Thursday, September 27, 2018 5:11 PM

Theory of consumer choice

ROOM 1: Consumer's Preference (Tastes)

ROOM 2: Consumer's Affordability

ROOM 3: Consumer Choice

3 questions

1. What a consumer wants? → Preferences
2. What baskets of goods a consumer can afford? → Budget Constraint
3. Given Preferences (1) and Budget constraint (2), which basket maximize consumer's utility (or satisfaction)?

Main Concern

Suppose we have 2 goods: X & Y (meals) (movies)

P_X, P_Y, M

To maximize his utility, How many units of x and y he should choose optimally.

Mathematically,

Maximize $U(X, Y)$ → objective Function

Subject to budget constraint: $\underbrace{P_X \cdot X}_{\text{expenditure spent on good } x} + \underbrace{P_Y \cdot Y}_{\text{expenditure spent on good } y} \leq M$ ← money income

(expenditure spent on good x + expenditure spent on good y = total expenditure)

$$\boxed{(X^* = ?,\ Y^* = ?) \rightarrow \max U}$$

↓

consumer's utility maximization problem (UMP)

Actually, we have 2 approaches to answer the question above:

1. via Cardinal approach (OLD APPROACH)
   - Cardinal: measurable
   - Pioneered by Jeremy Bentham (Father of Utilitarianism (School of thought))
   - "Utility is measurable" (assumed)

2. via Ordinal approach (NEW APPROACH) OR MODERN ECONOMIC THEORY
   - Ordinal: ordering
   - "It is enough to study consumer's behavior if he/she can "rank" his/her preferences"

Let's start w/ ORDINAL APPROACH:

- To study "Preferences", tool is "INDIFFERENCE CURVES"
- To study "Affordability", tool is "BUDGET LINES"
- To study "Choice", tool is "CONSTRAINT OPTIMIZATION"

① Preferences (Tool is Id)

To start w/, we have to make some assumptions about consumer's preference as follows:

① He/she must be able to "rank"

(EX) When we offer a consumer 2 baskets: X & Y, he/she must be able to tell us one of the three possible answers:

① She likes X more than Y: $X \succ Y \leftrightarrow U(X) > U(Y)$ ($\succ$: IS PREFERED TO)

② She likes Y more than X: $Y \succ X \leftrightarrow U(Y) > U(X)$

③ X and Y are indifferent: $X \sim Y \leftrightarrow U(X) = U(Y)$

② He/She loves variety (OR Averages are preferred to Extremes)

(F, C) — FOOD, CLOTHES

basket X: (0, 100)
basket Y: (60, 40)
basket Z: (100, 0)

$Y \succ X$ and $Y \succ Z$

$\Updownarrow$ $\qquad$ $\Updownarrow$

$U(Y) > U(X)$ $\qquad$ $U(Y) > U(Z)$

③ He/She prefers more of the goods rather than less of the goods

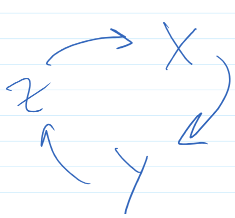
i.e, "More is preferred to less"

or

"More is better"

④ His/her preference is consistent. (Transitivity)

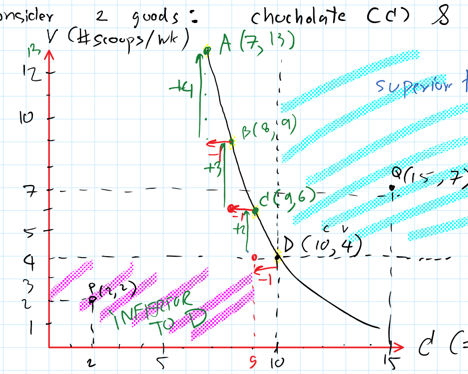
If $X \succ Y$ and $Y \succ Z$, then, to be consistent, it must be the case that $\underline{X \succ Z}$.



$X \to Y \to Z$

Indifference Curves

Consider 2 goods: chocholate (C) & Vanila (V)



Indifference curve:

a curve contains all baskets of the two goods that provide the same satisfaction level to the consumer.

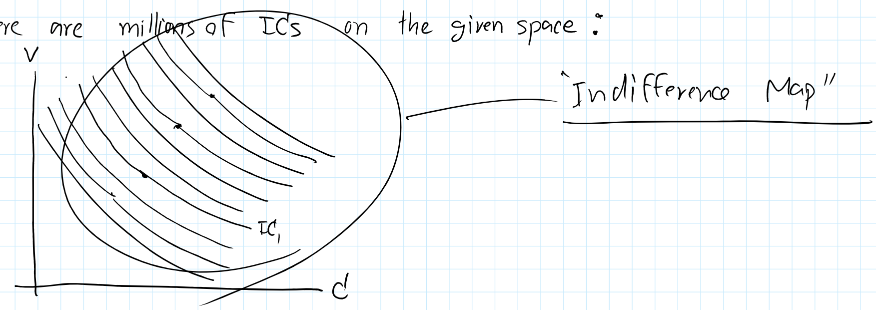
$A \sim B \sim C \sim D$

- $D \succ P$
- $Q \succ D$

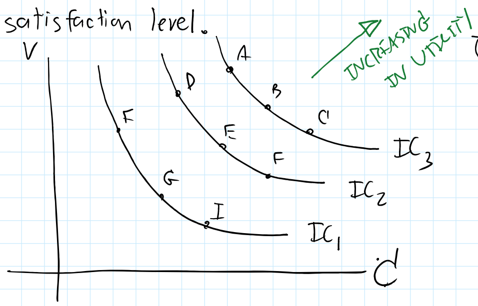
Properties of IC's

① IC's are downward sloping.

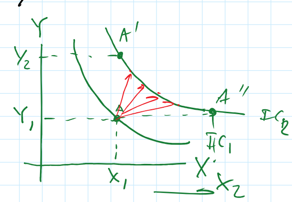
② There are millions of IC's on the given space:



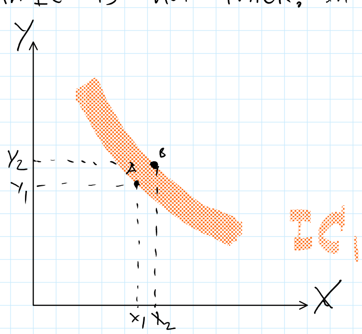
③ The higher the IC's towards NE direction, the higher satisfaction level.



$U_{ON\ IC_3} > U_{ON\ IC_2} > U_{ON\ IC_1}$



④ An IC is not thick. In other words, an IC is a thin line.



Proof by Contradiction: let's make a thick IC and see if something goes wrong...

Student A

Since A and B are on the same IC then, $A \sim B$

Student B

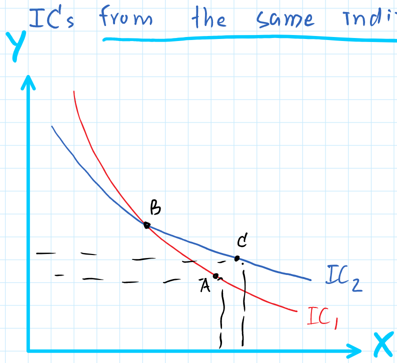
Since B has more of the two goods compare to basket A, then $B \succ A$.

Since either $A \sim B$ or $B \succ A$ can be true. Both statements cannot be true at the same time.

This is called " Contradiction " which emerges when thick IC is allowed.

If we want to avoid such contradiction, don't make a thick IC!

⑤ IC's from the same indifference map "DO NOT CROSS."



Proof by contradiction: make them cross and see what happens...

On IC_1: Since A and B are on the same IC, namely IC_1, then $A \sim B$.

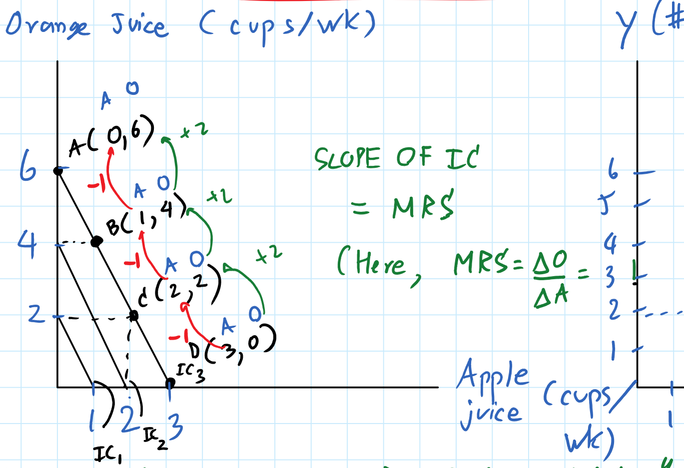
On IC_2: Since B and C are on the same IC, namely IC_2, then $B \sim C$.

By transitivity, when $A \sim B$ and $B \sim C$, then $A \sim C$. — STATEMENT ①

Since C contains more of x and Y, then, By more-is-better assumption, $C \succ A$ ②

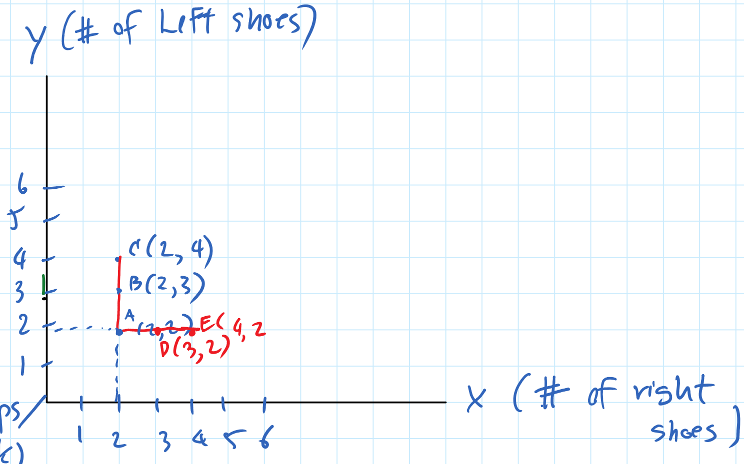
Again, contradiction emerges when we allow for crossing IC's.
To avoid this contradiction, don't make crossing IC's.

Two extreme examples of IC's



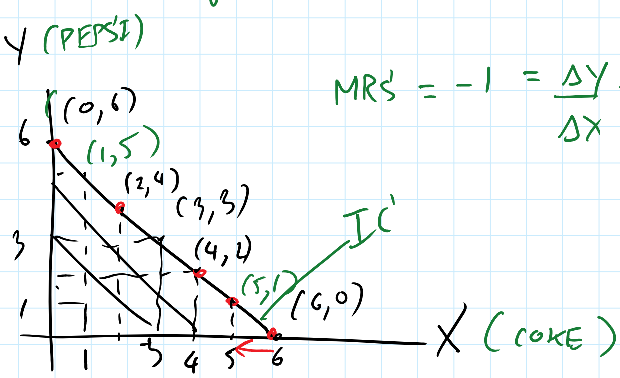
SLOPE OF IC = MRS

(Here, $MRS = \frac{\Delta O}{\Delta A} =$

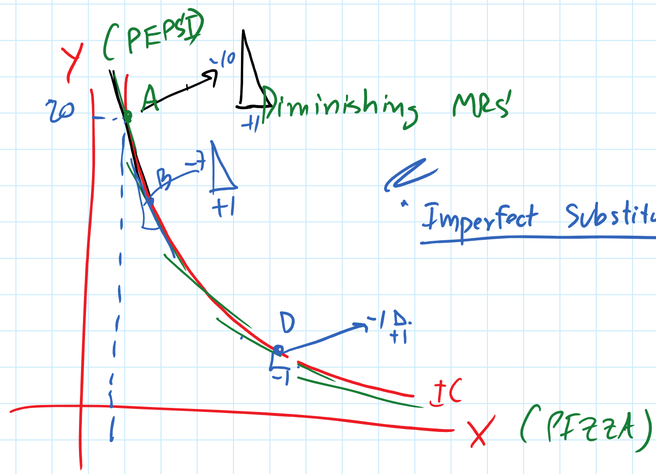


When the two goods are "perfect substitutes"

IC's are straight line.



$$MRS = -1 = \frac{\Delta Y}{\Delta X} = \frac{-1}{+1}$$



Diminishing MRS

"Imperfect Substitutes"

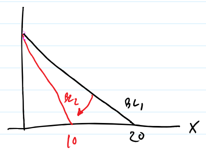
MRS = Marginal Rate of Substitution

$\Downarrow$

the rate at which a buyer is willing to trade one good for another so that his utility remains constant. (or remains the same.)

FACT#3

$P_X = 100$ $\quad$ $P_X' = 200$
$P_Y = 200$ $\quad$ $P_Y = 200$
$M = 2000$ $\quad$ $M = 2000$



SLOPE OF $BL_1 = -\frac{10}{20} = -\frac{1}{2}$

SLOPE OF $BL_2 = -\frac{10}{10} = -1$

SLOPE BECOMES STEEPER...

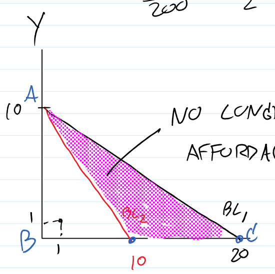
$\equiv$

OPP. COST OF GOOD X BECOMES MORE EXPENSIVE

SINCE SLOPE OF $BL = -\frac{P_X}{P_Y}$

B/F $\quad$ A/F

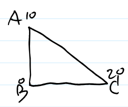
$-\frac{100}{200} = -\frac{1}{2}$ $\quad$ $-\frac{200}{200} = -1$



NO LONGER AFFORDABLE CHOICES when $P_X \uparrow$

B/F

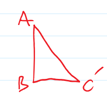
$P_X = 100$, $P_Y = 200$, $M = 2000$



OLD BUDGET SET

A/F

$P_X' = 200$, $P_Y = 200$, $M = 2000$

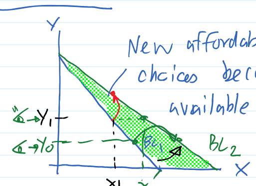


NEW BUDGET SET

SHRINKS OR REDUCES

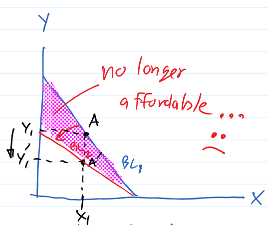
To sum up: Increase in P_X reduces consumer's budget set.

Other cases



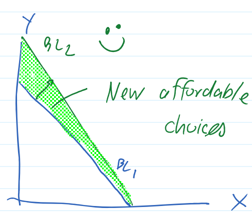
New affordable choices become available. :)

When $P_X \downarrow$...
BL swings outward.



no longer affordable...

When $P_Y \uparrow$...
BL will rotate inward.



New affordable choices

When $P_Y \downarrow$...
BL will rotate outward

I Preferences ✓ $\quad$ II Budget ✓ $\quad$ III Choice

Consumer's Utility Maximization Problem (UMP)

Let's begin...

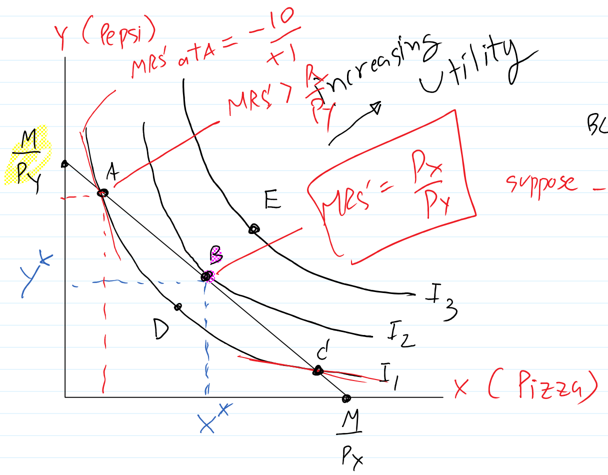
Maximize $U(X, Y)$
subject to $P_X \cdot X + P_Y \cdot Y = M$

Problem: $(X^* = ?, Y^* = ?) \rightarrow$ maximize his Utility given

his budget.

Q: Is there any economic advice to solve this problem?

A: Yes! We have. It's so called "Rational Spending Rule" or "Golden Rule of Utility Maximization"



BL: $P_x \cdot X + P_y \cdot Y = M$

suppose $-\frac{P_x}{P_y} = -\frac{100}{50} = -2$ (MC_x)

$Y = \frac{M - P_x \cdot X}{P_y}$

$Y = \frac{M}{P_y} - \frac{P_x}{P_y} \cdot X$

intercept Y-Axis

SLOPE OF BL

SLOPE OF BL $= -\frac{\frac{M}{P_y}}{\frac{M}{P_x}} = -\frac{\cancel{M}}{P_y} \cdot \frac{P_x}{\cancel{M}} = -\frac{P_x}{P_y}$

Fact#1 Basket $B(X^*, Y^*)$ maximizes the consumer's satisfaction given his budget!

or you can say that B is "the utility maximizing choice".

Fact#2 Notice that At $B(X^*, Y^*)$, slope of IC' = Slope of BL!

That is,

$$\boxed{MRS_{xy} = \frac{P_x}{P_y}}$$

(w/o SIGN)

Note at A: Slope of IC' > Slope of BL or $MRS' > \frac{P_x}{P_y}$.

at C: Slope of IC' < Slope of BL or $MRS < \frac{P_x}{P_y}$.

Let's explain this...

MRS_{xy} = Rate at which this guy is willing to exchange/trade one good for another so that his utility remains constant.

Mathematically speaking, $MRS_{xy} = -\frac{\Delta Y}{\Delta X}\Big|_{U=\bar{U}}$ so that

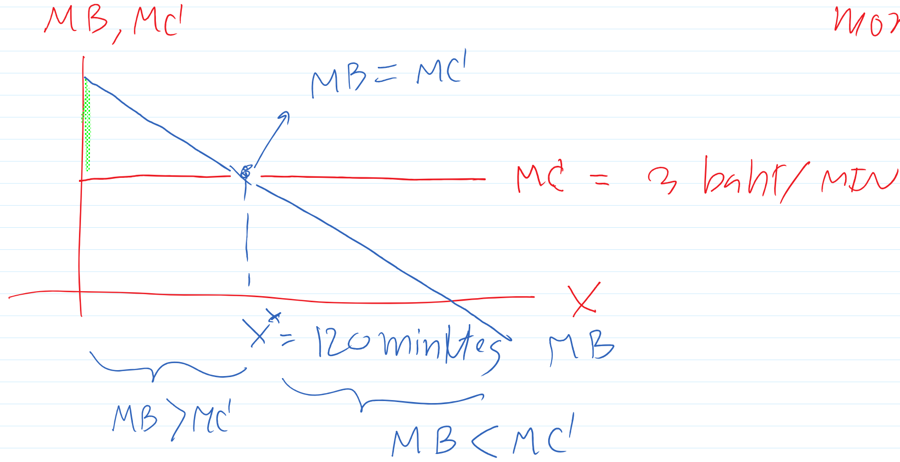
utility remains constant.

- $-\frac{P_x}{P_y}$ the opportunity cost of good x (tells us about how many Y he must give up in order to get "1 MORE UNIT OF GOOD X"),

- MRS_{xy} can be viewed as Marginal Benefit of X measured in terms of how many y he is willing to trade for X

$-\frac{P_x}{P_y}$ u ——— u Marginal Cost of X

at A : $MB_X > MC'_X$ → keep consuming more X



To sum up : If a consumer aims at maximizing utility given a budget constraint, mathematically, he should spend such that

$$\boxed{MRS_{xy} = \frac{P_x}{P_y}}$$

consider (w/o sign)

(MB_x)

ling

(MC'_x)

This is so called "Rational Spending R
or
"Golden Rule of Ut
Maximization"

Next, let's consider OLD APPROACH OF CONSUMER THEORY

- TU = Total Utility = all satisfaction level a consumer ob from a basket of goods.
- MU = Marginal Utility = extra utility a consumer obtains from an extra unit a good.
- Let's assume that utility/happiness is measurab unit of measurement is "Utils" Utilon

Consider a consumer.

Beer Consumption

X (# glasses/night)	TU (Utils)	MU
0	0	
1	10	+10
2	18	+8
3	24	+6
4	28	+4
5	28	0
6	20	-8

Fact #1 : IF x

Fact#2 : As x rises, and

Fact#3 : the beer Marg

Rule"

tility

CHOICE

...

tains

of

le.

meter

$=0, \quad TU_x = 0$

increases, TU_x

reaches its peak,

then fall.

first unit of

gives the highest

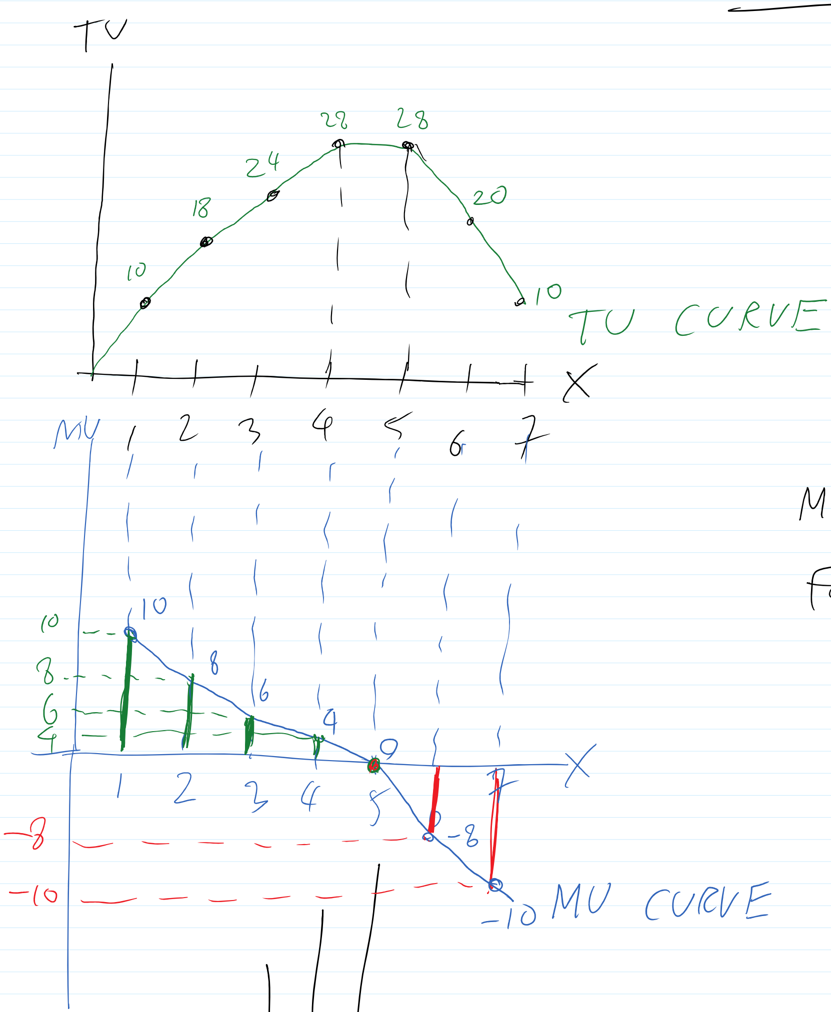
ginal utility!

5	28	0
6	20	-8
7	10	-10

Marg

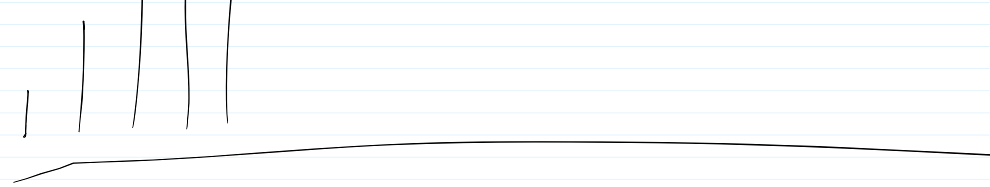
Fact#4 : As

decl



Most of the

Follow "



gives the highest
ginal utility !
x increases, MU is
lining / diminishing

goods in the world
law of diminishing
marginal utility "

Thursday, October 18, 2018 10:50 AM

Consider a game of maximizing total utility ...

Suppose $P_x = 2$ baht/unit
$P_Y = 1$ " ——— "
$M = 9$ baht/day.

X	TU_x	MU_x	MU_x/P_x	Y	TU_Y	MU_Y	MU_Y/P_Y
0	0	–	–	0	0	–	–
1	10	10		1	8	8	
2	18	8		2	15	7	
3	24	6		3	21	6	
4	28	4		4	26	5	
5	31	3		5	30	4	
6	33	2		6	33	3	

Q: Given 9 baht/day, $(X^* = ?, Y^* = ?) \longrightarrow$ TU is maximized?

Ex: $(3,3) \longrightarrow TU = TU_x + TU_y = 24 + 21 = 45$ utils.