

Lecture 9(i)

Announcements

- Work on “Consumer Theory” worksheet (at week 9 on Canvas) before recitation.
- Midterm 2 coming up. Can start looking at practice midterms (at week 10 on Canvas).

Lecture

1. Substitution and Income Effects

2. Robinson and Crusoe with indifference curves and budget constraints. (We finish the masterpiece.) Our version of



3. Costs
U-shaped Average Cost

At optimal consumption bundle

At optimum two conditions:

$$(1) \quad MRS = \frac{P_{\text{pizza}}}{P_{\text{beer}}}$$

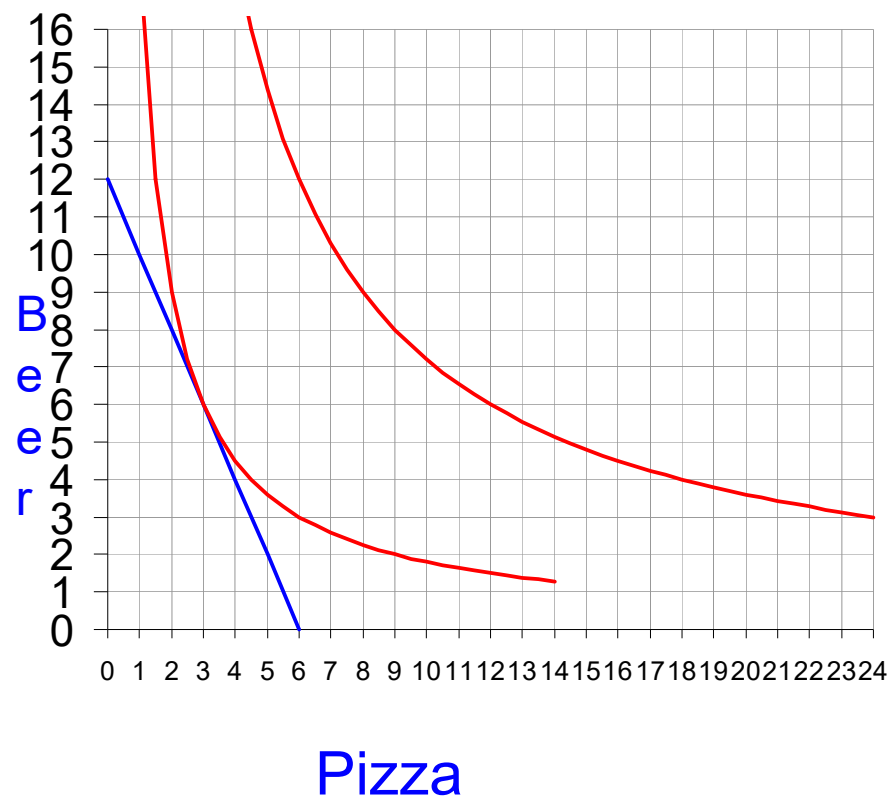
(2) On budget constraint

$I = \$24$ and $P_{\text{Beer}} = \$2$ fixed

$P_{\text{Pizza}} = \$4$: Label **OCB A**

$P_{\text{Pizza}} = \$1$: Label **OCB C**

When P_{pizza} falls from \$4 to \$1
Both conditions messed up at A.



(OCB is Optimal Consumption Bundle)

Movement **A** to **C** is total effect of price decrease

Breakdown to substitution effect:
New opportunity cost, but original indifference curve.

Label this **S**

Substitution Effect is movement from **A** to **S**

Income Effect is movement from **S** to **C**

To understand income effect, if Goldy buys A (original bundle), he will have $3 \times \$3 = \9 money left over in his wallet.

Substitution Effect

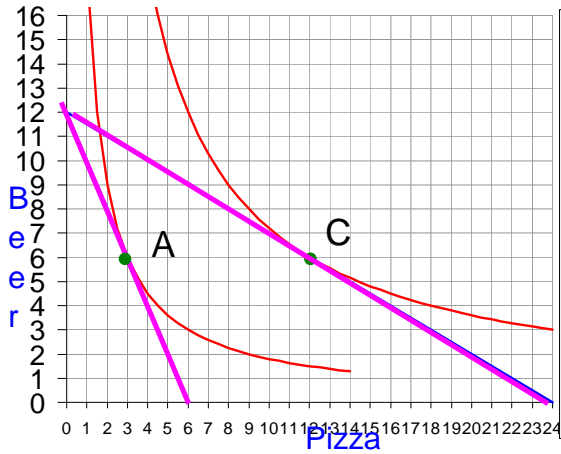
buy more pizza because opportunity cost of pizza is lower

Income Effect

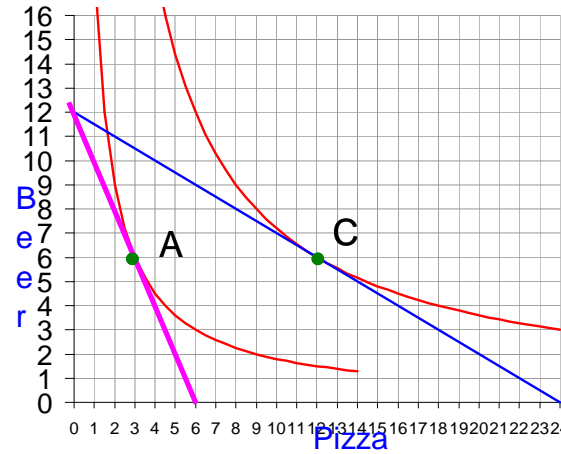
buy more pizza because have greater purchasing power, and because pizza is a normal good.

But if pizza inferior good, buy less, and substitution and income effect go different ways.

Let's redo this maneuver, so you can get the hang of it....



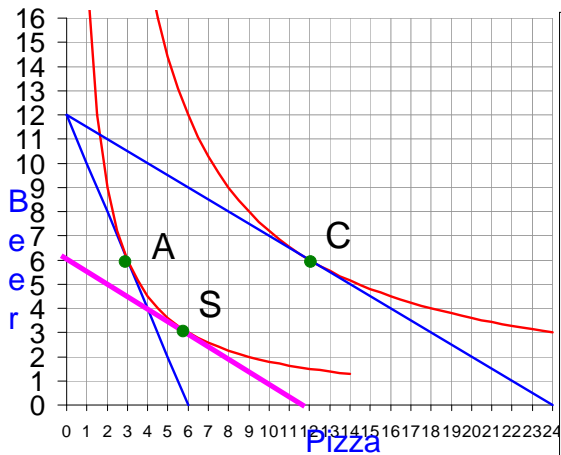
Example 1
 P_{pizza} falls from \$4 to \$1
 $P_{\text{beer}} = \$2$, Income = \$24



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 $P_{\text{beer}} = \$2$, Income = \$24

Optimum goes from A to C
 (3 pizza to 12 pizza)

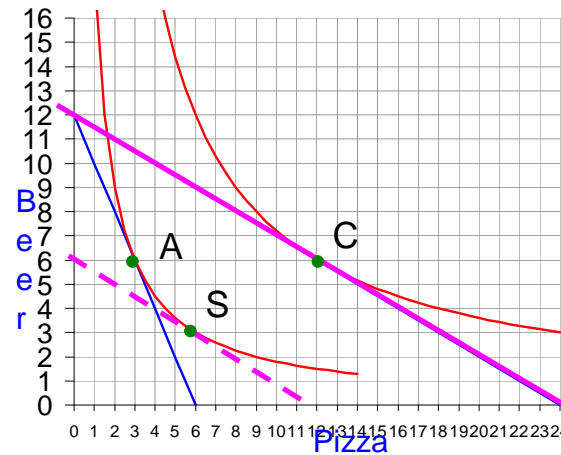
To get Sub Effect we rotate on original indifference condition to get MRS condition fixed.



Example 1
 P_{pizza} falls from \$4 to \$1
 $P_{\text{beer}} = \$2$, Income = \$24

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Sub effect is A to S



Example 1
 P_{pizza} falls from \$4 to \$1
 $P_{\text{beer}} = \$2$, Income = \$24

Optimum goes from A to C
 (3 pizza to 12 pizza)

Sub effect is A to S
 Inc is S to C

Normal good, both work in same direction.

One of the most important applications of theory of income and substitution effects is **Labor supply**

For consumer goods, price goes up, result in a **decrease** in income. So for normal goods, **Sub** and **Inc** go the same way.

For labor, price goes up, individual gets an **increase** in income.

Income Effect

- Leisure a normal good
- So income effect: **work less**
- Evidence that leisure a normal good: What do lottery winners do? Quit working?

Leisure: a good. Has an opportunity cost: wage.

Wage goes up:

Substitution effect

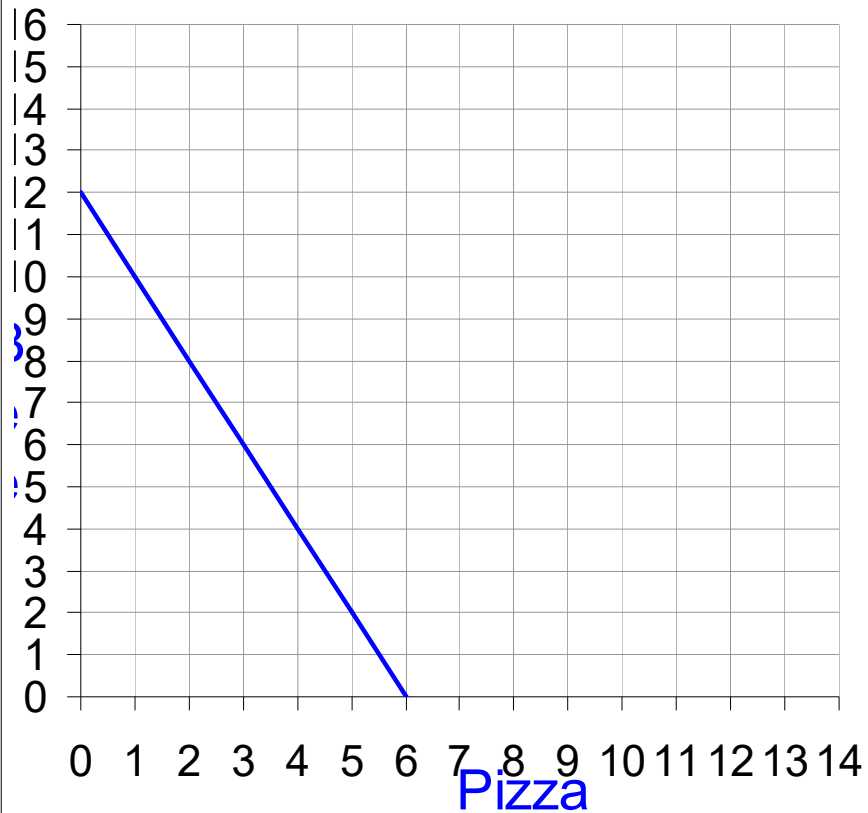
- Opportunity cost of leisure increases
- consume less leisure or..... **work more**

What is **net** effect?

Over time, as income has increased time spent working has gone down (but income has increased dramatically) So for trend **over time**, income effect has predominated

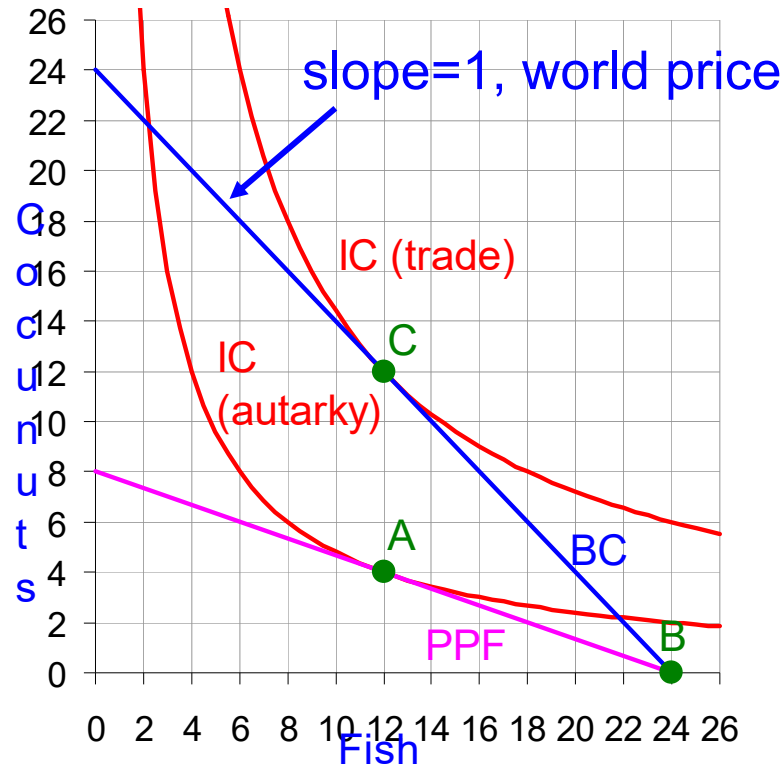
Finally let's test your knowledge of the substitution effect, by figuring out what it will be for **Bucky** who consumes in fixed proportions.

Suppose pizza falls to \$2...



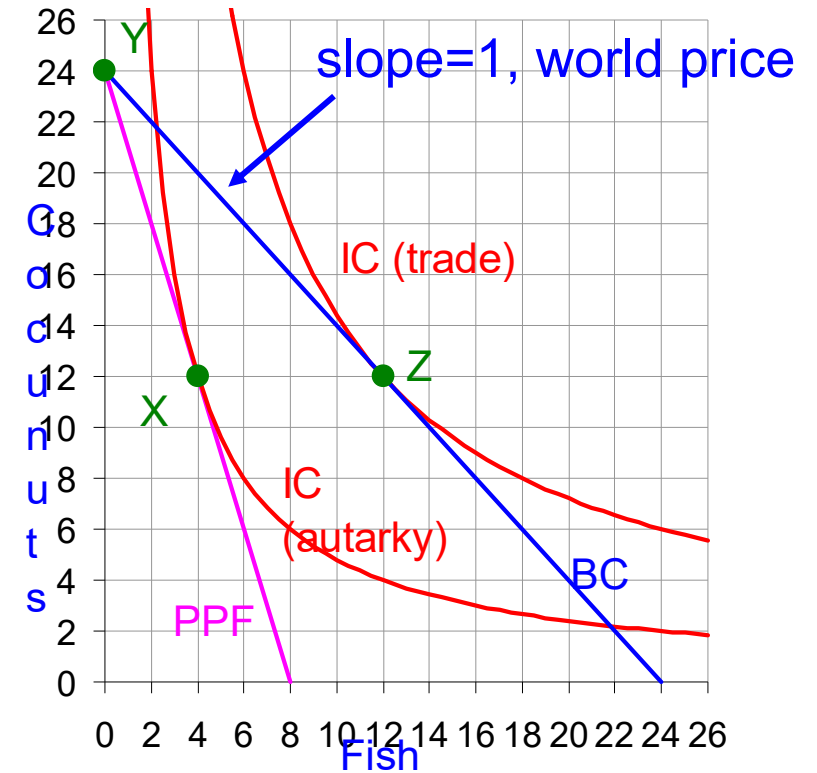
Next we use our new knowledge about preferences and indifference curves to finish our diagram of **comparative advantage** as a basis for trade.

Comparative Advantage as a Basis Robinson PPF



	Produce	Consume
Autarky	A(12F,4C)	A (12F,4C)
Trade	B(24F,0C)	C(12F,12C)

for Trade (Complete Picture!) Friday PPF



	Produce	Consume
Autarky	X(4F,12C)	X(4F,12C)
Trade	Y(0F,24C)	Z(12F,12C)

Lots of great stuff on graph!!!!

1. Production Possibility Frontier
2. Choice under autarky (pink PPF is budget constraint, choice A where MRS equals opportunity cost)
3. With trade specializing in terms of comparative advantage. Picks production B to maximize income.
4. With trade and new budget constraint in blue. Picks C to maximize utility.
5. Supply=Demand (Robinson supplies 12 fish and Friday demands 12 fish)

3. Costs

Costs pretty simple so far in Econland

S1: can make 0 or 1 widget.

Cost to make 0 widget: \$0

Cost to make 1 widget: \$1

In real world, things are usually more complicated.

Meet S11

Details of her widget operation.

Fixed Cost of \$4 to be in business
These are costs that are the same regardless of quantity produced.

Examples:

- Salary of the CEO
- Electric bill for lights
- rent on factory

Variable Input:

Labor (\$2 an hour)

Widget Juice (\$1 quart, need one quart per widget)

(Cost in \$)

Q	L hours	Labor Cost (wage= \$2 hr)	Mater- ials Cost	Variabl Cost
0	0.0	0	0	0
1	.5	1	1	2
2	2.0	4	2	6
3	4.5	9	3	12
4	8.0	16	4	20

The cost structure for S11 exhibits

Diminishing Marginal Returns

To get first widget, need half hour of labor

To get second widget, need 1.5 hours of labor more.

So return on additional units of labor added is diminishing.

This is what happens when pick the **low hanging fruit** first.

(Note, here we don't have diminishing returns in materials)

One big table

Q	FC Fixed Cost	VC Variable Cost	TC Total Cost
0	4	0	
1	4	2	
2	4	6	
3	4	12	
4	4	20	

$$TC = FC + VC$$

$$AFC = \text{Average Fixed Cost} = FC/Q$$

$$AVC = \text{Average Variable Cost} \\ = VC/Q$$

Marginal Cost: change in cost from increasing output one unit.

AFC	AVC	ATC	MC Marginal Cost

MC between 0 and 1 is $2 = 6 - 4$

MC between 1 and 2 is $4 = 10 - 6$

MC between 2 and 3 is $6 = 16 - 10$

S11's Cost Table
(Example of U-Shaped ATC)

Q	AFC	AVC	ATC	MC
0	-	0	-	2
1	4.00	2.00	6.00	4
2	2.00	3.00	5.00	6
3	1.33	4.00	5.33	8
4	1.00	5.00	6.00	

Graph of
S11's Cost Structure

