



# Theory of the Firm III:

Cost in the Short- & Long-Run

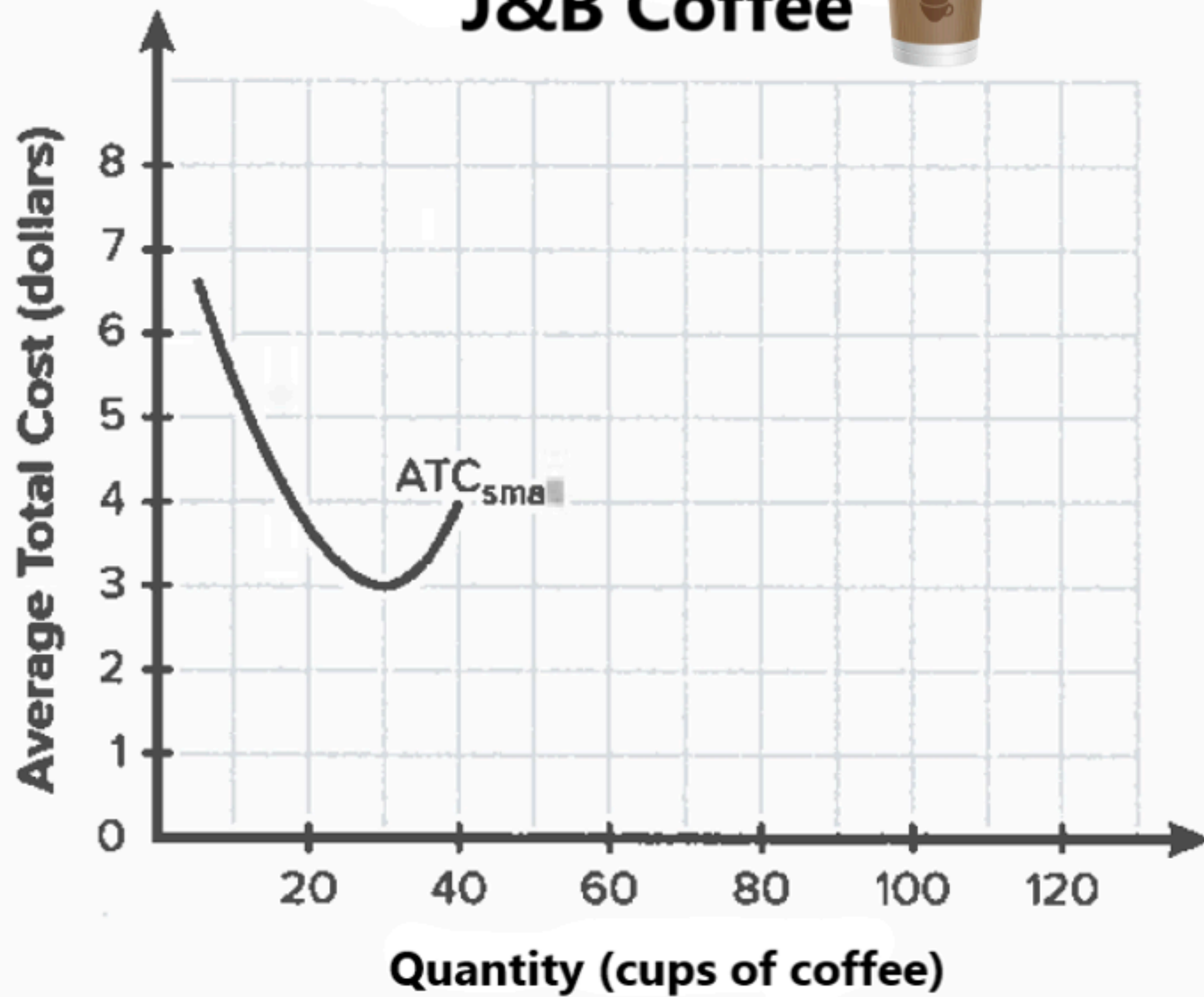
BECO-3310 Fall 2025

# Ex: J&B Coffee

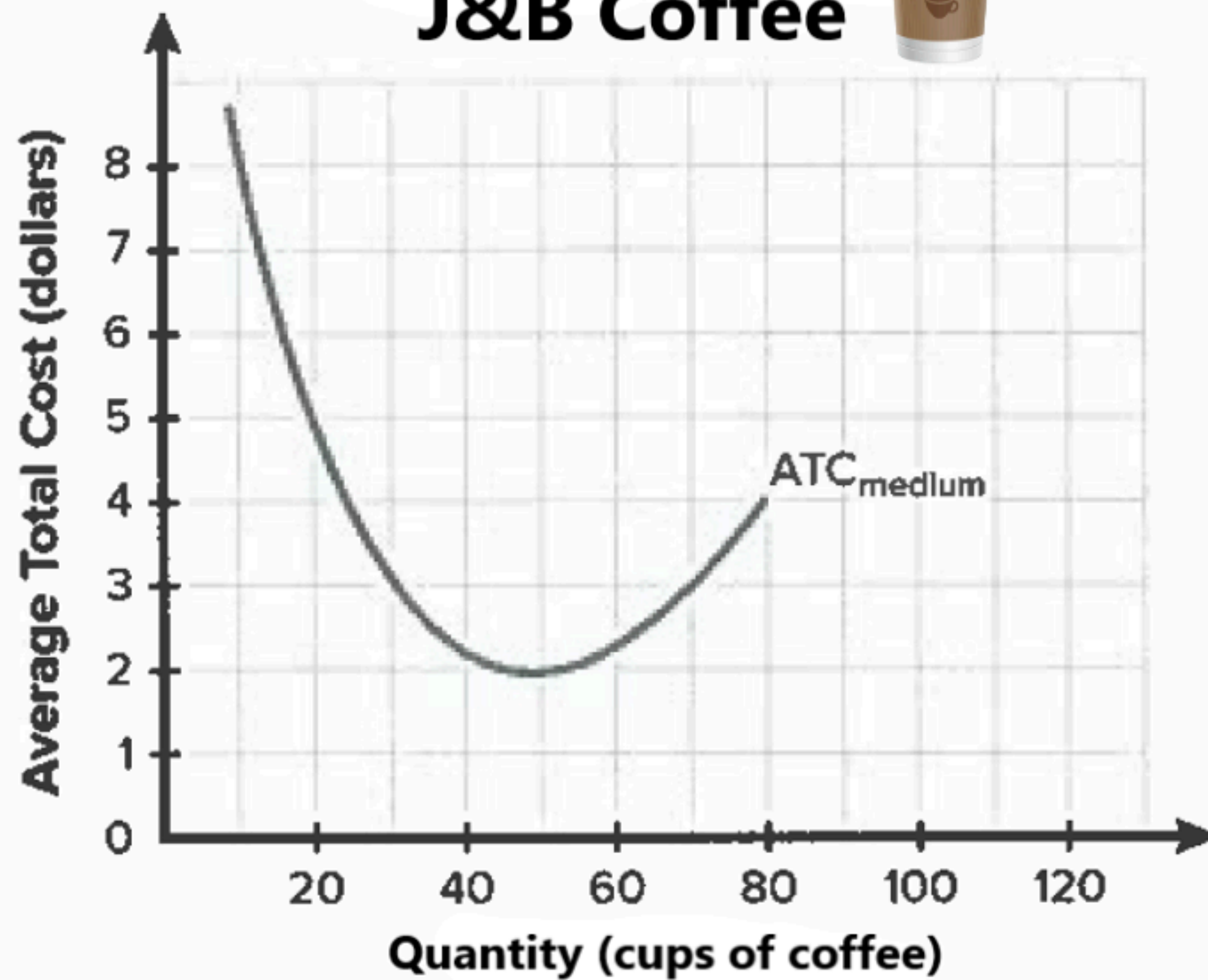


- If J&B Coffee wants to make more coffee today, basically, all it can do is hire more employees to work (increase labor input).
- As time progresses, they can...
  - Buy more machines.
  - Change locations or lease more space.
  - Renovate the seating area, etc.
- Firms need time to make more choices!

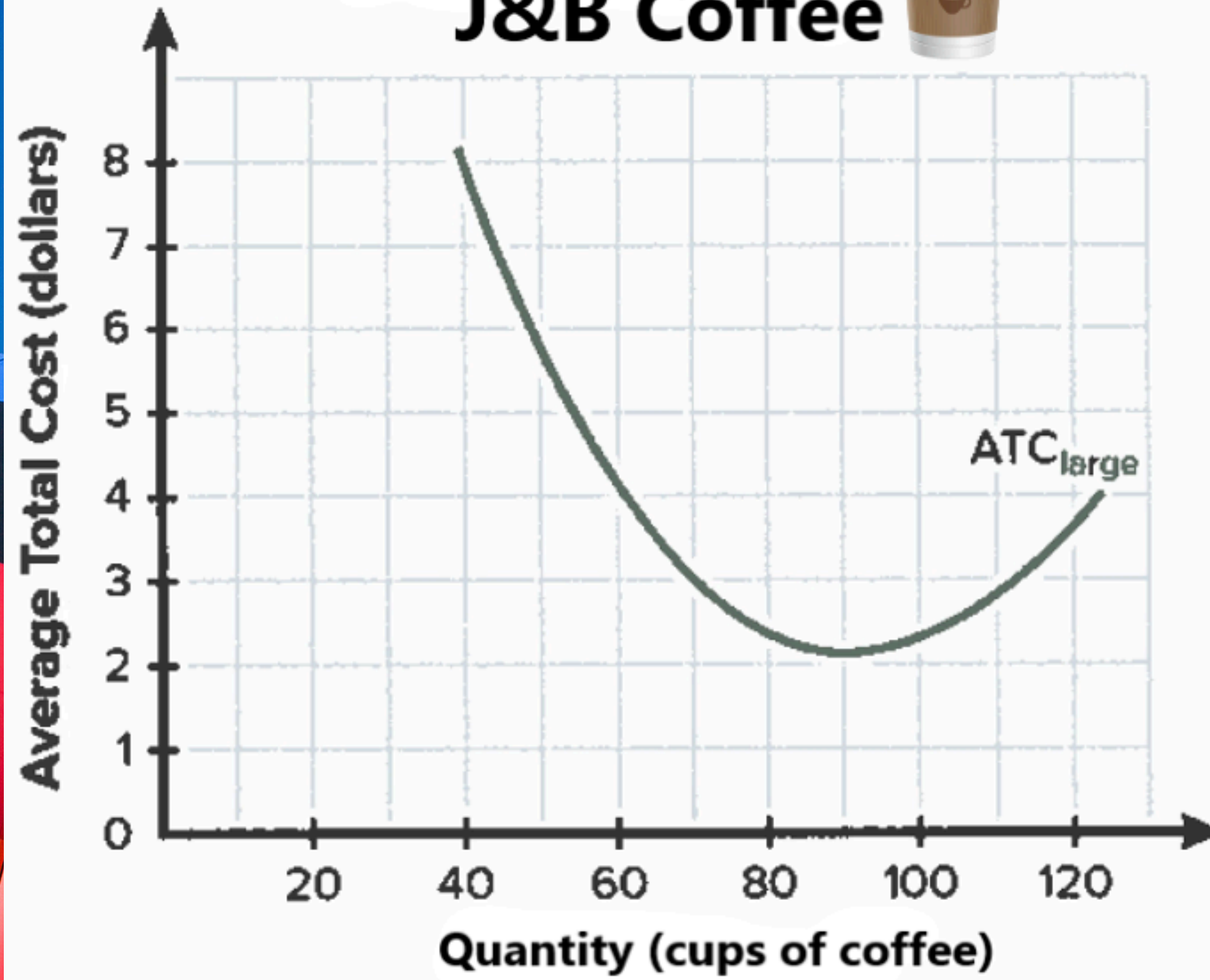
# J&B Coffee



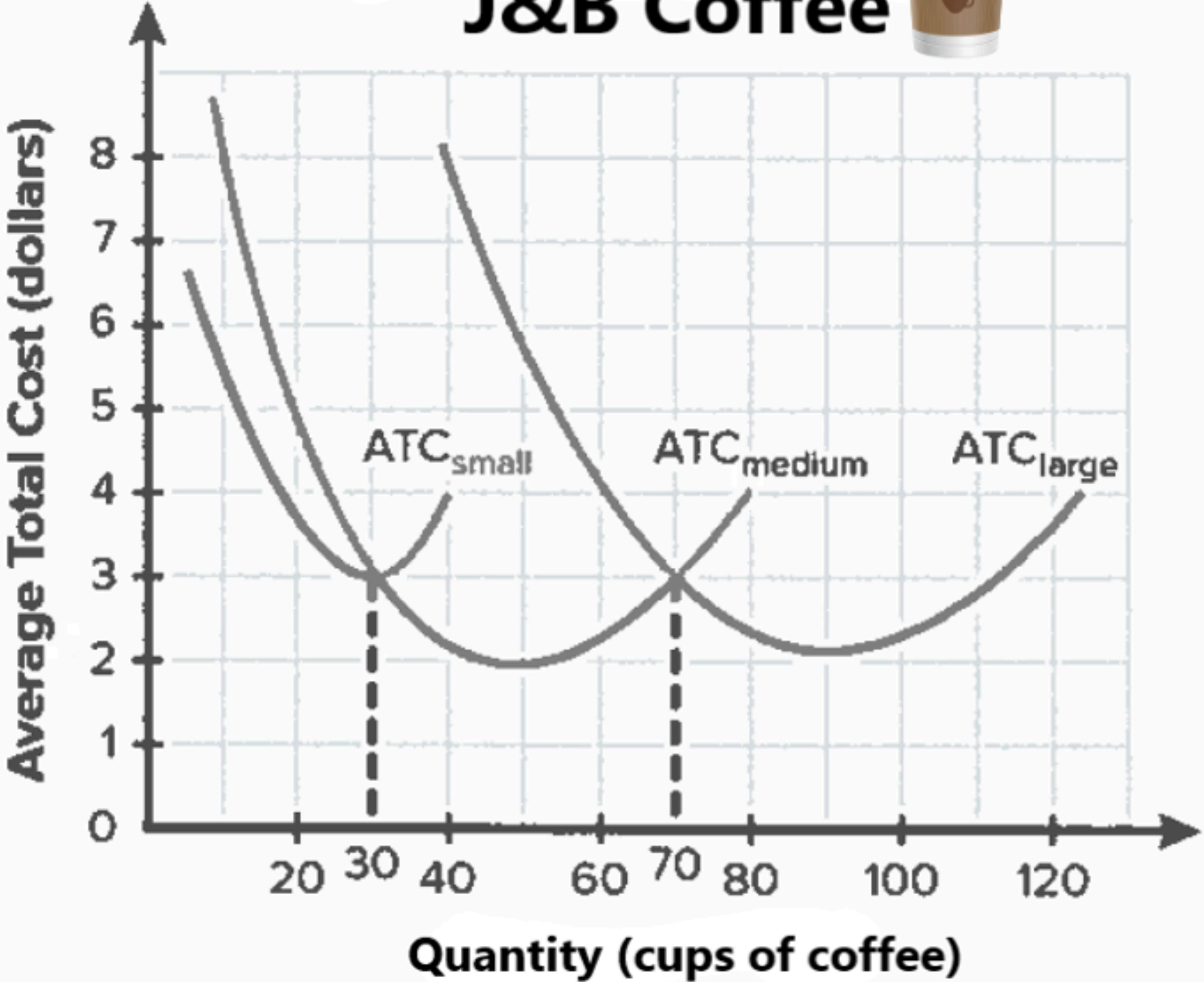
# J&B Coffee



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# Economies & Diseconomies of Scale

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- **Economies of Scale**

- Long-run ATC falls as quantity of output increases.
- Getting more and more out of their output.

- **Diseconomies of Scale**

- Long-run ATC rises as quantity of output increases.

- **Constant Returns to Scale**

- Long run ATC stays say as quantity of output rises.

# Economies of Scale



- Economies of scale occur because higher production levels allow for greater specialization among workers.
- Ex: If Ford can hire a lot of workers and produces a lot of cars, it can reduce costs using modern assembly-line production.
- More and more workers (to a point) allows everyone to do what they are best at. There's specialization & gains from trade within a firm!

# Diseconomies of Scale

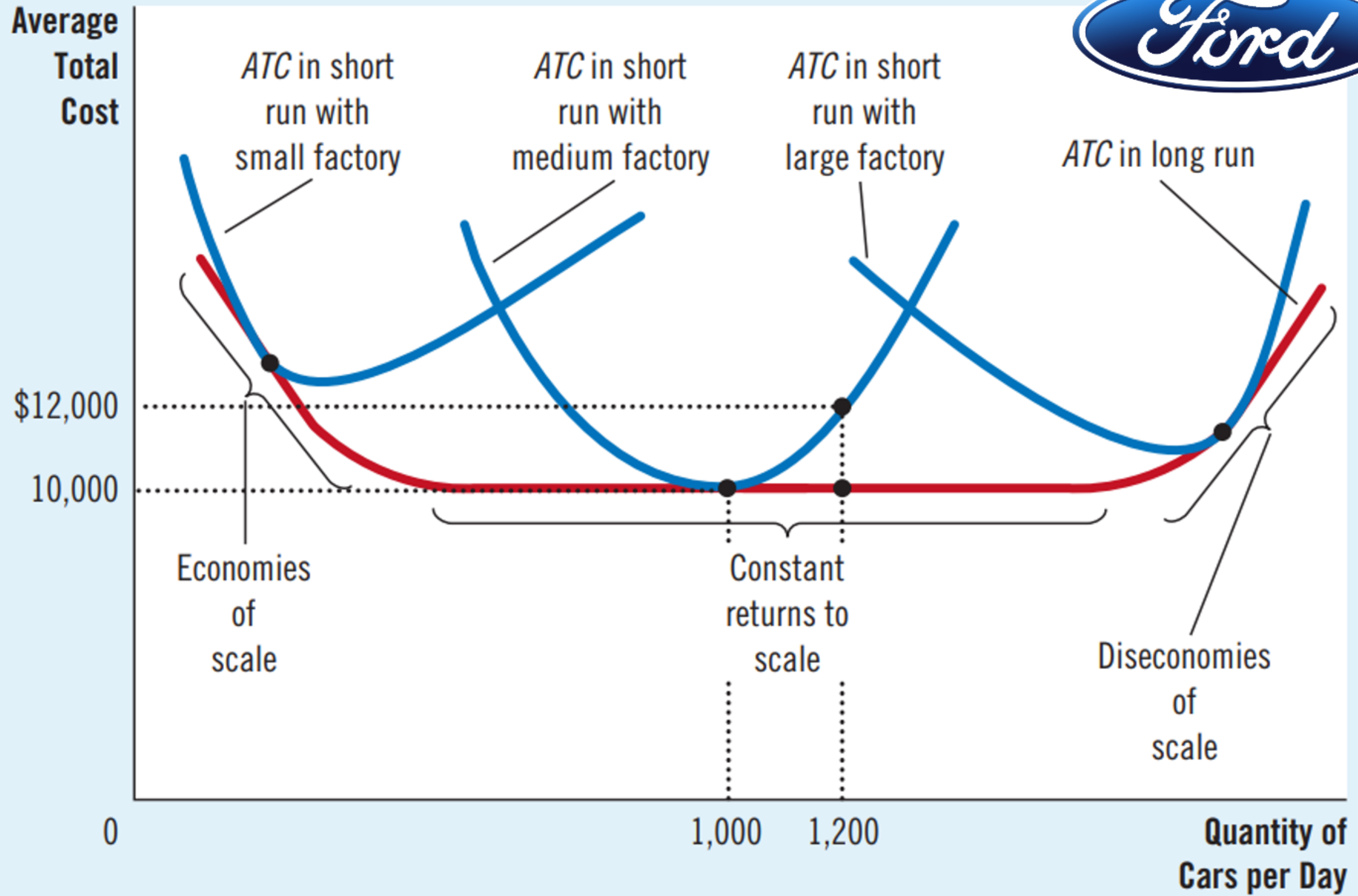


- Diseconomies of scale occur because of coordination problems.
  - Ex: The more cars Ford produces, the more stretched the management team becomes, and the less effective the managers become at keeping costs down.
- These concepts help us understand the nature of long-run costs...

# Production Over Time

# ATC is “U-Shaped”

- Long-run ATC is falling at low levels of production but rising at high levels of production.



# Production Over Time

- All production takes place over some time period. Therefore, all expressions of output levels and cost concepts, necessarily, are expressed according to some time period.
- The Short-Run is the period during which one or more resources (and thus one or more cost of production) cannot be changed.
- The Long-Run is the period during which all resources (and thus all costs of production) can be changed.

# Short-Run Costs of Production

- Fixed Costs do not vary with the level of output.
- Variable Costs do vary with the level of output.
- In the short-run, there are both ***fixed & variable*** costs.
  - One or more inputs cannot change in the short-run. Those costs are ***fixed***.

# Long-Run Costs of Production


- In the long-run, ALL costs are variable costs.
- Economies of scale are **cost savings** that technology allows when all resource inputs are increased together.
- Diseconomies of scale are **added costs** that, beyond some point, accompany the expansion of production using more of all inputs.

<b>Term</b>	<b>Definition</b>	<b>Mathematical Description</b>
Explicit costs	Costs that require an outlay of money by the firm	
Implicit costs	Costs that do not require an outlay of money by the firm	
Fixed costs	Costs that do not vary with the quantity of output produced	$FC$
Variable costs	Costs that vary with the quantity of output produced	$VC$
Total cost	The market value of all the inputs that a firm uses in production	$TC = FC + VC$
Average fixed cost	Fixed cost divided by the quantity of output	$AFC = FC/Q$
Average variable cost	Variable cost divided by the quantity of output	$AVC = VC/Q$
Average total cost	Total cost divided by the quantity of output	$ATC = TC/Q$
Marginal cost	The increase in total cost that arises from an extra unit of production	$MC = \Delta TC / \Delta Q$

**Practice!**




In the long run...

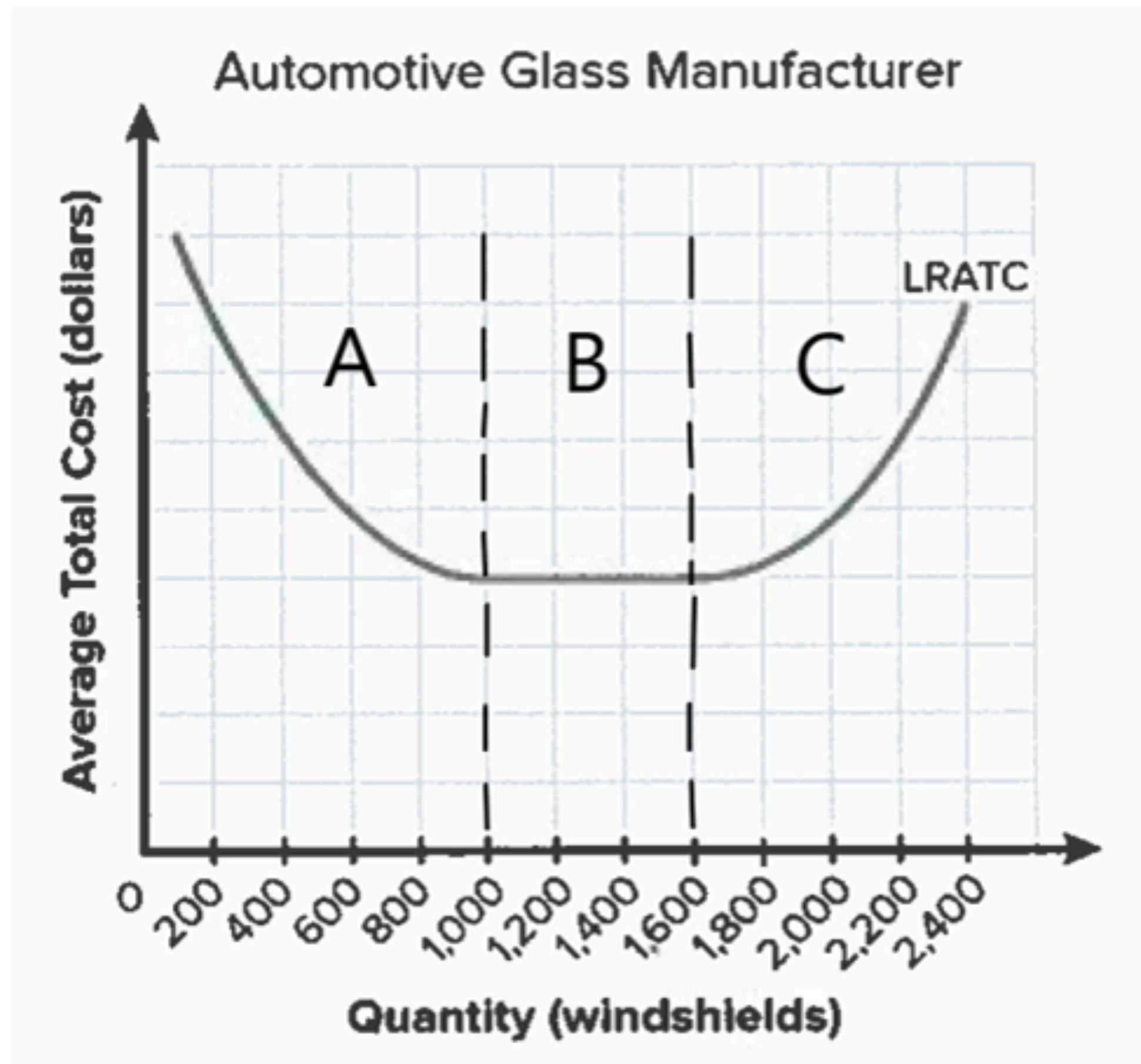
- a. inputs that were fixed in the short run remain fixed.
  - b. inputs that were fixed in the short run become variable.
  - c. inputs that were variable in the short run become fixed.
  - d. variable inputs are rarely used.
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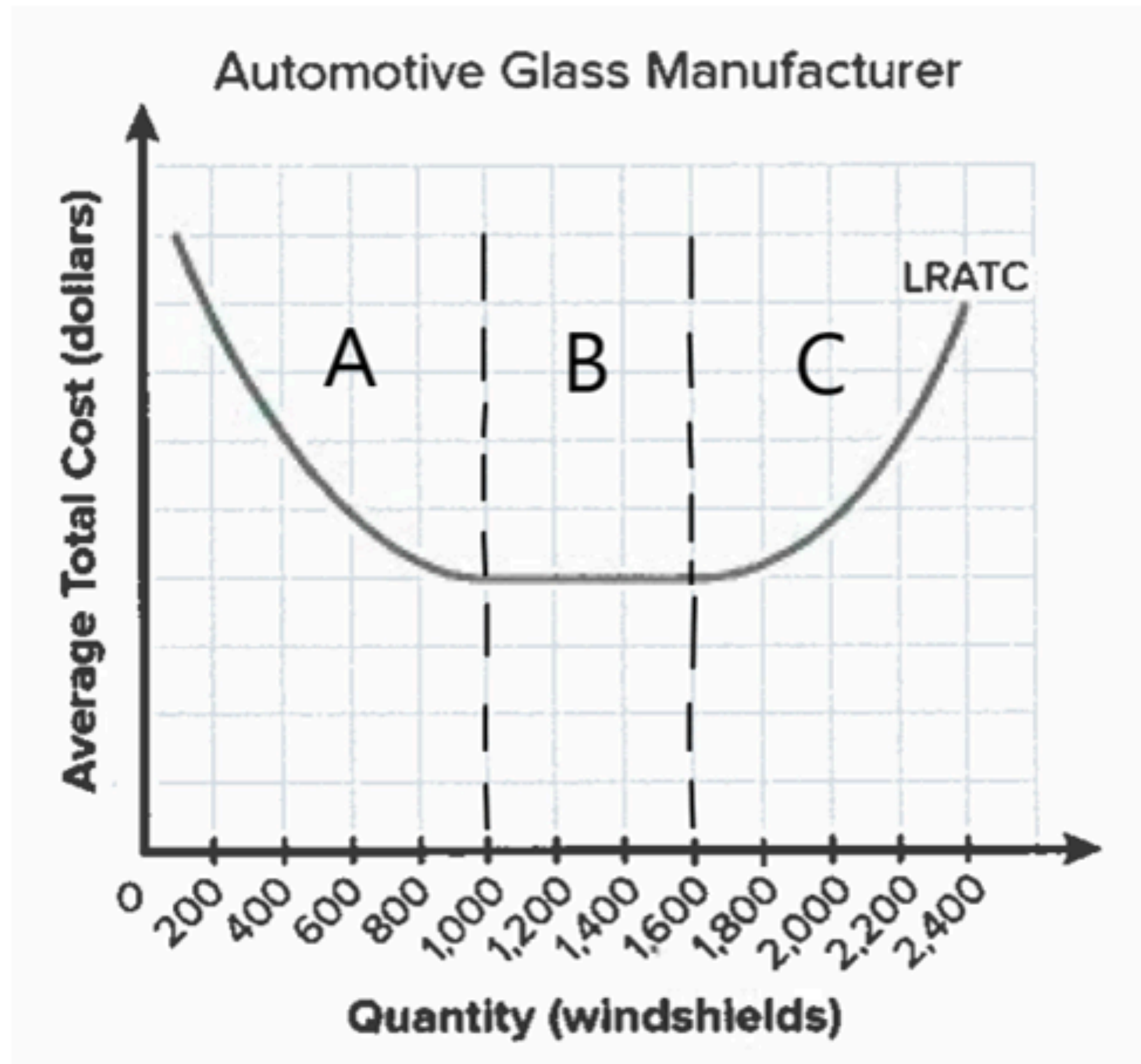
**Figure 1**



Refer to Figure 1 above: In which area does the firm exhibit economies of scale?

- a. A
- b. B
- c. C
- d. All of the above.

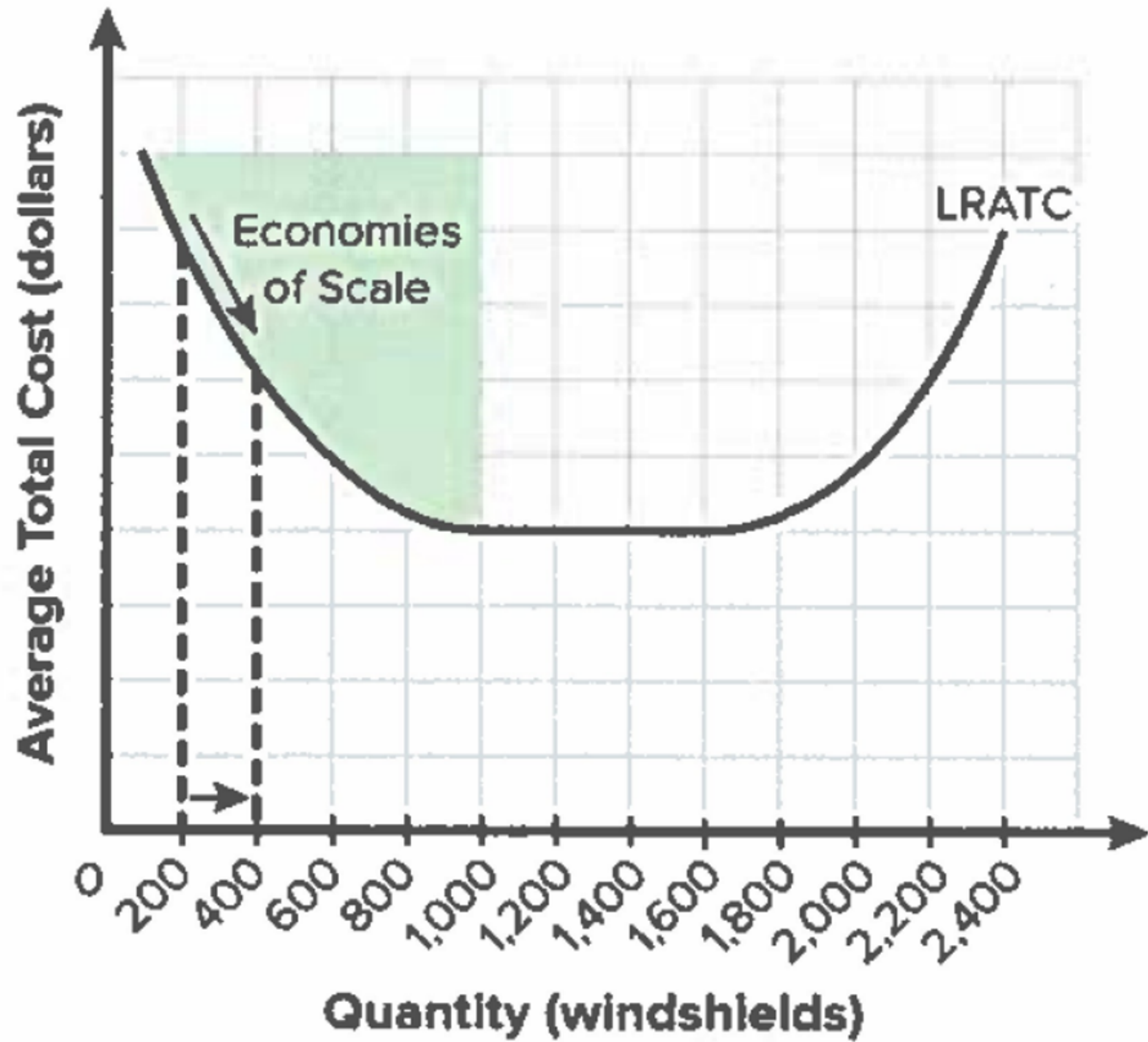
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# Automotive Glass Manufacturer





Economies of scale occur when...

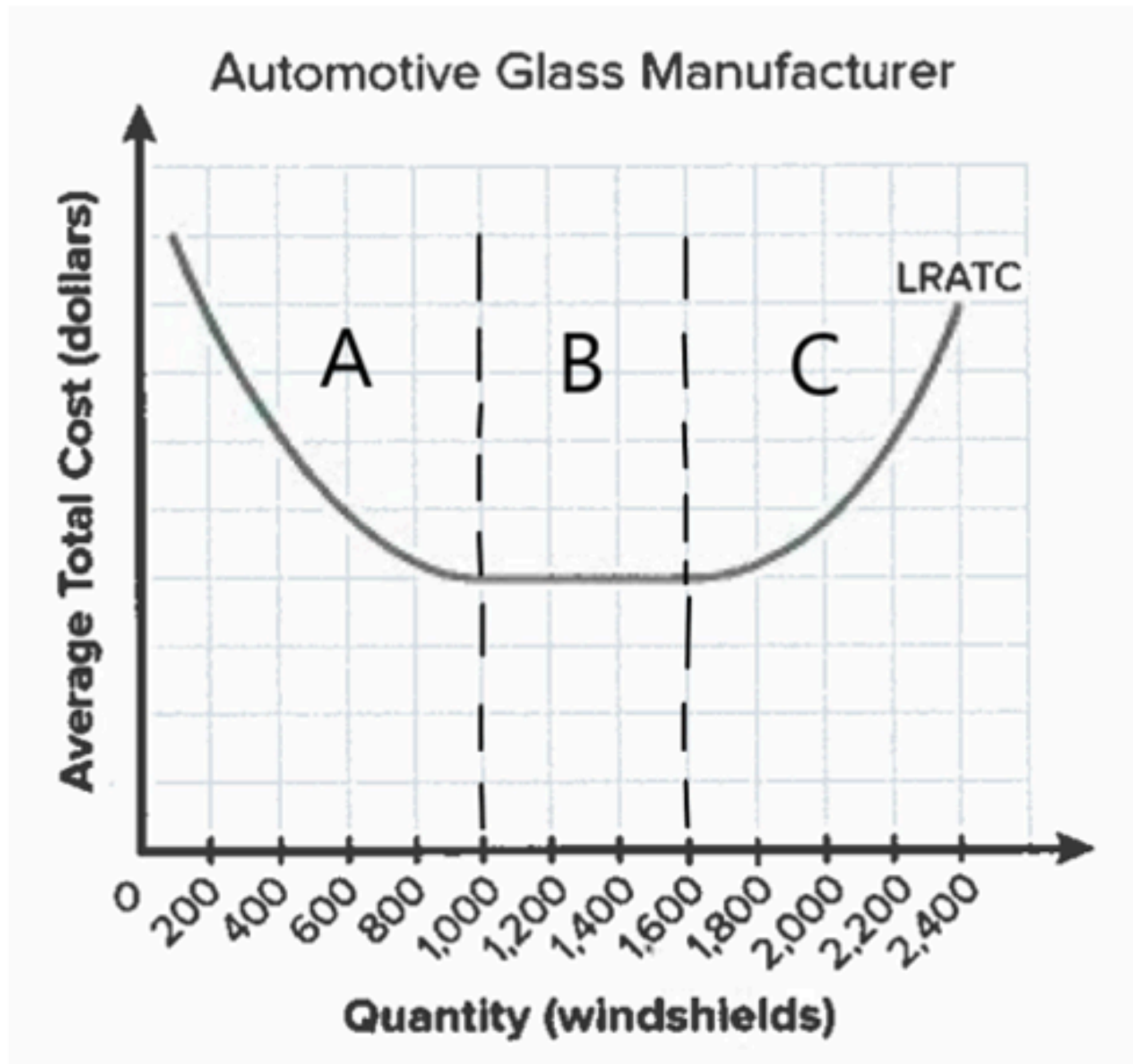
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  - c. average fixed costs are falling.
  - d. average fixed costs are constant.
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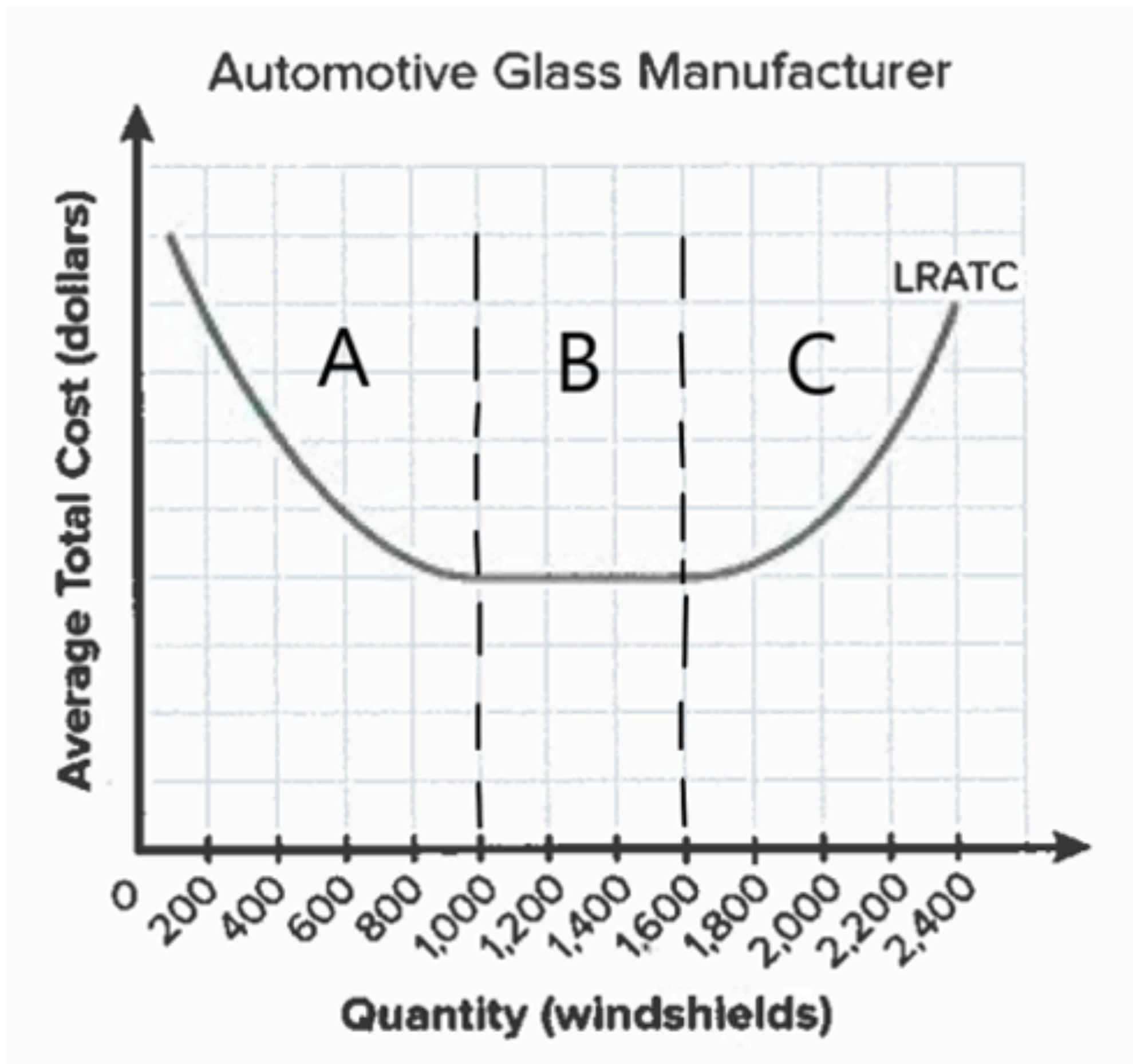
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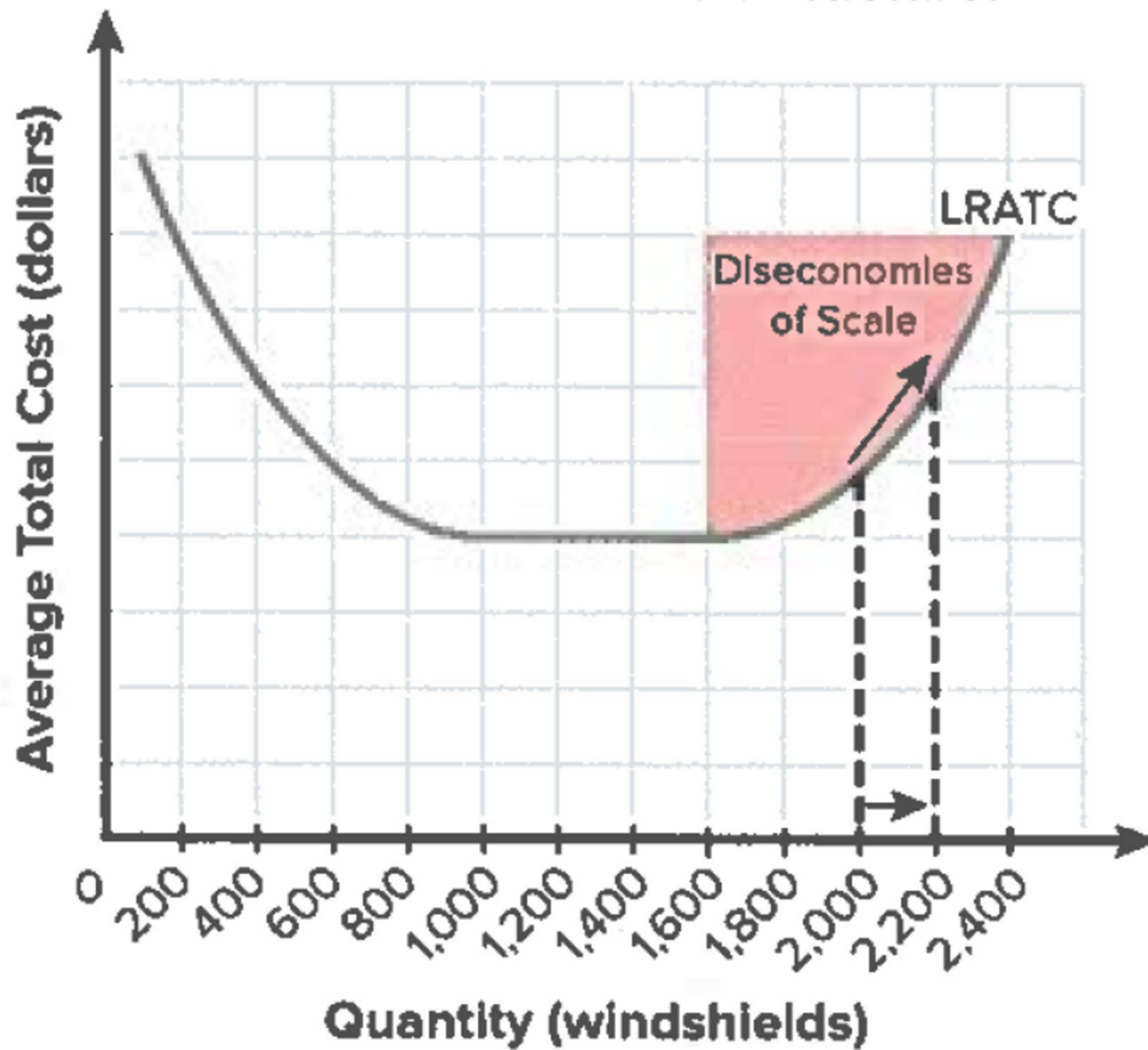
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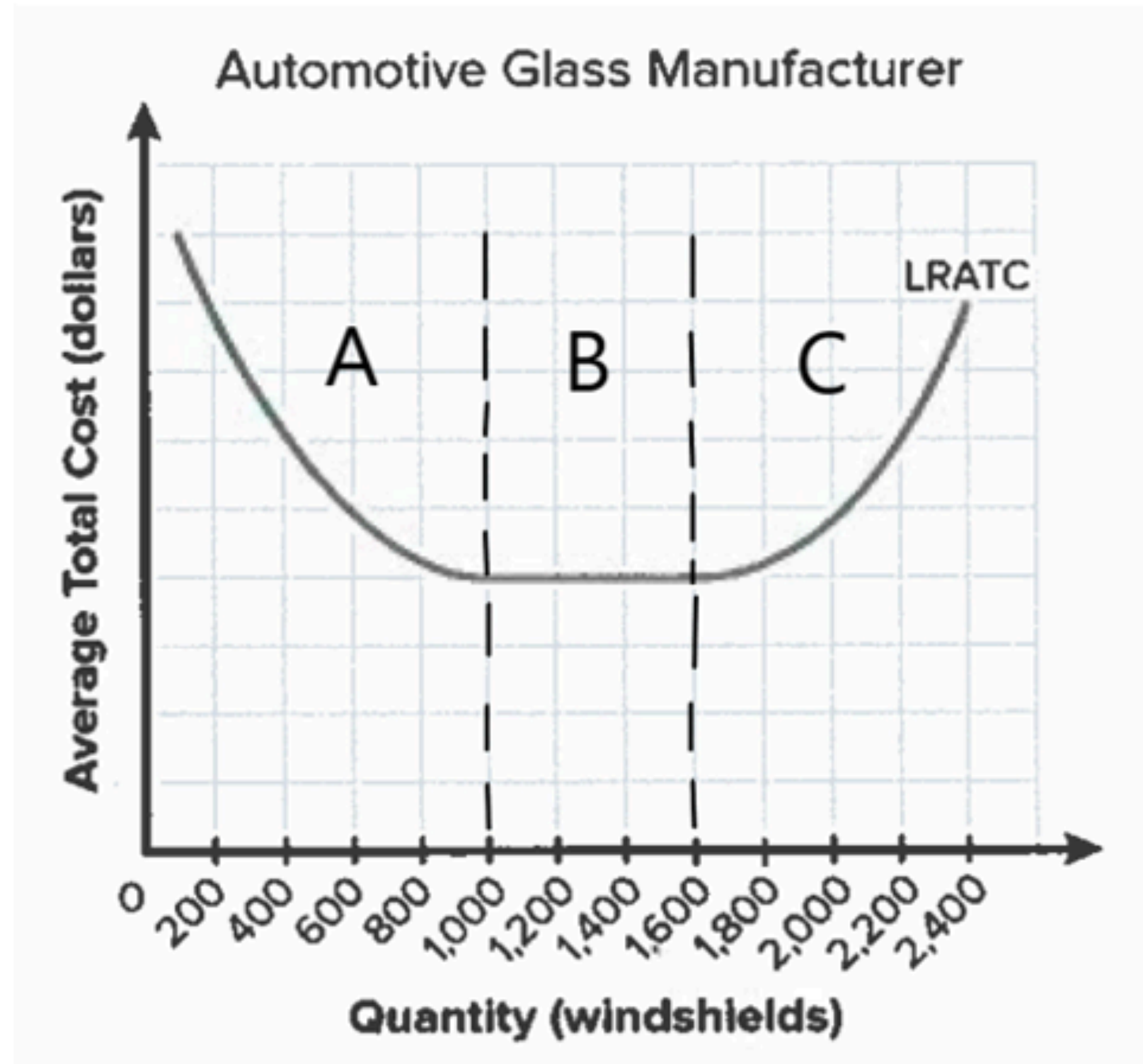
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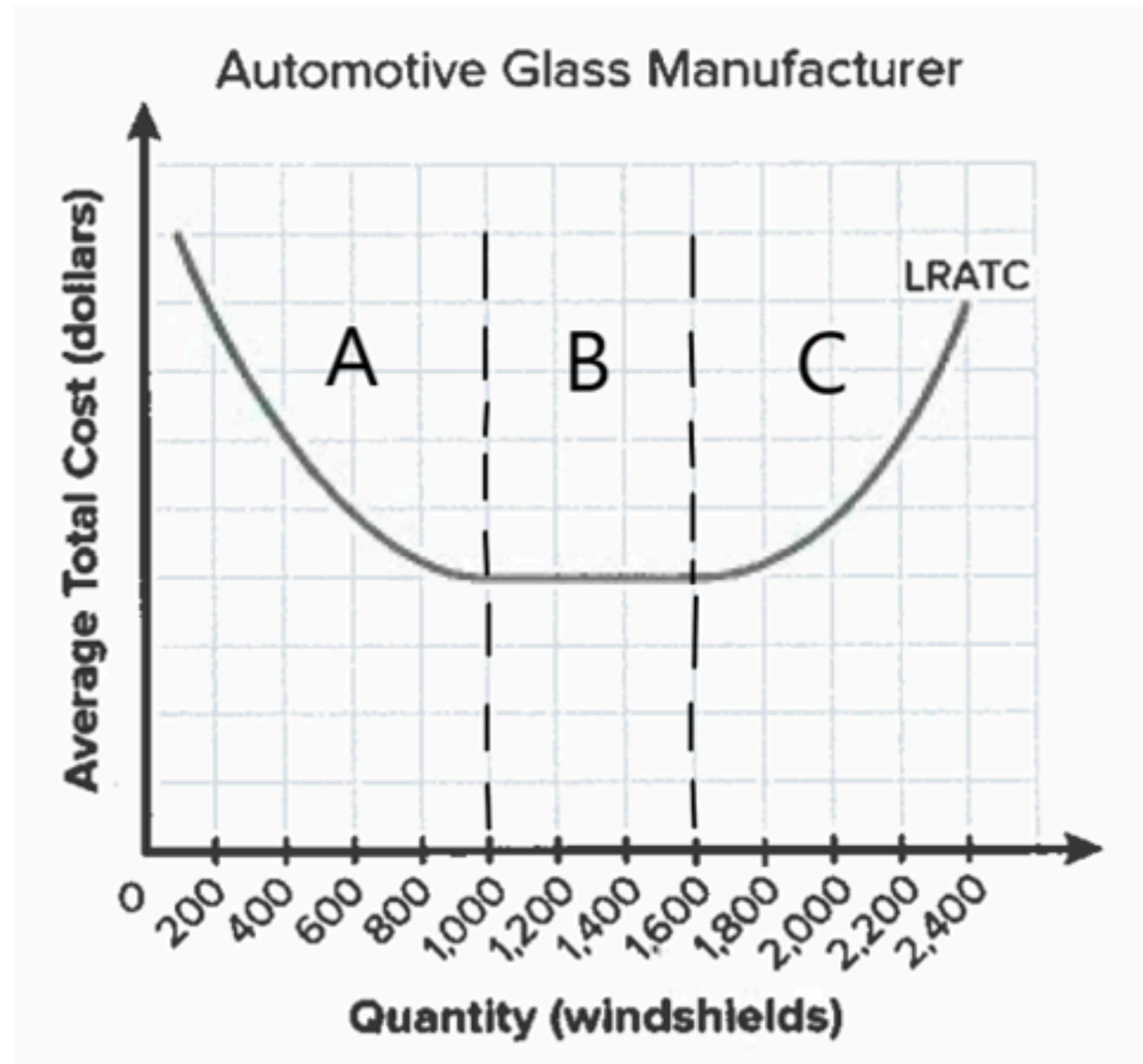
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Refer to Figure 1 above: In which area does the firm exhibit constant returns of scale?

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- b. B
- c. C
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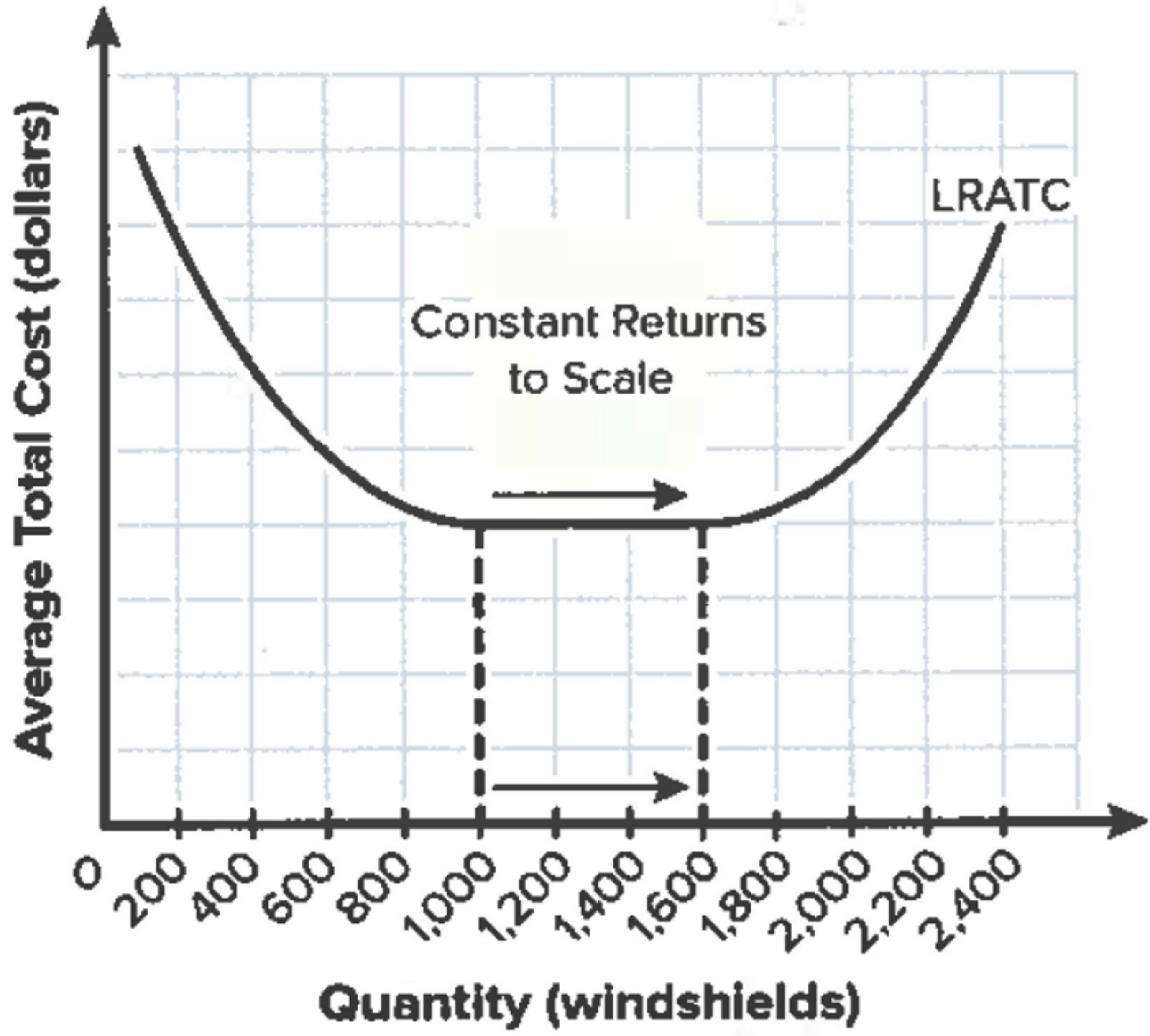
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# Automotive Glass Manufacturer



So what?

# Why Do Firms Exist?

- **Transaction Costs!**
  - Some costs are too costly to undertake alone (search & information, bargaining).
  - Firms emerge to minimize transaction costs & help bring goods to the market.
- Firms deal with the cost over both short- & long-time horizons.
- Firms tend to be efficient at weighing benefits & costs.

# Producing to Maximize Profit

- Production is typically not an end in itself and managers generally attempt to maximize profits.
- Other motivations (fulfillment, charity, etc.) may impinge on the profit motive.
- Firms that don't seek to maximize profits risk being outcompeted by other firms.

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# Producing to Maximize Profit

- **Marginal Revenue** is the additional revenue that a firm acquires by selling another unit of output.
- Profit-maximizing firms will continue to produce and sell more units when **MR > MC**.
- Just like Average Costs, there are short- & long-run implications.
- We will get started with this idea next class.

**Thanks for your attention!**  
**End of class.**