2 = Y_2$ to $C_3 = Y_3$ and leisure will come back to the original point, h_1 . Therefore, the society will gain the benefit from education in longrun.

trade-off ? is it worth to have education ?

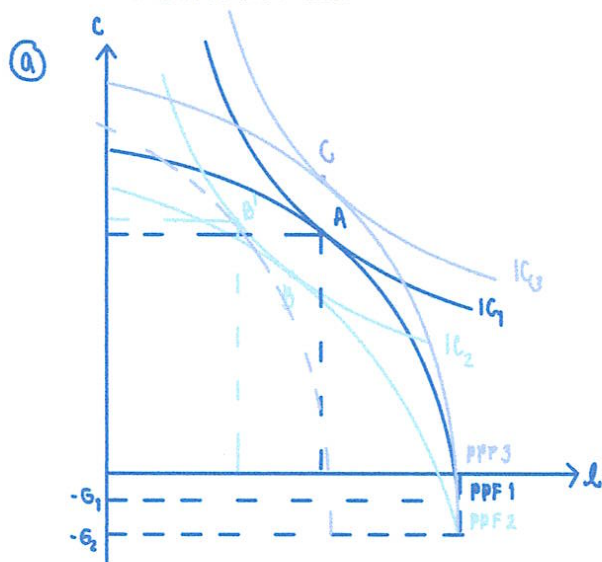
benefit vs. cost

explain all possible cases

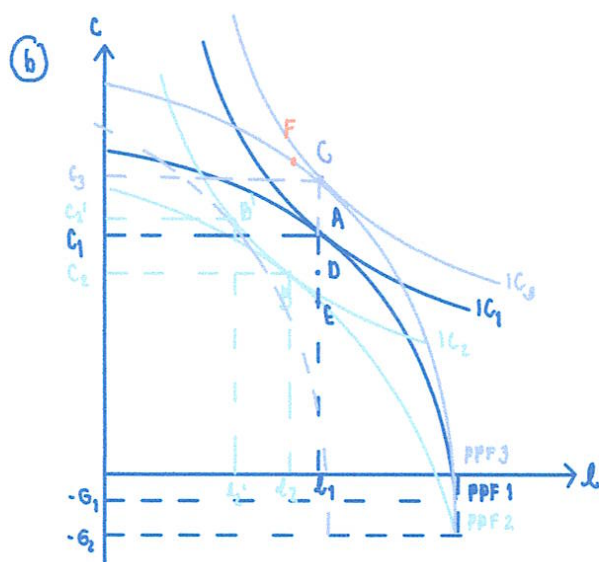
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2. Suppose that government spending makes private firms more productive; for example, government spending on roads and bridges lowers the cost of transportation. This means that there are now two effects of government spending, the first being the 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 .

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



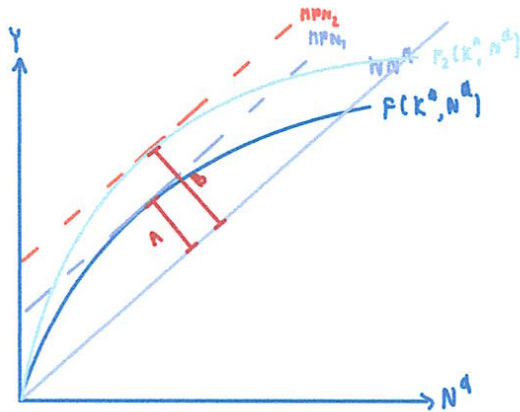
From the graph, it represents the overall effects of increase in government spending which increases welfare.



Since the government spending (G) increases, it causes the pure negative income effect which the PPF will rotate downward from PPF_1 to PPF_2 . This affects on consumption (C) and leisure time (L) that the initial Pareto equilibrium was at A on PPF_1 . The consumption was equal to C_1 and leisure time was equal to L_1 . When the government spending increases that the Pareto equilibrium now shifts from A to B where B is on PPF_2 , now the consumption decreases from C_1 to C_2 and leisure time decreases from L_1 to L_2 . From the graph, we can see that the increase of government spending is AE and the decrease of consumption is AB . As can be seen that the increase of government spending must be greater than decrease of consumption since the output (Y) increases.

As the government spending increases and it can increase productivity, the PPF will rotate upward from PPF_2 to PPF_3 which the Pareto equilibrium will shift from B to C . When productivity increases, it constructs the substitution effect and income effect. For the substitution effect, we will construct imaginary PPF which it is parallel with PPF_3 but rotates downward. Now we get point B' where the imaginary PPF tangents with IC_2 . At point B' , it shows the substitution effect that we consider the consumption and leisure time as normal goods. When productivity increases that the leisure time becomes more expensive, the consumers tend to decrease their leisure times and increase their consumption. So the leisure time decreases from L_2 to L_2' and consumption increases from C_2 to C_2' . Next, we will consider income effect which the point B' shifts to C . In this case, we suppose that substitution effect is equal to income effect. Now, at point C the leisure time increases from L_2' to L_1 and consumption increases from C_2' to C_3 . Finally, after government spending increases which affects on productivity, the consumer consume the same amount of leisure time but spend more consumption.

In addition, we can suppose the substitute effect is greater than income effect. The pareto equilibrium is at F which the leisure time decreases but consumption increases. Then, when the leisure time decreases, the number of labor will increase and output will increase.

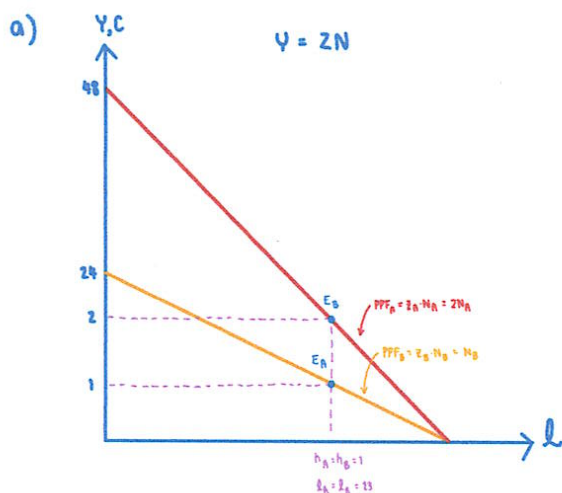
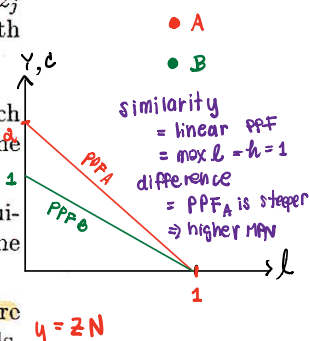


In terms of profitability, when productivity increases, the production function will relate upward from $F(k^A, N^A)$ to $F_2(k^A, N^A)$. Besides, the gap between production function and WN^A represents the profitability. The gap is wider from A to B. So, the profit increases.

b

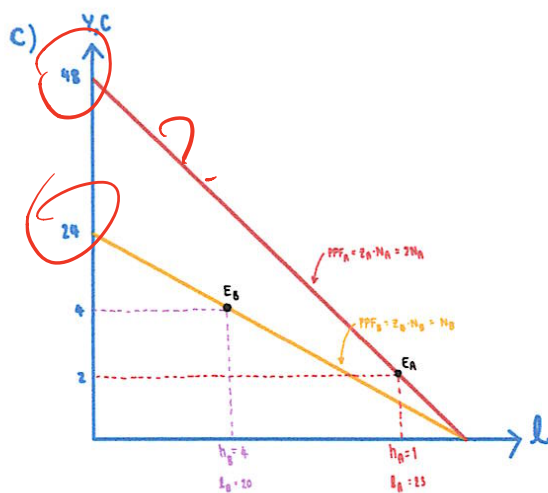
3. Suppose there are but two countries, namely A and B. Each country is indexed by "j" for $j = A$ and B. Both countries have no government, i.e. $G_j = T_j = 0$. Suppose the technology of both countries are linear production in labor hours. That is, $y_j = z_j N_j$ where N_j is the number of working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



From the question, we determine the PPF as a linear line meaning that the slope of PPF is trade-off between leisure time and consumption. Recall that the productivity of country A is better than country B. So, the PPF of country A is steeper than PPF of country B which is PPF_A and PPF_B . As the slope of PPF of country A is steeper than the slope of PPF of country B, this means that there is a higher trade off on country A. At the endowment, country A and B have h_A and h_B are equal to 1, and l_A and l_B are equal to 1, but consumption and output of country A is 2 unit and country B is 1 unit.

- ⑥ As slope of PPF, MRT, is equal to real wage, at the competitive equilibrium the slope of PPF of country A is steeper than country B, so we can imply that the real wage of country A is higher than the real wage of country B. In aspect of trading between consumption and leisure time, country A has to sacrifice more leisure time than country B. To have 1 more consumption unit, country A has to sacrifice more leisure time than country B.

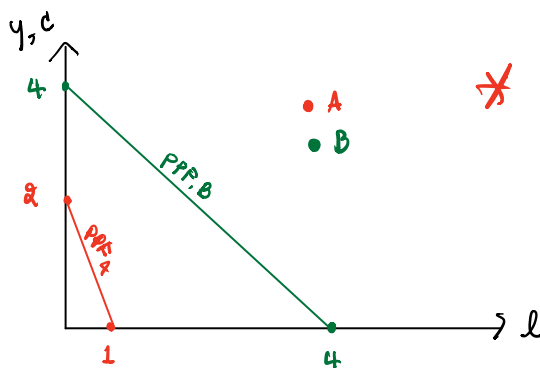


incorrect graph

From the question, we determine the PPF as a linear line meaning that the slope of PPF is trade-off between leisure time and consumption. Recall that the productivity of country A is better than country B. So, the PPF of country A is steeper than PPF of country B which is PPF_A and PPF_B . As the slope of PPF of country A is steeper than the slope of PPF of country B, this means that there is a higher trade off on country A. At the endowment, country A has $h_A = 1$, $l_A = 23$, and output and consumption is equal to 2 while country B has $h_B = 4$, $l_B = 20$, and output and consumption is equal to 4.

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Comment.



* source of wage differential
= productivity of worker *