

## Chapter 13 - cost + production function

- max  $\Pi \rightarrow \Pi = TR - \underline{TC}$

How does TC vary with Q.?

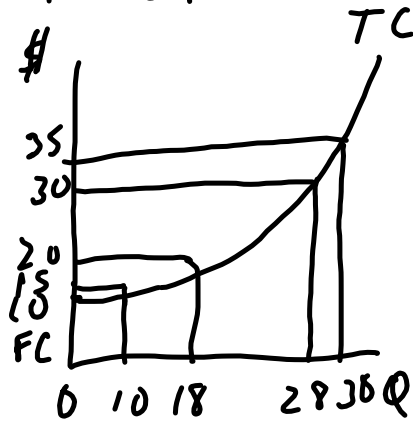
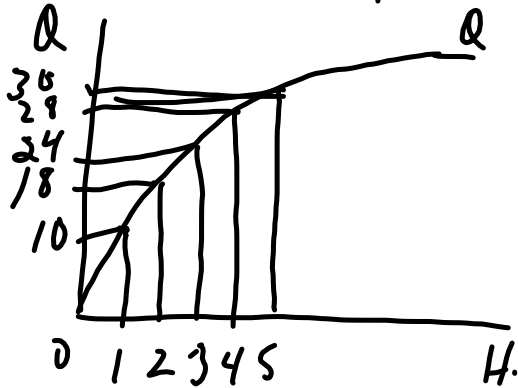
How does P (Revenue) vary with Q?

↳ depends on market structure  
(How many firms are in market?)

Cost side  
 Q3 p 276  
 $MP = \frac{\Delta Q}{\Delta H}$      $FC \rightarrow \text{constant } \$10$   
 Variable cost = \$5/h

AC	H	Q	MP	FC	VC	TC	MTC = FC + VC
	0	0		10	0	10	
15/10	1	10	10	10	5	15	1.60
	2	18	8	10	10	20	8/5
	3	24	6	10	15	25	
	4	28	4	10	20	30	
35/30	5	30	2	10	25	35	2.50

TC linear



Total Cost  $\rightarrow$  Marginal Cost  
compare with Marginal Revenue

to max  $\Pi \rightarrow$  last (marginal) unit

Marginal Revenue = Marginal Cost

suppose  $\overset{MR}{MR} > MC \rightarrow Q \uparrow \overset{MC}{MC} \uparrow$

$MR < MC \rightarrow Q \downarrow MC \downarrow$

$MR = \overline{MC} \rightarrow$  hold  $Q$  constant

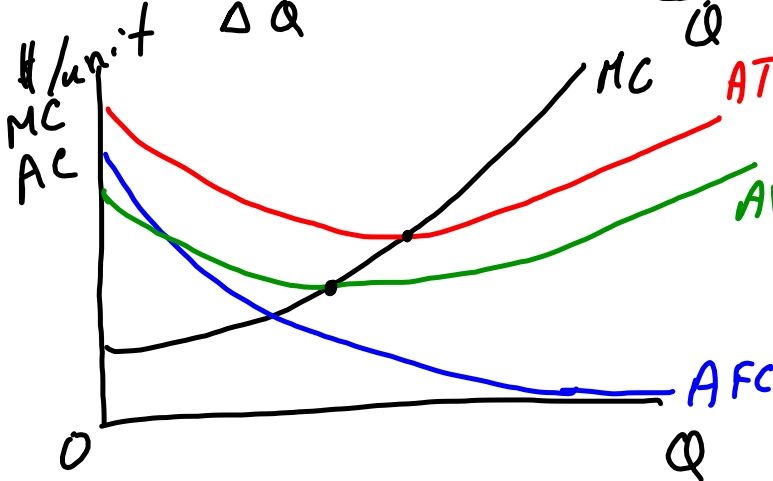
Total cost → Marginal Cost | Variable Cost VC  
 → Average Cost

$$MC = \frac{\Delta TC}{\Delta Q}$$

$$AC = \frac{TC}{Q}$$

$$AFC = \frac{FC}{Q}$$

$$AVC = \frac{VC}{Q}$$



$$ATC = \frac{TC}{Q}$$

$$= AFC + AVC$$

↓  
 unavoidable cost  
 ↙ ↘  
 avoidable cost

Fig 5  
 p271

$$\text{Min ATC} = MC$$

$AVC = MC$  - if  $MC < AVC$  AVC falling  
 if  $MC > AVC$  AVC rising.

Short run cost curves

Short run vs Long run.

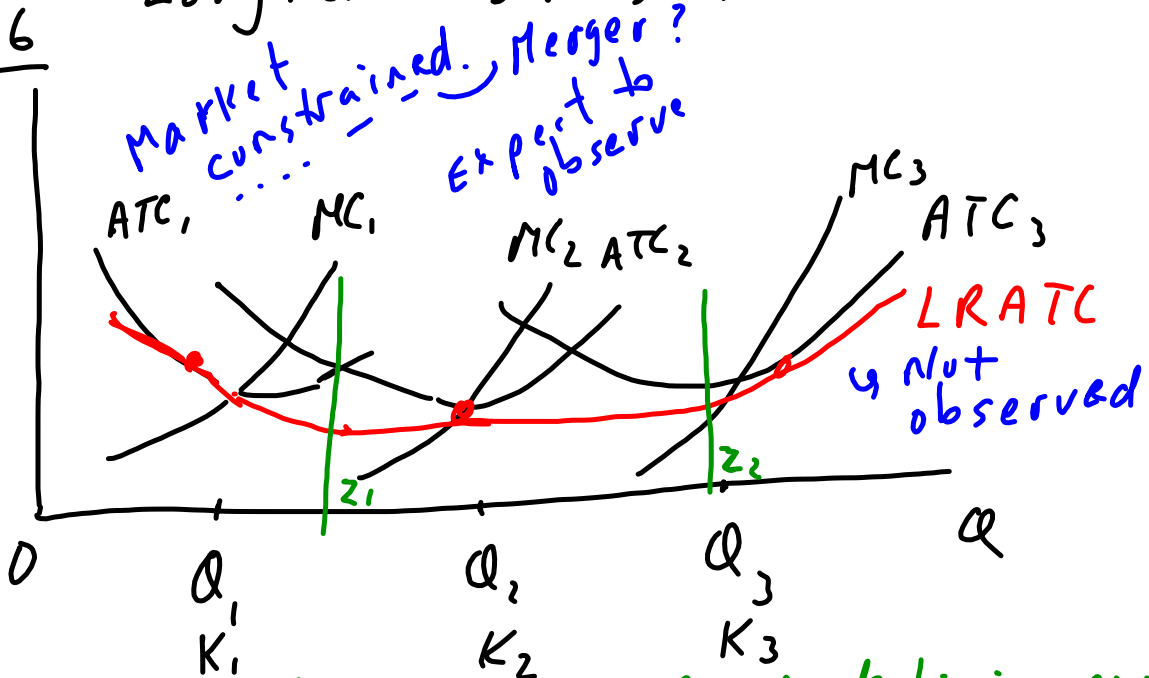
Fixed vs  
variable  
inputs  
eg. fix capital.  
vary labor

All factors variable  
capital + labor  
variable

Long run  $\rightarrow$  scale of operation  
 (size of plant)  
 - economies of scale

Long run  $\rightarrow$  series of short runs

Fig 6  
 ATC  
 MC



$0 \rightarrow Z_1$  LRATC  $\downarrow$  - economies of scale declining cost  
 $Z_1 \rightarrow Z_2$  LRATC  $\uparrow$  - diseconomies of scale constant cost  
 $Z_2$  LRATC  $\uparrow$  - diseconomies of scale increasing cost

Mergers - horizontal → same product  
- vertical → stages of production.