Micro Alphabetical Meaning of Symbols

Symbol	Meaning
$\Rightarrow$	Causes
$\uparrow$	Increases
Σ	Sum of
$\downarrow$	Decreases
Δ	Delta = Change in
AFC	Average Fixed Costs
ATC	Average Total Costs
AVC	Average Variable Costs
CS	Consumer Surplus
d	Firm's demand
D	Demand
D_L	Demand for Labor=MRP
DWL	Deadweight Loss, Efficiency Loss
E_d	Elasticity Coefficient of Demand
FC	Fixed Costs
LR	Long Run
LR ATC	Long Run Average Total Costs
M	Imports
MB	Marginal Benefits
MB_P	Marginal Private Benefits
MB_S	Marginal Social Benefits
MC	Marginal Costs
MC_P	Marginal Private Cost
MC_S	Marginal Social Cost
MP	Marginal Product
MR	Marginal Revenues
MRC	Marginal Resource Cost=S_L
MRP	Marginal Revenue Product=D_L
MU	Marginal Utility
p	Firm's price
P	Price
P_C, Q_C	Competitive Price & Quantity
P_e, Q_e	Price & Quantity at the initial equilibrium
P_f	Fair Return Price to Monopolist
P_m, Q_m	Monopolist's Price & Quantity

Symbol	Meaning
Ppc	Production Possibilities Curve
P_r	Socially Optimal Price
PS	Producer Surplus
P_W	World price
q	Firm's quantity
Q	Quantity (amount)
QD	Quantity Demanded
QS	Quantity Supplied
R	Rent (payment for land)
r	Real Interest Rate
S	Supply
S_L	Supply of Labor=MRC
S_{LF},D_{LF}	Supply & Demand for Loanable Funds
SR	Short Run
T	Tariff or Tax
TC	Total Costs
TP	Total Product
TR	Total Revenues
TU	Total Utility
VC	Variable Costs
W	Wage rate
W_C	Competitive Wage rate
W_U	Union Wage rate
WTO	World Trade Organization
X	Exports
Y	Income

Microeconomics Cue Card

Economic Analysis
1. *Point A - Before change*
2. *Δ (Delta) = Change*
3. *Point B - After change*

Scarcity & Choice

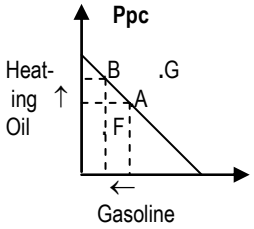
The Economic Problem

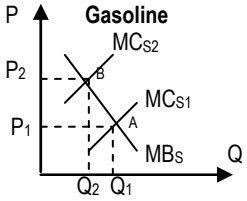
* **Resources** (also called **Factors of Production** or **Inputs**) are scarce.

Resources	Incomes
land (natural)	rent
labor	wages
capital	interest
entrepreneurship	profits

* Peoples' wants and needs for **Goods and Services (Outputs)** are unlimited.

Scarcity & Choices





Two Choices are **Trade-Off's**

Economic Analysis
1. *A-allocative efficiency (P_1=MC_{S1})*
2. *Δ - cold winter*
3. *B –short run give up gasoline to get heating oil ⇒ new allocative efficiency (P_2=MC_{S2})*

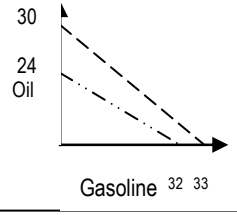
Gasoline is the **opportunity cost** of heating oil.
Point F = inefficient use of resources
Point G = unattainable in SR
All points on Ppc curve - full-employment & production

Specialize & Trade : Comparative Advantage Benefits

1. Input or Output problem? Output because outputs vary
2. Absolute advantage for each? EM
3. Comparative advantage for each? EM for Heat, ST for Gasoline
4. Terms of trade? 1.1 G <1 HO <1.3 G ⇒ **Both Benefit**

OOO -Output varies Opportunity cost goes Over
IOU - Input varies Opportunity cost goes Under

Prompt: Refinery EM produces 33 gal. gasoline or 30 gal. heating oil per barrel of crude oil. Refinery ST produces 32 gal. gasoline or 24 gal. heating oil per barrel of crude oil. Should they specialize & trade?

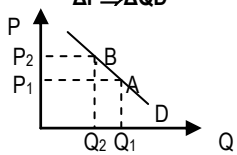


	Heating Oil	Gasoline
EM	30 1 HO= 33/30 = **1.1G**	33 1 G = 30/33=.9HO
ST	24 1 HO = 32/24 = 1.3G	32 1G = 24/32**=.75HO**

Demand and Demand Elasticity

A Change in Price causes a change in Quantity Demanded. Move along curve.

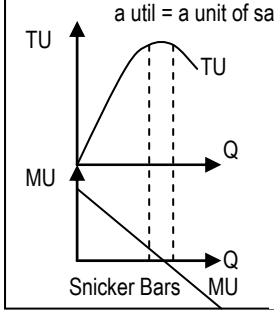
ΔP⇒ΔQD



1. *A at P_1, Q_1*
2. *Δ ↑Price of cup of coffee ⇒ ↓ quantity demanded*
3. *B: P↑, Q↓*

Law of Diminishing Marginal Utility—The more of a good a consumer already has, the lower the extra (marginal) utility (satisfaction) provided by each extra unit.

a util = a unit of satisfaction

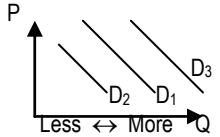


Consumers . .
* want to maximize their total utility
* want the most for their money
* $\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$
* Σ MU = TU

A Change in Anything but Price causes a change in Demand. Shift the curve.

Δ Determinant⇒ΔD

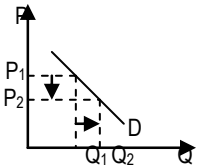
Typical Determinants or *Ceteris Paribus* Conditions are
Δ Buyer tastes/preferences
Δ Number of buyers / population
Δ Income
Δ Price of related goods (substitutes & compliments)



Economic Analysis
1. *D_1*
2. *Δ Population ↑ ⇒ people drink more coffee in Houston.*
3. *D_3↑ (QD↑ at every P)*

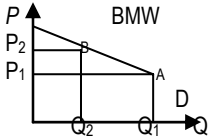
Why the demand curve slopes downward—What causes the inverse relationship between price and quantity demanded? *Move along the curve.*

1. The Law of **Diminishing Marginal Utility**
2. **Income Effect**—a lower price has the effect of increasing money income⇒buy more of other things
3. **Substitution Effect**—a lower price cause people to switch to the purchase of the "better deal".
4. Common sense—buy more if price is lower



Elastic Demand's slope: ΔQ>ΔP⇒flatter

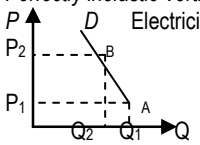
Perfect elastic-horizontal



* luxury
* close substitute
* large % income
* longer time

Inelastic Demand's slope: ΔQ<ΔP⇒steeper

Perfectly inelastic-vertical



* necessity
* no close substitute
* small % income
* shorter time

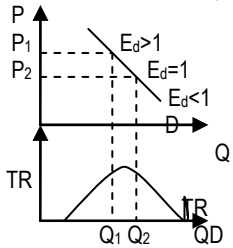
Elasticity Coefficients based on **percent of change** (%Δ)

Price Elasticity of Demand Formulas

* $E_d = \%\Delta QD_x \div \%\Delta P_x$ (No neg. #)
* $E_d = \frac{\Delta QD_x}{\text{original } QD_x} \div \frac{\Delta P_x}{\text{original } P_x}$
* midpoint (arc) formula: $E_d = \frac{\Delta Q}{\Sigma Q/2} \div \frac{\Delta P}{\Sigma P/2}$

Elasticity & Total Revenue Test

Elastic >1 if P↓⇒TR↑ (opposites)
Unit elastic =1 if ΔP⇒no ΔTR
Inelastic <1 if P↓⇒TR↓ (same direction)



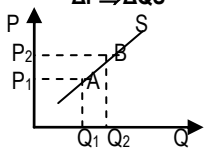
TR=P x Q

Cross Elasticity $E_{xy}=\%\Delta QD_x \div \%\Delta P_y$
Income Elasticity $E_Y=\%\Delta QD_x \div \%\Delta Y$ (Y=income)

Supply & Supply Elasticity

A Change in Price causes a change in Quantity Supplied. **Move along curve**.

ΔP⇒ΔQS

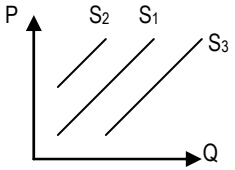


Eco Analysis
1. *A at P_1, QS_1*
2. *Δ ↑Price of cup of coffee ⇒ ↑Quantity supplied*
3. *B: P_2↑, QS_2↑*

A Change in Anything but Price causes a change in Supply. Shift the curve.

Δ Determinant⇒ΔS

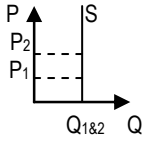
Typical Determinants or *Ceteris Paribus* conditions
- Δ resource (factor) prices
- Δ technology or technique
- Δ taxes/subsidies
- Δ price of other goods ⇒ production substitution
- Δ Price expectations
- Δ Number of sellers



Less ↔ More Cups of Coffee

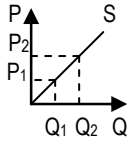
Economic Analysis
1. *S_1*
2. *Δ Starbucks opens more stores⇒# sellers↑*
3. *S_3↑ (QS↑ at every P)*

Elasticity of supply --Slope of Curve No TR test

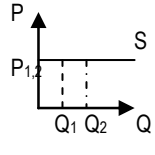


* *Immediately*
Inelastic supply
Vertical or steep

* *Short Run*
More elastic due to firm´s intense use of fixed resources (upslopiing)



* *Long Run*
All resources can change
Elastic supply
Horizontal, flat



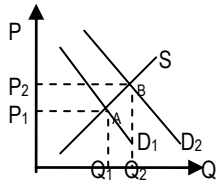
The key determinant of price elasticity of supply is the amount of time a seller has to change the amount of the good they can produce (or supply).

Price Elasticity Coefficient of Supply based on % of change, not slope

$E_S = \%\Delta QS_x / \%\Delta P_x$

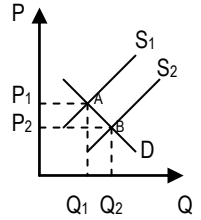
Supply / Demand Equilibrium – Product Markets (Industry)

iPod's



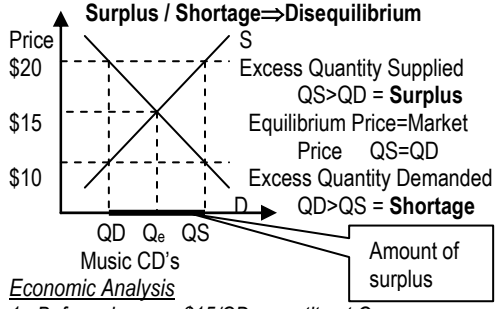
Eco Analysis
1. *A--P_1, Q_1*
2. *Δ greater popularity (Δ preferences) ⇒D↑*
3. *B--P_2↑,Q_2↑*

iPod's



Eco Analysis
1. *A—P_1, Q_1*
2. *Δ—faster, smaller chips (Δ technology) ⇒S↑*
3. *B--P↓, Q↑*

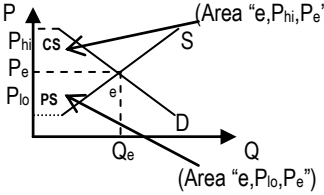
Surplus / Shortage⇒Disequilibrium



Economic Analysis
1. *Before change - $15/CD, quantity at Q_e*
2. *Change: Seller raises price to $20 on new hit CD*
3. *After change – Surplus because QS > QD at the higher price*

Consumer & Producer Surplus

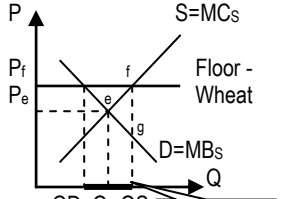
** Consumers' surplus is the difference between that paid (P_e) and what one would have paid based on utility (P_{hi})



** Producers' surplus is the difference in the price charged (P_e) and the price a seller could sell for based on costs (P_{lo}).

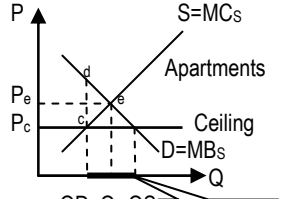
Efficiency Loss = Dead Weight Loss Govt. taxes or regulations or monopoly power reduce consumer and/or producer surpluses below society's allocative efficiency.

Government Price Floor



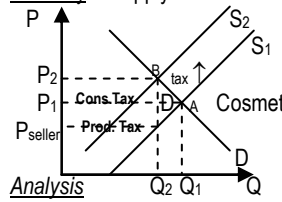
Eco Analysis
1. *Before--P_eQ_e*
2. *Change – Govt. sets price floor to help farmers at P_f.*
3. *After—OS>QD⇒ Surplus of wheat & efficiency loss area "efg"*

Government Price Ceiling



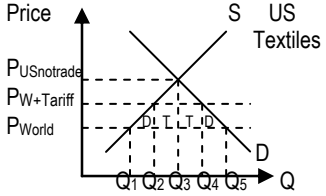
Eco Analysis
1. *Before–P_eQ_e*
2. *Change – Govt. sets apt. price ceiling to help poor.*
3. *After – QD>QS⇒ Apartment shortage & efficiency loss area "cde"*

Excise Taxes and Tax Incidence
(Who really pays the tax depends on elasticity of supply and of demand.)



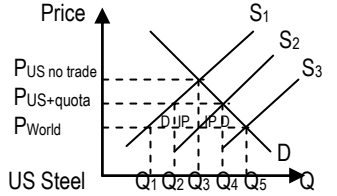
Analysis
1. *A-- No tax at equilibrium P_1 , Q_1*
2. *Δ --Govt. taxes cosmetics ↑⇒per unit costs ↑⇒S↓ (excise–business tax)*
3. *B – P_2, Q_2 : Consumer tax=$(P_2-P_1)Q_2$; Producer tax=$(P_1-P_{seller})Q_2$; Efficiency Loss area "D"*

Tariff=import tax=customs duty



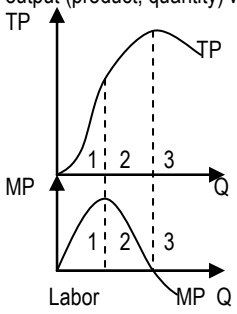
1. *Before--$P_{w+Tariff}$, produces Q_2 , has efficiency loss areas "D", gets tariff revenues areas "T",and imports Q_2 to Q_4.*
2. *Change—WTO treaty requires US to remove tariffs*
3. *After – P↓(US pays P_{World}), Q↓ (domestically producing to Q_1); M↑(US imports $Q_1 – Q_5$)*

Quota – limit on the quantity of imports



1. *Before – US pays $P_{US+quota}$, produces Q_2 , has efficiency loss areas "D", import producer gets extra profits "IP", and the US imports Q_2 to Q_4.*
2. *Change – WTO outlaws quotas*
3. *After – P↓ (US pays P_{World}), Q_{US}↓ (domestically producing to Q_1), M↑(US imports $Q_5 – Q_1$)*

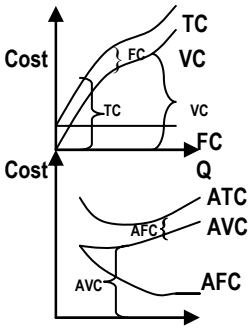
Law of Diminishing Returns—As extra units of a variable resource/input (labor) are added to fixed resources (capital,land), output (product, quantity) will decline at some point.



1) If TP↑, MP↑
2) If TP↑ Less Diminishing, MP↓ to 0
3) If TP↓, $MP_{Negative}$.

Fixed inputs-Short run only

Short Run Production Costs—TC=FC+VC
ATC=AFC+AVC

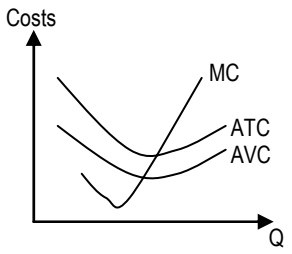


TC/Q=ATC
VC/Q=AVC
FC/Q=AFC

Fixed costs can't change in the short run.

Variable costs can change in the short run.

Marginal Costs: MC is the cost of producing one more unit of output.

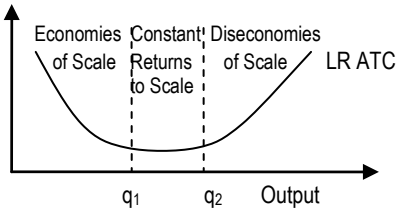


MC crosses ATC and AVC at their lowest points.

No relationship between MC and AFC

MC at lowest point when Marginal Product (MP) is at its highest point. These curves are mirror images.

Long Run ATC – <u>All resources variable, none fixed</u>

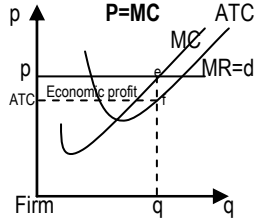


- Economies of Scale due to labor & managerial specialization, efficient capital⇒per unit costs↓
- Constant Returns to Scale⇒per unit costs same
- Diseconomies of Scale due to inefficiencies from large, impersonal bureaucracy⇒per unit costs↑

Perfect Competition – The Firm

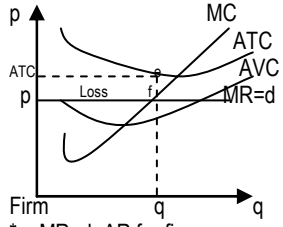
Characteristics
**Very large number of firms
**Standardized products
**Price takers
**Easy entry into and easy exit from market
**No non-price competition (advertising)
**Ex: Agriculture

Profit Maximization Rule
MR=MC
P=MC



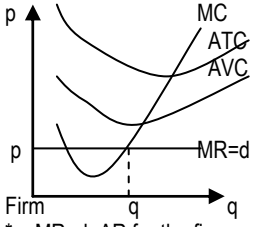
*p=MR=d=AR for firm
*q where MR=MC
*economic profits area ($p,e,f,_{ATC}$)

Short Run Loss Minimization
MR=MC, P>AVC



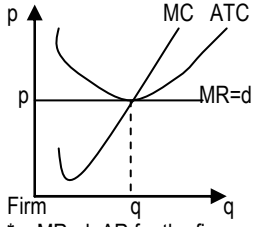
*p=MR=d=AR for firm
*q where MR=MC
*loss area ($_{ATC}$,e,f,p)--price below ATC & above AVC
*Fixed costs are covered (space between ATC & AVC).

Shut Down Decision
P<AVC



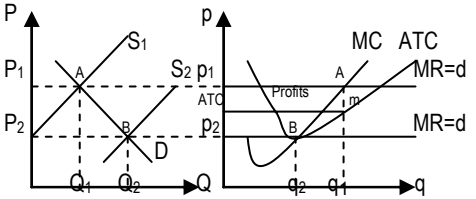
*p=MR=d=AR for the firm
*q where MR=MC
*shut down because fixed costs (ATC-AVC=AFC) are the least loss possible

Long Run Equilibrium
MR=MC=min. ATC=P



*p=MR=d=AR for the firm
*q where MR=MC
*firm in long run equilibrium where P=MC at min. ATC

Industry and Firm in an Expanding Industry



Analysis **Industry** **Firm**

1. A--Industry at P_1, Q_1 equilibrium ⇒ firm price taker at p_1, MR=MC at q_1, earns economic profits ($p_1,m,_{A,ATC}$)

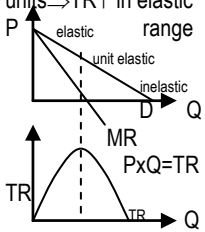
2. Δ—Other producers see profits and enter the market⇒number of firms ↑⇒industry supply ↑ to S_2

3. B--P↓,Q↑(industry) ⇒ firm price taker at p_2 = MC =MR at q_2 (allocative efficiency), no economic profits p_2= min. ATC (productive efficiency)

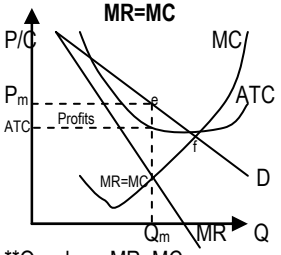
Monopoly – THEORY OF FIRM

Characteristics
**One firm=industry
**Unique product with no close substitutes
**Price maker
**Many barriers, entry blocked
**Little advertising except for public relations
**Ex: local utilities, patented drugs

Why <u>Demand</u> and <u>MR</u> aren't the same:
MR<P b/c to sell Q↑, Monopolist P↓ on all units⇒TR↑ in elastic

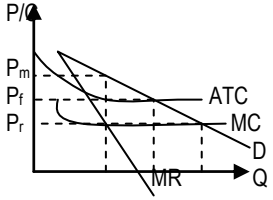


Profit Maximizing Rule
MR=MC



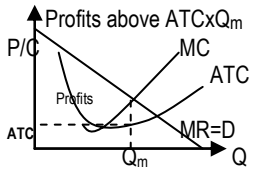
**Q_m where MR=MC
**P_m where Q_m intersects D
**Eco Profit = $(P_m$-ATC)Q_m or Economic Profit=TR-TC
**Efficiency loss ($_{e, f, MR=MC}$)

Regulated Monopoly
*Typically Natural Monopolies with Economies of Scale
*Fair-Return Price: P_f=ATC ⇒ monopolist breaks even
*Socially Optimal Price: P_r=MC ⇒subsidies to monopolist ⇒ allocative efficiency

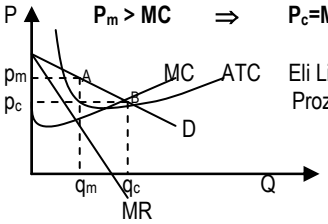


Price Discrimination—The practice of selling a product at more than one price not justified by cost differences. Due to *monopoly power, *E_d segregates market, *buyers can't resell product. Examples: airlines, movies

P varies; MR=D



Monopoly becomes Competitive
P_m > MC ⇒ P_c=MC



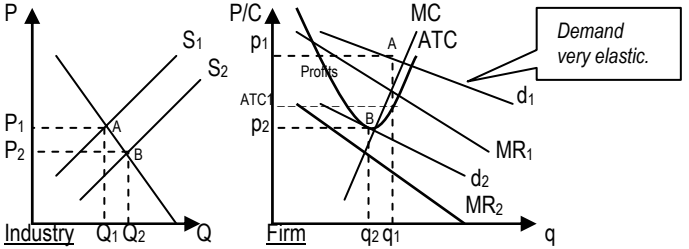
Eli Lily produces Prozac

1. A P_1, Q_1 – Monopoly with profits, efficiency loss
2. Δ The patent protecting Prozac runs out and other firms now produce the generic drug ⇒ competition ⇒ firm becomes price taker
3. B ↓p_c, ↑q_c

Monopolistic Competition – Theory of the Firm

Characteristics
**Many firms
**Differentiated products
**Limited control over price
**Few entry barriers
**Much non-price competition—many ads,brands
**Ex: retail trade, clothing, restaurants

Monopolistically Competitive firm reaches Long Run Equilibrium



1. A Industry at equilibrium P_1, Q_1 Firm earning eco profits (p_1>ATC)
2. Δ New firms enter industry, S↑ ⇒ firm's d↓ b/c more close substitutes and a smaller share of total demand ⇒ MR↓
3. B Industry ↓P_2, ↑Q_2; Firm in Long Run Equilibrium at ↓p_2=ATC, ↓q_2

Oligopoly

Characterisitcs
**Few firms
**Standardized or differentiated
**Interdependence limits price control unless collusion
**Many barriers to entry
**Non-price competition high with product differentiation—ads
**Ex: Aircraft, tires

Definitions—
* *Strategic Behavior*-A firm consider reactions of other firms to its actions.
* *Concentration Ratio*--% of market controlled by largest firms
* *Market oligopolistic* if at least 4 firms control 40%
* *Collusion=Cooperation*
* *Self-interest⇒non-coop*
* *Cartel—a formal collusion on price, quantity, share*
* *Game Theory*—the study of how people behave in strategic situations.

Game Theory Ex:--Two Cereal Firms

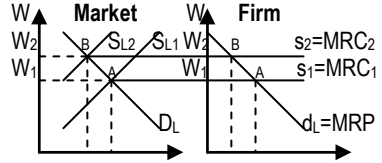
		General Mills Cereals: Ad's	General Mills Cereals: No Ad's
Kellogg	Ad's	$70M / $70M	$40M / $90M
Kellogg	No Ad's	$90M / $40M	$50M / $50M

* *Dominant Strategy*—best for a player no matter what other does— Both runs ad's even though it is an inferior position.
* *Payoff Matrix*—Payoff or profit to each party for each combination of choices
* *Outcome*: $Q_{oligopolists} > Q_{monopolist}$; $P_o < P_m$

Resource (Factor, Input) Markets

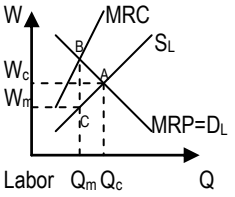
* *Resource* demand **derived** of *product*
* **$MPxP=MRP_L=D_L$**
The Δ TR from each added unit of resource
* **Wages=MRC_L=S_L**
The Δ TC from each added unit
* Profit Max Rule: **MRP_L=MRC_L** or **($\Sigma mrp's=D_L$) = S_L**

Pure Competition Labor Market



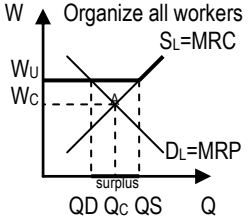
1. A Firm is wage taker at W_1, q_1
2. Δ baby boomers retire⇒ market S_L↓, firm's MRC↑
3. B Market to W_2↑,Q_2↓ Firm W_2↑, q_2↓

Imperfect Competition or Monopsonist (1 firm D_L)
* Firm can set wages, but if one more worker hired at higher wage, all current workers receive pay raise, so **$S_L \neq MRC$**.



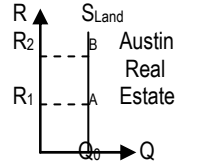
Workers (S_L) Gain Monopoly Power as a Union

How unions raise wages:
* Increase demand for products ⇒ D_L↑
* Increase productivity ⇒ D_L↑
* Restrict membership ⇒ S_L↓
* Organize all workers ⇒ negotiate W↑



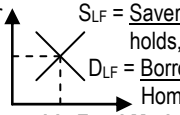
1. A Competitive Equilibrium in labor market--W_C,Q_C
2. Δ Union negotiates W↑
3. After QD_L<QS_L⇒surplus of labor at W_U

Economic Rent paid for use of Land



Eco Analysis
1. A at R_1, Q_0
2. Δ Population ↑
3. B at R_2↑, Q_0

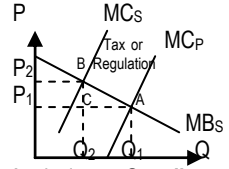
Interest paid for use of Capital



Loanable Fund Market r=real interest %

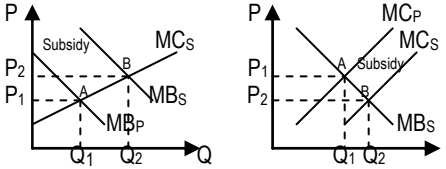
Market Failure and Government Solutions

Negative Externality—Private costs born by society/3rd party



Analysis **Gasoline**
1. A—MB_S=MC_P, Efficiency loss ($_{A,B,C}$)=society's cost, resource overallocation
2. Δ—Govt. taxes or regulates
3. B—MB_S=MC_S, P_2↑, Q_2↓

Positive Externality—Social benefits to 3rd parties born by private firms



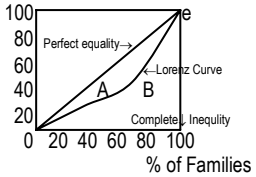
Analysis **Higher Education**

1. A—P_1,Q_1 under-allocation of resources	*1. A—P_1,Q_1 Under-allocation of resources*
2. Δ—Govt. susidy to consumers⇒MB↑	*2. Δ—Govt. subsidy to universities⇒MC↓*
3. B—P_2, Q_2, MB_S=MC_S	*3. B—P_2,Q_2, MB_S=MC_S*

Public Goods
* Govt. provides the goods/service
* Paid by tax revenues
* Difficult to exclude non-payers ⇒ freeriders
* Shared consumption of good, service ⇒ no rivalry for good/service

Anti-Trust Laws
* Goals: promote competition and efficiency
* Laws: Sherman—no monopoly & no restraints of trade (collusive price fixing & dividing markets), Clayton—no price discrimination not based on costs, no tying contracts, no interlocking directorates, Federal Trade Commission and Wheeler Act—Cease & desist orders & no deceptive acts and practices (ads), Celler-Kefauver —no anti-competitive mergers.

Lorenz Curve—Income Inequality



Distance between 0e and Lorenz Curve shows degree of inequality.
Gini ratio--numeric measure of overall dispersion of income
Gini ratio = Area A÷Areas A+B
0 = perfect equality; .249 = Japan; .435 = USA; .519 = Mexico; 1 = complete inequality

Causes of Income Inequality:
* Ability, talent
* Education/training
* Discrimination
* Preferences-types of work, leisure
* Unequal wealth
* Market power
* Luck, misfortune

Income Redistribution Tradeoff: Reduced efficiency, production & total income