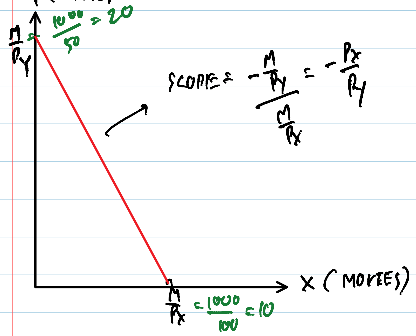
WEEK 10 (22.10.13)

BUDGET LINES (CONTINUED)

BUDGET LINE EQUATION : $Y = \frac{M}{P_x} - \frac{P_x}{P_y} \cdot X$



$\frac{M}{P_x}$ = MAXIMUM AMOUNT OF GOOD X THE BUYER COULD BUY WHEN HE BUYS NO Y.

$\frac{M}{P_y}$ = MAXIMUM AMOUNT OF GOOD Y THE BUYER COULD BUY WHEN HE BUYS NO X.

EX: $M = 1000$
$P_x = 100$
$P_y = 50$

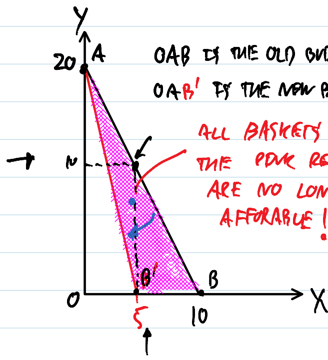
SLOPE $= -\frac{P_x}{P_y} = -\frac{100}{50} = -2$

OPP. COST OF OBTAINING ONE EXTRA UNIT OF GOOD X IN TERM OF FORGONE Y.

LOOK: HE MUST REDUCE 2 UNITS OF GOOD Y (MEALS) IN ORDER TO GET ONE ADDITIONAL MOVIE TICKET.

\# SUPPOSE $P_{x\,(\text{MOVIES})}$ RISES FROM 100 BAHT TO 200 BAHT/TICKET.

WHAT HAPPENS TO THE BUDGET LINE ?



OAB IS THE OLD BUDGET SET
OAB' IS THE NEW BUDGET SET

ALL BASKETS IN THE PINK REGION ARE NO LONGER AFFORABLE !

OLD SITUATION	NEW SITUATION
$P_x = 100$	$P_x' = 200$
$P_y = 50$	$P_y = 50$
$M = 1000$	$M = 1000$
$\frac{M}{P_x} = \frac{1000}{100} = 10$	$\frac{M}{P_x'} = \frac{1000}{200} = 5$:(
$\frac{M}{P_Y} = \frac{1000}{50} = 20$	$\frac{M}{P_y} = \frac{1000}{50} = 20$
BUDGET LINE AB	BUDGET LINE AB'

- WHEN P_X BECOMES MORE EXPENSIVE, THE BUDGET LINE ROTATES (SWINGS / PIVOTS) INWARD FROM AB TO AB'.
- THE SLOPE OF THE BL BECOMES STEEPER:

OLD SLOPE : $-\frac{P_x}{P_y} = -\frac{100}{50} = -2$

NEW SLOPE : $-\frac{P_x'}{P_y} = -\frac{200}{50} = -4$

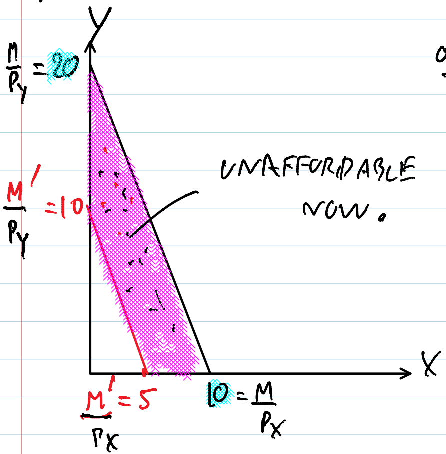
IT IMPLIES THAT " OPPORTUNITY COST OF GETTING AN EXTRA UNIT OF GOOD X (MOVIE TICKET) INCREASES !

NOW, TO GET 1 MORE TICKET, HE MUST REDUCE HIS CONSUMPTION ON MEAL BY 4 UNITS, INSTEAD OF 2 !

AN INCREASE IN P_X REDUCES HIS BUDGET SET. SOME BASKETS ARE NOW UNAFFORDABLE. THE CONSUMER IS TYPICALLY WORSE OFF WHEN PRICE OF A GOOD INCREASES :(

DIY:
- WHAT HAPPENS TO THE BL IF PRICE OF GOOD X FALLS? EXPLAIN W/ A DIAGRAM AND GIVE ECONOMIC INTUITION.
- WHAT HAPPENS TO THE BUDGET LINE IF PRICE OF GOOD Y RISES?

WHAT IF HIS INCOME FALLS?



OLD SITUATION

$P_X = 100$
$P_Y = 50$
$M = 1000$
$\frac{M}{P_X} = 10$
$\frac{M}{P_Y} = 20$

NEW SITUATION

$P_X = 100$
$P_Y = 50$
$M' = 500$
$\frac{M'}{P_X} = \frac{500}{100} = 5$
$\frac{M'}{P_Y} = \frac{500}{50} = 10$

- WHEN INCOME FALLS, THE BUDGET LINE SHIFTS INWARD IN A PARALLEL MANNER.
- BUDGET SET SHRINKS! ALL BASKETS IN THE PINK REGION ARE NO LONGER AFFORDABLE.
- A REDUCTION IN INCOME MAKES THE CONSUMER WORSE OFF :(

SO FAR,

1	2	3
IC ✓	BL ✓	UTILITY MAXIMIZATION:

HOW DOES HE CHOOSE OPTIMALLY, GIVEN HIS PREFERENCE AND BUDGET CONSTRAINT?

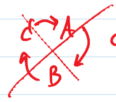
CONSIDER A REPRESENTATIVE CONSUMER, HE HAS A WELL-DEFINED GOAL: MAXIMIZE HIS SATISFACTION GIVEN HIS PREFERENCE AND BUDGET CONSTRAINT. HIS PREFERENCE IS WELL-BEHAVED.

- HE CAN RANK
- MORE IS BETTER
- HE LOVES VARIETY
- HIS PREFERENCE IS

MAXIMIZE $U(X, Y)$ → CALLED "OBJECTIVE FUNCTION"
SUBJECT TO $P_X \cdot X + P_Y \cdot Y \leq M$ → CALLED "CONSTRAINT"

THIS IS "A CONSUMER'S OPTIMIZATION PROBLEM".

- HIS PREFERENCE IS CONSISTENT (TRANSITIVITY)
IF $A \succ B$ AND $B \succ C$, THEN $A \succ C$.

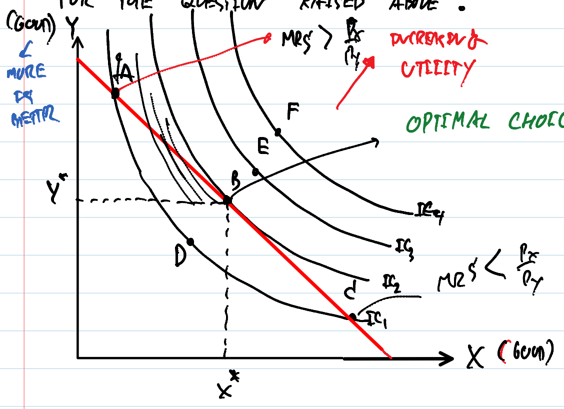


CIRCULAR PREFERENCE IS RULED OUT.

THIS IS "A CONSUMER'S OPTIMIZATION PROBLEM".

THE PROBLEM IS: $\boxed{\begin{matrix} X^* = ? \\ Y^* = ? \end{matrix}} \longrightarrow$ MAX U.

NOW, WE ARE GOING TO GIVE HIM AN ECONOMIC ADVICE FOR THE QUESTION RAISED ABOVE.



OPTIMAL CHOICE: BEST AFFORDABLE CHOICE

FACT #1 GIVEN HER PREFERENCE AND HER BUDGET CONSTRAINT, BASKET $B(X^*, Y^*)$ IS THE OPTIMAL CHOICE.

FACT #2 AT BASKET $B(X^*, Y^*)$,

SLOPE OF IC = SLOPE OF BL

$$MRS_{XY} = \frac{P_X}{P_Y} \quad \text{(RELATIVE PRICE)}$$

RECALL THAT MRS_{XY} = RATE THAT THIS BUYER IS WILLING TO GIVE UP ONE GOOD FOR ANOTHER (SO THAT HER UTILITY IS CONSTANT).

EX $P_X = 100$
$P_Y = 50$
$\frac{P_X}{P_Y} = \frac{100}{50} = 2$

$\frac{P_X}{P_Y}$ = OPPORTUNITY COST OF HAVING AN EXTRA UNIT OF GOOD X MEASURED IN TERM OF FORGONE UNIT(S) OF GOOD Y.

MRS_{XY} MEASURES "MARGINAL BENEFIT OF GOOD X" (MONEY)

$\frac{P_X}{P_Y}$ MEASURES "MARGINAL COST OF GOOD X."

NOTE MARGINAL ≡ ADDITIONAL ≡ EXTRA ≡ INCREMENTAL

MARGINAL BENEFIT = ADDITIONAL BENEFITS FROM AN ADDITIONAL UNIT OF THE GOOD.

MARGINAL COST = ADDITIONAL COSTS WHEN BUYING AN ADDITIONAL UNIT OF THE GOOD.

LOOK AT BASKET A:

SLOPE OF IC > SLOPE OF BL

$$MRS_{XY} > \frac{P_X}{P_Y}$$

$$MB_X > MC_X$$

EX: SUPPOSE AT A: MRS = 10

$$\frac{P_X}{P_Y} = \frac{100}{50} = 2 \qquad (P_X = 100, \ P_Y = 50)$$

AT A: HE IS WILLING TO GIVE UP 10 Y FOR 1X (REFLECTED BY MRS). WHEN HE ARRIVES AT THE MARKET, HE FOUND THAT TO GET 1X, IT REQUIRES TO GIVE UP ONLY 2Y!

HE MUST BE HAPPY SINCE HE PREPARES TO GIVE UP 10 Y FOR 1X BUT IT REQUIRES ONLY 2!

$\underbrace{\text{FOR 1X}}_{MB_X}$ ... $\underbrace{2}_{MC_X}$

AS A RESULT, HE KEEPS BUYING MORE OF X AND LESS OF Y AS LONG AS $MB_X > MC_X$.

HE STOPS CONSUMING MORE OF X WHEN $MB_X = MC_X$ (POINT B)

$$\left(MRS_{XY} = \frac{P_X}{P_Y}\right)$$

THAT IS THE MOVEMENT FROM $A \longrightarrow B$.

SUMMARY AT THE OPTIMAL CHOICE: $MRS_{XY} = \frac{P_X}{P_Y}$.

(MB_X) (MC_X)

- LET'S TRAVEL BACK TO THE OLD DAYS WHEN ECONOMISTS TRY TO EXPLAIN CONSUMER CHOICE.

IN THE OLD TIME, ECONOMISTS ASSUME THAT UTILITY IS MEASURABLE.

THEY DREAM OF HAVING A DEVICE CALLED "UTILOMETER" FOR MEASURING SATISFACTION LEVEL ONE GETS FROM CONSUMING A BASKET OF GOOD/SERVICE (JEREMY BENTHAM)

OK, LET'S ASSUME THAT UTILITY IS MEASURABLE AND THE UNIT OF MEASUREMENT IS "UTILS"

TOTAL UTILITY (TU): TOTAL SATISFACTION FROM A BASKET OF G&S.

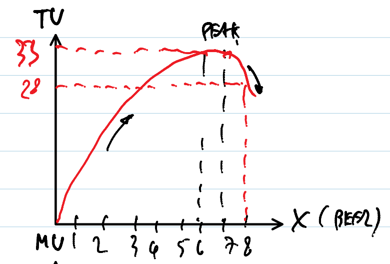
MARGINAL UTILITY (MU): "AN EXTRA OR ADDITIONAL UTILITY" FROM AN EXTRA UNIT OF G&S.

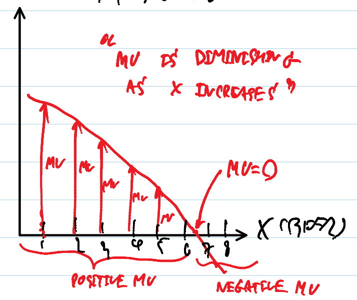
(UTILS)

BEER (#GLASS)	TU	MU
0	0	
		+10
1	10	
		+8
2	18	
		+6
3	24	
		+4
4	28	
		+3
5	31	
		+2
6	33	
		0
7	33	
		-5
8	28	

OBSERVATION #1 AS CONSUMING MORE BEER, TU INCREASES, REACHES ITS PEAK, AND THEN DECREASES.

OBSERVATION #2 MARGINAL UTILITY IS "DIMINISHING" AS HE CONSUMES MORE BEER.





"LAW OF DIMINISHING MARGINAL UTILITY"

"AS A CONSUMER CONSUMES MORE OF A GOOD, ADDITIONAL UTILITY FROM SUCCESSIVE UNITS OF THE GOOD IS DIMINISHING"

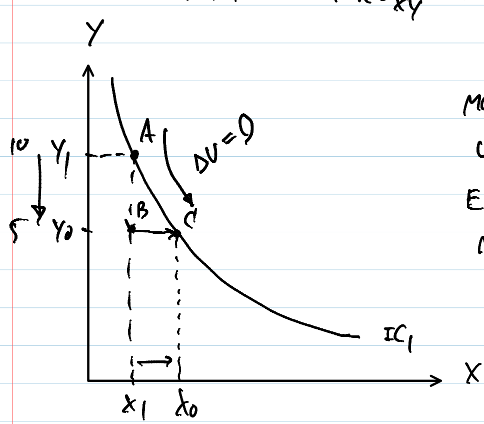
Ex: MU_x FROM GLASS NO. 3 = 6 UTILS

MU_x FROM GLASS NO. 4 = 4 UTILS

FALLING OR DIMINISHING

NOW, WE ARE GOING TO SEE ANOTHER VERSION OF MRS_{xy}.

RECALL THAT $MRS_{xy} = \frac{\Delta Y}{\Delta X}\Big|_{\bar{U}}$.



MOVEMENT FROM A → B:

UTILITY LOSS = $MU_Y \cdot \Delta Y$

Ex: $MU_Y = 2$ AND $\Delta Y = -5 \Rightarrow MU_Y \cdot \Delta Y = -10$ UTILS

MOVEMENT FROM B → C:

UTILITY GAIN = $MU_X \cdot \Delta X$

Ex: $MU_X = 1$ $\Delta X = 10 \Rightarrow MU_X \cdot \Delta X = +10$ UTILS

MOVEMENT FROM A → C:

$\Delta U = 0$

A → B B → C

$$MU_Y \cdot \Delta Y + MU_X \cdot \Delta X = 0$$

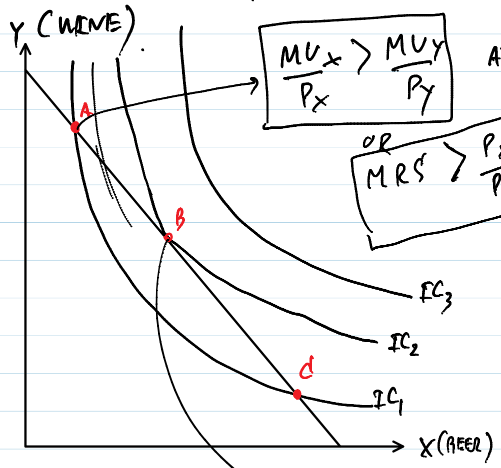
$$MU_Y \Delta Y = -MU_X \cdot \Delta X$$

$$\frac{\Delta Y}{\Delta X} = -\frac{MU_X}{MU_Y}$$

SO $$\boxed{MRS_{XY} = \frac{\Delta Y}{\Delta X} = -\frac{MU_X}{MU_Y}}$$

WHERE MU_X = MARGINAL UTILITY FROM GOOD X

MU_Y = MARGINAL UTILITY FROM GOOD Y.



$$\boxed{\frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}}$$

OR $$\boxed{MRS > \frac{P_X}{P_Y}}$$

AT BASKET A: $SLOPE_{IC} > SLOPE_{BL}$

$$MRS > \frac{P_X}{P_Y}$$

$$\frac{MU_X}{MU_Y} > \frac{P_X}{P_Y}$$

OR $$\frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}$$

IGNORE THE SIGN: $MRS = -\frac{MU_X}{MU_Y}$ CONSIDER ONLY MAGNITUDE.

$$\boxed{MRS = \frac{P_X}{P_Y}}$$

OR $$\boxed{\frac{MU_X}{MU_Y} = \frac{P_X}{P_Y}}$$

OR $$\boxed{\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}}$$

TO MAXIMIZE UTILITY, HE MUST SPEND SUCH THAT

ONCE HE USED UP HIS INCOME, $\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$. (AT POINT B)

WHERE $\frac{MU_X}{P_X}$ = MARGINAL UTILITY FROM LAST BAHT SPENT ON GOOD X (BEER)

$\frac{MU_Y}{P_Y}$ = MARGINAL UTILITY FROM LAST BAHT SPENT ON GOOD Y (WINE)

WINE $MU_{WINE} = 10$, $P_{WINE} = 10$ $\Rightarrow$ $\frac{MU_{WINE}}{P_{WINE}} = \frac{10}{10} = 1$

BEER $MU_{BEER} = 8$, $P_{BEER} = 4$ $\Rightarrow$ $\frac{MU_{BEER}}{P_{BEER}} = \frac{8}{4} = 2$

$$\frac{MU_{BEER}}{P_{BEER}} > \frac{MU_{WINE}}{P_{WINE}}$$

$$(2) > (1)$$

$\Rightarrow$ PER BAHT SPENT ON BEER GIVES "HIGHER" MU

(2) / (1)

⇒ PER BAHT SPENT ON BEER GIVES "HIGHER" MU

THAN PER BAHT SPENT ON WINE.

A RATIONAL SPENDING RULE (OR GOLDEN RULE OF UTILITY MAXIMIZATION

"A RATIONAL BUYER WHO AIMS AT MAXIMIZING HIS OR HER SATISFACTION LEVEL GIVEN LIMITED RESOURCES, HE/SHE SHOULD SPEND IN SUCH A WAY THAT

ONCE HE/SHE USED UP THE RESOURCES (I.e, MONEY, TIME, ETC.)

MARGINAL UTILITY PER BAHT SPENT ON ALL GOODS

MUST BE EQUAL: $\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$

IF $\frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}$, HE CAN IMPROVE HIS UTILITY BY BUYING MORE OF ____ AND LESS OF ____.

IF $\frac{MU_X}{P_X} < \frac{MU_Y}{P_Y}$, HE CAN IMPROVE HIS UTILITY BY BUYING MORE OF ____ AND LESS OF ____.