

## Economic concepts for policy evaluation

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### Two parts

- Two concepts used throughout economics
  - Opportunity cost
  - Present value
- Two criteria for policy evaluation
  - Efficiency
  - Equity

## Opportunity cost

- **Opportunity cost** = the cost of a resource in terms of its maximum value in another activity

The full economic cost of a good or service includes all opportunity costs, as well as the cash outlay.

e.g. 1. Suppose your host offers you ice cream. She has several flavours. Suppose your favourite is chocolate and your second preference is butterscotch ripple. An opportunity cost of having chocolate is the pleasure you forego by not having butterscotch ripple.

## Opportunity cost: example 2

Suppose you give someone a lift home. It takes you  $\frac{1}{2}$  hour of driving out of your way. Suppose the cost of oil, gas, wear and tear, etc. on your car is \$3.00. Suppose your wage is \$40 per hour. Then the opportunity cost of your time for driving the person home is \$20. So the full economic cost is \$23, not \$3

### Opportunity cost: example 3

Suppose tuition fees for a year in medical school, the cost of books etc. sum to \$25,000. Suppose the student, if working, could earn \$45,000 as a lab technician; that is the opportunity cost of her time attending university. The full economic cost of the year of education is not \$25,000 but \$25,000 PLUS \$45,000 which equals \$70,000.

### Opportunity cost: example 4

Suppose you are a homeowner. Your utilities, property tax, and other expenses for your house are \$7000. Your mortgage is paid off so you have no mortgage payments.

Your house is worth \$300,000. Suppose your best alternative investment is a GIC paying 5%. Then if you sold your house you could earn

\$15,000 per year (\$300,000 at 5%).

However there is income tax. Suppose your marginal tax rate is 40%. Then you would pay

tax of \$6,000 (40% of \$15,000).

The GIC yield, net of tax is then \$9,000.

Thus keeping \$300,000 equity in your home has an opportunity cost of \$9,000 per year.

The full economic cost of living in your house for a year is  
 $\$7,000 + \$9,000 = \$16,000$ , or \$1,333 per month.

### Opportunity cost, example 5

The previous example implicitly assumes that the value of the house is constant in real dollars. Now suppose the value is rising by 2% per year. Then this year it increases in value by \$6,000. This is an economic benefit, or a negative opportunity cost. So now the full economic cost of living in your house for a year is

\$7,000 for utilities, property tax etc.

\$9,000 opportunity cost of use of equity

- \$6,000 capital gain (untaxed)

Thus full economic cost is \$10,000 (\$833 per month)

### Note: some outlays are not economic costs

- Suppose your mortgage payment is \$1200 per month. Suppose the interest portion is \$800 per month. Then your economic (and accounting) mortgage expense is \$800 per month, not \$1,200 per month.
- Your payment minus interest if \$1,200 - \$800 equals \$400. What is this extra amount for?  
For paying off your mortgage. This counts as saving in economic (and accounting) terms.

Note: The payment amount of \$1200 may be far more relevant to you than the \$800 interest expense. You may be short of cash and the \$400 per month of saving you do may be “forced saving.” You must save this amount because of the lender’s requirement.

## Application to housing

- Everything in the homeowner examples is relevant to social housing owned by a charity except for the role played by income tax
- Much of what is in the homeowner examples is relevant to private rental housing. However tax rules are different. For example, investors pay income tax on the annual benefit (i.e. on net rental income) and pay tax on the capital gains when they sell.

## Present value

- Adding dollars you receive to-day and dollars you receive a year from to-day is like adding apples and oranges.
- To allow proper comparison, you have to convert dollars you receive a year from now into a present value. You can legitimately add the dollars you receive to-day to the present value of the dollars you receive a year from now.

## Explaining present value

- Suppose you put \$100 to-day into a one-year GIC carrying 3% interest. Then at the end of one year the \$100 has turned into  
\$100 plus \$3 interest (which equals \$103)

Suppose someone gives you a note to-day promising to give you \$103 in one year's time. How much is it worth? It is worth \$100 to-day. We say the present value of \$103 received in a year's time is \$100 (assuming the interest rate is 3%).

## Explaining present value, cont'd

- We can write
  - \$1.00 to-day is worth  $\$1.00 \times (1 + 0.03)$  [equals \$1.00 times 1.03] = \$1.03 a year from now.
  - Going in the opposite direction, the present value of \$103 received a year from to-day is \$103 divided by 1.03 which is \$1.00.
- How much is the worth to-day of a dollar received a year from now? It is worth about 3% less than a dollar. Note  
\$1.00 divided by 1.03 is \$0.971.

### Explaining present value, cont'd

- What is the worth to-day of \$1.00 received two years from now?
  - To see that, take the first case, and assume the \$1.00 is put into the account for two years.
  - Then \$1.00 is worth \$1.03 at the end of one year and is worth \$1.03 plus 3% at the end of two years or about \$1.06.
  - So \$1.06 received in two years is worth about \$1.00 to-day
  - Similarly, \$1.00 received in two years is worth about 94 cents.

### Explaining present value, cont'd

- From this we know that \$1.00 received one year from to-day PLUS \$1.00 received two years from to-day is worth \$1.91.
- If the interest rate were 9%, the \$2.00 received in the future would be worth \$1.76.
- The interest rate makes a large difference to the present value of future payments.

## Applications

- It is not meaningful for a bank to tell you how much interest you will pay over the life of the mortgage. Knowing the interest rate, principal (the amount you owe), amortization period, nature of compounding are much more informative.
- If you have, say, 4 years left on the term of your mortgage, you have **an immediate gain in net worth** every time the mortgage rate increases, because the present value of your future payments falls.

## Applications, cont'd

- The size of the government debt attributable to future social housing commitments --where the commitment was to write down the mortgage rate to 1%-- has dropped. Lower interest rates, if mortgages are, say, 5 year term, mean that the **present value of the cost of the interest subsidy is less than it would have been if interest rates had not fallen.**
- If interest rates are volatile, the present value of interest subsidies will be volatile as well. Thus **governments giving such subsidies will find their debt size is volatile**, even if there are no new commitments.

## Two criteria for policy evaluation

Economists use both criteria

- **Economic efficiency**
  - The term has a special meaning
  - Very different from what engineers mean when they use “efficiency”
- **Equity**
  - In principle, equity is a value judgment and economists have no special expertise
  - In practice, economists analyzing tax policy, make extensive use of “horizontal equity” (likes treated the same) and “vertical equity”

### Economic efficiency

- A situation is economically efficient **if there is no alternative** in which at least one person is better off and no one is worse off.
- Sometimes a redistribution/trade might leave both traders better off.
  - e.g.1 Let a mother give her two kids, John and Mary, 3 books and 3 videos each. Suppose John has strong preference for books, Mary for videos. Then if Mary gives John a book and John in return gives Mary a video John ends up with 4 books, 2 videos  
Mary ends up with 2 books, 4 videos  
and they are both better off.  
**So, the original, equal distribution, was not economically efficient.** The new one may or may not be, but it represents an **efficiency improvement compared to the original distribution.**

### Example 2: key money

Suppose there is tight rent control, no intertenancy decontrol and

- A tenant, Mary, splits with her husband and is left with a 2 bedroom apartment renting for \$800 per month in Toronto
- Market rent for available 2 bed. apt is \$1,100
- Apartment seekers, Ken and Barbie, intend to stay at least a year, and offer Mary \$2,000 if she will move out and let them have the apt.
- Mary accepts and moves into a one-bed apt renting for \$900
- Ken and Barbie are better off: the present value of the \$300 saving per month for 12 months is greater than \$2,000  
Mary is also better off. Otherwise she would not have accepted the offer.

This trade represents an efficiency improvement. (It is also illegal.)

### More widely applicable example

Suppose Mary, with 2 kids, lives in a housing unit subsidized by taxpayers, with the subsidy costing \$500 per month. Suppose Mary was offered \$500 per month if she moves out. Suppose Mary accepted.

After the offer is accepted

- Taxpayers are no worse off (still pay \$500)
- Mary is better off (she accepted the offer)

Conclusion: the housing subsidy is not economically efficient.

### More generally: the economic doctrine on transfers

- Money transfers are better than goods transfers
- Why? People, e.g. Mary, are the best judge of what makes them happy (or gives them utility)
- So economists tend to oppose food subsidies, housing subsidies etc. and prefer to give low income people money transfers.
- Economists tend to rank transfers according to how close they are to a pure money transfer
  
- Muth's definition of an economist: someone who gives his brother for his birthday not a necktie, but money.

### But...

Economic theory underlying the result assumes:

- Taxpayers care only about making Mary and other transferees happier, don't care about how Mary spends the money
- Mary is the best judge of her own self-interest
- Mary makes decisions in the best interests of her kids as well as herself

Note also, economists usually assume

- all kinds of housing are available (i.e. markets are complete)
- consumers are highly competent and rational

## Equity

- Principles from public finance:
  - Taxation is horizontally equitable if those with the same income and wealth pay the same tax
  - Taxation is vertically equitable if the percentage burden on richer people is greater than the percentage burden on lower-income people
- Subsidies are treated analogously

## Examples

- Consider two women aged 75, each with an income of \$1200 per month. One is in seniors' housing and pays \$360 per month. The other is in market housing and pays \$800 per month. The apartments they occupy are the same. There is a waiting list for seniors' housing.
  - Horizontally inequitable? Yes
- As above except
  - The market housing is twice as big as the seniors housing but is rundown
  - Seniors' housing is available but the woman in market housing does not want to move there.
  - Horizontally inequitable?

## In conclusion ...

A principle many welfare economists like

- From John Rawls, a philosopher: imagine that you do not know what wealth, parents, personal capabilities you have. Design a world you would like to live in.

A thought-provoking paper

- Jean-Yves Duclos, Laval, “Equity and Equality”  
Innis lecture, C. Economics Assn meetings,  
2006, to be published in C.E.Journal.