Friday, January 23, 2015 12:40 PM

THEORY OF CONSUMER CHOICE

PREFERENCES / TASTES

AFFORDABILITY

OPTIMIZATION

TOOL: INDIFFERENCE CURVES HAVE BEEN USED TO DESCRIBE A CONSUMER'S PREFERENCES.

TOOL: BUDGET LINES USED TO DESCRIBE A CONSUMER'S AFFORDABILITY

GIVEN HIS PREFERENCES AND HIS BUDGET CONSTRAINT, HOW DOES HE OPTIMALLY CHOOSE A BASKET OF GOODS & SERVICES TO MAXIMIZE HIS UTILITY.

UTILITY MAXIMIZATION PROBLEM (UMP)

CONSIDER A CONSUMER W/ 2 GOODS: X AND Y

(MOVIES, MEAL)

(FOODS, CLOTHES)

(___ , ___)

P_X = PRICE OF X (BAHT/UNIT)

P_Y = PRICE OF Y (BAHT/UNIT)

I = HIS MONEY INCOME (BAHT/MONTH)

NOTE: P_X, P_Y, AND I ARE EXOGENOUS VARIABLES

DECISION VARIABLES (X, Y)

$$\max_{X,Y} \; U(X, Y) \rightarrow \text{OBJECTIVE FUNCTION}$$

SUBJECT TO

$$\underbrace{P_X \cdot X + P_Y \cdot Y}_{\text{TOTAL EXPENDITURES TOWARD X \& Y}} = I \rightarrow \text{BUDGET CONSTRAINT.}$$

I → INCOME (HIS AVAILABLE RESOURCES)

$(X^* = ?, \; Y^* = ?) \rightarrow U$ IS MAXIMIZED.

Wednesday, January 28, 2015 11:13 AM

THEORY OF CONSUMER CHOICE (CONTINUED)

NOTE: FOR BASIC KNOWLEDGE TAUGHT IN EE211: PRINCIPLE OF MICROECONOMICS, YOU ARE REQUIRED TO DO SELF-STUDY

FOR EX:
- PROPERTIES OF ICs (IN DETAILS)
- BUDGET LINES
- $\frac{MU_x}{P_x} = \frac{MU_y}{P_y} \Rightarrow$ RATIONAL SPENDING RULE

READ: PINDYCK AND RUBENFELD OR FRANK OR ANY "INTERMEDIATE MICROECONOMICS" BOOK

PREFERENCES — BUDGET CONSTRAINT — OPTIMIZATION

PREFERENCES

ASSUMPTIONS ABOUT CONSUMER'S PREFERENCES

① COMPLETENESS: THE CONSUMER IS ABLE TO RANK HIS PREFERENCES

EX: IN CHOOSING BET. 2 BASKETS: (F_1, C_1) BASKET A vs (F_2, C_2) BASKET B

HE MUST BE ABLE TO GIVE ONE OF THE THREE OPTIONS:

① $A \succ B$ (A IS PREFERRED TO B) $\Longleftrightarrow U(A) > U(B)$

② $B \succ A$ (B IS PREFERRED TO A) $\Longleftrightarrow U(B) > U(A)$

③ $A \sim B$ (A AND B ARE INDIFFERENT) $\Longleftrightarrow U(A) = U(A)$

NOTE $\succ$ = IS STRICTLY PREFERRED TO

$\succsim$ = IS WEAKLY PREFERRED TO

WHEN $A \succsim B$, IT MEANS THAT A IS PREFERRED AT LEAST AS MUCH AS IS B.

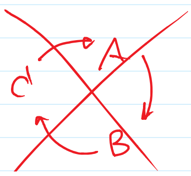
② TRANSIVITY: IF WE HAVE THREE BASKETS AND ASK HIM TO RANK AS FOLLOWS:

IN CHOOSING BET. A vs. B: SUPPOSE HE CHOOSES A OVER B.

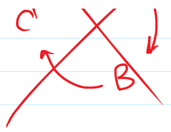
" ——————————— " B vs C: " ——————————— " B OVER C.

" ——————————— " A vs C: GIVEN THE RESULTS ABOVE, TO COMPLY W/ TRANSITIVITY, HE MUST CHOOSE A OVER C.

$$\boxed{\text{IN SHORT, IF } A \succ B \text{ AND } B \succ C, \text{ THEN } A \succ C.}$$



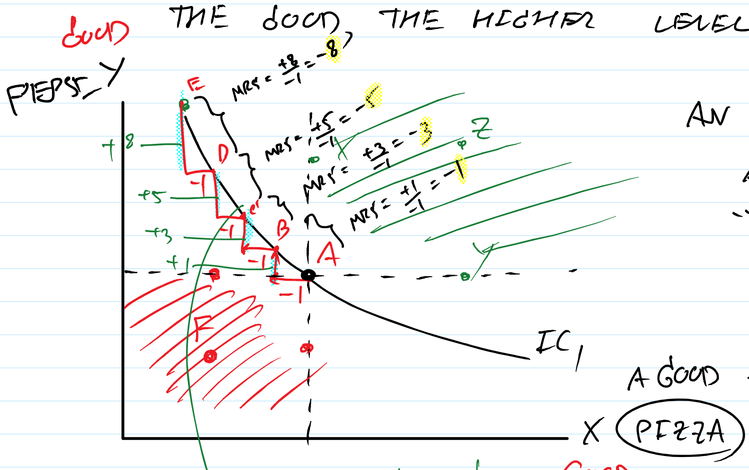
WE TRY TO AVOID CIRCULAR PREFERENCES



AVOID CIRCULAR PREFERENCES!

③ CONVEXITY : AVERAGES ARE PREFERRED TO EXTREMES
(≡ CONSUMER LOVES VARIETY)

④ MORE IS BETTER : GOODS IN OUR TALK ARE ASSUMED TO BE DESIRABLE, i.e, THE HIGHER AMOUNT OF THE GOOD, THE HIGHER LEVEL OF SATISFACTION.



AN INDIFFERENCE CURVE : A CURVE CONTAINING ALL BASKETS OF GOODS THAT GIVE "THE SAME SATISFACTION LEVEL" TO A CONSUMER.

A GOOD
- GOOD : MORE IS BETTER
- BAD : LESS IS PREFERRED TO MORE
- NEUTER : MORE OR LESS OF IT DOES NOT AFFECT UTILITY LEVEL.

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

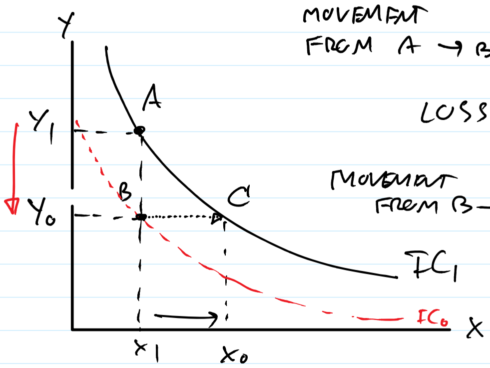
MARGINAL RATE OF SUBSTITUTION : RATE AT WHICH ONE GOOD CAN BE TRADED W/ ANOTHER GOOD TO KEEP HIS UTILITY CONSTANT.

MRS IS DIMINISHING.

Ex: 8 → 5 → 3 → 1 (IGNORE MINUS SIGN)

(WHY?)

MATHEMATICAL NOTE



MOVEMENT FROM A → B : LOSS IN UTILITY = ?

LOSS IN UTILITY = $MU_y \cdot \Delta Y$ (2) (-5) → -10 UTIL

MOVEMENT FROM B → C' : GAIN IN UTILITY = ?

GAIN IN UTILITY = $MU_x \cdot \Delta X$ (1) (10) → +10 UTIL

FROM A → C' : $\Delta U = 0$

A → B + B → C' = A → C'

LOSS IN UTILITY + GAIN IN UTILITY = $\Delta U = 0$

$$MU_y \cdot \Delta Y + MU_x \cdot \Delta X = 0$$

$$MU_y \cdot \Delta Y + MU_x \cdot \Delta X = 0$$

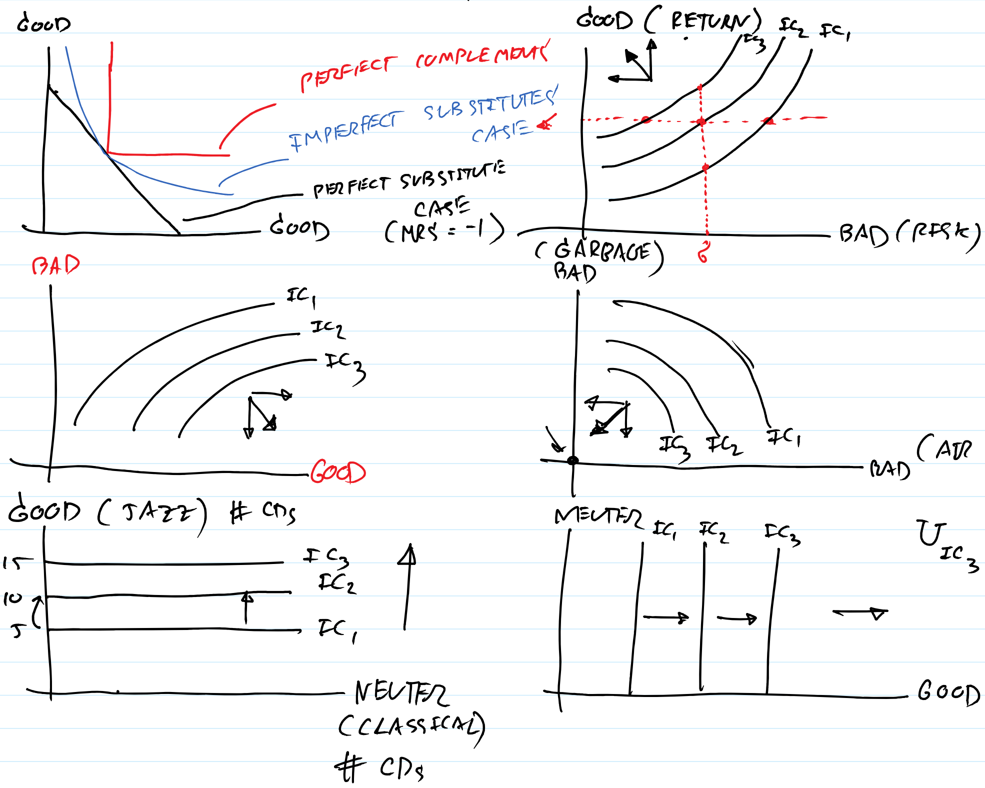
$$\boxed{\frac{\Delta Y}{\Delta X} = -\frac{MU_x}{MU_y}}$$

AS $\frac{\Delta Y}{\Delta X} = MRS$, SO $\boxed{MRS = -\frac{MU_x}{MU_y}}$

ANOTHER VERSION OF MRS.

PROPERTIES OF IC's (SELF REVIEW)

1. IC's ARE DOWNWARD SLOPING.
2. IC's DO NOT CROSS.
3. IC's ARE NOT THICK.
4. THE HIGHER IC's TOWARDS NORTHEAST DIRECTION GIVE HIGHER SATISFACTION LEVEL.
5. A BASKET OF GOODS WILL HAVE AN INDIFFERENCE CURVE PASSING THROUGH IT.



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

WK 4
Wednesday, February 04, 2015 11:10 AM

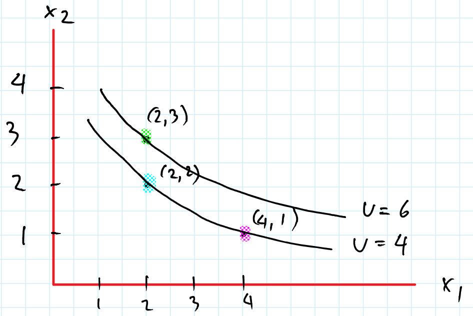
UTILITY FUNCTIONS & INDIFFERENCE CURVES

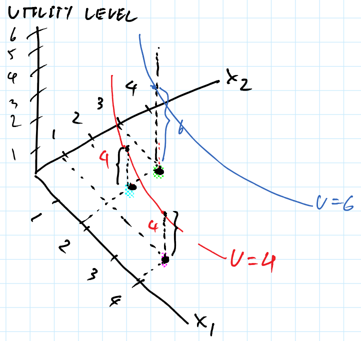
CONSIDER THE BASKET $\overset{x_1,\,x_2}{(4,1)}$, $\overset{x_1,\,x_2}{(2,3)}$, AND $\overset{x_1,\,x_2}{(2,2)}$

SUPPOSE $U(x_1, x_2) = x_1 \cdot x_2$

$U(2,3) = 2\cdot 3 = 6$
$U(4,1) = 4\cdot 1 = 4$
$U(2,2) = 2\cdot 2 = 4$

THAT IS $(2,3) \succ (4,1) \sim (2,2)$.





SO $U(x_1, x_2) = x_1 \cdot x_2$ REPRESENT THIS CONSUMER'S PREFERENCE RELATION.

NEXT, LET'S DO SOME TRANSFORMATION

$U(x_1, x_2) = x_1 \cdot x_2$

DEFINE $V(x_1, x_2) = U^2 = x_1^2 \cdot x_2^2$

$V(2,3) = 2^2 \cdot 3^2 = 36$
$V(4,1) = 4^2 \cdot 1^2 = 16$
$V(2,2) = 2^2 \cdot 2^2 = 16$

$\Big\}$ $(2,3) \succ (4,1) \sim (2,2)$

THEREFORE, V PRESERVES "THE SAME ORDER OF PREFERENCE AS U.

NEXT, DEFINE $W = 2U + 10$

SO $W(x_1, x_2) = 2\,x_1 x_2 + 10$

$W(2,3) = 2\cdot 2\cdot 3 + 10 = 22$
$W(4,1) = 2\cdot 4\cdot 1 + 10 = 18$
$W(2,2) = 2\cdot 2\cdot 2 + 10 = 18$

$\Big\}$ $(2,3) \succ (4,1) \sim (2,2)$

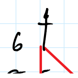
AGAIN, W PRESERVES THE SAME ORDER AS U AND SO REPRESENT THE SAME PREFERENCES.

CONCLUSION

- UTILITY FUNCTION —BRIDGE— PREFERENCE DESCRIBED BY ICs
- DOING A MONOTONIC TRANSFORMATION TO THE ORIGINAL UTILITY FUNCTION DOES NOT CHANGE THE PREFERENCE RELATION. (i.e., STILL $(2,3) \succ (4,1) \sim (2,2)$.)

SOME OTHER UTILITY FUNCTIONS & THEIR ICs

CONSIDER $\boxed{V(x_1, x_2) = x_1 + x_2}$.

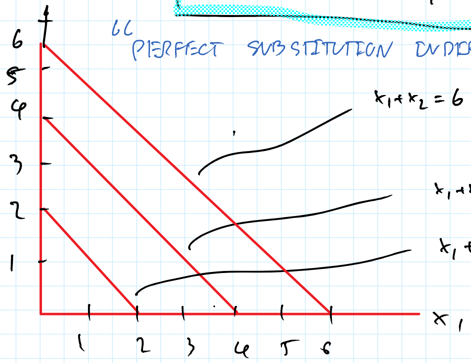


"PERFECT SUBSTITUTION INDIFFERENCE CURVES"

CONSIDER $\boxed{V(x_1, x_2) = x_1 + x_2}$.

"PERFECT SUBSTITUTION INDIFFERENCE CURVES"

WHAT DO THE IC's LOOK LIKE FOR THIS UTILITY FUNCTION?



ALL ARE LINEAR AND PARALLEL.

CONSIDER $W(x_1, x_2) = \min\{x_1, x_2\}$

IT IS CALLED "LEONTIEF UTILITY FUNCTION"

A $(1,1) \to W(1,1) = \min\{1,1\} = 1$

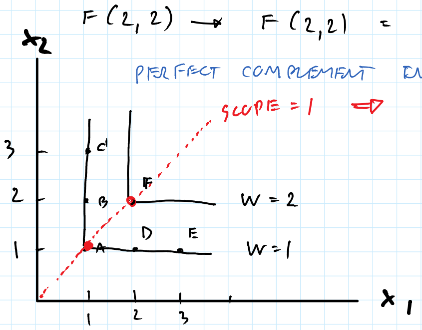
B $(1,2) \to W(1,2) = \min\{1,2\} = 1$

C $(1,3) \to W(1,3) = \min\{1,3\} = 1$

D $(2,1) \to W(2,1) = \min\{2,1\} = 1$

E $(3,1) \to W(3,1) = \min\{3,1\} = 1$

F $(2,2) \to F(2,2) = \min\{2,2\} = 2$



GENERAL FORM

$$U(x_1, x_2) = \min\{ax_1, bx_2\}$$

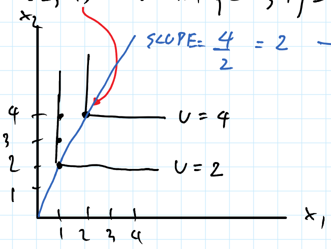
EX: $U(x_1, x_2) = \min\{2x_1, x_2\}$

$(1, 2) \to \min\{2 \cdot 1, 2\} = 2$

$(1, 3) \to \min\{2 \cdot 1, 3\} = 2$

$(1, 4) \to \min\{2 \cdot 1, 4\} = 2$

$(2, 4) \to \min\{2 \cdot 2, 4\} = 4$



SLOPE $= \frac{4}{2} = 2 \to$ EVERY TIME, THIS GUY WILL CONSUME A PACKAGE OF 1 UNIT OF GOOD 1 AND 2 UNITS OF GOOD 2

x_1	x_2
1	2
2	4
3	6

NOTICE THAT SLOPE $= \frac{a}{b}$ TELLS US ABOUT HIS CONSUMPTION OVER x_1 AND x_2

DIY: CONSIDER $U(x_1, x_2) = ax_1$. DESCRIBE THIS UTILITY FUNCTION IN TERM OF IC's.

BUDGET CONSTRAINTS

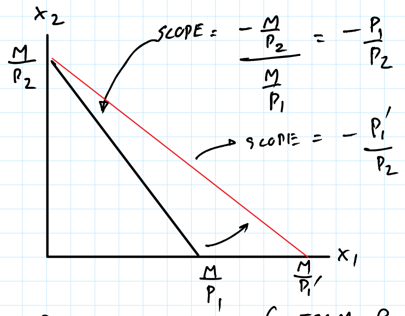
CONSIDER 2 GOODS: x_1 AND x_2

P_1 = PRICE OF GOOD 1

P_2 = PRICE OF GOOD 2

$M =$ INCOME

BUDGET CONSTRAINT : $P_1 x_1 + P_2 x_2 = M$



$$x_2 = \frac{M - P_1 x_1}{P_2}$$

$$x_2 = \frac{M}{P_2} - \frac{P_1}{P_2} x_1$$

INTERCEPT SLOPE

IF P_1 FALLS ... (FROM P_1 TO P_1')

BUDGET LINE SWINGS OUTWARD AND OPPORTUNITY COST OF GOOD 1 BECOMES CHEAPER

EX: B/F $P_1 = 100$, $P_2 = 50$ $\Rightarrow \frac{P_1}{P_2} = \frac{100}{50} = 2$

A/F $P_1' = 50$, $P_2 = 50$ $\Rightarrow \frac{P_1'}{P_2} = \frac{50}{50} = 1$

APPLICATION

EX) THE FOOD STAMP PROGRAM

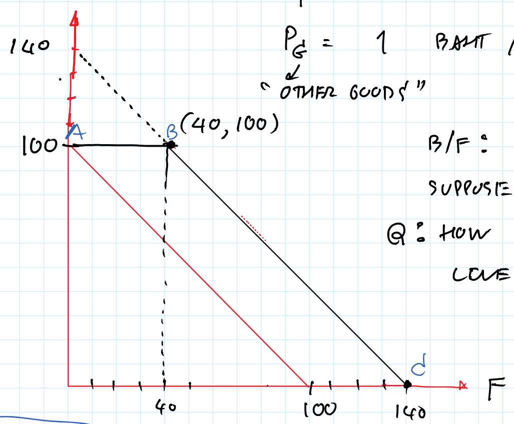
FOOD STAMPS ARE COUPON THAT CAN BE LEGALLY EXCHANGED ONLY FOR FOOD.

SUPPOSE $M = 100$ BAHT / DAY

$P_F = 1$ BAHT / UNIT

$P_G = 1$ BAHT / UNIT

"OTHER GOODS"



B/F: $F + G = 100 \Rightarrow$ BUDGET LINE

SUPPOSE YOU RECEIVE 40 FOOD STAMPS.

Q: HOW DOES IT AFFECT YOUR BUDGET LINE ?

D-I-Y

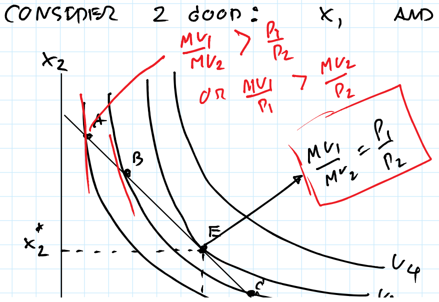
WHAT IF FOOD STAMP CAN BE TRADED ON A BLACK MARKET OF 0.5 BAHT EACH?

HOW DOES IT AFFECT THE BUDGET CONSTRAINT?

SO FAR ... IC's, UTILITY FUNCTIONS, BUDGET CONSTRAINT.

NOW, CONSUMER OPTIMIZATION PROBLEM.

CONSIDER 2 GOOD: x_1 AND x_2 (OR GOOD 1 AND GOOD 2)

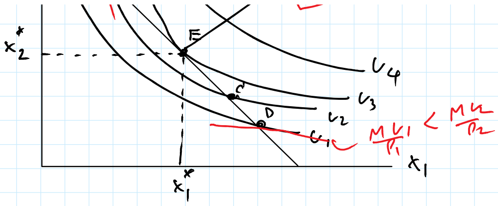


PROBLEM:

$$\boxed{\begin{array}{l} \max\ U(x_1, x_2) \\ \text{s.t. } P_1 x_1 + P_2 x_2 = M \end{array}}$$

$x_1, x_2 \rightarrow$ ENDOGENOUS VARIABLES

$P_1, P_2, M \rightarrow$ EXOGENOUS



$x_1, x_2 \rightarrow$ ENDOGENOUS VARIABLES

$P_1, P_2, M \rightarrow$ EXOGENOUS VARIABLES

$(x_1^* = ?,\ x_2^* = ?) \rightarrow$ MAX U.

AT E: SLOPE OF IC = SLOPE OF BL

$$-\frac{MU_1}{MU_2} = -\frac{P_1}{P_2}$$

$$\frac{MU_1}{MU_2} = \frac{P_1}{P_2}$$

OR $$\boxed{\frac{MU_1}{P_1} = \frac{MU_2}{P_2}}$$

EXTRA UTILITY FROM THE LAST BAHT SPENT ON GOOD 1

EXTRA OR ADDITIONAL UTILITY FROM THE LAST BAHT SPENT ON GOOD 2

"RATIONAL SPENDING RULE"

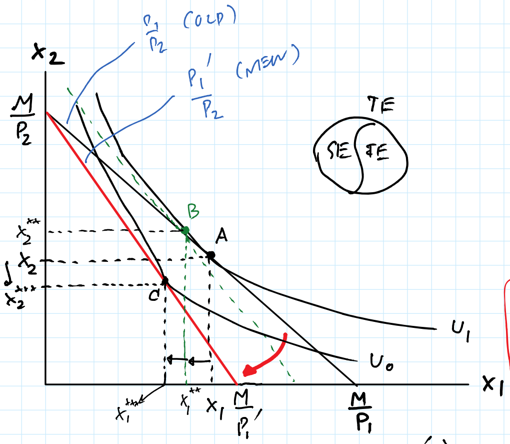
IF $\frac{MU_1}{P_1} > \frac{MU_2}{P_2}$, HE SHOULD REALLOCATE HIS BUDGET TOWARDS BUYING MORE OF GOOD 1 AND LESS OF GOOD 2.

IF $\frac{MU_1}{P_1} < \frac{MU_2}{P_2}$, CONSUME MORE OF 2 AND LESS OF 1

(EX: MOVING FROM $D \rightarrow C \rightarrow$ E)

WEEK 4B (06.02.15)

- DECOMPOSITION OF THE TOTAL EFFECT OF A CHANGE IN PRICE
  - HICKSIAN APPROACH (STUDIED IN EE211)
  - SLUTSKY APPROACH
- SLUTSKY'S EQUATION
- CORNER SOLUTION
- PRICE-CONSUMPTION CURVE (PCC) & INCOME-CONSUMPTION CURVE (ICC)



SUPPOSE P_1 RISES...

BL ROTATES INWARD.

NEW CHOICE: $C(x_1^{***}, x_2^{***})$

RESULT: BUY LESS OF x_1

" ——— " x_2

MOVEMENT FROM $A \rightarrow C$ = TOTAL EFFECT (OF A PRICE CHANGE)

MOVEMENT FROM $A \rightarrow B$ = SE.

MOVEMENT FROM $B \rightarrow C$ = IE.

WHERE $P_1' > P_1$.

STRATEGY: ELIMINATE IE SO THAT WE CAN SEE "PURE SUBSTITUTION EFFECT."

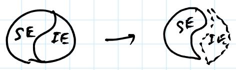
TECHNIQUE: CREATE AN IMAGINARY BUDGET LINE

WITH 2 PROPERTIES:

① PARALLEL W/ THE NEW BL

+ ② TANGENT W/ THE OLD IC.

RATIONALE: RECALL THAT YOU WANT TO DECOMPOSE SE AND IE.



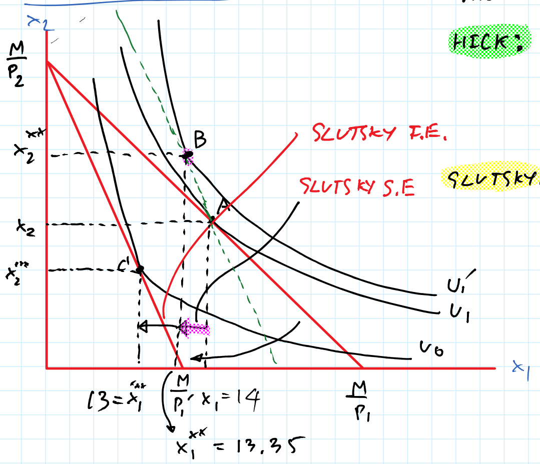
TO DO SO, YOU TRY TO "GET RID OF" IE SO THAT YOU CAN SEE "PURE SE".

TO "GET RID OF" IE, HICK ASKS THE FOLLOWING QUESTION:

HOW MUCH INCOME THE CONSUMER NEEDS TO GET BACK TO THE ORIGINAL INDIFFERENCE CURVE WHEN HE FACES WITH THE NEW RELATIVE PRICE, NAMELY $\frac{P_1'}{P_2}$?

RECALL THAT WHEN P_1 RISES, HIS REAL INCOME FALLS.

SLUTSKY'S APPROACH TO DECOMPOSE THE TOTAL EFFECT OF A PRICE CHANGE.



- WHEN ISOLATING INCOME EFFECT,

HICK: TO MAKE REAL INCOME CONSTANT, THE CONSUMER MUST GET BACK TO THE ORIGINAL IC WHEN HE FACES W/ THE NEW RELATIVE PRICE.

SLUTSKY: TO MAKE REAL INCOME CONSTANT, THE CONSUMER MUST BE ABLE TO BUY OR AFFORD "THE ORIGINAL BASKET" WHEN HE FACES W/ THE NEW RELATIVE PRICE

SUPPOSE P_1 RISES...

HIS UTILITY FALLS.

OLD CHOICE: $A(x_1, x_2)$

NEW CHOICE: $C'(x_1^{***}, x_2^{***})$

SLUTSKY: TO ELIMINATE INCOME EFFECT (IE), SLUTSKY ASKS:

HOW MUCH MONEY INCOME THE CONSUMER NEEDS TO BE ABLE TO AFFORD HIS ORIGINAL BASKET WHEN HE FACES W/ THE NEW RELATIVE PRICE?

EXAMPLE SUPPOSE DEMAND FUNCTION FOR MILK IS

$$x_1 = 10 + \frac{M}{10 \cdot P_1} \quad \Rightarrow \quad x_1(P_1, M)$$

INITIALLY, $M = 120$, $P_1 = 3$

$$x_1 = 10 + \frac{120}{10 \cdot 3} = 14 \text{ LITRES / WK.}$$

i.e., EXPENDITURES ON MILK $= 14 \cdot 3 = 42$ BAHT SPENT ON MILK

" ——— " OTHER GOOD $= 120 - 42 = 78$ BAHT ON OTHER GOODS

NOW SUPPOSE $P_1' = 4$

QUESTION W/ THE NEW RELATIVE PRICE YOU FACE, HOW MUCH MONEY INCOME IS NEEDED TO AFFORD THE

INITIAL BASKET?

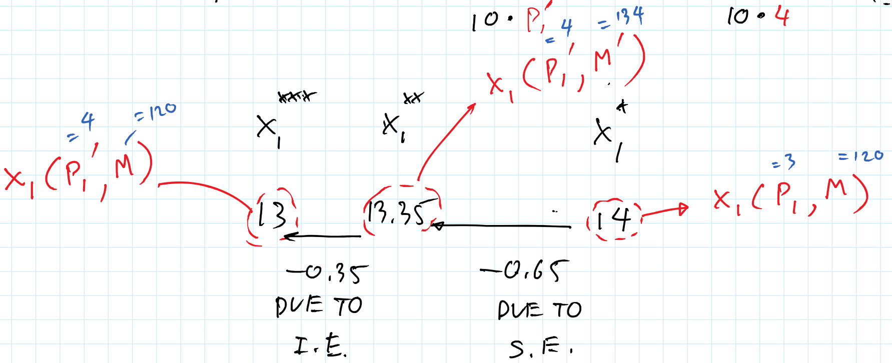
ANSWER $78 + 14 \cdot 4 = 134$ BAHT/WK !

THIS GUY WILL BUY $x_1^{**} = 10 + \dfrac{134}{10 \cdot 4} = 13.35$ LITRES/WK

THEREFORE, $\underset{x_1(P_1', M')}{13.35} - \underset{x_1(P_1, M)}{14} = -0.65$ LITRES IS THE SUBSTITUTION EFFECT (S.E.)!

HOW ABOUT THE INCOME EFFECT?

$$x_1^{***} = 10 + \frac{M}{10 \cdot \underset{=4}{P_1'}} = 10 + \frac{120}{10 \cdot 4} = 13 \rightarrow \text{HIS FINAL CONSUMPTION}$$



THE SUBSTITUTION EFFECT IS

$$\Delta x_1^S = x_1(P_1', M') - x_1(P_1, M) \quad \Longleftrightarrow \quad 13.35 - 14 \ (= -0.65)$$

THE INCOME EFFECT IS

$$\Delta x_1^N = x_1(P_1', M) - x_1(P_1', M') \quad \Longleftrightarrow \quad 13 - 13.35 \ (= -0.35)$$

THE TOTAL EFFECT IS

$$\Delta x_1 = \Delta x_1^S + \Delta x_1^N$$

$$= [\cancel{x_1(P_1', M')} - x_1(P_1, M)] + [x_1(P_1', M) - \cancel{x_1(P_1', M')}]$$

$$\boxed{\Delta x_1 = x_1(P_1', M) - x_1(P_1, M).}$$

IN TERMS OF DERIVATIVE (OR RATE OF CHANGE)

$$\frac{dx_1}{dp_1} = \frac{dx_1^S}{dp_1} - \frac{dx_1}{dM} \cdot \frac{dM}{dp_1}$$

SINCE $M = P_1 x_1 + P_2 x_2$

SINCE $M = P_1 x_1 + P_2 x_2$

$$\frac{dM}{dP_1} = x_1 .$$

$$\boxed{\frac{dx_1}{dP_1} = \frac{d x_1^s}{dP_1} - \frac{dx_1}{dM} \cdot x_1}$$

SLUTSKY'S EQUATION

• WHEN x_1 IS A NORMAL GOOD	$-$	$-$	$-$	$+$	$\cdot$	$+$
• WHEN x_1 IS AN INFERIOR GOOD (SE > IE)	$-$	$-$	$-$	$-$		$+$
• WHEN x_1 IS A GIFFEN GOOD (IE > SE)	$+$	$-$	$-$	$-$		$+$
	TE	SE		IE		

LAW OF DEMAND IS VIOLATED!

SE ALWAYS NEGATIVE (WHY?)