



THE COSTS OF PRODUCTION PART III

It is one of the greatest economic errors to put any limitation on production ... We have not the power to produce more than there is the potential to consume.

– Louis D. Brandeis



A Cost Summary

The output decision has to be based not only on the capacity to produce (**the production function**) but also on the costs of production (**the cost function**).



A Cost Summary

The MC curve always intersects the ATC curve at its lowest point.

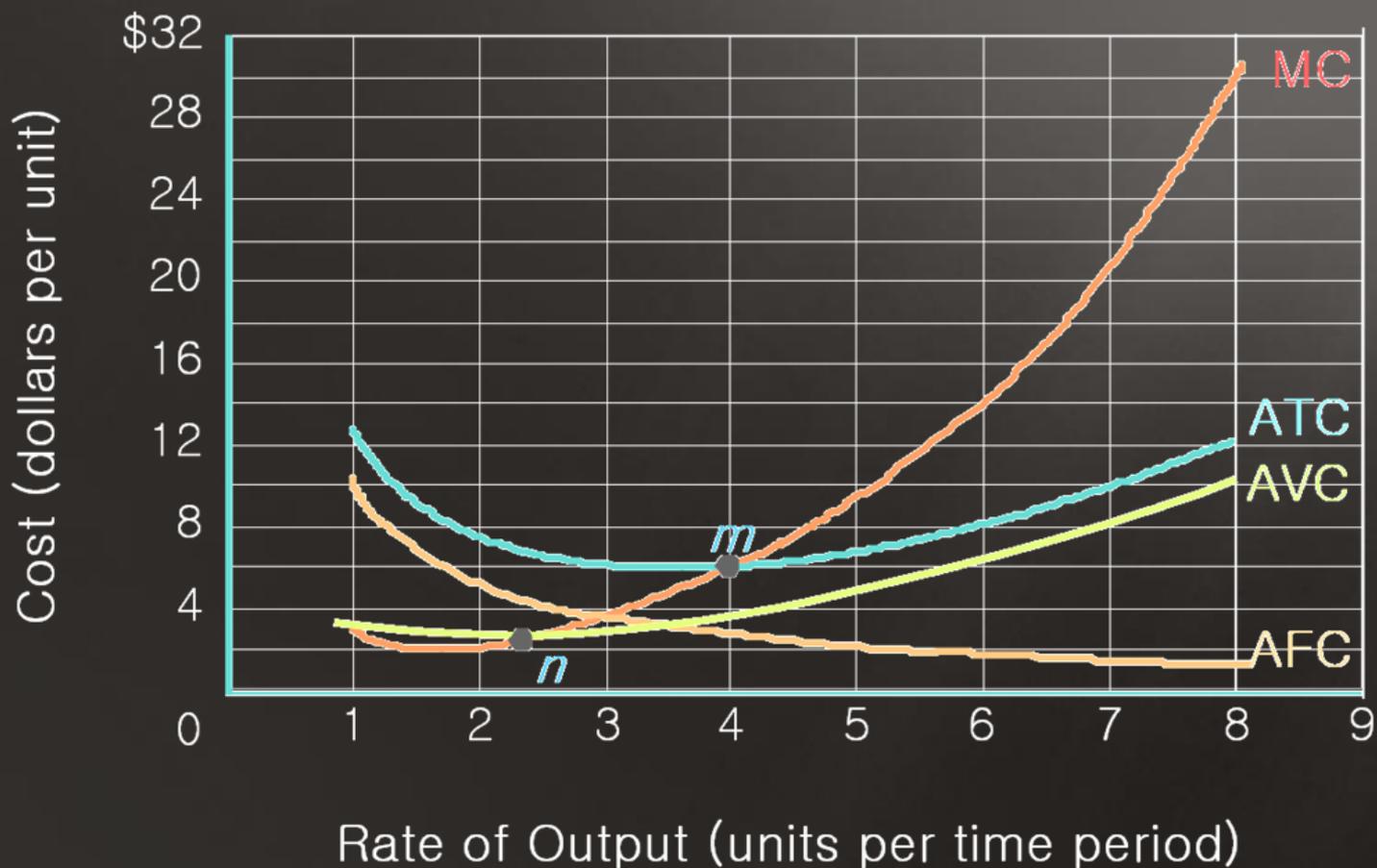
If $MC > ATC$, ATC is increasing.

If $MC < ATC$, ATC is decreasing.

If $MC = ATC$, ATC is at minimum.



Chart: Basic Cost Curves





Short Run Production Costs Summary

Total Fixed Costs = TFC

Total Variable Costs = TVC

Total Costs = TC

Average Fixed Costs = AFC

Average Variable Costs = AVC

Average Total Costs = ATC

Marginal Costs = MC

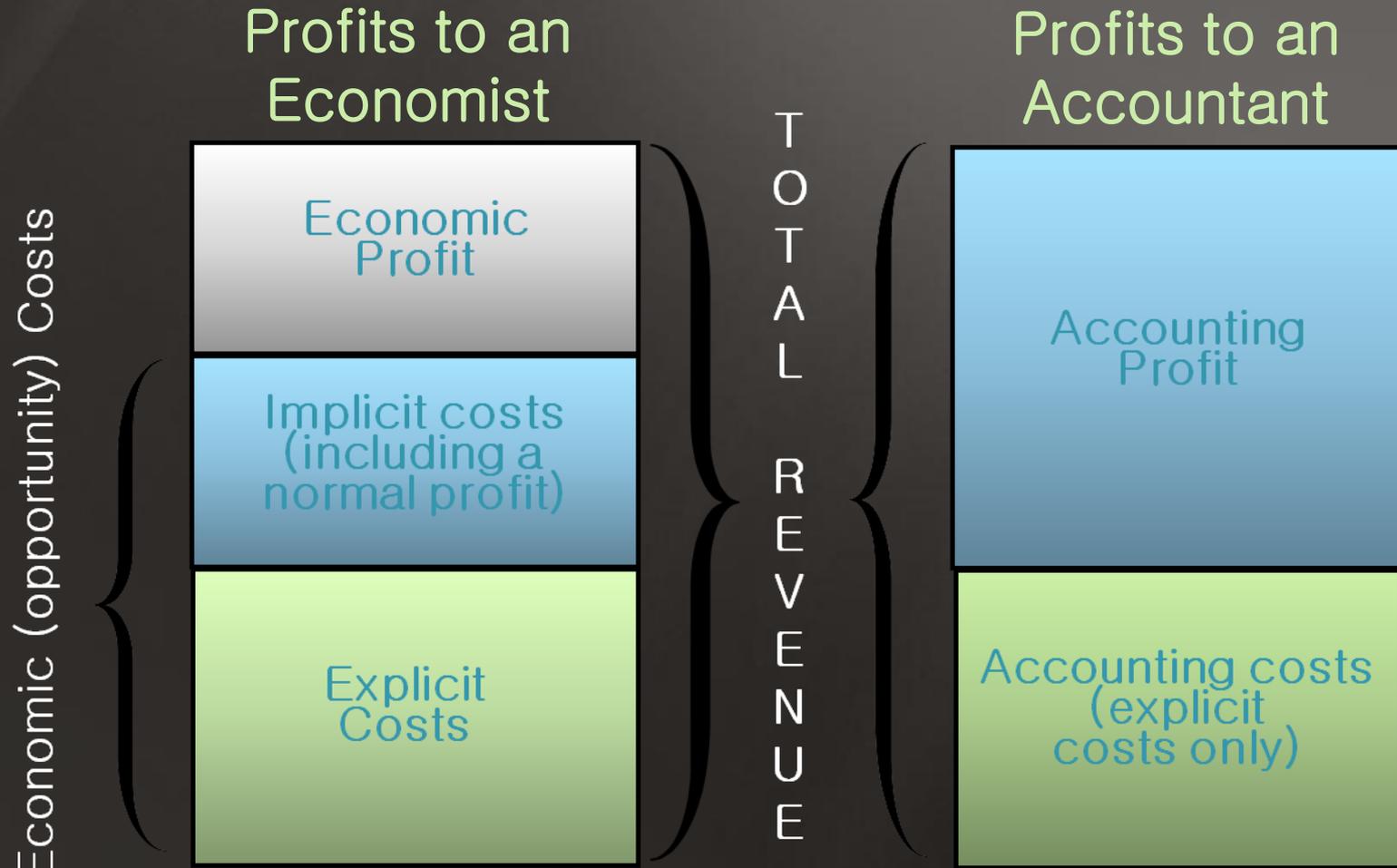


Economic Cost vs. Accounting Cost

- Accountants typically count dollar costs only and ignore any resource use that doesn't result in an explicit dollar cost.
- Economists believe implicit costs as well as explicit costs are part of the total costs of production.



Economic Cost vs. Accounting Cost





Explicit and Implicit Costs

- **Explicit costs** are the payments made for the use of a resource.
- **Implicit costs** are the value of resources used, even when no direct payment is made. (Remember the concept of *opportunity cost*.)



Economic Cost

Economic cost represents the value of all resources used to produce a good or service:
opportunity cost.

Economic cost = explicit cost + implicit cost



Economic Cost vs. Accounting Cost

Economic and accounting costs will diverge whenever any factor of production is not paid ... an implicit wage, rent, etc.



Long Run Costs

- The short run is characterized by costs that cannot be changed (fixed costs).
- There are no fixed costs in the long run.
- The **long run** is a period of time long enough for all inputs to be varied (no fixed costs).



Long Run and Short Run

- In the short run, it pays to sell to any customer who'll pay marginal cost.
- Even if you're losing money overall, you're losing less than if you had turned down the sale.
- In the long run, when you can get out of your fixed cost, you shut down if your average price is not more than average cost.



Making Long Run Production Decisions

- To make their long run decisions:
 - Firms look at costs of various inputs and the technologies available for combining these inputs.
 - They choose the combination which offers the lowest cost.



Technical Efficiency and Economic Efficiency

- **Technical efficiency** – as few inputs as possible are used to produce a given output
- **Economically efficient** – the method that produces a given level of output at the lowest possible cost.
 - It is the least-cost technically efficient process.



Determinants of the Shape of the Long Run Cost Curve

- The law of diminishing marginal productivity does not apply in the long run.
- All inputs are variable in the long run.
- The shape of the long run cost curve is due to the existence of economies and diseconomies of scale.

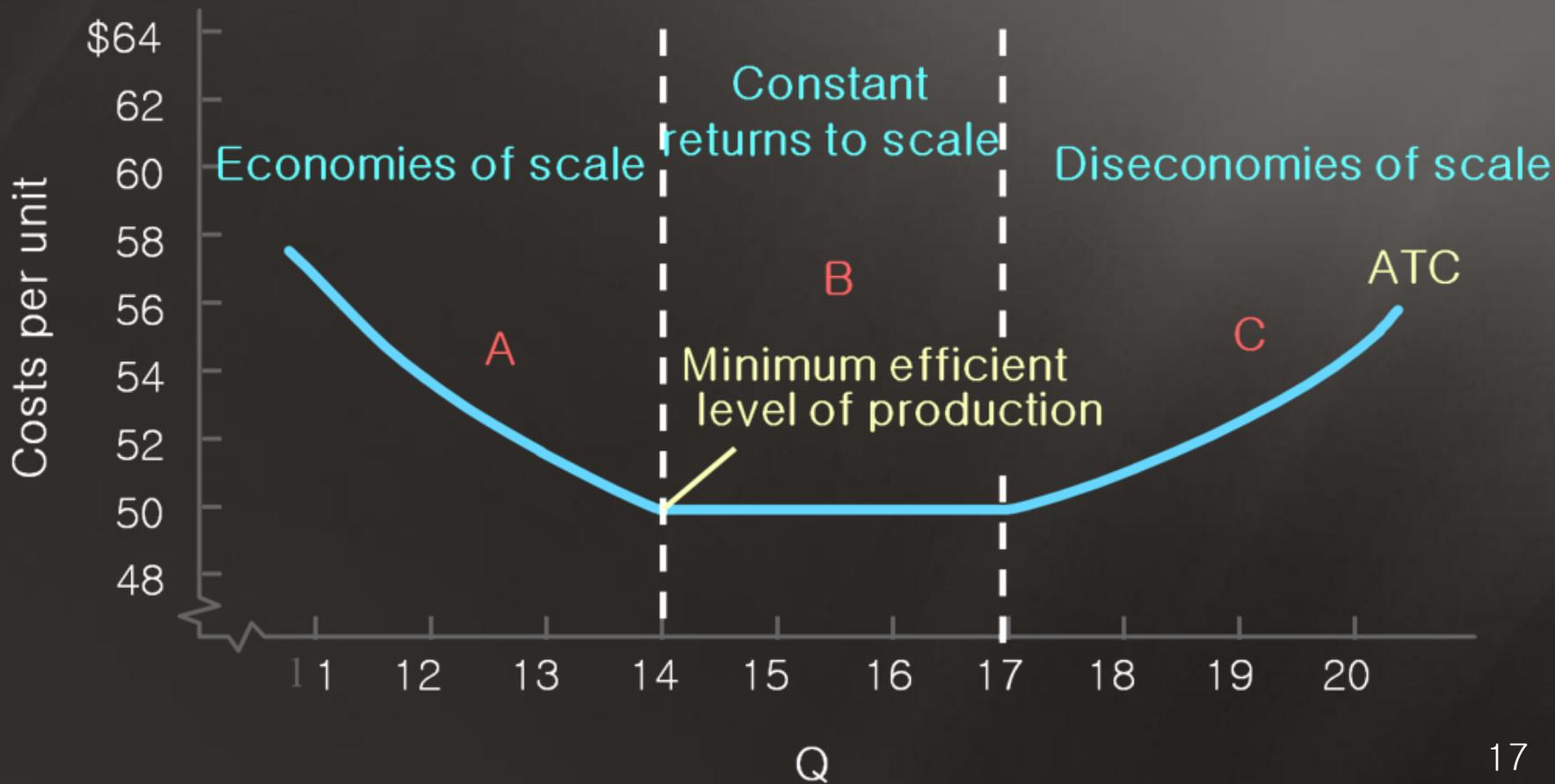


A Typical Long Run Average Cost Table

Quantity	Total Costs of Labor	Total Cost of Machines	Total Costs = $TCL + TCM$	Average Total Costs = TC/Q
11	\$381	\$254	\$635	\$58
12	390	260	650	54
13	402	268	670	52
14	420	280	700	50
15	450	300	750	50
16	480	320	800	50
17	510	340	850	50
18	549	366	915	51
19	600	400	1,000	53
20	666	444	1,110	56



Chart: A Typical Long Run Average Total Cost Curve



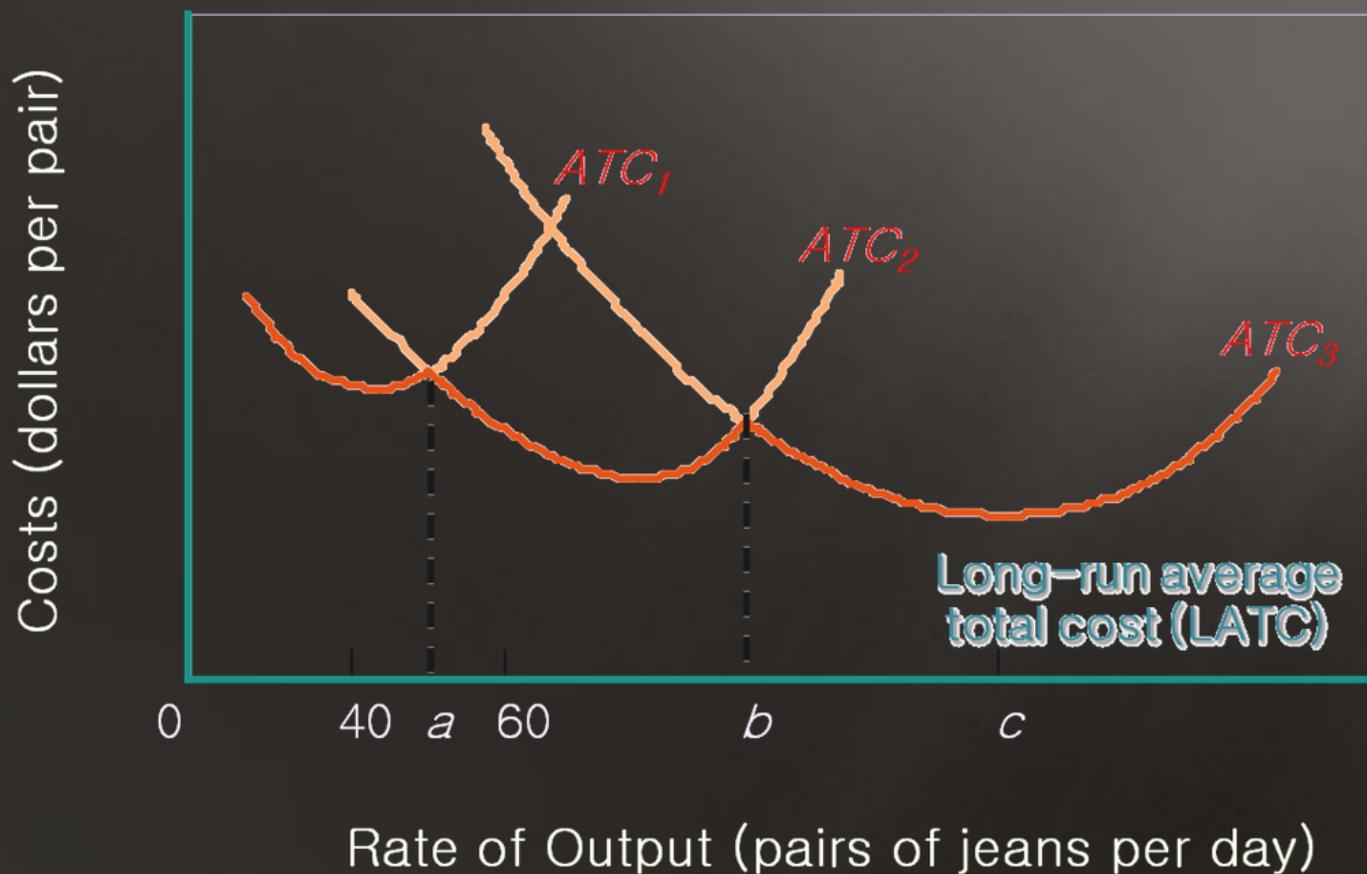


Long Run Average Costs

The long run cost curve is a summary of our best short run cost possibilities.



Chart: Long Run Average Costs



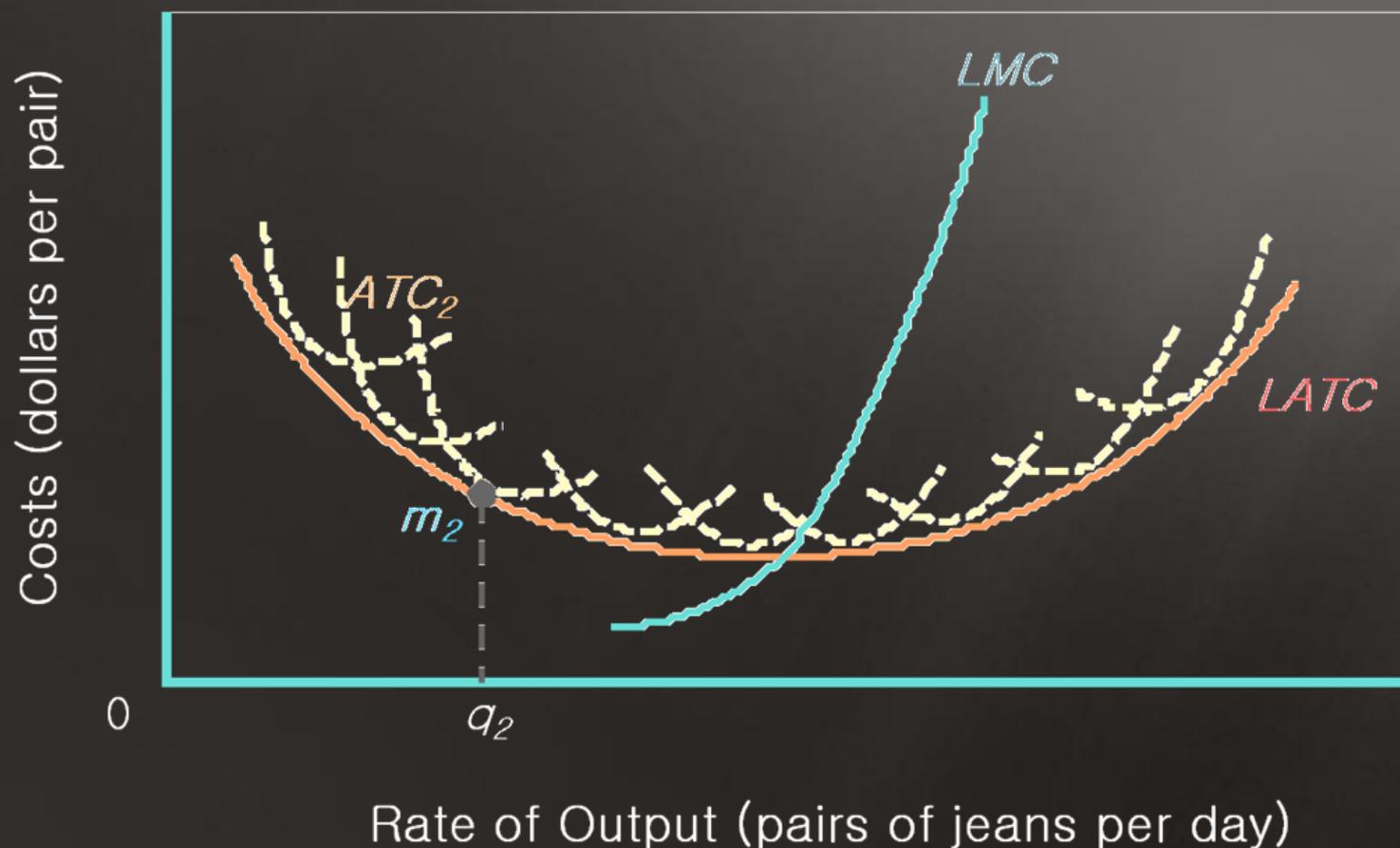


Long Run Marginal Costs

The long run marginal costs (LMC) curve intersects our long run average total cost (LATC) curve at its lowest point.



Chart: Long Run Costs with Unlimited Options





Economies of Scale

Economies of scale are reductions in minimum average costs that come about through increases in the size (scale) of plants and equipment.



Economies of Scale Decisions

- There are many optional plant sizes available in long run production.
- A firm can decide to use one large plant or several smaller plants to produce a given amount of output.



Constant Returns to Scale

Constant returns to scale are increases in plant size that do not affect minimum average cost – minimum per-unit costs are identical for small plants and large plants.



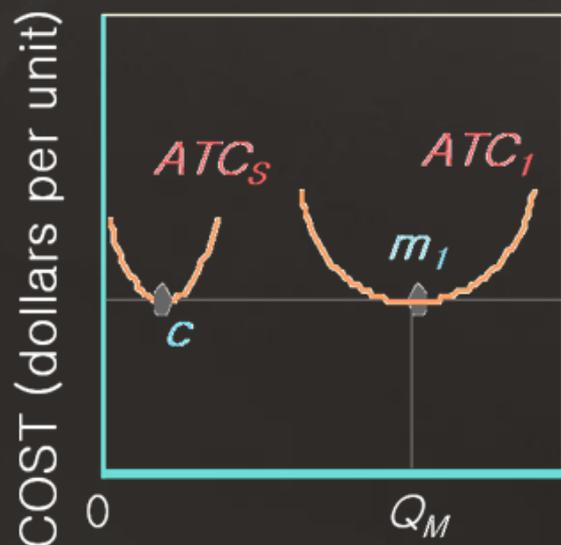
Diseconomies of Scale

- Efficiency and size do not necessarily go hand in hand.
- **Diseconomies of scale** occur when an increase in plant size results in reducing operating efficiency.



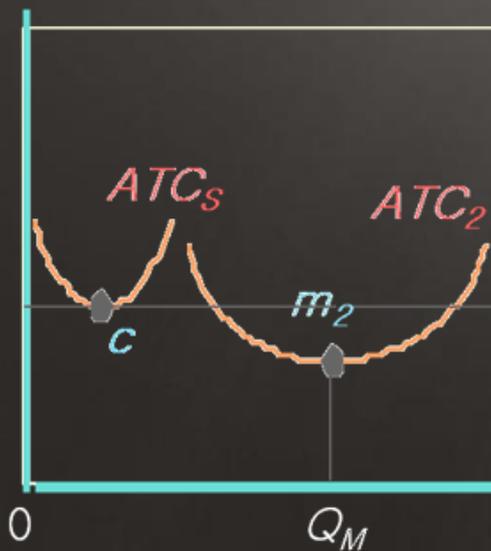
Charts: Economies of Scale

Constant returns to scale



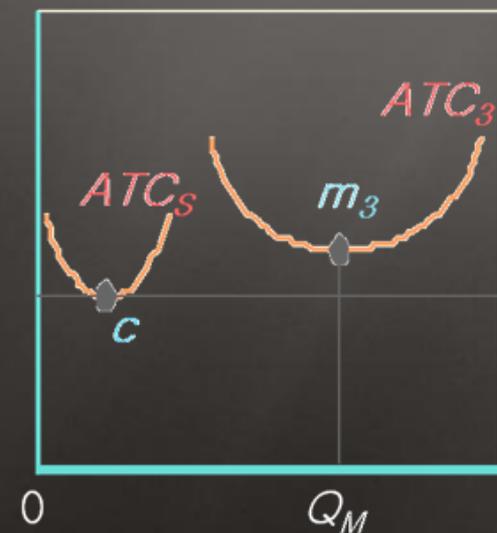
RATE OF OUTPUT
(units per period)

Economies of scale



RATE OF OUTPUT
(units per period)

Diseconomies of scale



RATE OF OUTPUT
(units per period)



Global Competitiveness

Global competitiveness ultimately depends on the costs of production.



Cheap Foreign Labor?

- Low wages are not a reliable measure of global competitiveness.
- A worker's productivity (MPP) depends on the quantity and quality of other resources in the production process.



Unit Labor Costs

- Both factor costs and productivity are taken into account to measure competitiveness.
- Unit labor cost is a true measure of global competitiveness.

$$\text{Unit labor cost} = \frac{\text{wage rate}}{\text{MPP}}$$



Increases in Productivity

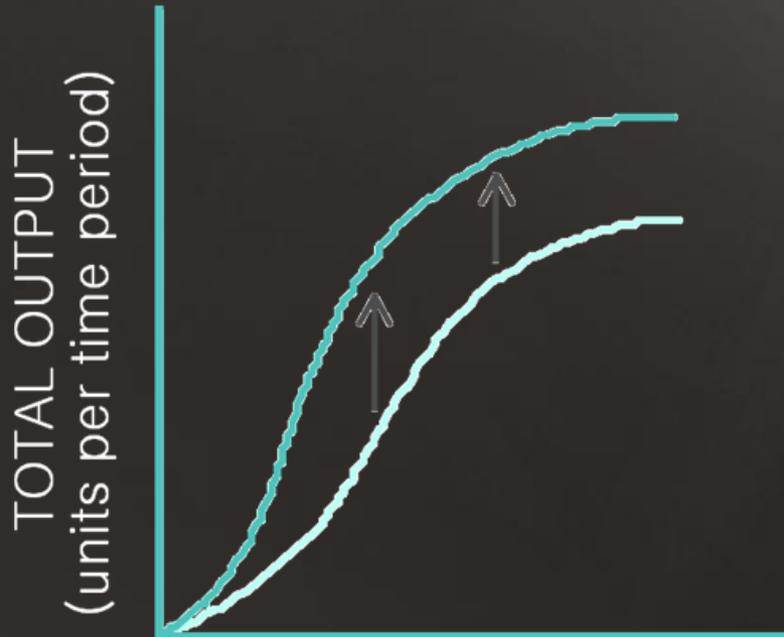
American productivity must increase as fast as other nations in order for America to stay competitive in global markets.



Charts:

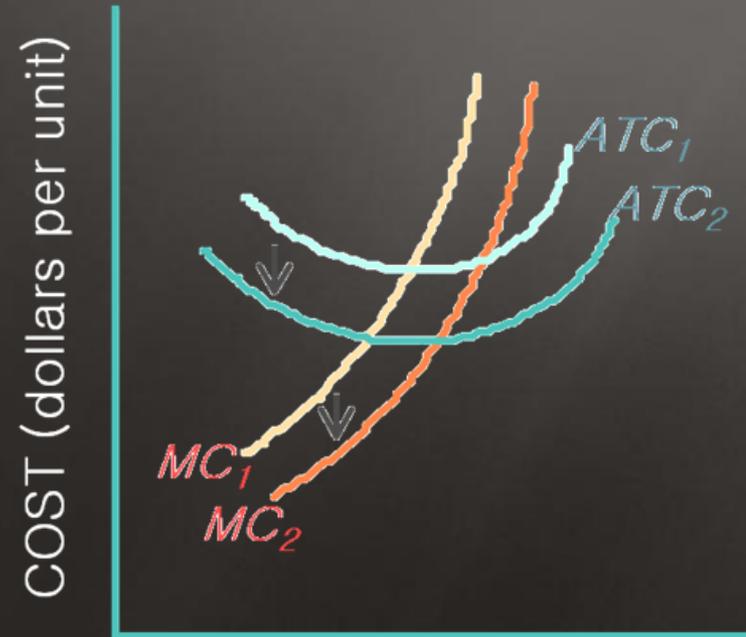
Productivity Improvements Reduce Costs

When the production function shifts up ...



Resource Inputs
(dollars per unit)

Cost curves shift down.



Rate of Output
(units per time period)



THE END