

# PubPol/Econ 541

Class 18

## **Scale Economies and Imperfect Competition**

by

Alan V. Deardorff  
University of Michigan  
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# Assumptions

<b>Old Trade Theories</b>	<b>New Trade Theories</b>
Constant returns to scale	Increasing returns to scale
Perfect competition	Imperfect competition
Homogeneous products	Differentiated products
Firms irrelevant	Firms identical

# Outline

- Scale Economies
- Monopolistic Competition
- Heterogeneous Firms

# Pause for Discussion

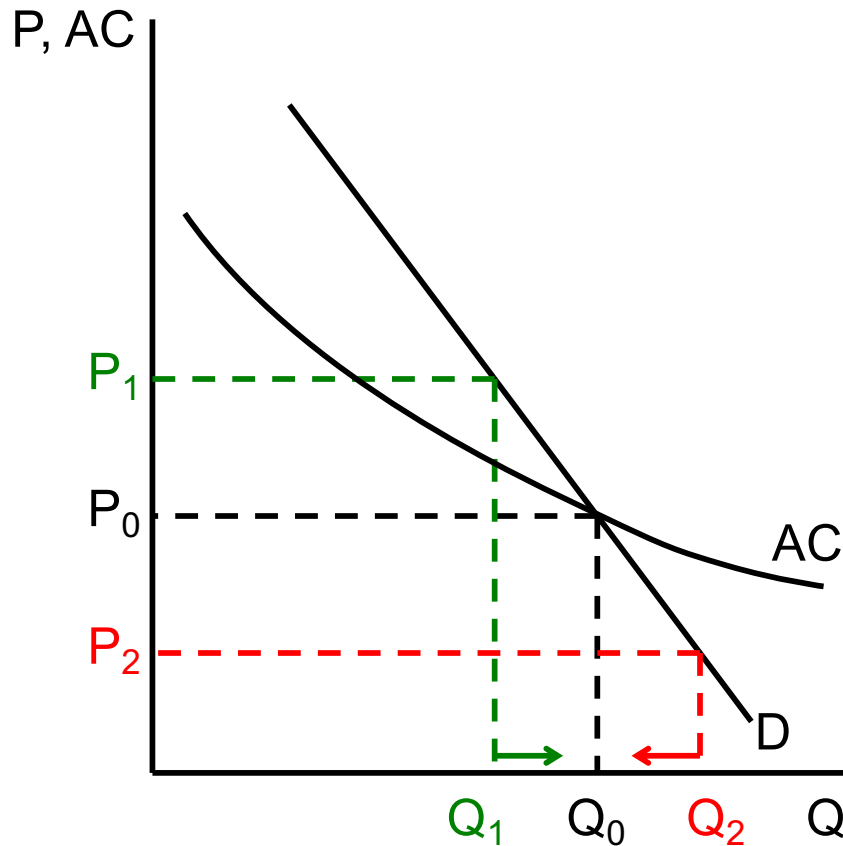
# Questions

- What are economies of scale, and how do external economies of scale differ from internal economies of scale?
- What are some reasons why the costs of a number of firms producing the same thing might be lower if they are located close together than far apart?

# Outline

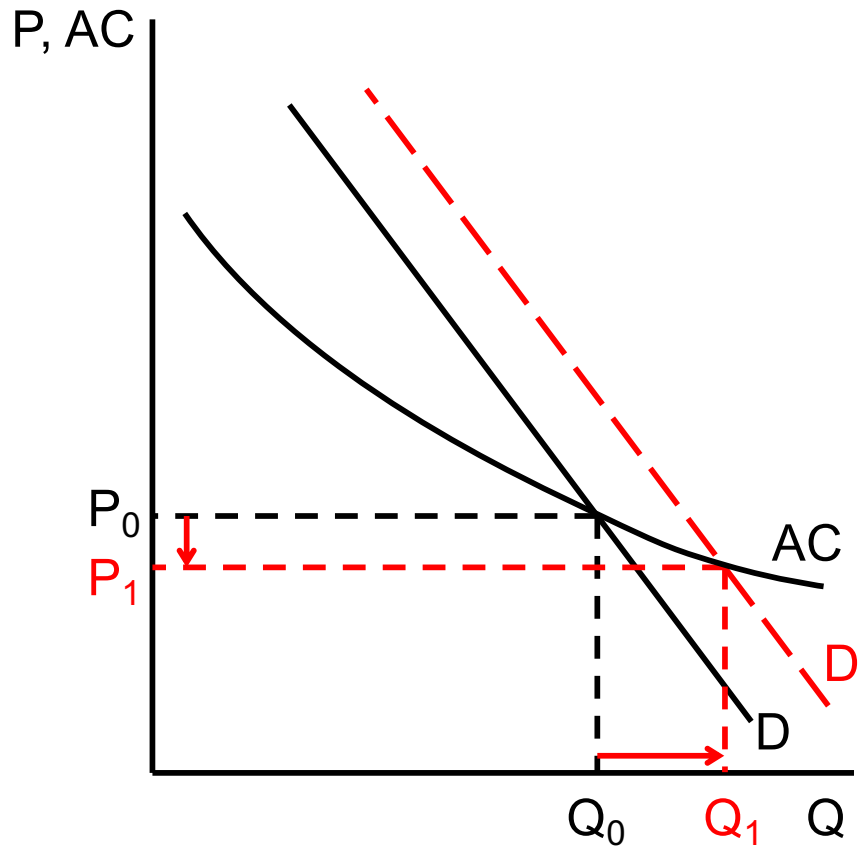
- **Scale Economies**
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- Heterogeneous Firms

# Scale Economies



- With scale economies, average cost falls with higher output
- Equilibrium is output at which  $P=AC$
- Dynamics
  - Think of arbitrary output causing price from D-curve
  - Profit ( $P>AC$ ) causes expansion
  - Loss ( $P<AC$ ) causes contraction
  - Market is stable if D steeper than AC

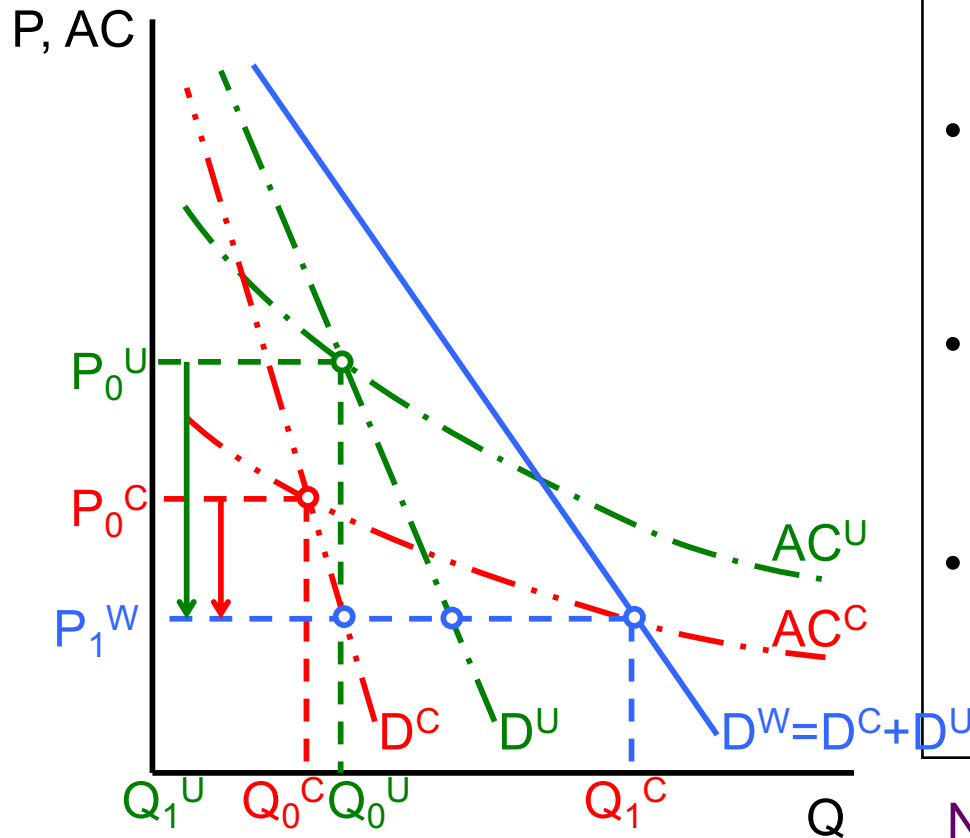
# Scale Economies



- Contrary to usual markets, a rightward shift in demand causes price to fall



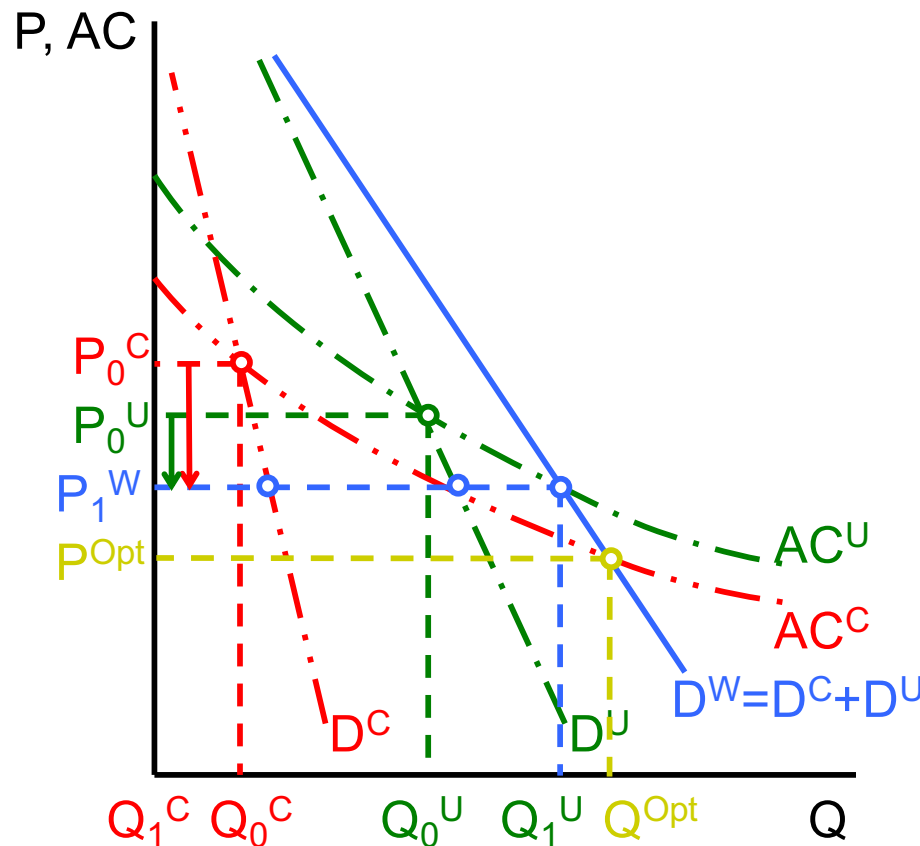
# Two-Country Autarky and Trade



- Suppose US has higher cost than China
- Without trade
  - US has  $P_0^U = AC^U$
  - China has  $P_0^C = AC^C$
- With trade, China underprices US and takes the whole world market
- Price falls in both countries and demanders gain in both, the US by more

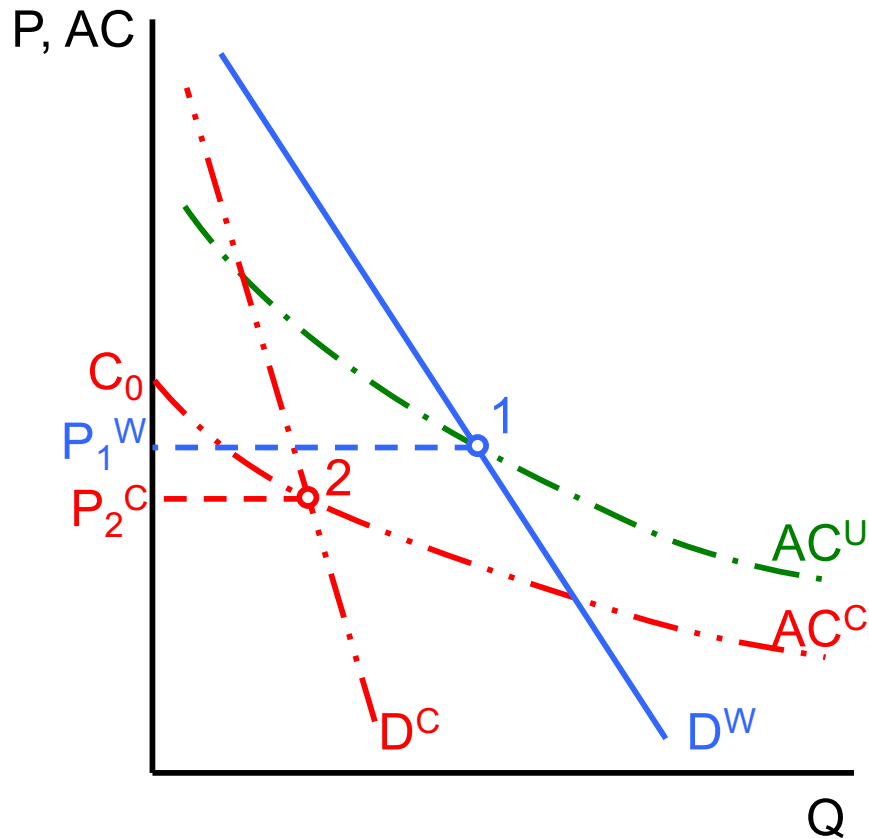
NOTE: Here the country with lower AC curve also has lower autarky price and exports the good. Those won't always be the case. See next.

# Case of Less Demand in Low-Cost Country



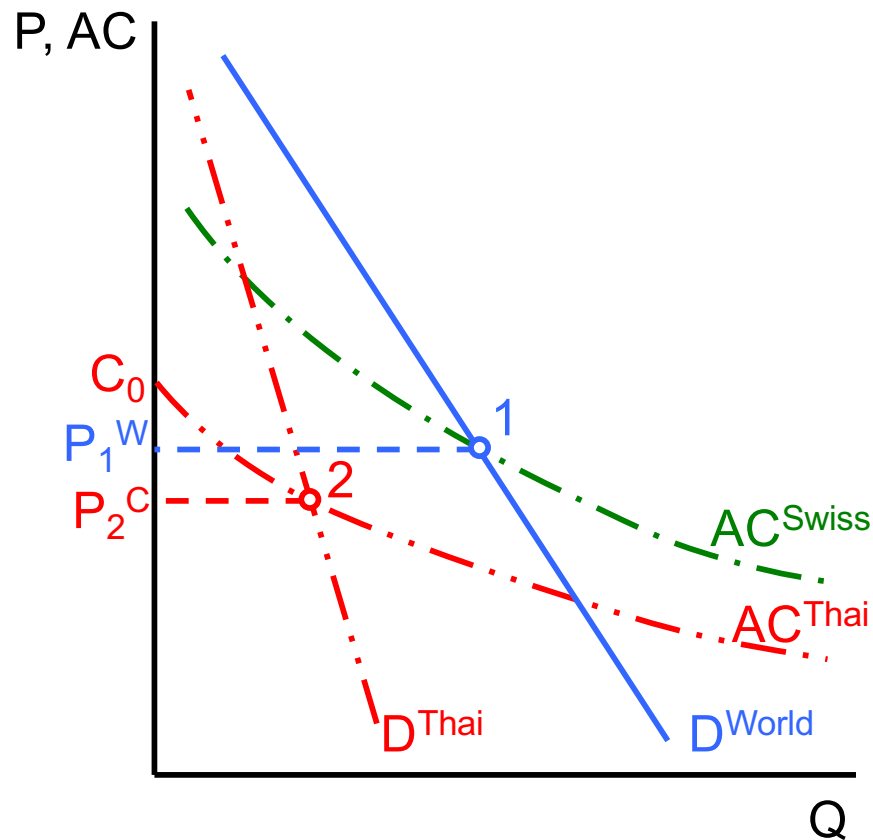
- Now, with less demand, China's autarky price is higher than the US, even though AC curve is lower
- With trade, US underprices China even though it has the higher AC curve, and US takes the whole world market
- Price falls in both countries and demanders gain in both, the US by less
- World would benefit more if somehow China took whole market at  $Q^{Opt}$

# Potential Loss from Trade



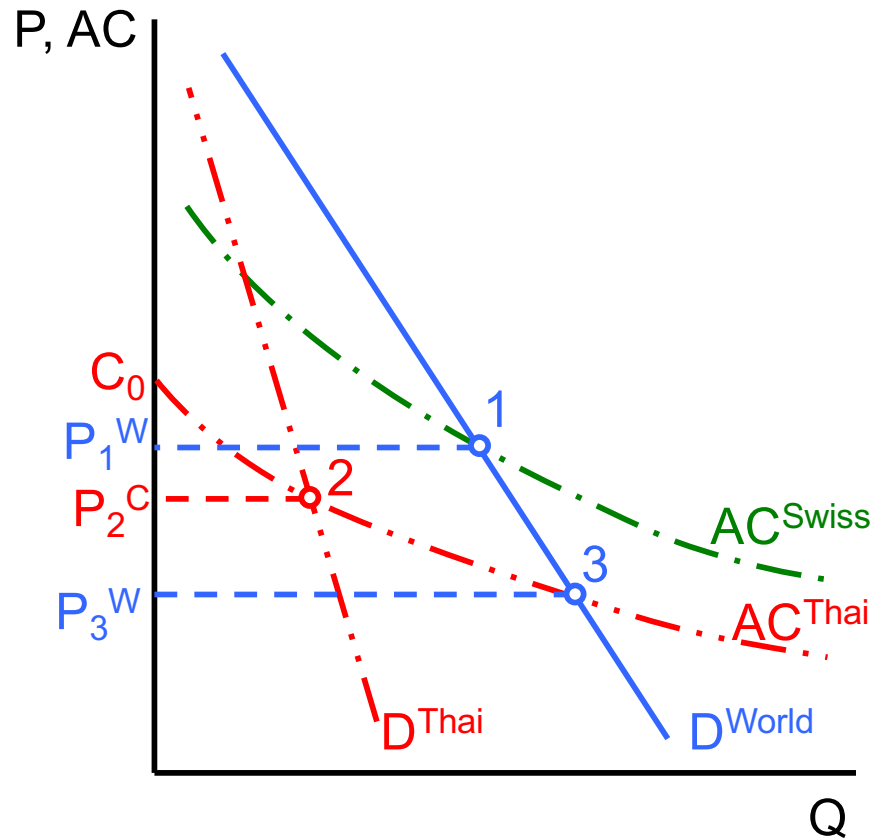
- Suppose China is initially not producing, so that free trade is at point 1
- Even with lower AC curve, China cannot enter, because its cost of initial output is  $C_0 > P_1^W$
- If China cuts off trade with high tariff, it moves to point 2, with lower price. Both suppliers and demanders in China gain
- So China gains by not trading!

# Potential Loss from Trade



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- So China gains by not trading!
- This is the textbook's example of Swiss and Thai watches

# Infant-Industry Protection



- Note that after using protection to get the industry started, Thailand and the world can then gain even more by returning to free trade, since Thailand now starts with a cost below  $P_1^W$ .
- The new world price becomes  $P_3^W$ , with Thailand meeting all of world demand
- This is an example of the “infant industry argument” for protection

# Pause for Discussion

# Questions

- Can the “forward falling” be interpreted the same way as a conventional upward sloping supply curve, saying how much industry will supply at each given price?
- Also, though not mentioned in the text, how does this differ from a “backward bending supply curve” that one sees in other contexts, such as labor supply?

# Questions

- How does opening to trade with external economies of scale differ from the partial equilibrium models earlier in the course?
  - Do low-cost suppliers still export?
  - Do high-cost suppliers still reduce production, and their countries import?
  - Does price rise in the low-price country and fall in the high-price country?
  - Does a move to free trade cause winners and losers in both countries?



# Outline

- Scale Economies
- **Monopolistic Competition**
- Heterogeneous Firms

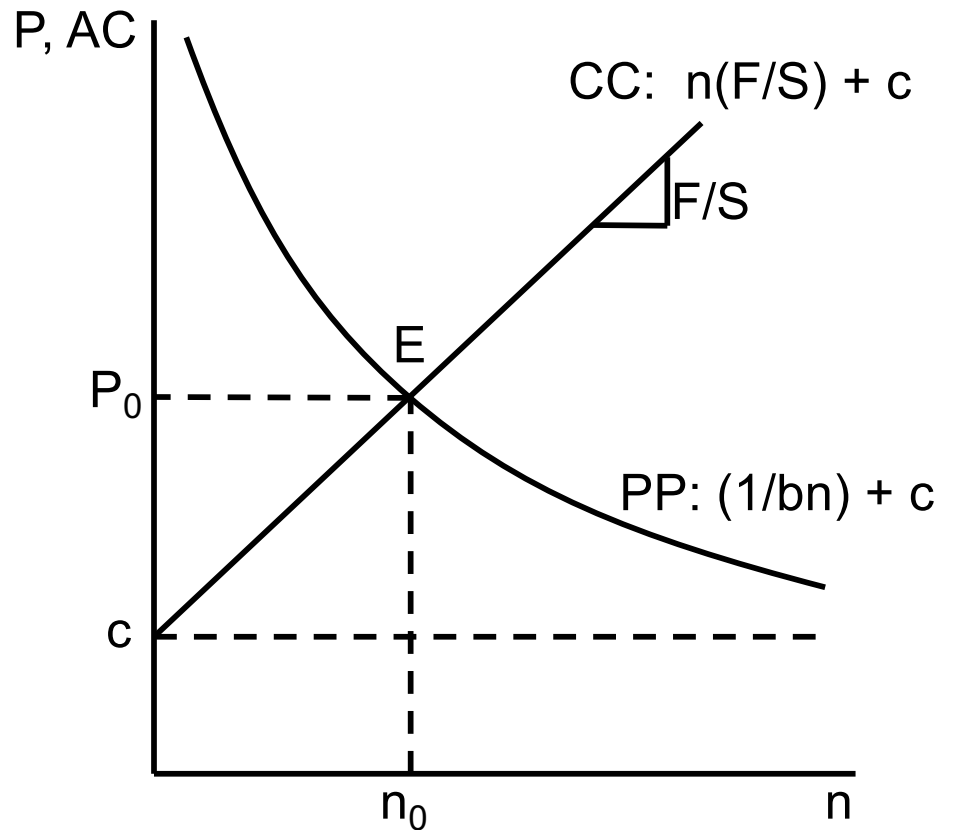
# Monopolistic Competition

- Economy: many ( $n$ , which is variable) firms, all alike but producing differentiated products
- Model
  - Cost per firm:  $C = F + cQ$ 
    - where  $F$ =fixed cost,  $c$ =marginal cost,  $Q$ =output
  - Demand per firm:  $D = S/n - Sb(P - \bar{P})$ 
    - where  $S$ =market size,  $n$ =# of firms,  $P$ =firm's price,  $\bar{P}$ =average of all firms' prices,  $b > 0$  is a parameter
  - Equilibrium:  $P = \bar{P} = C/Q; Q=D$

Note: Average cost falls with higher output  
 $C/Q = c + F/Q$

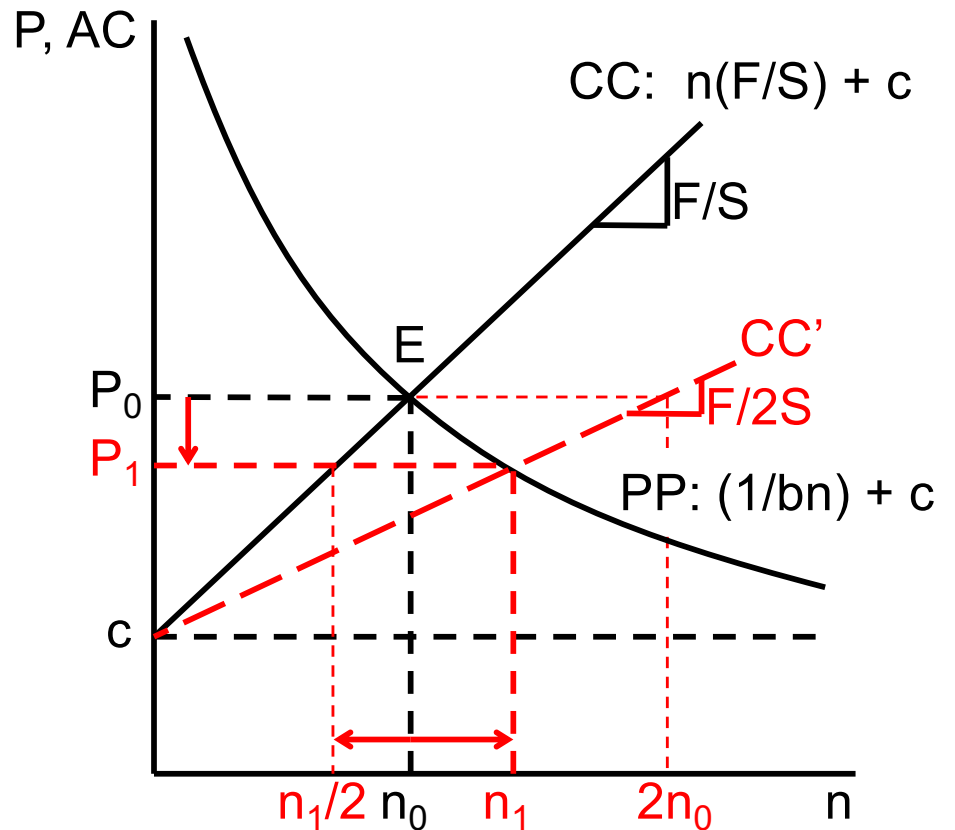
# Monopolistic Competition

- Conditions:
  - Average cost:  
 $AC = n(F/S) + c$
  - Monopoly price:  
 $P = (1/bn) + c$
  - Equilibrium:  
 $P = AC$



# Monopolistic Competition

- World of 2 identical countries: world is just like 1, except  $S$  is twice as large
- Move from autarky to 2-country free trade causes
  - Price to fall
  - Number of firms to rise, but not to double
    - Thus number in each country falls



# Pause for Discussion

# Questions

- Why do “internal economies of scale” lead to imperfect competition?
- What two things contribute to the gap between price on a demand curve facing a monopolistic firm and its marginal revenue?
- How then is this related to the markups of price above marginal cost that firms charge?

# Questions

- The monopolistic competition model in the text is depicted with two curves, the upward sloping CC curve and the downward sloping PP curve, with the number of firms in the industry,  $n$ , on the horizontal axis. What, intuitively, do these two curves represent, and why are they shaped as they are?

# Questions

- What assumption is captured by saying that the equilibrium is the intersection of the CC and PP curves?
- Why can the monopolistic competition model lead to trade without comparative advantage?
- In the monopolistic competition model, are there any losers from trade?



# Questions

- What are the replacements in the monopolistic competition model of the following three assumptions, and how does each contribute a new reason for gain from trade?
  - perfect competition,
  - constant returns to scale, and
  - product homogeneity

# Outline

- Scale Economies
- Monopolistic Competition
- **Heterogeneous Firms**

# Heterogeneous Firms

- Old Trade Theory (Ricardo, Heckscher-Ohlin, Specific Factors) had
  - Constant returns to scale
  - Perfect competition
  - Homogeneous products
- Thus firms played no role

# Heterogeneous Firms

- New Trade Theory (Krugman, etc.) had
  - Increasing returns to scale
  - Imperfect competition
  - Differentiated products
- Firms played important roles, but
- They were assumed identical

# Heterogeneous Firms

- New, New Trade Theory (Melitz) had
  - Most of the assumptions of New Trade Theory, but
  - Heterogeneous firms
- How?
  - Firms' Productivities differ, coming from a random drawing

# Heterogeneous Firms

- Other features of a Melitz Model
  - Aside from productivity parameters, firms are identical
  - Each produces a differentiated product and engages in monopolistic competition
    - Hence each has zero expected profits (prior to drawing random productivity)
  - There are fixed costs of
    - Production, and of
    - Exporting

# Heterogeneous Firms

- Fixed costs of production imply
  - Increasing returns to scale
  - If productivity is low (thus cost high), firm
    - Won't sell enough to cover cost
    - Will exit
  - If productivity is high, firm
    - Charges lower price
    - Makes profit
    - Stays in the market

# Heterogeneous Firms

- Fixed costs of exporting imply
  - If productivity is not much above breaking even on domestic market, firm would run a loss if it exported
  - Only firms with the highest productivity export



# Heterogeneous Firms

- Effects of lower trade barriers
  - Highest-productivity firms expand output and exports
  - High-productivity firms, start to export
  - Low productivity firms reduce output
  - Lowest productivity firms shut down
- Implications of more trade
  - Fewer firms, lower prices
  - Higher average productivity

# Pause for Discussion

# Questions

- It seems obvious that firms differ. Why was that not allowed with perfect competition?
- What is the new source of gain from trade that the heterogeneous firm model introduces?

