501A. 11/26

* Welfare MWG 3.I.

Consider a particular consumer facing a change from p^0 to p^1.

How good or bad would this change be for her?

☆ Today's point.

- Consumer has a utility function u, and wealth w.

(1) $\Delta V = V(p^1, w) - V(p^0, w)$ (ex if $v = 2u$, ΔV will be doubled)

How good or bad.

(2) Hicks Compensation (Compensating Variation) →

$$V(p^0, w^0) = V(p^1, w^1)$$

Define $CV \in \mathbb{R}$ (CV: Compensating Variation, real number)

$$V(p^0, w^0) = V(p^1, w^0 - CV) \Rightarrow \text{So, } w^1 = w^0 - CV \;:\; CV = w^0 - w^1$$

[CV : + , goodness ($p^0 > p^1$)
  CV : − , badness.

Let $\bar{v}^0 = v(p^0, w^0)$.

a level of utility

$w^0 = e(p^0, \bar{v}^0)$ (e is inverse of $\bar{v}^0$ with p^0)

(Throughout this section, assume u is continuous, LNS and g, h are single-valued)

$$w^1 = e(p^1, \bar{v}^0)$$

$$CV = w^0 - w^1 = e(p^0, \bar{v}^0) - e(p^1, \bar{v}^0)$$

(initial level of utility)

($CV(p^0, p^1, w^0)$: initial price, new price, initial wealth)

NOTE $f: \mathbb{R} \to \mathbb{R}$

$a, b \in \mathbb{R}$

$f(b) - f(a)$

(3) Equivalent variation

$$v(p^0, w^1) = \underbrace{v(p^1, w^0)}_{:=\bar{v}^1}$$

$v(p^0, w^0+EV) = v(p^1, w^0)$ Then, $w^0+EV = e(p^0, \bar{v}^1)$, $w^0 = e(p^0,$

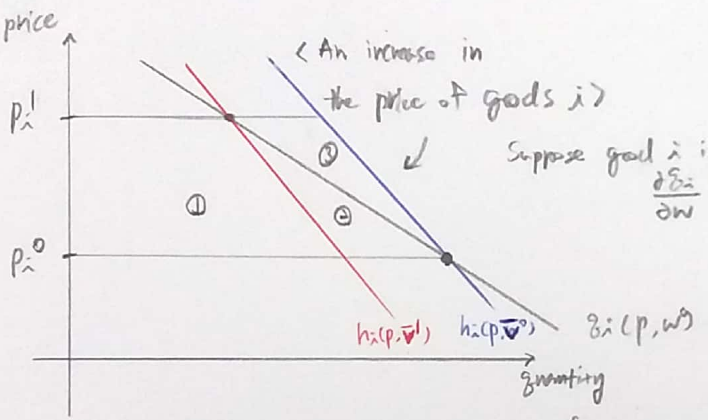
Define $EV \in \mathbb{R}$. $w^1 = w^0 + EV$: $EV = e(p^0, \bar{v}^1) - e(p^1, \bar{v}^1)$ (New level of utility)

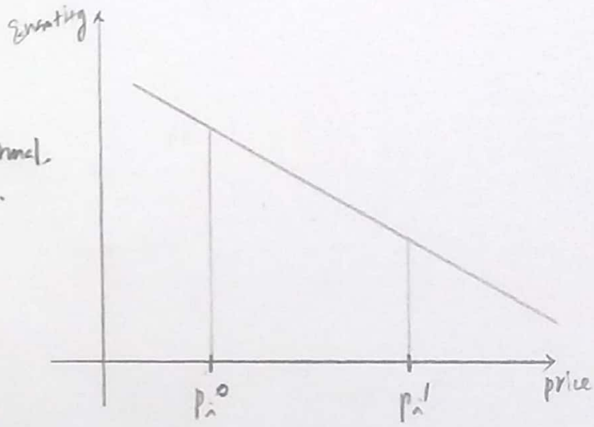
$$\begin{cases} p^0 > p^1, & EV : + \\ p^0 < p^1, & EV : - \end{cases}$$

---

(4) Area variation (From MWG)

Now let us suppose that the price of only one good i changes $p_j^1 = p_j^0$, $\forall j \neq i$





- $\Rightarrow AV = \int_{p_i^1}^{p_i^0} x_i(p, w^0)\, dp_i$

$$\begin{cases} AV : ① + ② \\ CV : ① + ② + ③ \\ EV : ① \end{cases}$$

when $p^0 > p^1$
$EV \leq AV \leq CV$

Note: $f(b) - f(a) = \int_a^b f'(x)\, dx$.

- e is a single-valued fcn. So, • $CV = \int_{p_i^1}^{p_i^0} \frac{\partial e((p_i, p_{-i}^0), \bar{v}^0)}{\partial p_i} dp_i$

Note 2: $p_{-1} = (p_2, \dots, p_n)$

(Only p_i is changed, NOT p_{-i})

$$= \int_{p_i^1}^{p_i^0} h_i(p, \bar{v}^0)\, dp_i$$

- $EV = \int_{p_i^1}^{p_i^0} h_i(p, \bar{v}^1)\, dp_i$

$\Rightarrow$ Generally, AV, CV, EV are different b/c wealth effect.