ECO100: Introductory Economics
Consumer Choice & Demand

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Consumer Choice

- The Consumer's “Problem": A consumer sees a set of prices, how ought she allocate her income?
- “Rational” choices ought to maximize something ...

The Punch Line

The Last Dollar Rule

The Assumption

If you can buy fractional units of any good (e.g., 0.3547 BMWs) ...

If you buy X and Y, happiness maximization tells me:

$$\frac{\text{Happiness from } \textit{last} \text{ unit of } X}{P_x} = \frac{\text{Happiness from } \textit{last} \text{ unit of } Y}{P_y}$$

If you buy X but **NOT** Z, happiness maximization tells me:

$$\frac{\text{Happiness from } \textit{last} \text{ unit of } X}{P_x} > \frac{\text{Happiness from } \textit{first} \text{ unit of } Z}{P_z}$$

Motivating Utility

Forget affordability for the moment

- Choose between bundle A and B

$$A = \{6 \text{ poutines}; 3 \text{ beers}\} \text{ and } B = \{4 \text{ poutines}; 5 \text{ beers}\}$$

- No universally correct answer, depends on tastes and preferences
- If Choose A $\longrightarrow$ A gives you at least as much **utility** as B
  - Utility your **individual** scoring system
  - **Cannot** make inter-personal comparisons
  - Levels (i.e., the numbers assigned to different levels of happiness) do not matter

Preferences and Goods: Some Assumptions

1. Your preferences do not depend on prices nor your income
2. You can rank every possible "bundle" (Is bundle C at least as good as bundle J?)
   - Distinction: "Indifferent between" versus "cannot rank"
3. Items we consider are "goods" instead of "bads"
4. Always prefer more of a good to less of a good

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Utility: Some assumptions

1. All consumers are utility maximizers (given information, budget (i.e., income) and prices)
2. **Law of diminishing marginal utility:** (eventually) the marginal utility obtained by consuming additional units of a good declines

Example

Q	TU	MU
0	-30	
1	-10	20
2	8	18
3	23	15
4	30	7

twice as large-- meaninful

Exception: Threshold goods

ex: table/table legs

ex: years in university(3-4)

"Constrained" Utility Maximization

Dollars are a scarce resource

Income=7

tacos/ice cream

find happiness/dollars

(unit of happiness)

HOW SHOULD I SPEND

WAY OF MAXIMIZE=

WHAT SHOULD I BUY FIRST??

$$\frac{MUT}{PT} = \frac{MUI}{PI}$$

	Tacos: $P_t = \$1$			Ice Cream: $P_{ic} = \$2$		
Q	TU	MU	MU/P	TU	MU	MU/P
1	29	29	1 29	30	30	4 15
2	46	17	2 17	54	24	6 12
3	58	12	7 12	70	16	8
4	67	9	9	80	10	5
5	72	5	5	88	8	4
6	73	1	1	90	2	1

General Outcome

Assuming partial units can be purchased

Notation: MU_X =utility from the last unit of X

Utility-maximizing rule

- With prices P_X and P_Y, for any X and Y that you purchase, $\{X^*, Y^*\}$ maximizes utility only if

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} \text{ at } \{X^*, Y^*\}$$

"Proof by contradiction"

That is, you say $\left\{\hat{X}, \hat{Y}\right\}$ maximizes utility, but you also say

$\frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}$ at $\left\{\hat{X}, \hat{Y}\right\}$ ... prove by contradiction

EX: 9000>9

The "Proof"

Let's transfer some money from Y to X.

$$\frac{MUx}{Px} = \frac{MUy}{Py}$$

9000>9

Take 1 from y and move to X

cost -9unit

bnefit +9000units

8991units

As we move $ from Y to X

= increase the quantity of X= MUx= Mux/Px ↓

↓Qy -= ↑MUy= MUy/Py ↑

A Word of Caution

Assumption: Computer purchases must be in integers: 1,2, or 3 MacBooks is fine, but not .75 MacBooks. You are a utility maximizer who purchases a wide variety of goods and services. You are definitely buying a computer, considering 2 options: MacBook Air costs $1000 and will give you 2000 utils; Dell Vostro costs $600 and will give you 1000 utils. Which of the following is definitely true?

- A You will definitely purchase the MacBook.
- B You will definitely purchase the Dell.
- C While you will purchase a computer, either the Dell or the MacBook could be a rational choice.
- D You are indifferent between the MacBook and the Dell.

if i buy dell wt i am gonna do with extra $400 ?
if the happiness of $400> 1000 more hapiness ======= dell !
Luxury good----- >HOW MUCH HAPPINESS COULD I PURCHASE BY USING THE MONDY I SAVE?
rich ppl==== mac--- those mondy wroth less than that worth for poor

$\Delta P_X \longrightarrow \Delta Q_X$

i.e., Why demand curves slope down

Consider $\downarrow P_X$:

Substitution Effect

Py increase

MUx/Px= move $ to utility equal again

Income Effect

Income increase

increase effective income --- ability to purchase utility

normal good------ decrase Px-->.INCOME INCASRE-->Q

IR: LAW OF DEMAND

IF SE> IE DECRASE THE prize, then Q arise(law of demand)

If SE < IE decasese the prize, the Q drop (giffen good)

INFERPR GOOD

INCOME

QUANTITY

(PURCHASE LESS)

Why income effects are generally small

Most buget share relatively small

Most items have good substitides and having a good substitutes --- small income effect

--links--

substitute/income

1) assume coke/spirit are substitutes

2) Pc=1, Ps=1 (6 units of each)

3) how badly are you harmed if the Pc= $1000000000 ????

4) i am not affected !! coz we have substitutes ~~~

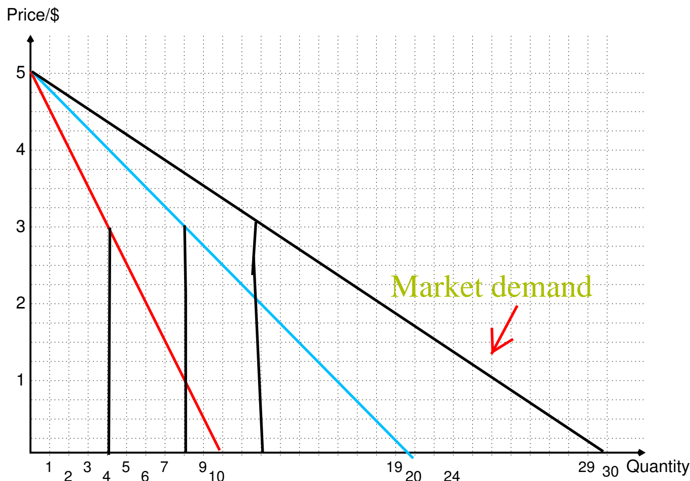
The better they regards they are good substitides

less harm to the consumers

if there is no other substitude (ex: China-- all budget- goes to rice income constrained)

Market Demand from Individual Demands

- Conceptually Straightforward: Add up demands at each price (P).
- Example: Bob: $P(q_b^d) = 5 - \frac{q_b^d}{4}$; Robert: $P(q_r^d) = 5 - \frac{q_r^d}{2}$



Algebraically

Bob: $P(q_b^d) = 5 - \frac{q_b^d}{4}$; Robert: $P(q_r^d) = 5 - \frac{q_r^d}{2}$

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HAVE P(Q), WANT O(P)
BOB--- Q=20-4P
ROBERT-- Q=10-2p
Market demand= sump up the demand curve
             = 20-4p+ 10-2P
Q(p)= 30-6p
equation---graph
P(Q)=5- Q/6
```

(Own-) Price Elasticity of Demand

1. Price responsiveness matters!
2. What we want: Measure responsiveness of Q^d to changes in own-price.

Hurdles

1. Is $1 a big or small price change?
2. Is 100 a big or small quantity change?
   - Related: 100 medium cups of coffee equals 35,488.24 mL

Solution

Compare $\%\Delta Q^D$ (percent change quantity demanded) to $\%\Delta P$ (percent change in price)

Baseline Definition

- Given a price change, demand is elastic if the resulting $|\%\Delta Q^D|$ is **greater than** the $|\%\Delta P|$
- Given a price change, demand is inelastic if the resulting $|\%\Delta Q^D|$ is **less than** the $|\%\Delta P|$

Example

Interpretation 2, if quantity changed by100 how much does the price have to change to "clear the market? "
ex; Q go down by 1%--> Pup by 1/3% if E=3

Our preferred measure: $\epsilon_{Q_i^D, P_i}$

$$\epsilon_{Q_i^D, P_i} = \frac{|\%\Delta Q^D|}{|\%\Delta P|}$$

This classes: always take absolute value

Interpretation

= infinity-----> perfectly elastic

>1----------> elastic

=1-----------> unit elastic

<1------------> inelastic

0-------------> perfectly inelastic

INterpretation1 given A 1% up in P. by what % will D decrease

ex: ϵ =3--> P up 1%, Q down 3%

INterpretation2 if Q changes what changes in P is required to "clear the market"

ex: E =3, Q up by 1%, P down 1/3%

Determinants of Elasticity of Demand

Two Observations

1. Price elasticity measures the willingness and ability to substitute away from a good (at current prices) when faced with $\uparrow P$
2. Doing without is always a potential substitutes, albeit not always a particularly good one ?

The One Rule You Need to Remember

Better substitutes--- more elastic demand

A) Short-Run VS Long-Run
inelastic elasitc

B) Micro: Narrow market definition (Gast station X) VS Macro: broad market definition (all gas stations)

C) Necessity VS Luxuries
more inelastic more elastic

Calculating (Arc) Elasticity of Demand

Ex: Two points on demand curve: $\{Q_a^D = 8, P_a = \$3.50\}$ and $\{Q_b^D = 10, P_b = \$2.50\}$

Problem: Want same value for $a \to b$ as $b \to a$

- $|\%\Delta Q^D|$

$$\underbrace{\left|\frac{8-10}{8}\right| = \frac{2}{8}}_{a\to b} \neq \underbrace{\frac{2}{10} = \left|\frac{10-8}{10}\right|}_{b\to a}$$

E= $\frac{\%\Delta Q}{\%\Delta P}$

Solution: Use "change relative to average" (midpoint method)

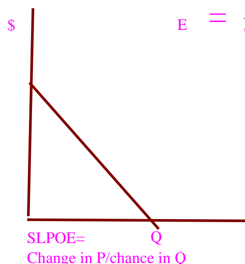
$\mathcal{E} = \frac{2/9}{1/3} = 2/3$

Calculating Point Elasticity of Demand

Avert your eyes if you are allergic to calculus

Linear Demand: $MWTP(Q) = P(Q) = A - B \times Q$

E = %CHANGE IN Q / % CHANGE IN P = 1/SLOPE (P/Q)



EX: Q(P)= 100-1/2(P)--> MWTP=P(Q) 200-2Q (EQUATION FOR DEMAND CURVE)

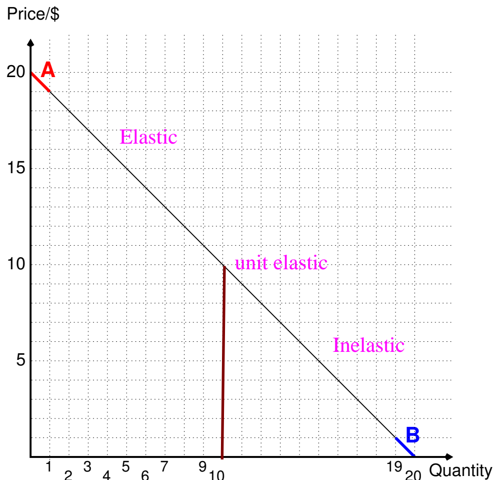
P=10, E=1/19

P=180, E=9

Price Elasticity and the Linear Demand Curve

Example: $Q^D = 20 - P$

E=%CHANGEQ/
%CHANGEP

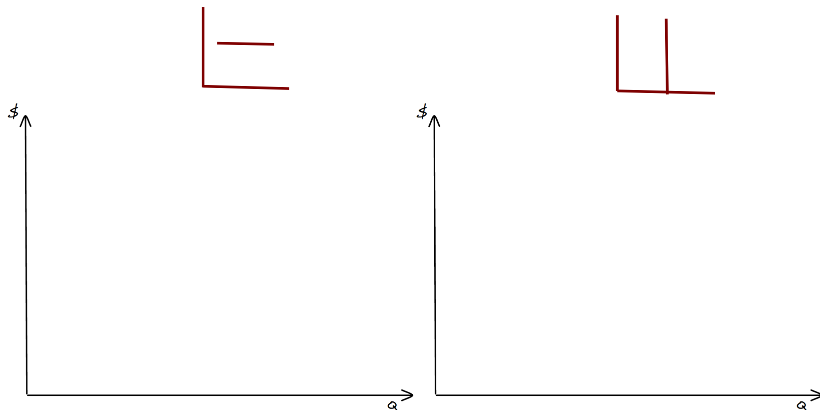


A---> ELASTIC
B---->INELATIC

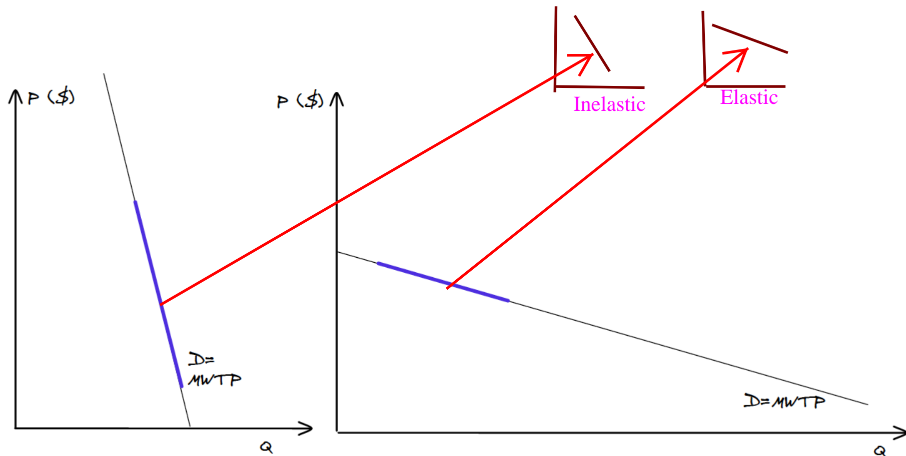
TRUST me result
E=1 unit elastic at midpoint of liner demand

Nothing is linear---> Reasonably sensible

The Art of Drawing Demand Curves I



The Art of Drawing Demand Curves II



Total Revenue (TR) and Price Elasticity of Demand

$TR = P \times Q$, Profits=TR-Total Costs

TR NOT PROFITS

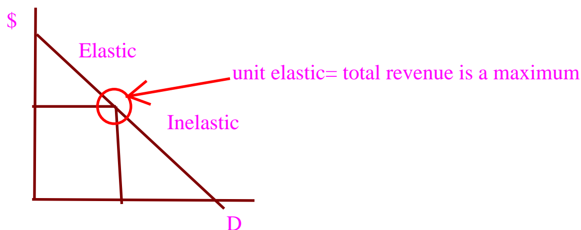
An $\uparrow P$ has 2 effects on amount of money into sellers' pockets:

1. Price Effect: ↑ More $ from anyone who purchase
2. Quantity Effect: ↓ Fewer purchases

The General Rule

E >1 , change in Q%> change in P%----> decrease price(TR ^)/increase price (TR v)

E<1. chan(....) -----> decrease price(TR v)/increase P (TR^)



E= %change in Q/ %change in se

Other Elasticities of Demand

Income elasticity of demand ϵ_I

percentage change in the quantity demanded that results from a 1 percent change in the income

Q

$

SE=Income
>O normal
<0 inferiori good

Cross-price elasticity of demand $\epsilon_{Q_A^D P_B}$

percentage change in quantity demanded of good A given a 1 percent change in the price of good B

Q

P

SE= price of related good
>0 substituts
<0 complements