

Lecture 9: Costs

October 27, 2026

Course Administration

- ① Problem Set 8 posted
- ② Achieve for Chapter 7 posted; optional
- ③ Midterm: Come see me if grade < 62
 - See syllabus page on website
 - Search for “scheduler”

Course Administration

- ① Problem Set 8 posted
- ② Achieve for Chapter 7 posted; optional
- ③ Midterm: Come see me if grade < 62
 - See syllabus page on website
 - Search for “scheduler”
- ④ Quiz 2: Lecture 12, Nov. 17
- ⑤ Final exam
 - Tuesday Dec. 15: PHIL 108 **3 to 5**, or MON 250 **5:20 to 7:20**
 - If you need a DSS exam, request it now!

Course Administration

- ① Problem Set 8 posted
- ② Achieve for Chapter 7 posted; optional
- ③ Midterm: Come see me if grade < 62
 - See syllabus page on website
 - Search for “scheduler”
- ④ Quiz 2: Lecture 12, Nov. 17
- ⑤ Final exam
 - Tuesday Dec. 15: PHIL 108 **3 to 5**, or MON 250 **5:20 to 7:20**
 - If you need a DSS exam, request it now!
- ⑥ Today: Second of five supply lectures
- ⑦ Any questions?

Midterm Results Distribution

Score	Both	Afternoon	Evening
20-29	2	2	0
30-39	1	1	0
40-49	7	1	6
50-59	4	1	3
60-69	6	3	3
70-79	5	3	2
80-89	14	7	7
90-100	4	2	2
N	43	20	23
Mean	69.1	70.5	67.8
Std. dev.	20.0	22.0	18.4

Curved grades

Grade	Score is		Exams
	>	≤	
A	85	100	13
A-	75	85	7
B+	70	75	3
B	63	70	5
B-	58	63	1
C+	50	58	4
C	45	50	6
C-	40	45	1
D+	35	40	1
D	30	35	0
D-	25	30	2

Looking Forward

- If you are on the border of a letter grade, I round up
- If you got an A and are willing to volunteer to help a student, send me an email
- If you got a B or below and would like help from a student volunteer, send me an email

Next Week: Ripped from the Headlines

Send article by Wednesday midnight.

Afternoon

Finder	Presenter
Ali W.	Tom E.
Beylie I.	Kendell Y.
Toni W.	Bridget V.

Evening

Finder	Presenter
Ben J.	Devan K.
Emma L.	Fatima Y.
Emily S.	

This Week: Ripped from the Headlines

Afternoon

Finder	Presenter	Summarizer
Tom E.	Sydney W.	Jimmy
Liz T.	Kordiea R.	Emily M.

Evening

Finder	Presenter	Summarizer
Nicole-Ant.	Zoey F.	Sydney C.
.	Karolina H.	Sophia E.
Zoey F.	Olivia F.	Fatima Y.

Costs

- ① Why policymakers should care about costs
- ② Accounting and opportunity costs
- ③ Fixed and variable costs
- ④ Sunk costs
- ④ Average and marginal costs
- ⑤ Short and long run costs
- ⑥ (maybe) Economies of scale, returns to scale, returns to scope

Costs and Policymakers

Why Should Policymakers Care About Firm Costs?

- Shape of supply cost function determine economies of scale

Why Should Policymakers Care About Firm Costs?

- Shape of supply cost function determine economies of scale
 - big investment in mRNA covid vaccines and infrastructure
 - invest in a few big firms, or many little ones?
 - depends upon returns to scale

Why Should Policymakers Care About Firm Costs?

- Shape of supply cost function determine economies of scale
 - big investment in mRNA covid vaccines and infrastructure
 - invest in a few big firms, or many little ones?
 - depends upon returns to scale
- Input costs drive firm behavior

Why Should Policymakers Care About Firm Costs?

- Shape of supply cost function determine economies of scale
 - big investment in mRNA covid vaccines and infrastructure
 - invest in a few big firms, or many little ones?
 - depends upon returns to scale
- Input costs drive firm behavior
 - government wants green wind power
 - but infeasibly expensive due to landowner opposition and transmission line costs

Why Should Policymakers Care About Firm Costs?

- Shape of supply cost function determine economies of scale
 - big investment in mRNA covid vaccines and infrastructure
 - invest in a few big firms, or many little ones?
 - depends upon returns to scale
- Input costs drive firm behavior
 - government wants green wind power
 - but infeasibly expensive due to landowner opposition and transmission line costs
- Government policy can modify input costs

Why Should Policymakers Care About Firm Costs?

- Shape of supply cost function determine economies of scale
 - big investment in mRNA covid vaccines and infrastructure
 - invest in a few big firms, or many little ones?
 - depends upon returns to scale
- Input costs drive firm behavior
 - government wants green wind power
 - but infeasibly expensive due to landowner opposition and transmission line costs
- Government policy can modify input costs
 - Biden subsidies for computer chip industry
 - Trump tariffs

Why Should Policymakers Care About Firm Costs?

- Shape of supply cost function determine economies of scale
 - big investment in mRNA covid vaccines and infrastructure
 - invest in a few big firms, or many little ones?
 - depends upon returns to scale
- Input costs drive firm behavior
 - government wants green wind power
 - but infeasibly expensive due to landowner opposition and transmission line costs
- Government policy can modify input costs
 - Biden subsidies for computer chip industry
 - Trump tariffs → push investment into new industries

Why Should Policymakers Care About Firm Costs?

- Shape of supply cost function determine economies of scale
 - big investment in mRNA covid vaccines and infrastructure
 - invest in a few big firms, or many little ones?
 - depends upon returns to scale
- Input costs drive firm behavior
 - government wants green wind power
 - but infeasibly expensive due to landowner opposition and transmission line costs
- Government policy can modify input costs
 - Biden subsidies for computer chip industry
 - Trump tariffs → push investment into new industries
- Government is frequently a producer itself

Why Should Policymakers Care About Firm Costs?

- Shape of supply cost function determine economies of scale
 - big investment in mRNA covid vaccines and infrastructure
 - invest in a few big firms, or many little ones?
 - depends upon returns to scale
- Input costs drive firm behavior
 - government wants green wind power
 - but infeasibly expensive due to landowner opposition and transmission line costs
- Government policy can modify input costs
 - Biden subsidies for computer chip industry
 - Trump tariffs → push investment into new industries
- Government is frequently a producer itself
 - what's the right mix of labor and capital to provide SNAP food assistance?

Economic Costs vs. Accounting Costs

Economic Costs vs. Accounting Costs

- Accounting cost $\equiv$ direct cost
- Opportunity cost $\equiv$ cost of what you give up by using an input
 - Perhaps most easily thought of as next best opportunity for funds
 - What's the opportunity cost of pursuing a MPP?

Economic Costs vs. Accounting Costs

- Accounting cost $\equiv$ direct cost
- Opportunity cost $\equiv$ cost of what you give up by using an input
 - Perhaps most easily thought of as next best opportunity for funds
 - What's the opportunity cost of pursuing a MPP?
 - Give an opportunity cost example

Economic Costs vs. Accounting Costs

- Accounting cost $\equiv$ direct cost
- Opportunity cost $\equiv$ cost of what you give up by using an input
 - Perhaps most easily thought of as next best opportunity for funds
 - What's the opportunity cost of pursuing a MPP?
 - Give an opportunity cost example

Economic cost $\equiv$ accounting cost + opportunity cost

Opportunity Costs and Rent Control

- Rent control: City A decides to limit rent increases for newly constructed units
- With rent control, developers can still profit renting new apartments in City A
- Why might they avoid City A?

Opportunity Costs and Rent Control

- Rent control: City A decides to limit rent increases for newly constructed units
- With rent control, developers can still profit renting new apartments in City A
- Why might they avoid City A?
- They can make more money in City B!
- Opportunity cost of funds in City A is too high
 - OC: “value of what a producer gives up using an input”
 - using money in City A means you can't use it in City B

Opportunity Costs and Rent Control

- Rent control: City A decides to limit rent increases for newly constructed units
- With rent control, developers can still profit renting new apartments in City A
- Why might they avoid City A?
- They can make more money in City B!
- Opportunity cost of funds in City A is too high
 - OC: “value of what a producer gives up using an input”
 - using money in City A means you can't use it in City B

Opportunity Costs and Rent Control

- Rent control: City A decides to limit rent increases for newly constructed units
- With rent control, developers can still profit renting new apartments in City A
- Why might they avoid City A?
- They can make more money in City B!
- Opportunity cost of funds in City A is too high
 - OC: “value of what a producer gives up using an input”
 - using money in City A means you can't use it in City B

→ Considering only accounting costs leads to wrong conclusion about policy outcome

Opportunity Costs in Government

Newsletters

The Atlantic

IDEAS

Buses Shouldn't Be Free

The push for fareless transit is downstream of a larger failure: American urban elected officials have struggled to improve government services, especially infrastructure development.

By Jerusalem Demsas



- Late 2022 DC council considered making WMATA buses free in the city
- Argues that transit riders care more about service than cost
- Cutting fares has an opportunity cost – what is it?

Opportunity Costs in Government

Newsletters

The Atlantic

IDEAS

Buses Shouldn't Be Free

The push for fareless transit is downstream of a larger failure: American urban elected officials have struggled to improve government services, especially infrastructure development.

By Jerusalem Demsas



- Late 2022 DC council considered making WMATA buses free in the city
- Argues that transit riders care more about service than cost
- Cutting fares has an opportunity cost – what is it?
- “Focusing on zero-dollar rides is like overseeing a library system stocked solely with out-of-date self-help books in crumbling buildings and wondering if a fresh coat of paint will improve morale.”

“Buses Shouldn't Be Free,” *The Atlantic*, December 9, 2022. [\[link\]](#)

Opportunity Costs in Government

Newsletters

The Atlantic

IDEAS

Buses Shouldn't Be Free

The push for fareless transit is downstream of a larger failure: American urban elected officials have struggled to improve government services, especially infrastructure development.

By Jerusalem Demsas



- Late 2022 DC council considered making WMATA buses free in the city
- Argues that transit riders care more about service than cost
- Cutting fares has an opportunity cost – what is it?
- “Focusing on zero-dollar rides is like overseeing a library system stocked solely with out-of-date self-help books in crumbling buildings and wondering if a fresh coat of paint will improve morale.”

“Buses Shouldn't Be Free,” *The Atlantic*, December 9, 2022. [\[link\]](#)

→ Take opportunity costs into account in decisionmaking

Fixed and Variable Costs

Types of Cost

- Fixed costs $\equiv$ costs that do not depend on how much output the firm produces
- Variable costs $\equiv$ costs that do vary with the firm's output

Types of Cost

- Fixed costs $\equiv$ costs that do not depend on how much output the firm produces
- Variable costs $\equiv$ costs that do vary with the firm's output

$$\text{total cost} = \text{fixed cost} + \text{variable costs}$$

What Determines Whether the Cost is Fixed or Variable?

Time Horizon

- Many things are fixed in the short run
- Nothing is fixed in the long run

What Determines Whether the Cost is Fixed or Variable?

Time Horizon

- Many things are fixed in the short run
- Nothing is fixed in the long run

Other Factors

- Active rental markets can turn fixed costs into variable costs
- Long-run labor contracts can make labor a fixed, rather than variable cost

3 Key Cost Curves

By definition,

total cost = fixed cost + variable cost

or

$$TC = FC + VC$$

3 Key Cost Curves

By definition,

total cost = fixed cost + variable cost

or

$$TC = FC + VC$$

How does each of these change with Q ?

- Total cost
- Fixed cost
- Variable cost

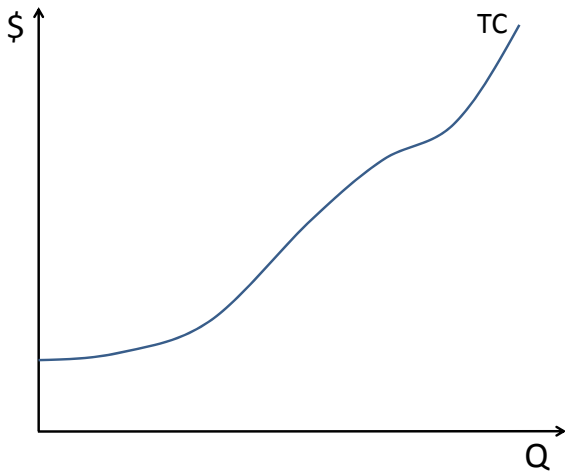
Drawing TC, FC and VC

What Does the Total Cost Curve Look Like?



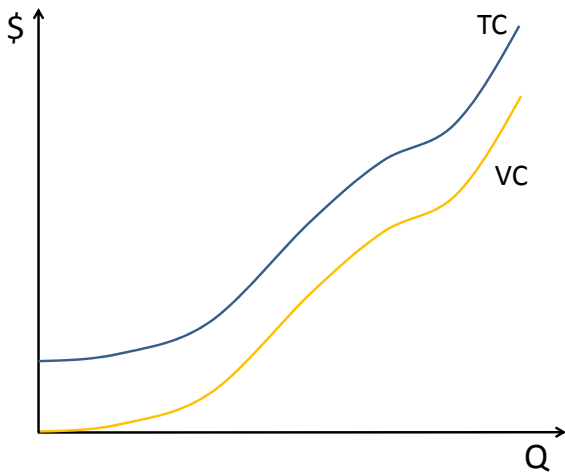
Drawing TC, FC and VC

What About the Variable Cost Curve?



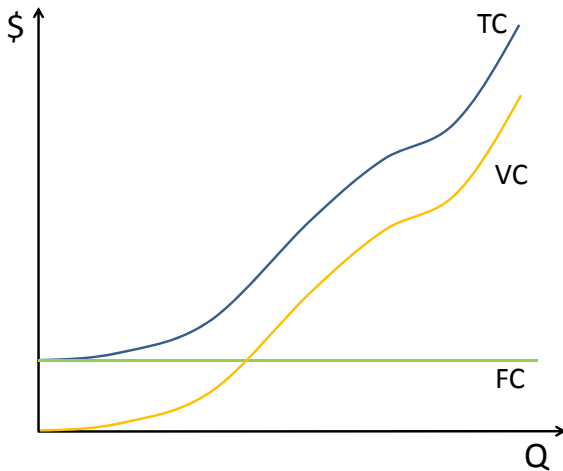
Drawing TC, FC and VC

And the Fixed Cost Curve?



Drawing TC, FC and VC

Everyone, Together



Subset of Fixed Costs: Sunk Costs

Defining Sunk Costs

- Firm has some fixed costs
- If the firm went bankrupt, some of those costs could be recovered
 - recovered = exchanged for cash

Defining Sunk Costs

- Firm has some fixed costs
- If the firm went bankrupt, some of those costs could be recovered
 - recovered = exchanged for cash
- The non-recoverable part of the fixed costs are sunk costs
- Examples?

Now that the Costs are Sunk

- When costs are sunk, they should not enter into future business decisions
- Making decisions based on sunk costs is known as the “sunk cost fallacy”
- Decisions should be forward-looking: sunk costs are gone

Waterworld and Sunk Costs

Or Iraq/Afghanistan Invasion and Sunk Costs, If You Prefer

Mo.	Ex. Rev.	Costs			Ex. Profit	
		Total	Sunk	Addt'l	Continue	No Prod.
June	150	-100	-16	-84	50	-16



^aTwo good listens on this topics are a Freakonomics [podcast](#) and a Planet Money [transcript/podcast](#).

Waterworld and Sunk Costs

Or Iraq/Afghanistan Invasion and Sunk Costs, If You Prefer

Mo.	Ex. Rev.	Costs			Ex. Profit	
		Total	Sunk	Addt'l	Continue	No Prod.
June	150	-100	-16	-84	50	-16

- June: Ex. Profit > 0 , clearly should go ahead.



^aTwo good listens on this topics are a Freakonomics [podcast](#) and a Planet Money [transcript/podcast](#).

Waterworld and Sunk Costs

Or Iraq/Afghanistan Invasion and Sunk Costs, If You Prefer

Mo.	Ex. Rev.	Costs			Ex. Profit	
		Total	Sunk	Addt'l	Continue	No Prod.
June	150	-100	-16	-84	50	-16
Sept.	150	-140	-100	-40	10	-100

- June: Ex. Profit > 0 , clearly should go ahead.



^aTwo good listens on this topics are a Freakonomics [podcast](#) and a Planet Money [transcript/podcast](#).

Waterworld and Sunk Costs

Or Iraq/Afghanistan Invasion and Sunk Costs, If You Prefer

Mo.	Ex. Rev.	Costs			Ex. Profit	
		Total	Sunk	Addt'l	Continue	No Prod.
June	150	-100	-16	-84	50	-16
Sept.	150	-140	-100	-40	10	-100



- June: Ex. Profit > 0 , clearly should go ahead.
- Sept.: Ex. Profit still > 0 .

^aTwo good listens on this topics are a Freakonomics [podcast](#) and a Planet Money [transcript/podcast](#).

Waterworld and Sunk Costs

Or Iraq/Afghanistan Invasion and Sunk Costs, If You Prefer

Mo.	Ex. Rev.	Costs			Ex. Profit	
		Total	Sunk	Addt'l	Continue	No Prod.
June	150	-100	-16	-84	50	-16
Sept.	150	-140	-100	-40	10	-100
Dec.	150	-175	-140	-25	-25	-140

- June: Ex. Profit > 0 , clearly should go ahead.
- Sept.: Ex. Profit still > 0 .



^aTwo good listens on this topics are a Freakonomics [podcast](#) and a Planet Money [transcript/podcast](#).

Waterworld and Sunk Costs

Or Iraq/Afghanistan Invasion and Sunk Costs, If You Prefer

Mo.	Ex. Rev.	Costs			Ex. Profit	
		Total	Sunk	Addt'l	Continue	No Prod.
June	150	-100	-16	-84	50	-16
Sept.	150	-140	-100	-40	10	-100
Dec.	150	-175	-140	-25	-25	-140



- June: Ex. Profit > 0 , clearly should go ahead.
- Sept.: Ex. Profit still > 0 .
- Dec.: Ex. Profit < 0 . Halt production? No, because alternative is loss of 140.^a

^aTwo good listens on this topics are a Freakonomics [podcast](#) and a Planet Money [transcript/podcast](#).

Waterworld and Sunk Costs

Or Iraq/Afghanistan Invasion and Sunk Costs, If You Prefer

Mo.	Ex. Rev.	Costs			Ex. Profit	
		Total	Sunk	Addt'l	Continue	No Prod.
June	150	-100	-16	-84	50	-16
Sept.	150	-140	-100	-40	10	-100
Dec.	150	-175	-140	-25	-25	-140



- June: Ex. Profit > 0 , clearly should go ahead.
- Sept.: Ex. Profit still > 0 .
- Dec.: Ex. Profit < 0 . Halt production? No, because alternative is loss of 140.^a

^aTwo good listens on this topics are a Freakonomics [podcast](#) and a Planet Money [transcript/podcast](#).

→ **Do not take sunk costs into account in decisionmaking**

Average and Marginal Costs

Going from Total to Average

Remember

$$TC = FC + VC$$

Going from Total to Average

Remember

$$TC = FC + VC$$

If the firm produces Q , how do we find average total cost?

Going from Total to Average

Remember

$$TC = FC + VC$$

If the firm produces Q , how do we find average total cost?

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

Going from Total to Average

Remember

$$TC = FC + VC$$

If the firm produces Q , how do we find average total cost?

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

Therefore

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

Going from Total to Average

Remember

$$TC = FC + VC$$

If the firm produces Q , how do we find average total cost?

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

Therefore

$$ATC = \frac{TC}{Q} = \frac{FC + VC}{Q}$$

Going from Total to Average

Remember

$$TC = FC + VC$$

If the firm produces Q , how do we find average total cost?

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

Therefore

$$ATC = \frac{TC}{Q} = \frac{FC + VC}{Q} = \frac{FC}{Q} + \frac{VC}{Q}$$

Going from Total to Average

Remember

$$TC = FC + VC$$

If the firm produces Q , how do we find average total cost?

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

Therefore

$$ATC = \frac{TC}{Q} = \frac{FC + VC}{Q} = \frac{FC}{Q} + \frac{VC}{Q}$$

- Average total costs: $ATC = \frac{TC}{Q}$
- Average fixed costs: $AFC = \frac{FC}{Q}$
- Average variable costs: $AVC = \frac{VC}{Q}$

Average Costs

Definitions

- Average total costs: $ATC = \frac{TC}{Q}$
- Average fixed costs: $AFC = \frac{FC}{Q}$
- Average variable costs: $AVC = \frac{VC}{Q}$

What about the shapes?

- AFC

Average Costs

Definitions

- Average total costs: $ATC = \frac{TC}{Q}$
- Average fixed costs: $AFC = \frac{FC}{Q}$
- Average variable costs: $AVC = \frac{VC}{Q}$

What about the shapes?

- AFC
- AVC – remember the law of diminishing returns

Average Costs

Definitions

- Average total costs: $ATC = \frac{TC}{Q}$
- Average fixed costs: $AFC = \frac{FC}{Q}$
- Average variable costs: $AVC = \frac{VC}{Q}$

What about the shapes?

- AFC
- AVC – remember the law of diminishing returns
- ATC

Note that because there are fixed costs, this must be the short run.

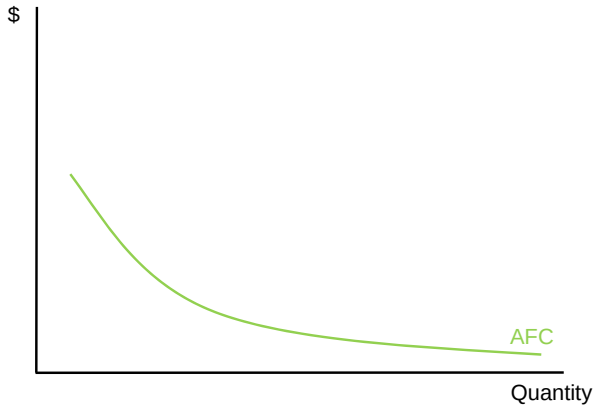
Average Costs in Pictures

What Does Average Fixed Cost Look Like?



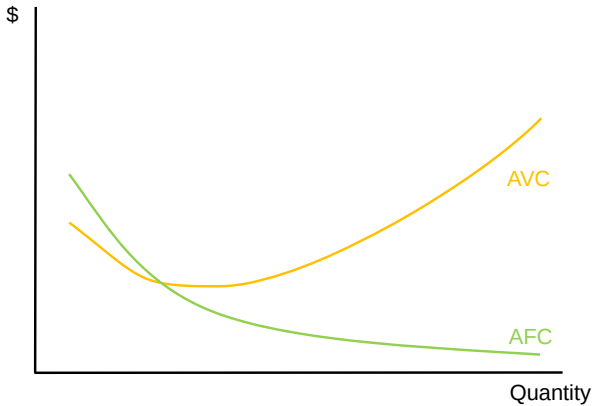
Average Costs in Pictures

What About Average Variable Costs?



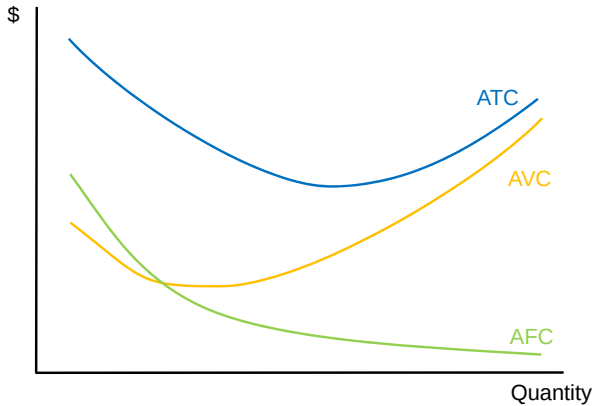
Average Costs in Pictures

And Average Total Cost?



Average Costs in Pictures

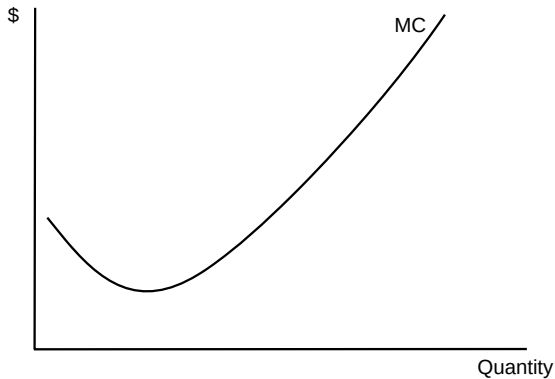
Everyone, Together



Marginal Cost

- Marginal cost $\equiv$ additional cost to produce an additional unit of output
- Without calculus, $MC = \frac{\Delta C}{\Delta Q}$, or the slope of the total cost curve
- With calculus, $MC = \frac{\partial C}{\partial Q}$
- What is its shape?

Drawing Marginal Cost



→ **Marginal cost is the only cost that matters for many firm decisions**

Average vs. Marginal Cost

$$ATC = \frac{TC}{Q}, MC = \frac{\Delta C}{\Delta Q} = \left(\frac{\partial C}{\partial Q} \right)$$

- Both come from total cost
- When $MC < ATC$, what happens to average cost as Q increases?

Average vs. Marginal Cost

$$ATC = \frac{TC}{Q}, MC = \frac{\Delta C}{\Delta Q} = \left(\frac{\partial C}{\partial Q} \right)$$

- Both come from total cost
- When $MC < ATC$, what happens to average cost as Q increases? decreases

Average vs. Marginal Cost

$$ATC = \frac{TC}{Q}, MC = \frac{\Delta C}{\Delta Q} = \left(\frac{\partial C}{\partial Q} \right)$$

- Both come from total cost
- When $MC < ATC$, what happens to average cost as Q increases? decreases
- When $MC > ATC$, what happens to average cost as Q increases?

Average vs. Marginal Cost

$$ATC = \frac{TC}{Q}, MC = \frac{\Delta C}{\Delta Q} = \left(\frac{\partial C}{\partial Q} \right)$$

- Both come from total cost
- When $MC < ATC$, what happens to average cost as Q increases? decreases
- When $MC > ATC$, what happens to average cost as Q increases? increases

Average vs. Marginal Cost

$$ATC = \frac{TC}{Q}, MC = \frac{\Delta C}{\Delta Q} = \left(\frac{\partial C}{\partial Q} \right)$$

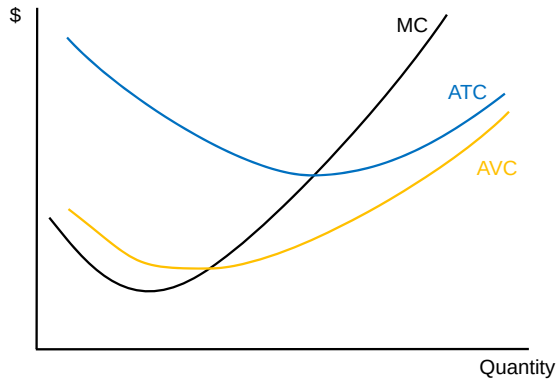
- Both come from total cost
- When $MC < ATC$, what happens to average cost as Q increases? decreases
- When $MC > ATC$, what happens to average cost as Q increases? increases
- $\rightarrow MC = AC \rightarrow AC$ must be at a minimum

Average vs. Marginal Cost

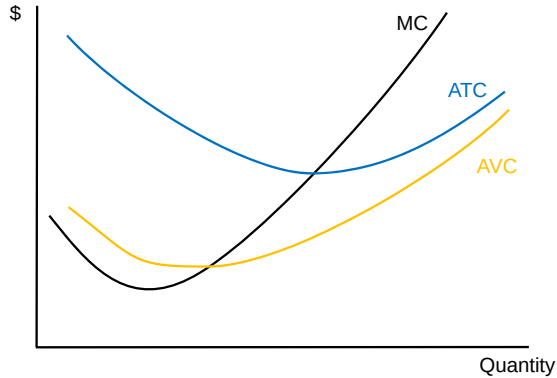
$$ATC = \frac{TC}{Q}, MC = \frac{\Delta C}{\Delta Q} = \left(\frac{\partial C}{\partial Q} \right)$$

- Both come from total cost
- When $MC < ATC$, what happens to average cost as Q increases? decreases
- When $MC > ATC$, what happens to average cost as Q increases? increases
- $\rightarrow MC = AC \rightarrow AC$ must be at a minimum
- $\rightarrow MC$ curve intersects AC curve at minimum

Average and Marginal Costs



Average and Marginal Costs



Marginal cost curve intersects average cost curve at its minimum

Relationship Between Costs

Use the logic of costs to figure out what's missing.

Q	TC	FC	VC	MC
0		5		
1			10	
2				8
3	28			

Relationship Between Costs

Use the logic of costs to figure out what's missing.

Q	TC	FC	VC	MC
0		5		
1			10	
2				8
3	28			

Q	TC	FC	VC	MC
0	5	5	0	0
1	15	5	10	10
2	23	5	18	8
3	28	5	23	5

Short Run & Long Run Costs

In the long run, nothing is fixed.

Implications of No Fixed Costs in Long Run

- Long run costs are never higher than short run costs
- Long run average cost curve intersected by marginal cost curve at the same place as the short-run average cost curve (where's that?)

Implications of No Fixed Costs in Long Run

- Long run costs are never higher than short run costs
- Long run average cost curve intersected by marginal cost curve at the same place as the short-run average cost curve (where's that?)
 - the minimum of the average cost curve
- But all costs in the long run are variable

An In-Class Problem: Costs

Suppose a firm's total cost curve is $TC = 10Q^2 + 6Q + 60$, and the marginal cost curve is $MC = 20Q + 6$.

- ① Find an expressions for the firm's
 - ① fixed cost
 - ② variable cost
 - ③ average total cost
 - ④ average variable cost
- ② Find the output level that minimizes average total cost.
- ③ Find the output level that minimizes average variable cost.
- ④ If $MC = 20Q + 6$ were the firm's long run marginal cost, could $MC_{SR} = 15Q + 6$ be the firm's short-run marginal cost?

In-Class Problem Answer

① Expressions for

- ① Fixed cost: The part of output not a function of price – or costs when output is zero
 $\rightarrow FC = 60$
- ② Variable cost: Recall that $TC = FC + VC \rightarrow 10Q^2 + 6Q + 60 = 60 + VC$, or
 $VC = 10Q^2 + 6Q$
- ③ Average total cost: $ATC = C/Q = 10Q + 6 + 60/Q$
- ④ Average variable cost: $AVC = VC/Q = 10Q^2 + 6Q = 10Q + 6$.

- ② Output level that minimizes average total cost: Recall that ATC is at a minimum where $ATC = MC \rightarrow 10Q + 6 + 60/Q = 20Q + 6$, or
 $10Q + 60/Q = 20Q \rightarrow 10Q = 60/Q \rightarrow 10Q^2 = 60 \rightarrow Q^2 = 6 \rightarrow Q = \sqrt{6}$
- ③ Output level that minimizes AVC is where
 $AVC = MC \rightarrow 10Q + 6 = 20Q + 6 \rightarrow 10Q = 0 \rightarrow Q = 0$. Remember that AVC increases with production.
- ④ We know that $MC_{SR} \geq MC_{LR}$, $15Q + 6 \leq 20Q + 6$, so, no.

Recap of Today

- Economic cost = accounting cost + opportunity cost
- Total Cost = Fixed Cost + Variable Cost
- Sunk Costs: don't make decisions based on them
- Average Cost and Marginal Cost
 - marginal costs intersects AC at minimum
- Short Run and Long Run Costs
- (probably next time) Economies of Scale (and maybe Scope)

Next Class

- Do Problem Set 9, and do Achieve problems as you see fit
- Read
 - Returns to scale: GLS 6.5
 - Economies of scale and scope: GLS 7.6
 - Competition: GLS Chapter 8.1-8.3