

The Difference between the CV & the EV

Let C denote the vector of nonmarket commodities (levels of public goods, health, weather, environment quality, etc).

Consider a deterioration C^1 to C^0 .

That is $C^0 \succ C^1$.

Assume C^1 is really BAD.

In this case

$$(I^0, P^0, A^0, C^0) \succ (I^0, P^0, A^0, C^1)$$

Define the CV

$$V(I^0, P^0, A^0, C^0) = V(I^0 - CV, P^0, A^0, C^1)$$

Since $C^0 \succ C^1$

$CV < 0$ and, in absolute terms, the individual's WTA the deterioration.

Note that there is no lower-bound (upper-bound) on this CV (WTA), it could be $-\infty$ ($+\infty$).

In contrast,

$$V(I^0 + EV, P^0, A^0, C^0) = V(I^0, P^0, A^0, C^1)$$

if $C^0 > C^1$, $EV < 0$ and, in absolute terms, the individual's *WTP* to stop to deterioration.

While the above equation is the standard definition of the *EV* in terms of the indirect utility function, one must recognize the possibility that there is not necessarily an $|EV| \leq I^0$ that equates the two sides of the equation.

That is, if $WTP = I^0$, it might still be the case that $V(0, P^0, A^0, C^0) > V(I^0, P^0, A^0, C^1)$.

If *WTP* is bounded by income, the $|EV|$ for $(C^0 \text{ to } C^1) \leq I^0$, so bounded from above.

Therefore for $(C^0 \text{ to } C^1)$

$$|CV| \leq \infty$$

and

$$|EV| \leq I^0$$

In theory, the difference between the two can be huge.

Examples:

C^0 you are healthy, the weather is great, and you don't care about anyone else.

C^1 you are in terrible pain with no chance of abatement and you don't care about anyone else.

What is your *WTP* to avoid the pain?

Probably your income, I^0 .

What is your *WTA* the pain?

Probably there is no amount.

Consider a second example.

Mining companies through pollution and mine tailings cause the effective loss of a river basin. This forces the Indian tribe that lived in this basin to move to an area with no river.

The whole culture of the tribe was based on the river basin where the tribe had lived for many generations.

The tribe loses its "culture."

How might the tribe's *CV* & *EV* for the deterioration differ?

The absolute value of *CV* is *WTA* the loss, probably huge, and the absolute value of *EV* is *WTP* to stop the loss.

Why the difference between the CV & EV for a deterioration in C ?

The difference between the CV & EV is a function of how easily one can substitute market commodities for the component of C that changed.

If there is a market commodity that is a perfect substitute for C

$$CV = EV \quad (\text{See Hanemann proposition 1})$$

If there are no substitutes for C , the difference between CV & EV can be infinity.

Why people used to think $CV \approx EV$ unless there were really weird income effects.

Consider the CV and EV associated with a price change, holding constant the characteristics of the market commodities and the levels of the nonmarket commodities. The CV and EV can differ only because of the “income effect” associated with the price change. There is no “substitution effect” causing them to differ. In addition, one would expect this income effect to be small, unless the price change caused a very significant change in one’s utility level (e.g. the price of cocaine quadruples for an addict). See the AER article by Robert Willig, “Consumer Surplus without Apology”.

There was a presumption on the part of many that the CV and EV for a policy that involves a change in the level of nonmarket commodities can only differ because of such income effects.

This is incorrect. For a change in the level of nonmarket commodities, the CV and EV can differ both because of the income effect and because of the substitution effect (how easily the market commodities substitutes for the nonmarket commodities whose levels have changed).

This incorrect presumption resulted for a number of reasons:

Willig was interpreted as saying his result carried over to characteristics space.

Some results in a paper by Randall and Stoll were misinterpreted.

Readings:

Hanemann, M., "Willingness to Pay and Willingness to Accept: How Much Can They Differ?" American Economic Review , June 1991, pp 635-647.

Shogrun, J.F., S.Y. Shin, D.J. Hayes and J.B. Kliebenstein, "Resolving Differences in Willingness to Pay and Willingness to Accept," American Economic Review , March 1994, pp 255-270.