The Compensating Variation: The Basics

Two states of the world

\[(m^0, p^0) \text{ and } (m^1, p^1).\]

What is the compensation variation associated with the \(\Delta\) from

\[(m^0, p^0) \text{ to } (m^1, p^1)?\]

It is the amount of money that must be subtracted from \(m\) in the new state to make one indifference between the original state and the new state with \(CV\) subtracted from \(m^1\); that is

\[(m^0, p^0) \sim (m^1 - CV, p^1).\]

In terms of the indirect utility function

\[u^0 = v(p^0, m^0) = v(p^1, m^1 - CV)\]

where

\[u^0\] is maximum utility given

\[p^0\] and \(m^0\).

Note if you take

\[u^0 = v(p^1, m^1 - CV)\] and solve for \((m^1 - CV)\) one gets

\[(m^1 - CV) = E(u^0, p^1)\]

\[\Rightarrow\]

\[m^1 - E(u^0, p^0) = CV\]

but

\[m^1 = E(u^1, p^1)\]

where \(u^1\) is maximum utility given \(m^1\) and \(p^1\).
So,

\[ CV = E(u^1, p^1) - E(u^0, p^1) \]

If \[ (m^1, p^1) > (m^0, p^0) \]

\[ CV > 0. \]

If \[ (m^1, p^1) < (m^0, p^0) \]

\[ CV < 0. \]

If \[ (m^1, p^1) > (m^0, p^0) \]

\[ CV > 0 \text{ is WTP for new state.} \]

If \[ (m^0, p^0) > (m^1, p^1) \]

\[ CV < 0 \text{ is, in absolute terms, WTA the new state.} \]