HW 1

Tuesday, August 31, 2021 9:44 PM

ECN 360 Homework #1, Fall 2021

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ECN 360
Homework #1
Due 9/16/2021

Directions: Answer each question **on a separate piece of paper**. Please be neat! Submit your homework via email to me at: ccdougla@umich.edu. A .pdf is preferred, though any file works in practice.

1. Imagine a society that produces military goods and consumer goods, which we'll call "guns" and "butter".

   a. Draw a production possibilities frontier for guns and butter. Using the concept of opportunity cost, explain why it most likely has a bowed-out shape.

   b. Show a point that is impossible for the economy to achieve. Show a point that is feasible, but inefficient.

   c. Imagine that a society has two political parties, called the Hawks (who want a strong military) and the Doves (who want a smaller military). Show a point on your production possibilities frontier that the Hawks might choose and a point that the Doves might choose.

   d. Imagine that an aggressive neighboring country reduces the size of its military. As a result, both the Hawks and the Doves reduce their desired production of guns by the same amount. Which party would get the largest "peace dividend", measured by the increase in butter production? That is, which party would see the largest increase in the production of butter, because of decreased production of guns? Explain.

2. Suppose a consumer has income of $3,000 that he only spends on wine and cheese. Suppose that wine costs $3 a glass and cheese costs $6 per pound.

   a. Draw the consumer's budget constraint. Put wine on the y-axis and cheese on the x-axis. What is the slope of his budget constraint and what does it tell us?

   b. Draw a consumer's indifference curves for wine and cheese. Put wine on the y-axis and cheese on the x-axis. Describe and explain the four properties of these indifference curves.

   c. Pick a point on the indifference curve for wine and cheese and show the marginal rate of substitution. What does the marginal rate of substitution tell us? (Note: you don't have to pick actual numbers on the indifference curve for the marginal rate

of substitution. Just identify where the marginal rate of substitution is and what it tells us).

d. Show a consumer's budget constraint and indifference curves for wine and cheese. Pick a point on the budget constraint and show the optimal consumption choice using indifference curves (again, you don't have to use actual numbers). If the price of wine is $3 a glass and the price of cheese is $6 a pound, what is the marginal rate of substitution at this optimum? (Hint: what does the marginal rate of substitution equal at the consumer's optimal choice?)

e. The price of cheese rises from $6 to $10 a pound while the price of wine remains at $3 a glass. The consumer's income remains at $3000. Show how the budget constraint changes because of this price increase. Pick any point on this new budget constraint and show the consumer's new optimum, using indifference curves.

Legend

PPF : Production Possibilities Frontier

MRS : Marginal Rate of Substitution

Slope : m : $\frac{\Delta Y}{\Delta X}$

BC : Budget Constraint

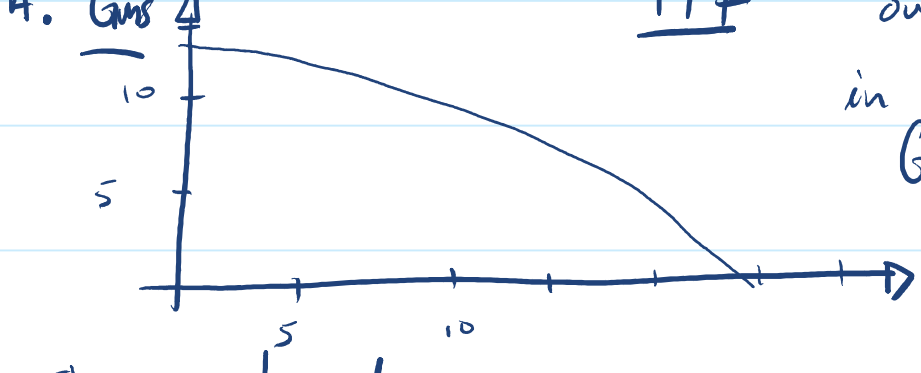
IC : Indifference Curve

1. Imagine a society that produces military goods and consumer goods, which we'll call "guns" and "butter".

a. Draw a production possibilities frontier for guns and butter. Using the concept of opportunity cost, explain why it most likely has a bowed-out shape.

#1 Guns & Butter

A. Guns



PPF

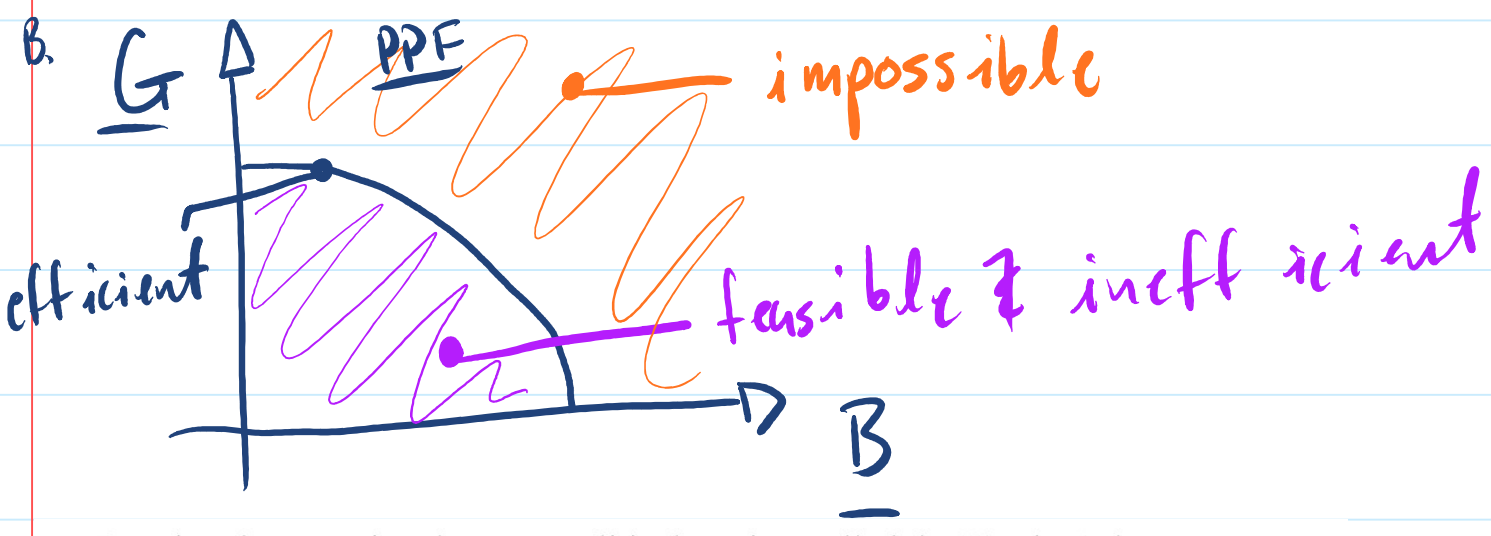
* This is likely bowed out due to specialization in the production of each Good. We have Gun & Butter Factories

- The opportunity cost for a Gun Factory to make 1

- The opportunity cost for a Gun factory to make 1 stick of butter may be many guns; similary a butter factory must give up many sticks of butter to produce 1 gun.

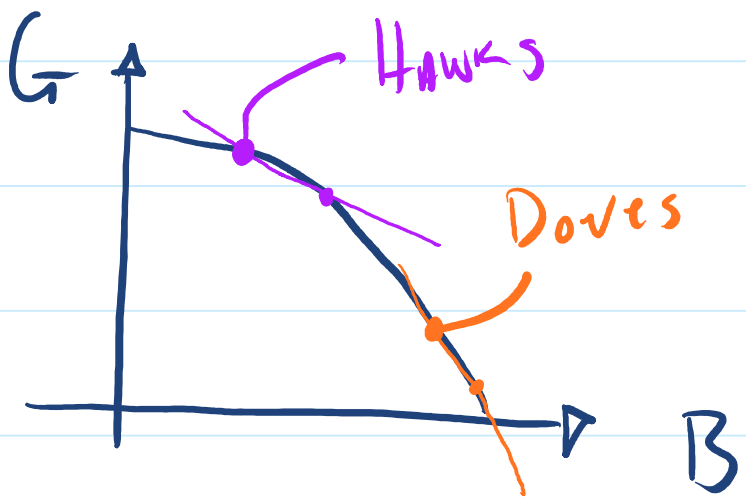
b. Show a point that is impossible for the economy to achieve. Show a point that is feasible, but inefficient.

B.



c. Imagine that a society has two political parties, called the Hawks (who want a strong military) and the Doves (who want a smaller military). Show a point on your production possibilities frontier that the Hawks might choose and a point that the Doves might choose.

C.



d. Imagine that an aggressive neighboring country reduces the size of its military. As a result, both the Hawks and the Doves reduce their desired production of guns by the same amount. Which party would get the largest "peace dividend", measured by the increase in butter production? That is, which party would see the largest increase in the production of butter, because of decreased production of guns? Explain.

D. As shown Above, the MRS $\left(\frac{\Delta Y}{\Delta X}\right)$ is much smaller for the hawks than the Doves. What this tells us is that the hawks must give up less guns than the doves per stick of butter. As a result they see the largest 'peace dividend', & get more sticks of butter in exchange for the same amount of guns.

The HAWKS

2. Suppose a consumer has income of $3,000 that he only spends on wine and cheese. Suppose that wine costs $3 a glass and cheese costs $6 per pound.

a. Draw the consumer's budget constraint. Put wine on the y-axis and cheese on the x-axis. What is the slope of his budget constraint and what does it tell us?

3,000

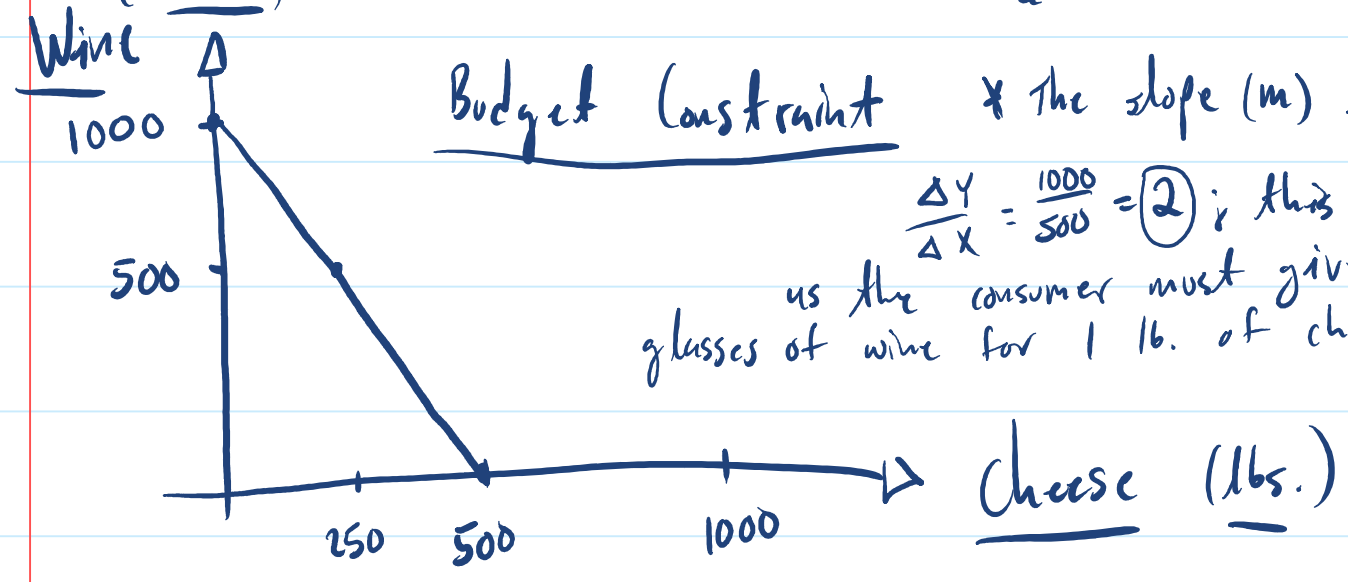
x-axis. What is the slope of his budget constraint and what does it tell us?

#2 Wine & cheese

$W_{max} = \frac{3,000}{3} = 1000$ Glasses

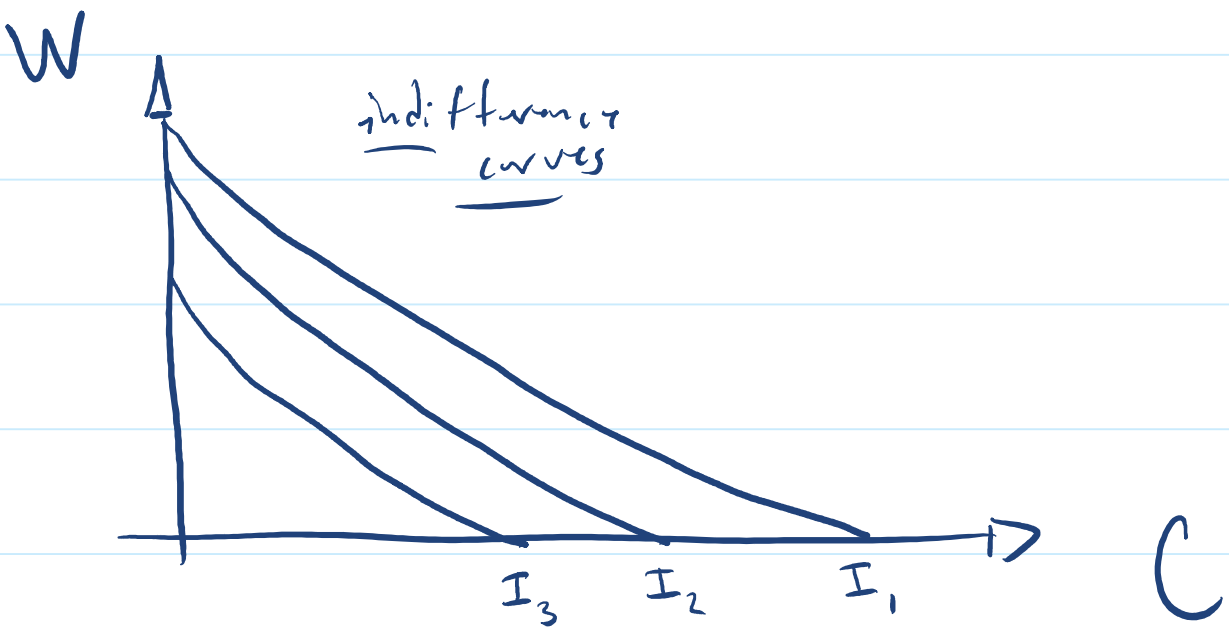
$C_{max} = \frac{3000}{6} = 500$ lbs.

A. (Glasses)



Budget Constraint * The slope (m) is $\frac{\Delta Y}{\Delta X} = \frac{1000}{500} = 2$; this tells us the consumer must give up 2 glasses of wine for 1 lb. of cheese.

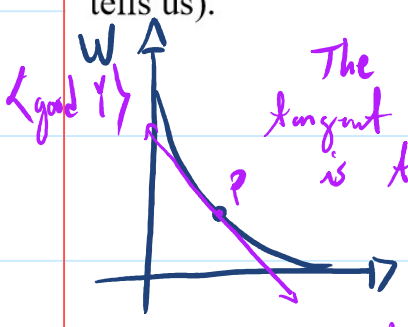
b. Draw a consumer's indifference curves for wine and cheese. Put wine on the y-axis and cheese on the x-axis. Describe and explain the four properties of these indifference curves.



Properties

1. The curves are concave {bowed-in}
   - people prefer a balance of the 2 goods.
2. $I_1 > I_2 > I_3$ [higher indifference curves are preferred]
   - more > less
3. The curves CANNOT intersect.
   - implies more ≯ less
4. The curves slope downward.
   - one good must be given up for the other

c. Pick a point on the indifference curve for wine and cheese and show the marginal rate of substitution. What does the marginal rate of substitution tell us? (Note: you don't have to pick actual numbers on the indifference curve for the marginal rate of substitution. Just identify where the marginal rate of substitution is and what it tells us).

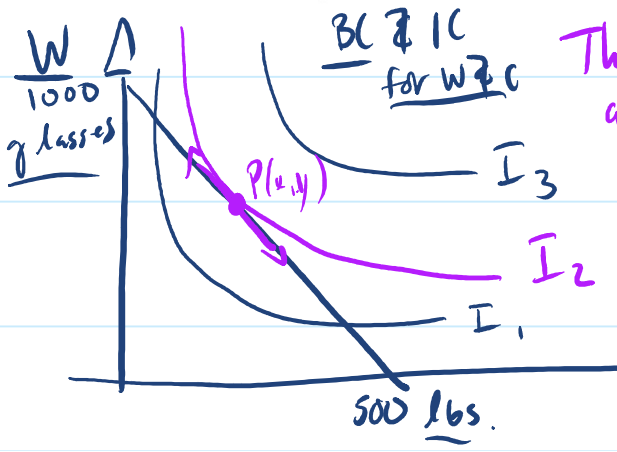


The MRS at some point P is the slope of the tangent line at such point. What this tells us is the amount of good Y a consumer will give up for 1 more good X.

- here it is the # glasses of wine they will exchange for 1 lb of cheese,

{good x} ... they will exchange for 1 lb of cheese, given they have x lbs. of cheese & y glasses of wine @ P(x,y).

d. Show a consumer's budget constraint and indifference curves for wine and cheese. Pick a point on the budget constraint and show the optimal consumption choice using indifference curves (again, you don't have to use actual numbers). If the price of wine is $3 a glass and the price of cheese is $6 a pound, what is the marginal rate of substitution at this optimum? (Hint: what does the marginal rate of substitution equal at the consumer's optimal choice?)



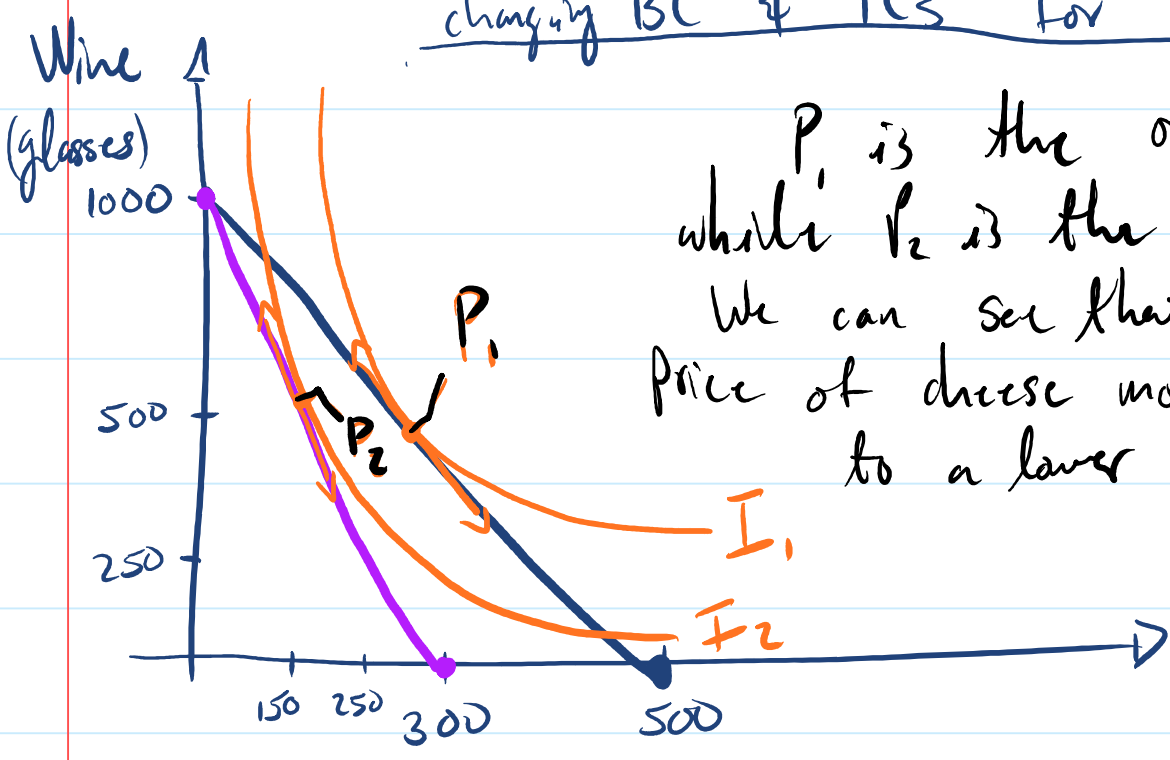
The optimal consumption choice is at point P where the budget constraint is the tangent to the indifference curve I_2. Here the MRS is 2 as $P_x/P_y = \$2/\$1 = 2$

e. The price of cheese rises from $6 to $10 a pound while the price of wine remains at $3 a glass. The consumer's income remains at $3000. Show how the budget constraint changes because of this price increase. Pick any point on this new budget constraint and show the consumer's new optimum, using indifference curves.

- Original
- New {cheese = $10/lb.}

$$C_{MAX} = \frac{3000}{10} = 300 \text{ lbs.}$$

changing BC & ICs for wine & cheese



P_1 is the original optimum while P_2 is the new optimum. We can see that the increase in price of cheese moved the consumer to a lower indifference curve.