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
0	0	–	–
1	10	10	5
2	18	8	(4)
3	24	6	3
4	28	4	2
5	31	3	1.5
6	33	2	1

Y	TU_Y	MU_Y	MU_Y/P_Y
0	0	–	
1	8	8	8
2	15	7	7
3	21	6	6
4	26	5	5
5	30	4	(4)
6	33	3	3

Q: Given 9 baht/day, $(x^* = ?, y^* = ?) \rightarrow$ TU is maximized?

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

$\frac{MU_x}{P_x}$ = Marginal Utility Per baht when spending on good x

$\frac{MU_y}{P_y}$ = "——" " Y

Ex $MU_x = 10$ utils when he consumes 1st unit of x
$P_x = 2$ baht per unit

$\frac{MU_x}{P_x} = \frac{10}{2} = 5$ utils per baht.

i.e., each baht spent on good x generates/delivers 5 utils

Now let's play a game of maximizing TU ...

Recall that $(x^* = ?, y^* = ?) \rightarrow$ TU is max,

	(x, Y)	Money spent	Money Left	TU (Utils)
Round 1	(0, Y)	1	9−1=8	$TU = TU_x + TU_y = 0 + 8 = 8$ utils
Round 2	(0, YY)	1	8−1=7	$TU = TU_x + TU_y = 0 + 8 + 7 = 15$ utils
Round 3	(0, YYY)	1	7−1=6	$TU = TU_x + TU_y = 0 + 8 + 7 + 6 = 21$ utils
Round 4	(X, YYY) since $\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = 5$	2+1=3	6−3=3	$TU = TU_x + TU_y = 10 + 8 + 7 + 6 + 5 = 36$ utils
Round 5	(XX, YYYYY) since $\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = 4$	2+1=3	3−3=0	$TU = TU_x + TU_y = (10+8) + (8+7+6+5+4) = 18 + 30 = 48$

(TU_x, TU_y)

Rational Spending Rule:

If a buyer aims to "maximize" his utility given a budget constraint, he should spend such that ... once money is spent up,

Marginal utility per baht spent on x = Marginal utility per baht spent on y,

i.e., $MU_x = MU_y$

i.e., $\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$

Q: Why (3, 3) is not a utility maximizing choice ?

(3, 3) → (2, 5)

buy more Y and buy less X

−X → loss = −6 utils

+2Y → gain = +9 utils

+3 utils

- TU = 45 utils
- $\frac{MU_x}{P_x} = 3 < \frac{MU_y}{P_y} = 6$

advice : since $\frac{MU_y}{P_y} > \frac{MU_x}{P_x}$

then he should buy more of Y and less of X.

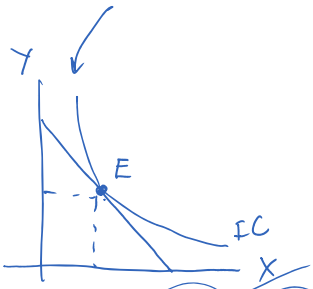
TU = 48 utils

$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$ (4) (4)

U.S version: BANG FOR THE BUCK

TH version : BANG FOR THE BAHT

COMPARISON BETWEEN ORDINAL APPROACH AND CARDINAL APPRO



slope of IC'

slope of BL

At E : $MRS' = \frac{P_x}{P_y}$

since $MRS' = \frac{MU_x}{MU_y}$, then

$\frac{MU_x}{MU_y} = \frac{P_x}{P_y}$

$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$

$\frac{MU_x}{P_x} =$ M/P

Conclusion

The two

give the

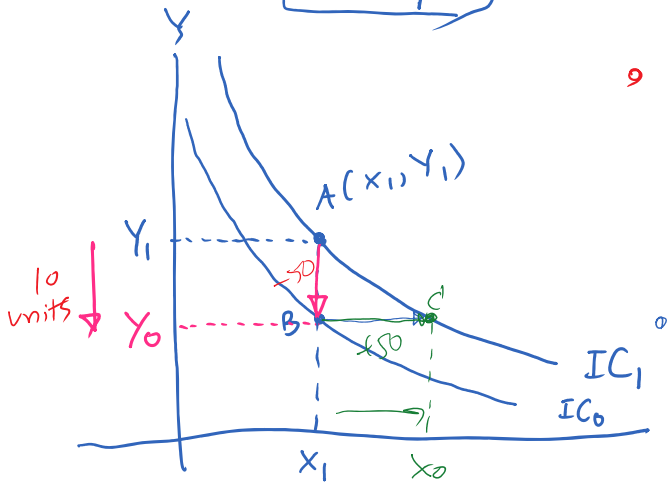
solution

Proof on $MRS' = \frac{MU_x}{MU_y}$

ACH

approaches
e same
(or advice)

Proof on $MRS = \frac{MU_X}{MU_Y}$



- MOVEMENT FROM A TO B INVOLVES W/ utility loss:

$$\text{utility loss} = \overset{5}{MU_Y} \cdot \overset{10}{\Delta Y}$$

- MOVEMENT FROM B TO C INVOLVES utility gain:

$$\text{utility gain} = \overset{2}{MU_X} \cdot \overset{25}{\Delta X}$$

Then $A \rightarrow B \rightarrow C$:

$\underbrace{MU_Y \cdot \Delta Y}_{(-50)} \quad \underbrace{MU_X \cdot \Delta X}_{(+50)}$

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

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

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

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

$$= MRS_{XY}$$

So,

$$MRS_{XY} = \frac{\Delta Y}{\Delta X}$$

Y

→ −50

ES w/

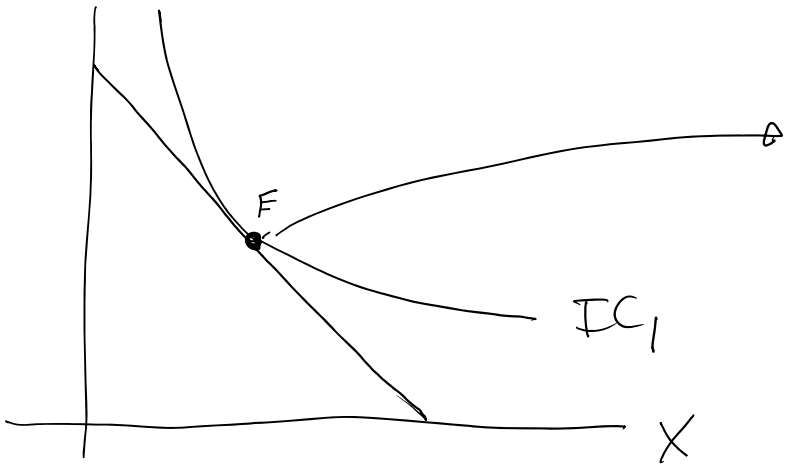
→ +50

0

$MU_x \cdot \Delta X$

$\frac{MU_x}{MU_y}$

$= -\frac{MU_x}{MU_y}$ #



At this point

Slope of IC = Slope of BL

$$MRS = -\frac{P_x}{P_y}$$

$$-\frac{MU_x}{MU_y} = -\frac{P_x}{P_y}$$

$$\frac{MU_x}{MU_y} = \frac{P_x}{P_y}$$

OR

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$$

occured at E.