Aggregation

- Need to aggregate impacts across individuals
- Welfare Function: Aggregation of individual welfare functions.

Individual welfare function for i

- $U_i = U_i(X_{i1}, X_{i2}, \ldots X_{ij})$
- Max $L=U_i(X_{i1}, X_{i2}, \ldots X_{ij})$
  $- \_(p_1*X_{i1}+p_2*X_{i2} \ldots - Y)$
- FOC:
  - $\partial U_{ij}/\partial X_j = \_ * P_j$
  - $\partial U_{ij}/\partial X_j = \partial U_i/\partial Y * P_j$
- $dU_i = \_j \partial U_i/\partial X_j \, dX_{ij} = \_j \partial U_i/\partial Y*P_j \, dX_{ij}$

Social Welfare Function

- $W = W(U_1, U_2, U_3, \ldots U_n)$
- $dW = \__i \; \partial W/\partial U_i \, dU_i$

  $= \__j \__i \; \partial W/\partial U_i * \partial U_i/\partial Y * P_j \, dX_{ij}$

  $= MSU_i * MU\ Income_i * Pj\ dX_{ij}$

Kaldor – Hicks Compensation Tests

- Kaldor: The winners from a project can *in principal* compensate the losers
- Hicks: The losers cannot bribe the potential winners *not to* undertake the project
- Scitovsky: Both the Kaldor and Hicks criteria are met.

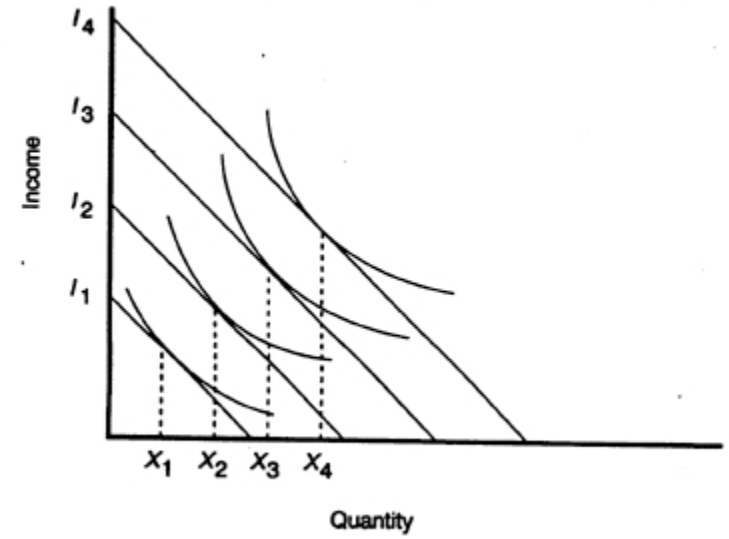
Kaldor – Hicks Compensation Tests

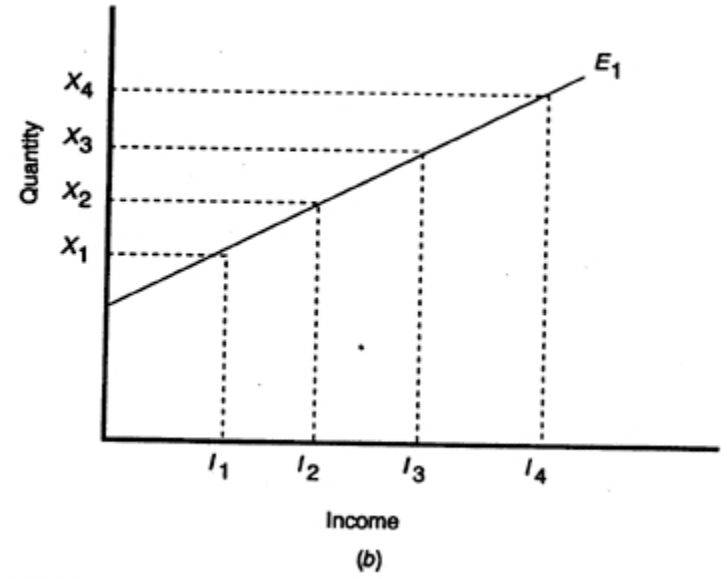
- These compensation tests assume:
  - $MSU_i = MSU_j$ for all i, j
  - MU_i Income = MU_j Income = k.
- A dollar has the same "value" (utility) for all individuals in society, no matter what their income level (or other characteristics).

Gorman Demand form

- $U_i = A_i(P) + B(P) * Y_i$
- $\partial U_i / \partial Y = B$ (for all i)

Figure 6.1 Gorman form Engle curves.





Example from Zerbe & Dively

- Consider option to build an airport
- Impacts:
- Costs
  - If built, neighboring residents will suffer from increased noise
  - WTP to not have the airport built (EV)
  - WTA after airport is built (CV)
- Benefits
  - Airlines “gain” from airport (increased profits)

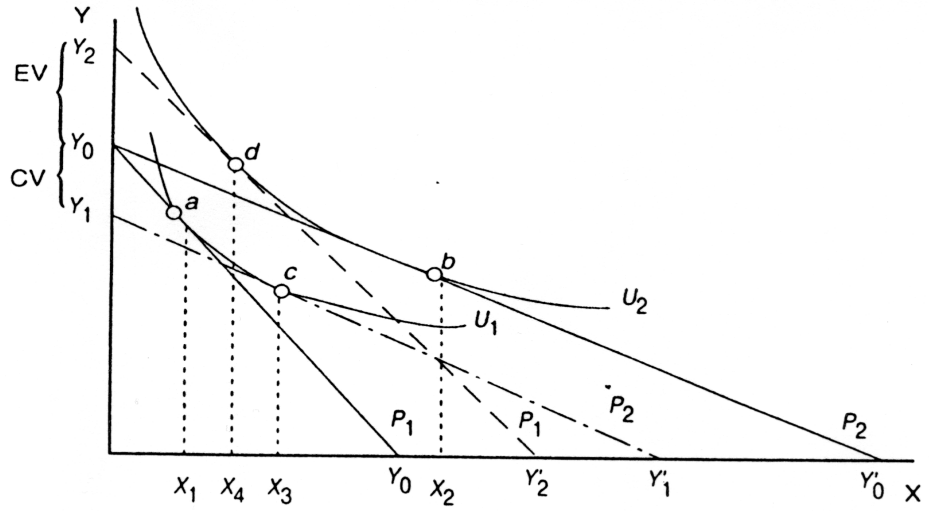
Example 1

	Residents	Airlines	Net Social Value
No airport to airport	-5000 WTA	+3000 WTP	-2000 Kaldor
Airport to no airport	+3500 WTP	-3000 WTA	+500 Hicks

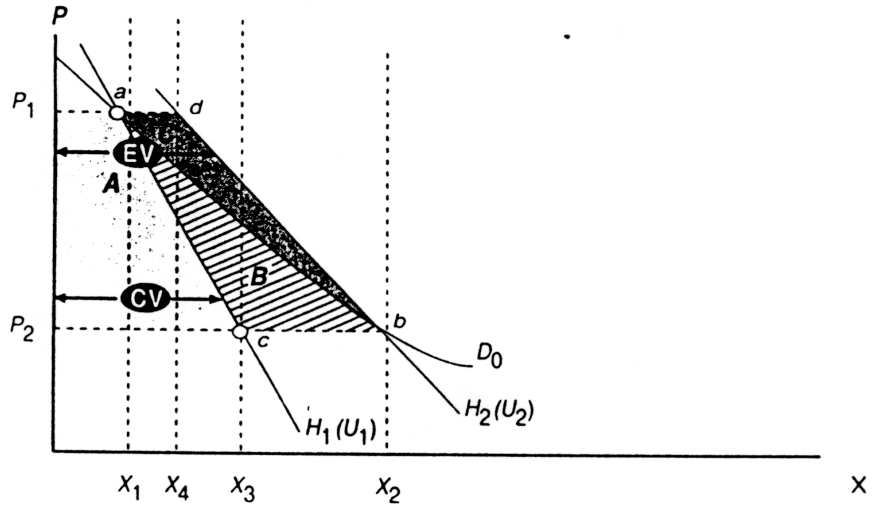
WTP vs WTA

- Generally Expect WTP to avoid a negative change will be less than the WTA to accept the change.
- Why?
  - WTP is constrained by limited income
  - WTA is unconstrained
- For normal goods, price reduction will have positive income effect, price increase will have negative income effect

GURE 5.8 CV, EV, and compensated demand curves.



(a)



(b)

Question?

- Why would airlines (firms) have different WTP than WTA?
  - WTP should be equal to expected future profits
  - WTA should also be equal to expected future profits
- General point – always need to look at final impacts on ***consumers***

Alternative Formulation

- Rather than the “benefits” of the airlines, consider the benefits of building the airport to local residents who would be able to use the new airport:
  - Reduced (total) price of airline travel (including the price of travel to the nearest airport)

Example 1

	Residents	Airlines	Net Social Value
No airport to airport	-5000 WTA	+3000 WTP	-2000
Airport to no airport	+3500 WTP	-3000 WTA	+500

Example 1A

	Residents	Resident airline travelers	Net Social Value
No airport to airport	-5000 WTA	+2000 WTP	-3000
Airport to no airport	+3500 WTP	-3200 WTA	+300

Ambiguous Outcomes of Compensation Rules

Example 2

	Residents	Resident airline travelers	Net Social Value
No airport to airport	-5000 WTA	+2000 WTP	-3000
Airport to no airport	+3500 WTP	-4000 WTA	-500

Ambiguous Outcomes of Compensation Rules

- In this situation:
  - If airport does not exist, don't build it
  - If airport exists, do not get rid of it
- *"Tyranny of the Status Quo"*
- Also, depends on property rights.
  - Do residents have right to quiet. If so they do not have pay the passengers, but passengers must compensate the residents for noise created.