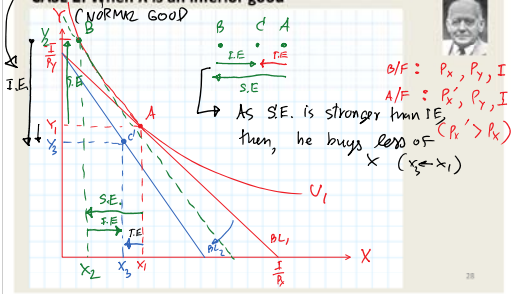
Decomposition of the Total Effect

CASE 2: When X is an inferior good (NORMAL GOOD)



B/F : $P_x, P_y, I \rightarrow A(x_1, y_1)$, U_1 level

A/F : $P_x', P_y, I \rightarrow d(x_3, y_3)$, U_0 level

$U_0 < U_1$ ∴

As S.E. is stronger than I.E, then, he buys less of X ($P_x' > P_x$) ($x_3 < x_1$)

Decomposition of the Total Effect

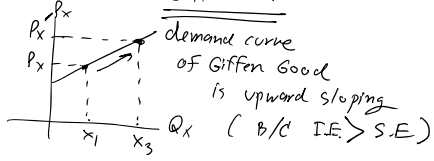
CASE 3: When X is a Giffen Good (super inferior good)

What happens if I.E > S.E?

it shows that

When P_x ↑, he buys more of X !!!

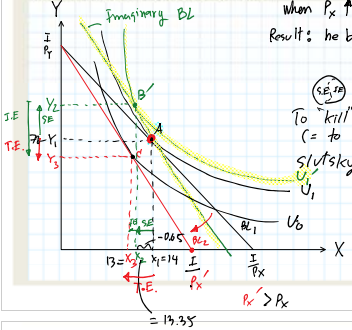
So X is so called "Giffen Good"



demand curve of Giffen Good is upward sloping (B/C I.E > S.E)

Decomposition of the Total Effect

CASE 1: When X is a normal good



When P_x ↑...

Result: he buys less of x & less of y SLUTSKY

To "kill" or "eliminate" I.E. (= to undo the change in real income)

Slutsky said " we must virtually compensate him w/ enough income so that he could afford "HIS ORIGINAL BASKET" at the new relative price ($\frac{P_x'}{P_y}$) he are dealing with

Notice that ① the Imaginary BL must pass through the old basket (basket A)

② the imaginary BL will touch a higher IC (U_1') [not U_1] !!!

SEPT 11 : Numerical Example of Slutsky's approach

Decomposition of the Total Effect

CASE 2: When X is an inferior good

Decomposition of the Total Effect

CASE 2: When X is an inferior good

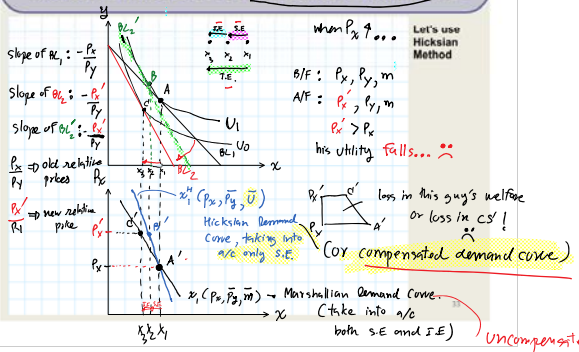
D - I - Y

Decomposition of the Total Effect

CASE 3: When X is a Giffen Good

D - I - Y

Hicksian Demand Curve Vs. Marshallian Demand Curve



Other Key Points

- We refer the Hicksian demand curve as "compensated" demand curve, whereas the Marshallian demand curve is referred as "uncompensated" demand.

IC (U_1) (not u_1) !!!

SEPT 11 : Numerical Example of Slutsky's approach

Consider a consumer's demand function for milk:

$$x_1 = 10 + \frac{m}{10 \cdot p_1}$$

x_1 = quantity demanded for milk
p_1 = price of milk
m = his income

Initially, $m = 120$ \$ / wk
$p_1 = 3$ \$ / litre

So • $x_1 = 10 + \frac{120}{10 \cdot 3} = 10 + 4 = 14$ litres / wk

• Expenditure on milk = $p_1 \cdot x_1 = 3 \cdot 14 = 42$ \$/wk

• Expenditure on all other goods = $m - p_1 x_1 = 120 - 42 = 78$ \$/wk.

Now, let's say, price of milk goes up to 4 \$ / litre ($p_1' = 4$)

Question: w/ the new relative price he faces, how many dollars would he need to buy the original basket (14 milk, 78 composite good)

Answer: $p_1' x_1 +$ composite good $= 4 \cdot 14 + 78 = 56 + 78 = 134$ \$/wk. $= m'$

Given p_1' and m': $x_1^{**} = 10 + \frac{m'}{10 \cdot p_1'} = 10 + \frac{134}{10 \cdot 4} = 13.35$ litres/wk

($x_1^{**}(p_1', m')$, $p_1' = 4$, $m' = 134$; $x_1(p_1, m)$, $p_1 = 3$, $m = 120$)

Then $13.35 - 14 = -0.65$ litres represents change in quantity demanded for milk due to pure substitution effect (S.E.) Note: Slutsky Concept. S.E.

Next: How about Income effect?

$$x_1^{***} = 10 + \frac{m}{10 \cdot p_1'} = 10 + \frac{120}{10 \cdot 4} = 10 + 3 = 13 \text{ litres/wk.}$$

($x_1(p_1', m)$, $m = 120$; $x_1(p_1', m')$, $m' = 134$)

$13 - 13.35 = -0.35$ litre / wk represents change in quantity demanded for milk due to Δ in his purchasing power when he faces w/ the new relative price. I.E.

SUMMARY

C B' A

• • •

($x_1(p_1', m')$, $m' = 134$)

- We refer the Hicksian demand curve as "**compensated**" demand curve, whereas the Marshallian demand curve is referred as "**uncompensated**" demand.
- The Hicksian demand curve is always downward-sloping because **it ignores the IE**.
- For the same reason, the Hicksian demand for a normal good is steeper than the Marshallian demand.

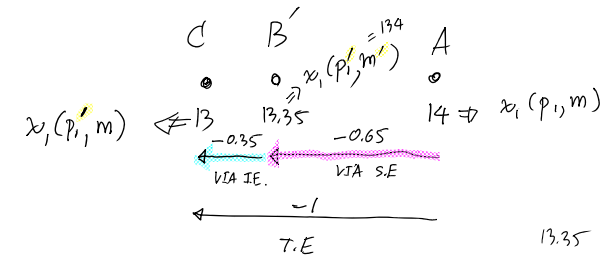
34

Slutsky's Equation

Consumer's Duality Problem

Fixed budget & utility maximisation
PRIMAL PROBLEM

SUMMARY



GENERAL FORM

The substitution effect is $\Delta x_1^{S.E} = x_1(p_1', m') - x_1(p, m)$ $\Leftrightarrow$ 13.35 − 14 = −0.65 (B, A)

The income effect is $\Delta x_1^{I.E} = x_1(p_1', m) - x_1(p_1', m')$ $\Leftrightarrow$ 13 − 13.35 = −0.35 (C: 13.00, B: 13.35)

So The Total effect is $\Delta x_1 = \Delta x_1^{S.E} + \Delta x_1^{I.E}$

$= [x_1(p_1', m') - x_1(p, m)] + [x_1(p_1', m) - x_1(p_1', m')]$

$\Delta x_1 = x_1(p_1', m) - x_1(p, m)$ (13 − 14)

($x_1(p_1', m)$: point C; $x_1(p, m)$: point A)

In term of derivative: (Rate of change)

$$\frac{dx_1}{dp_1} = \frac{dx_1^{S.E.}}{dp_1} - \frac{dx_1}{dm} \cdot \frac{dm}{dp_1}$$

(S.E. | I.E.)

Since $m = p_1 x_1 + p_2 x_2$, then $\frac{dm}{dp_1} =$

So $\frac{dx_1}{dp} = \frac{dx_1^{S.E}}{} - dx_1 \cdot x_1$

$4 = -1$

Slutsky's Equation !!!

x_1

always positive

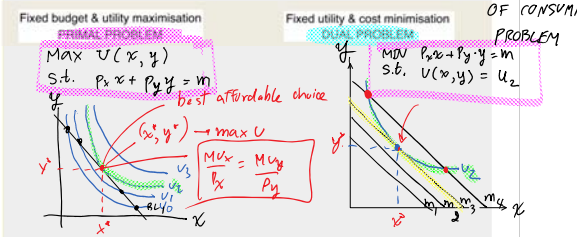
is slutsky

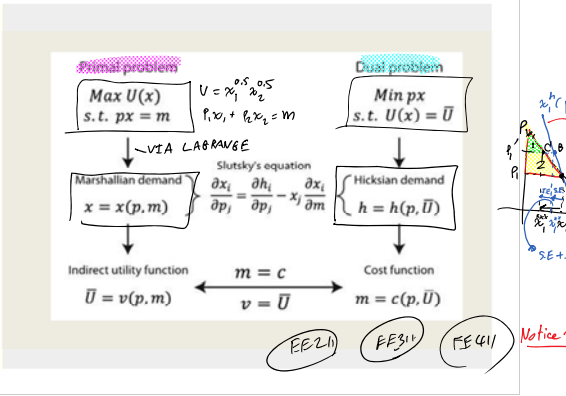
Fixed budget & utility maximisation
PRIMAL PROBLEM

Fixed utility & cost minimisation
DUAL PROBLEM

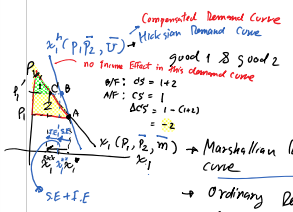
37

DUALITY = 2 SIDES OF THE SAME COIN OF CONSUMER'S PROBLEM





Notice that Marshallian demand curve is more price-responsive than Hicksian demand curve. (Why?)



So

$$\frac{dx_1}{dp_1} = \frac{dx_1}{dp_1}^{S.E} - \frac{dx_1}{dm} \cdot x_1$$

T.E = S.E + I.E

Suppose P_x ↑

- When x_1 is a normal good: $\downarrow x_1$ (−) $\quad \downarrow x_1$ (−) $\quad \downarrow x_1$ (−)
- When x_1 is an inferior good (S.E. > I.E): $\downarrow x_1$ (−) $\quad \downarrow x_1$ (−) $>$ $\uparrow x_1$ (+)
- When x_1 is a Giffen good (super inferior good) (I.E > S.E): $\uparrow x_1$ (+) $\quad \downarrow x_1$ (−) $<$ $\uparrow x_1$ (+)

$=$

law of demand is

is slutsky Equation

a.s.

$\frac{dx_1}{dm} \geq 0$

$\frac{dx_1}{dm} < 0$ ⊖⊖⊕

$\frac{dx_1}{dm} < 0$ ⊖⊖⊕

violated!

CS CV EV (pages 141 - 147) ***

Consumer Surplus, Compensating Variation, Equivalent Variation

compensating variation
A measure of how much money a consumer would be willing to give up after a reduction in the price of a good to be just as well off as before the price decrease.

equivalent variation
A measure of how much additional money a consumer would need before a price reduction to be as well off as after the price decrease.

EV CONCEPT : NEW UTILITY
OLD PRICE LEVEL

CV asks: How much income this guy would actually need to return to his original utility when he faces w/ the new (relative) price ?

CV CONCEPT : OLD UTILITY
NEW PRICE LEVEL

- Suppose $P_y = 1$, Y is a composite good, let's say
- Ok = his original income

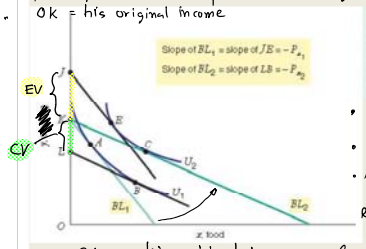


FIGURE 5.15 Compensating and Equivalent Variations with a Positive Income Effect
The price change from P_{x_1} to P_{x_2} has a positive income effect, so the compensating variation (the length of the segment KJ) and the equivalent variation (the length of the segment JK) are not equal. In this case, JK > KL.

- A is an original choice
- A is on U_1 and BL_1
- As $P_x \downarrow$, BL rotates outward from BL_1 to BL_2

Result: C is the new (final) choice
C is on U_2 and BL_2.
His utility rises ☺

CV = his original income − level of income he would require to get back to old utility level at the new (relative) price

= Ok − OL

= KL

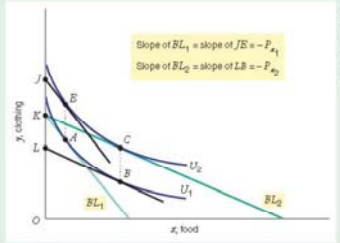


FIGURE 5.16 Compensating and Equivalent Variations with No Income Effect (Utility Function Is Quasilinear)
The utility function is quasilinear, so indifference curves U_1 and U_2 are parallel, and there is no income effect (C lies directly above B, and E lies directly above A). The compensating variation (KJ) and equivalent variation (KJ) are equal.

Advice : Look at page 144 (NUMERICAL EXAMPLE ON CV, EV)

& page 146 (CV, EV with quasilinear preference)

↓

CV = EV (why ?)

/

B/C No income effect

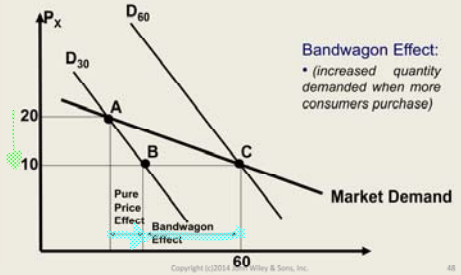
Network Externalities

- If one consumer's demand for a good changes with the number of other consumers who buy the good, there are network externalities.

Network Externalities

- Bandwagon effect: A positive network externality that refers to the increase in each consumer's demand for a good as more consumers buy the good

Network Externalities



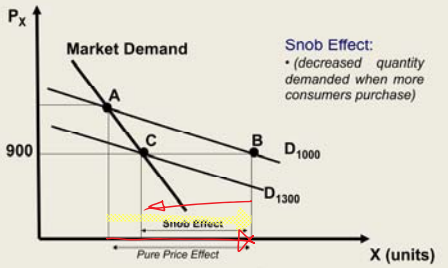
Bandwagon Effect:

- *(increased quantity demanded when more consumers purchase)*

Network Externalities

- Snob effect: A negative network externality that refers to the decrease in each consumer's demand as more consumers buy the good

Network Externalities



Snob Effect:
• *(decreased quantity demanded when more consumers purchase)*

Labor-Leisure Trade-off

- Divide the day into two parts: Work hours and leisure (non work) hours.
- Earns income during work hours and uses the income to pay for activities he enjoys in his leisure time.

Defining Labor Supply

- Total Daily income:
- *w(24-L)*

where w is the hourly wage rate

L is the leisure hours

24 is the 24 hours in a day

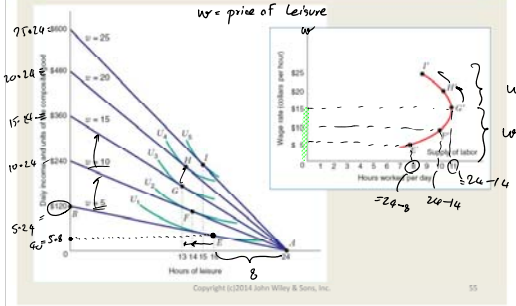
Supply of Labor

- An increase in wage rate reduces the amount of labor required to buy a unit of the composite good
- This leads to both a Substitution effect and Income effect.

Labor Supply Curve

- The labor supply curve slopes upward over the region where the substitution effect associated with the wage increase outweighs the income effect, but bends backward over the region where the income effect outweighs the substitution effect.

Labor Supply Curve



w↓ → work less b/c IE > SE

w↑ → work more

(why?) b/c SE > IE

Consumer Price Indices

CPI ⇒ uses fixed basket of good to calculate cost of living

CPI ⇒ ignores the fact that ppl always do "substitution" among the goods when price environment changes.

⇓

As a result, CPI "overestimates" cost of living.

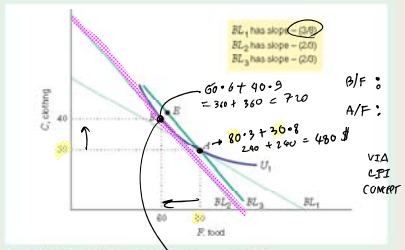


FIGURE 5.27 Substitution Bias in the Consumer Price Index

60·6 + 40·9 = 360 + 360 = 720

80·3 + 30·8 = 240 + 240 = 480 ✓

B/F : $P_F = 3$ $P_C = 8$

A/F : $P_F' = 6$ $P_C' = 9$

VIA CPI COMPUT

80·6 + 30·9 → Basket A

= 480 + 270

= 750 ✓ !!!

$\frac{COST_2}{COST_1} = \frac{750}{480} = 1.5625$

Ideal cost of living index

$= \frac{720}{480} = 1.50$

cost of living increases by 56%