Note: Quiz 1 can be picked up at Distribution Center. Second Quiz covers: Preferences, Budget and Optimal Choices.

Core of theory of demand: how does demand change in different environments.

Can have many directions. We will look at:
  - effect of changes in price, and
  - effect of changes in income.
Effect of Changes in Price

- What happens to optimal choices when price changes.
- Derive demand function from consumer’s optimal choices.
Demand Function

- Note, demand curve derived from definition: letting $P_x$ changes while holding others constant.
- See class notes for examples.
Demand Function (Cont’d)

Demand curve is also a "willingness to pay curve"

- MRS says willingness to substitute.
- \( MRS = \frac{P_x}{P_y} \), or willing to sacrifice \( \frac{P_x}{P_y} \) unites of y.
- To translate into value, \( \frac{P_x}{P_y} \cdot P_y = P_x \).
- Willing to pay \( P_x \) for additional unit of \( x \).
Effect of Changes in Income

- Income Consumption Curve (ICC): traces out optimal bundles on X-Y space as income changes.

- Engel curve (EC): depicts optimal choices on I-X space.

- Normal good: positive slope for both ICC and EC

- Inferior good: negative slope for both ICC and EC

With Quasilinear utility function, both are vertical line. (Math and intuition?)
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Market Demand

- Horizontal summation of individual demand.
- See class notes for examples.
- Usually assume identical individuals.
Income and Substitution Effect

- Does price increase always decreases demand (Giffen good)?
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Price changes involve two separate effects:
  – Substitution effect: good 1 becomes cheaper, more attractive than good 2 (opp. cost changes)
  – Income effect: b/c good 1 is cheaper, can buy more of it with a given amount of income. Purchasing power increased.
Substitution Effect

- How to separate?
Substitution Effect

How to separate?

- keep relative price changes, take away (grant) money to keep sth. fixed.

Hicks Decomposition: fix (initial) utility level.
Slutsky Decomposition: fix purchasing power (not income).
We will use Hicks below (clean intuition).
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  - how much consumer would require in payment to accept a change.
Start at original bundle A

A

BC1

IC1

y

x
Move to C when $P_x$ Decreases
Until it touches original IC at B.
Hicks approach keeps utility constant.
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- This is the sub. effect.  
- Note the hypothetic budget at B is smaller than that at A (why?).  
- We separate sub. effect out by taking away implicit income changes.

- Point C is the optimal bundle, that if we hold the new relative prices and add back the income that we took away.  
- This is the inc. effect.  
- Shift the hypothetic BC back to get implied changes in consumption.  

See class note for examples.
• Point A is original optimizing bundle.
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• Point B is the optimal bundle, that if we reduce the income just enough so that the consumer could just obtain the original utility level, at different relative prices.
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Therefore Giffen good must be inferior good.
Slutsky Decomposition: Keeps Purchasing Power Constant
Slustsky defines substitution effect by keeping purchasing power constant.

- both original BC and hypothetical BC go through A.
- Note incomes are different.
Application: Consumption and Leisure Choice

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- Formulate consumer’s problem, see class notes for example.
We can find demand for leisure from optimal choices, by varying wage rate (see graph below).

Since: supply of labour + demand for leisure = 24 hours.

$L = T - R$. (See graph below).
Initial wage $w_1$. Leisure demand $R_1$.
w1 -> w2
Leisure demand decreases R1->R2
Leisure demand
INCREASEs R2→R3
Demand for Leisure
Substitution effect makes an hour of leisure more expensive.
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Labour supply curve bends backward.
Compensating Variation and Equivalent Variation

- Two ways to measure consumer welfare.
  - Price changes result in welfare change.
  - Rather than describe welfare in utility terms, we would like to describe it in terms of dollars.

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  1. Ask how much money to compensate a consumer, at the new price, such that she obtains her initial utility level.
     — This is Compensating Variation.

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Initially consume at A.
Price increased.
New bundle at C.
Find CV by shifting NEW BC until touches INITIAL IC.
CV = diff. in expenditure
CV = e(B) - e(C)
Find EV by shifting INITIAL BC until touches NEW IC.
EV = \text{diff. in expenditure}
EV = e(B') - e(C)
Together: Price INCREASE
Note: these are pure income effects.
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• Which measure is higher depends on income elasticity.
• However as the budget share of most goods are small, they are virtually identical.