

NORMATIVE IMPLICATIONS OF CONSUMER THEORY

CONSUMER SURPLUS (P-R pp. 128-31, 300)

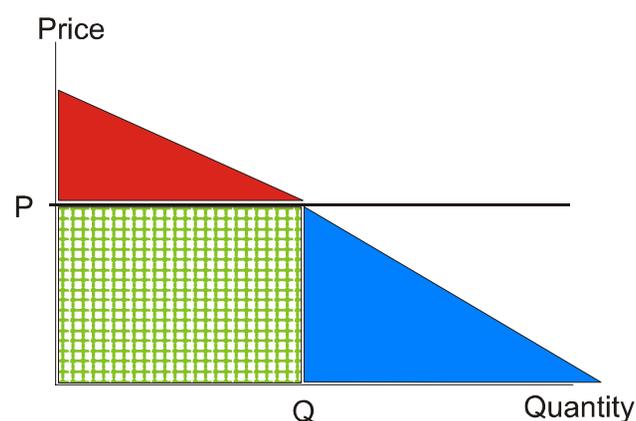
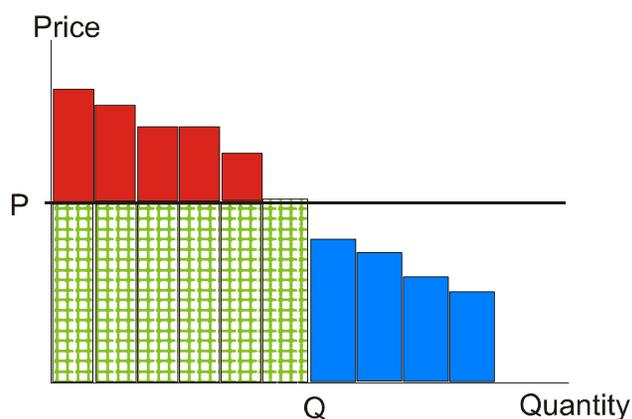
Demand curve shows willingness to pay (quantity can be discrete or continuous)

For marginal unit, willingness to pay = price; For inframarginal units, willingness to pay > price

Total willingness to pay for Q units = Area under demand curve from 0 to Q (red + green areas)

Total amount actually paid = revenue rectangle (green area)

Difference = extra benefit = consumer surplus (red area)



Many consumers: All units stacked horizontally in order of decreasing willingness to pay

Different consumers' successive units may be intermingled in this order

Total consumer surplus added up. This makes an implicit normative assumption:

All consumers' surpluses are equally weighted, so issues of income distribution neglected

DEAD-WEIGHT LOSS IN CONSUMPTION (P-R pp. 302-4)

Example – Supply curve is horizontal at price P_0

Tax T per unit of good purchased

Price rises from P_0 to $P_1 = P_0 + T$

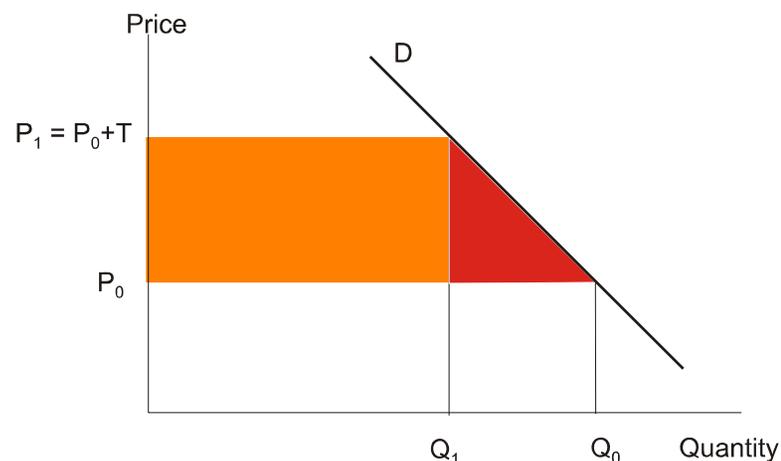
Quantity falls from Q_0 to Q_1

Government gains revenue = orange rectangle

Consumers lose surplus

= orange rectangle + red triangle

Dead-weight loss from taxation = red triangle



Linear example – Wheat (P-R pp. 36-7)

Demand curve $Q = 3000 - 250 P$; $P_0 = 3$ \$/bushel, $Q_0 = 2250$ million bushels

If tax T per bushel is levied, $P_1 = 3 + T$, $Q_1 = 3000 - 250 P_1 = 3000 - 250 (3+T) = 2250 - 250 T$

Revenue $R = T Q_1 = 2250 T - 250 T^2$ Deadweight loss $D = \frac{1}{2} (Q_0 - Q_1) T = \frac{1}{2} * 250 T^2$

Higher tax rates raise less than proportionately higher revenues (because tax base erodes)

but cause more than proportionately higher deadweight losses

These effects would be even worse if the 250 were a higher number (i.e. if demand were

flatter - more elastic); they would be zero if 250 replaced by 0 (totally inelastic demand)

Policy recommendation – [1] efficient tax system will have broad coverage and low rates

[2] relatively higher tax rates on commodities with less price-elastic demands

This may (but need not always) go against other considerations such as equity

Such issues treated more fully in ECO 341 (Public Finance)

If supply curve is upward sloping, there arise additional issues of [1] incidence of tax,

[2] dead-weight loss on supply side. Will consider these later / in problem sets etc.

ADDITIONAL TOPICS IN CONSUMER BEHAVIOR

COMPENSATING AND EQUIVALENT VARIATIONS (not in P-R)

More rigorous concept and measurement of deadweight loss, based on indifference curves

Continue land area example in its consumer interpretation

Initial income $I = 20$, prices, $P_X = 1$, $P_Y = 1$

Quantities $X = 10$, $Y = 10$, Utility $U = 100$

New prices $P_X = 2$, $P_Y = 1$

Quantities $X = 5$, $Y = 10$, Utility $U = 50$

What income lets consumer have

old utility at new prices?

At income Z and new price, cons. chooses

$X = \frac{1}{2} Z / 2 = Z / 4$, $Y = \frac{1}{2} Z / 1 = Z / 2$

Utility $Z^2 / 8$. Setting this = old 100,

$Z = \sqrt{(800)} = 20\sqrt{2} = 28.28$

Define Compensating variation = Increase in income that compensates consumer for price rise

= $28.28 - 20 = 8.28$

What income gives consumer new utility at old prices, or

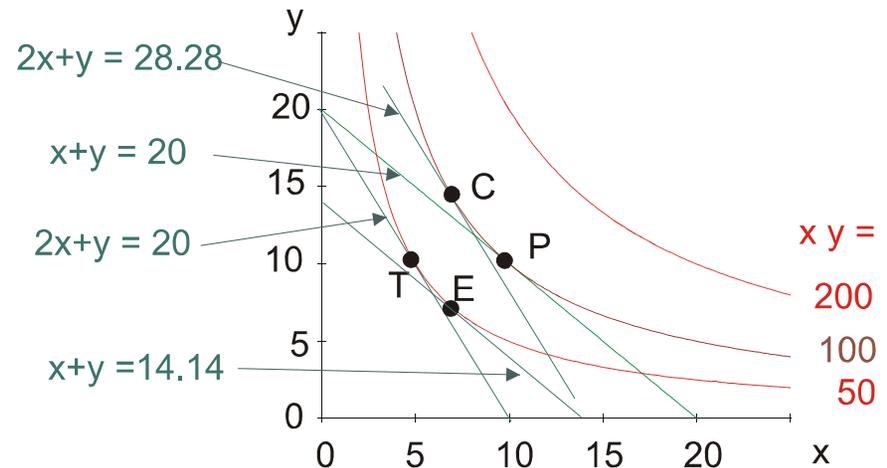
what income change is alternative or equivalent to the price change?

At income Z and old prices, cons. chooses $X = \frac{1}{2} Z / 1 = Z / 2$, $Y = \frac{1}{2} Z / 1 = Z / 2$

Utility $Z^2 / 4$. Setting this = new 50, $Z = \sqrt{(200)} = 10\sqrt{2} = 14.14$

Define Equivalent variation = Decrease in income that has same effect on utility as the price rise

= $20 - 14.14 = 5.86$



Now suppose Y represents an aggregate of all the other goods, measured in \$ spent on them

So $P_Y = 1$ always, and we will refer to the price of X as simply P

Suppose the price of X increases because a tax is levied per unit of good X purchased

Let subscript 0 stand for pre-tax, 1 for post-tax. So $P_0 = 1$, $T = 1$, $P_1 = 2$

Post-tax quantities $X_1 = 5$, $Y_1 = 10$, utility $U = 50$

Tax revenue $R = T X_1 = 1 * 5 = 5$

Suppose instead the price of X is kept at 1, but the government simply levies a flat \$ amount (called a lump sum tax) of \$5 on the consumer.

Budget constraint becomes $1 * X + 1 * Y = 20 - 5 = 15$

Optimal quantities $X = \frac{1}{2} * 15 / 1 = 7.5$, $Y = \frac{1}{2} * 15 / 1 = 7.5$, utility = $(7.5)^2 = 56.25 > 50$

Conversely, government can extract more \$ by lump sum tax while keeping utility = 50

Suppose \$ amount of tax = $20 - 10\sqrt{2} = 20 - 14.14 = 5.86 > 5$

Then consumer has income = $10\sqrt{2}$; budget constraint $1 * X + 1 * Y = 10\sqrt{2}$

Optimal quantities $X = \frac{1}{2} * 10\sqrt{2} / 1 = 5\sqrt{2}$, $Y = \frac{1}{2} * 10\sqrt{2} / 1 = 5\sqrt{2}$; Utility = $(5\sqrt{2})^2 = 50$

The \$ amount ($5.86 - 5 = 0.86$) that is “wasted” when the government tries to raise revenue using the tax on X instead of the lump sum tax is a more rigorous measure of the dead-weight loss from the tax on X, because the two taxes are chosen to be equivalent in their effect on the consumer’s own preferences (equal utility effects)

Other uses of compensating and equivalent variation concepts:

Consider a consumer facing the loss of an amenity or a public good

EV = Consumer’s maximum willingness to pay to keep the amenity

CV = What society must pay the consumer to make up for the loss of the amenity

The two perspectives are like different “property rights” or “entitlements”

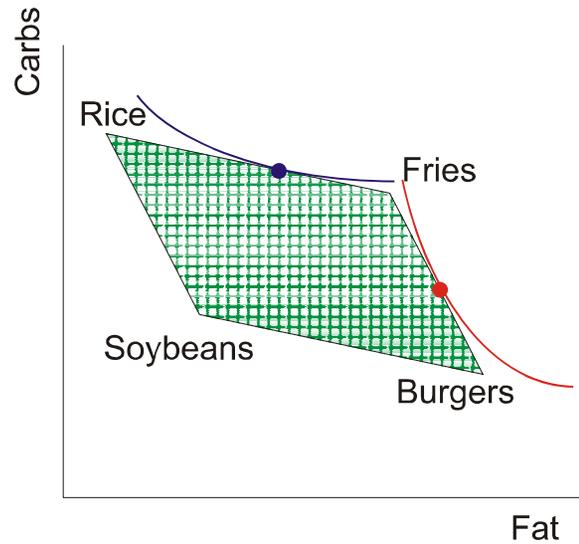
Since the loss would leave the consumer worse off, if the amenity is a normal good, $CV > EV$

Conversely, can consider a situation where consumer stands to gain; then $EV > CV$ if normal

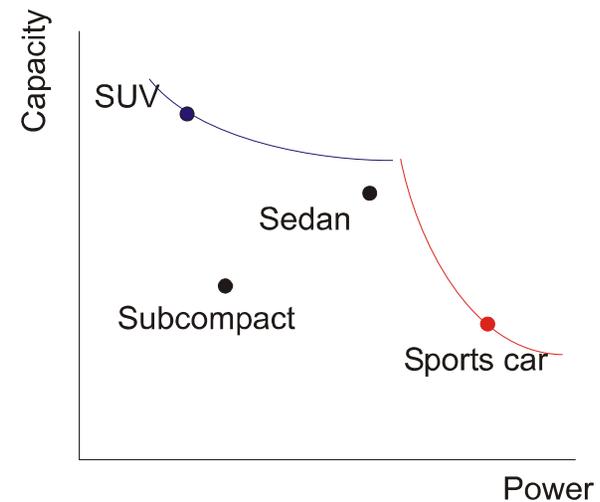
CHARACTERISTICS APPROACH TO CONSUMER PREFERENCES & DEMANDS (not in P-R)

Basic idea – consumers care for various characteristics contained in goods, not for goods per se

Combinable case



Non-combinable case



Vertices show feasible fat, calories by spending entire food budget on one of four kinds of food
Green area is entire feasible set
Consumer with red indifference curve will buy combo of burgers & fries
One with blue i.c.'s: rice and fries

Points show power & capacity of 4 cars
Suppose all are feasible choices
Consumer with red indifference curve will buy sports car
One with blue i.c.'s will buy the SUV
An intermediate one may buy the sedan
Here no one will buy the subcompact (May be other reasons - budgetary etc)

REVEALED PREFERENCE (P-R pp. 89-92)

We observe behavior (demands), not indifference curves. Can we infer latter from former?
This is conceptual assurance, not practicable method. But should know.

Suppose consumer has standard (complete, transitive, non-satiated) preferences as shown by the red indifference curves, but we don't know these in advance

If given a point P with no other information, we can only say that the consumer prefers P to all points to its southwest (in OSPW)

prefers all points northeast (in NPE) to P

But now we are told that P is actual choice when budget line is AB. This tells us that P is preferred to all points in OAB

(additional info about points in APA, BPW)

Take a point like T. It is chosen when consumer faces budget line CD

So T is preferred to all points in OCD

By transitivity, P is also preferred to these (additional info about point in ATC)

Next take U, yields additional info about CUF

By taking T closer to P, U closer to T, ...

and similarly points on the other side of T

we can find out that P is preferred to

And these constitute all points below the indifference curve through P,

so we know the indifference curve

