

Trade Policy: Part One

Instructor: David Jenkins¹

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¹I wish to acknowledge Battista Severgnini for providing last year's slides to me. His generosity saved me much time, and these slides are partially based on his. Any errors are of course my own.

- ▶ Last time: Increasing Returns to Scale
 - ▶ Krugman: External Economies
 - ▶ Larger industries have lower cost
 - ▶ Drives industries to concentrate
 - ▶ A reason for trade
 - ▶ Implications of external economies
 - ▶ Historical Accident
 - ▶ Money on the table
 - ▶ Infant industries
 - ▶ Melitz and Krugman: Internal Economies
 - ▶ Larger firms have lower cost
 - ▶ Each firm a different product or variety
 - ▶ Consumers like a mix
 - ▶ Reason for trade: more (and cheaper) varieties

Plan for Today

Chapter 8:

- ▶ Review: Monopoly
- ▶ Review: Monopolistic competition
- ▶ New: Trade costs
- ▶ New: Dumping
- ▶ New: Multinationals

Chapter 9 :

- ▶ Tariffs
- ▶ Consumer & Producer Surplus
- ▶ Export Subsidies

Chapter 10 :

Review

- ▶ Begin review

External vs Internal Increasing Returns

- ▶ Firms or locations?
 - ▶ If increasing returns happen within an industry and firm, what would the economy look like?
 - ▶ If increasing returns happen within an industry and location, what would the economy look like?
- ▶ First: increasing returns within industry and location
 - ▶ Firms are very small, no affect on aggregate production
 - ▶ The more the industry produces, the lower are average costs
 - ▶ Good model for Silicon Valley startups

Decreasing marginal product of labor?

- ▶ Specific factors, HO – increase labor, fix capital, decreasing returns to labor
- ▶ Now we want increasing returns – what is the argument?
 - ▶ Specialized suppliers
 - ▶ Labor market pooling
 - ▶ Knowledge spillovers

- ▶ To start, simplest possible model
 - ▶ One country
 - ▶ One good
 - ▶ One factor: Labor
 - ▶ *External* increasing returns to scale
 - ▶ That is: industry/location scale economies

The firm's problem

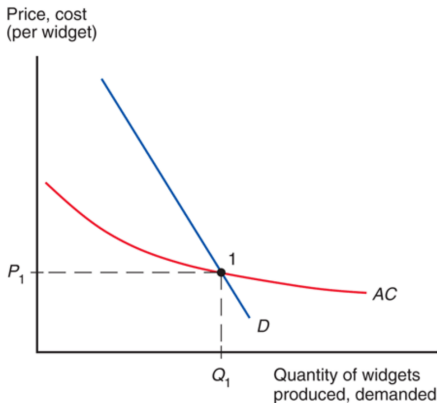
- ▶ Firms are really tiny
- ▶ They think they do not affect industry wages
- ▶ In equilibrium, zero-profits again
- ▶ What is the equilibrium wage?

Equilibrium supply and demand

- ▶ We have been equating relative supply and relative demand
- ▶ Nothing relative here, we only have one good
- ▶ Now we are going to equate average cost and demand
- ▶ Why does avg. cost have to equal price in equilibrium?
- ▶ Hint: Labor gets everything in this model

Equilibrium supply and demand

- ▶ Last piece: Average cost is falling due to external economies of scale



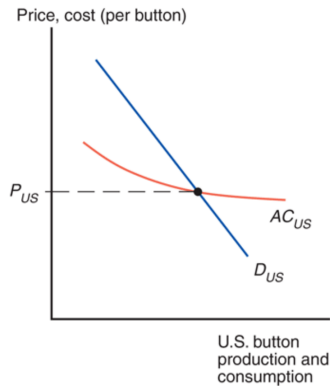
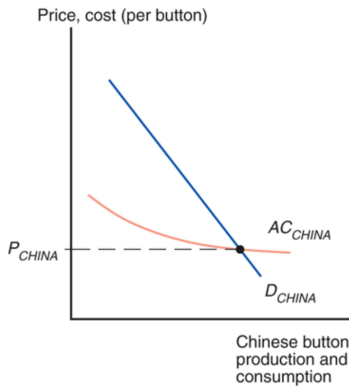
- ▶ Where does demand curve come from?

Trade and External Economies

- ▶ Two countries: China and US
- ▶ Two goods: Buttons and Not-Buttons
- ▶ One factor: Labor
- ▶ External economies of scale

No button trade

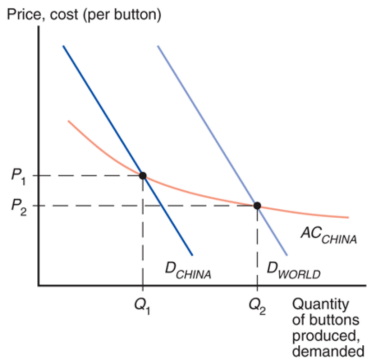
- ▶ Each country makes its own buttons (and not-buttons)



Allow button trade

- ▶ Opening to trade
 - ▶ China can undercut all American button makers
 - ▶ True even if very little Labor in American button making
 - ▶ Increasing marginal product of labor (unlike other models)
 - ▶ Implication: China makes all the buttons
- ▶ Scale economies
 - ▶ Cost of producing buttons in China goes down
 - ▶ Cost of producing buttons in US goes up
 - ▶ Cheaper buttons everywhere!
 - ▶ What about real wages of Chinese workers?
 - ▶ What about real wages of American workers?

Allow button trade

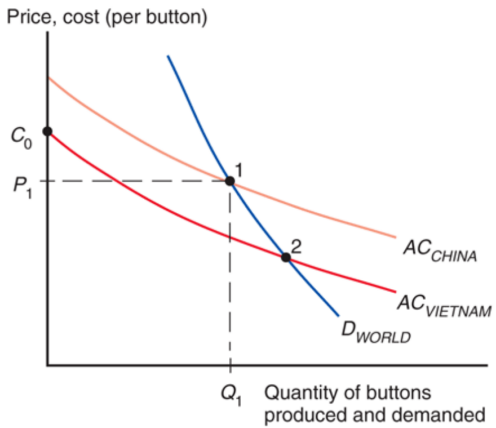


Implications of external economies model

- ▶ We are going to look at three results
 1. The world poverty trap
 2. Losses from trade
 3. Beneficial protectionism

Poverty traps and models of multiple equilibria

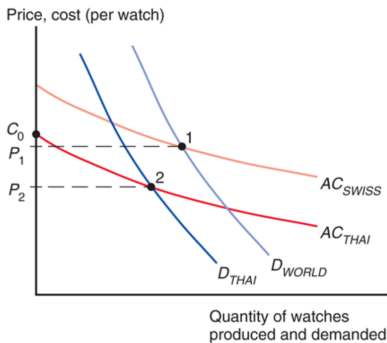
- ▶ The idea:
 - ▶ For some reason, only one country produces a good
 - ▶ Scale lowers the price of the good significantly
 - ▶ Another country would be more efficient only if it had all production
 - ▶ At current world price, no firm in other country will enter



Losses from trade

- ▶ External scale economies can also create losses from trade
- ▶ Intuition: Same story as wrong equilibrium
 - ▶ Thailand can make watches cheaper, but Switzerland started first
 - ▶ Now, even if Thailand only produced Thai watches, it would get lower price
 - ▶ Again, low world price keeps firms from entering

- ▶ What if Thai government shut down trade?
- ▶ Who benefits if Thai government shut down trade and then opened it again?



Learning by doing

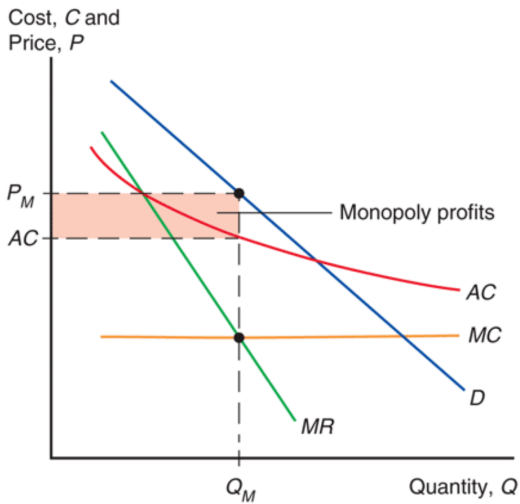
- ▶ Suppose that the more a country produces, the lower its cost
- ▶ Seems reasonable, lots of studies on WWII America show this
- ▶ Can give rise to dynamic losses from trade as well
 - ▶ Two countries, Two goods: Food and Clothing
 - ▶ Rich country has comp. adv. in Food
 - ▶ All learning in agriculture finished
 - ▶ In autarchy, both countries grow
 - ▶ Suppose Poor specializes in Food after opening to trade
 - ▶ Poor stops growing
- ▶ Trading dynamic losses for static gains

Next up: Chapter 8

- ▶ Now, internal increasing returns to scale
- ▶ The bigger the firm, the lower its cost
 - ▶ Issue: How many firms if we have two goods?
 - ▶ Solution: Each firm makes a different product
 - ▶ Implication: Each firm has a monopoly on its product
- ▶ Recently very popular, generate firm size distributions
- ▶ Past chapters: how does trade affect workers and factor owners
 - ▶ Firms were basically ignored
 - ▶ Side note: If we have L workers, how many free-entry, CRS firms are there?
- ▶ Main point of chapter: how does trade affect firms?

Monopoly

- ▶ Each firm has a monopoly over its own product
- ▶ Deconfusifying the textbook review of monopoly, go!
 - ▶ Price takers vs price makers
 - ▶ Gap between MR and Demand curves
 - ▶ Suppose linear demand: $Q = A - BP$
 - ▶ Average cost vs marginal cost



Monopolistic Competition

- ▶ Monopoly models are easy to analyze
- ▶ One firm doesn't make an interesting distribution
- ▶ Oligopoly models are hard
 - ▶ Pricing decisions depend on beliefs about other firm behavior
 - ▶ With strange beliefs, strange equilibria
- ▶ Solution: Monopolistic competition
 - ▶ Firms are very small
 - ▶ Firms care about market-wide average prices
 - ▶ Individual firm deviations don't change aggregate

Monop. Comp. equilibrium

- ▶ Plan:
 - ▶ Show average cost increasing with number of firms
 - ▶ Show price decreasing with number of firms
 - ▶ Show equilibrium number of firms is intersection (zero profits)

Avg. cost increasing in firm number

- ▶ Suppose firms face the demand:

$$Q = S \left(\frac{1}{n} - b(P - \bar{P}) \right)$$

- ▶ If firms are all the same, charge \bar{P}
- ▶ Production of a firm is $Q = \frac{S}{n}$
- ▶ What happens to production if n increases?
- ▶ What happens to the average cost of each firm?

Equil. price decreasing with number of firms

- ▶ Suppose firms face the demand:

$$Q = S \left(\frac{1}{n} - b(P - \bar{P}) \right)$$

- ▶ Get price as a function of quantity
- ▶ Write down firm problem
- ▶ Write first order condition
- ▶ Substitute $Q = \frac{S}{n}$

Price equals average cost

- ▶ Suppose price were higher than average cost
 - ▶ A new firm would enter
- ▶ Suppose price less than average cost
 - ▶ Some firm would exit
- ▶ Must be that price equals average cost

Opening up to trade

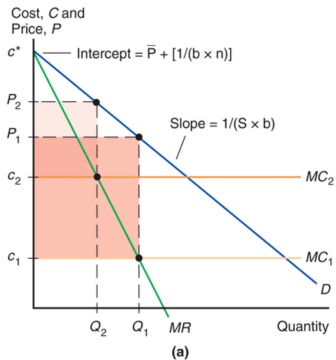
- ▶ First let's show that an increase in market size
 - ▶ Increases number of active firms (products)
 - ▶ Lowers equilibrium price of each product
- ▶ Firms produce $\frac{S}{n}$
- ▶ Market size S increases, each firm produces more
- ▶ Average cost falls
- ▶ Price firm's charge is $P = c + \frac{1}{bn}$
- ▶ Unrelated to market size

Heterogenous Firms

- ▶ Firms remain the same in every way
- ▶ *Except* that they have different marginal costs c
- ▶ Assume that firms learn c *after* they have paid fixed costs
- ▶ New equilibrium condition: Expected zero profits (net of fixed cost)

Heterogenous firm equilibrium

- Firms still produce at point where marginal revenue equals marginal cost



Heterogenous firms and trade

- ▶ Demand:

$$Q = S \left(\frac{1}{n} - b(P - \bar{P}) \right)$$

- ▶ What is the slope of the demand curve?
- ▶ What is its intercept?
- ▶ When a country opens to trade, how does demand change?

Heterogenous firms and trade

- ▶ Punchline: Opening up to trade
 - ▶ Worst firms exit
 - ▶ high-cost firms shrink
 - ▶ low-cost firms grow
- ▶ Industry more efficient as production is more concentrated in low-cost firms
- ▶ Effect similar to actual productivity growth

► End review!

Trade Costs and Extensive Margin

- ▶ Suppose there is some cost to trade
- ▶ Equivalent to increasing marginal cost of production
- ▶ Recall firms with high marginal cost don't enter domestic market
- ▶ Even fewer firms will enter the export market
- ▶ *Extensive margin*: Number of firms exporting
- ▶ *Intensive margin*: How much each firms export
- ▶ Trade costs reduce both

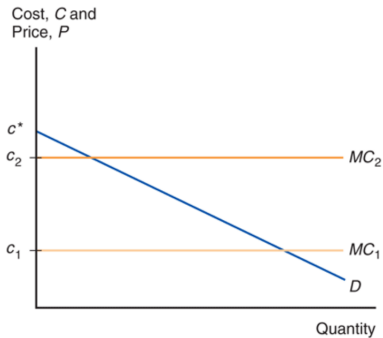
Extensive Margin is important

- ▶ Small share of firms export – 18% of American firms overall

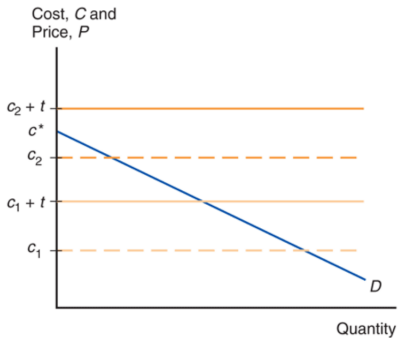
Printing	5%
Furniture	7%
Apparel	8%
Wood Products	8%
Fabricated Metals	14%
Petroleum and Coal	18%
Transportation Equipment	28%
Machinery	33%
Chemicals	36%
Computer and Electronics	38%
Electrical Equipment and Appliances	38%

Source: A. B. Bernard, J. B. Jensen, S. J. Redding, and P. K. Schott, “Firms in International Trade.” *Journal of Economic Perspectives* 21 (Summer 2007), pp. 105–130.

Extensive Margin in a Picture



(a) Domestic (Home) Market



(b) Export (Foreign) Market

Predictions of Heterogenous Firms with Trade Cost

- ▶ Subset of firms export
- ▶ Those that do are relatively productive
- ▶ Largely backed up by data:
 - ▶ Exporters on average twice as large as importers (size vs. prod?)
 - ▶ Produce on average 11% more per worker

Dumping

- ▶ *Dumping* is when a firm sells a product too cheaply abroad
 1. Sometimes if foreign price below domestic price
 2. Sometimes if foreign price below domestic price plus tariff
 3. Sometimes if foreign price is below cost of production
- ▶ Considered an unfair trade practice, WTO allows 'antidumping duty' or tariff
- ▶ Monopolistic competitive firms naturally do No. 2 (but not No. 1 or No. 3)
- ▶ Why?
- ▶ Textbook: This is just natural firm behavior
- ▶ Me: Don't feel too bad – these firms are still monopolists!

Pause

- ▶ Trade costs: exporters on average more productive
- ▶ Dumping: Depending on definition, natural behavior
- ▶ Now: Foreign Direct Investment
- ▶ Note: Not directly related to increasing returns
- ▶ Included because firm behavior in trade

Foreign Direct Investment

- ▶ Comes in two flavors
 1. *Vertical*: Do manufacturing where it is cheap
 2. *Horizontal*: Produce close to final market
- ▶ Vertical example: iPhones made in China, designed in California
- ▶ Horizontal example: Japanese cars produced in the United States

Motives for FDI

- ▶ Vertical FDI
 - ▶ ex: Take advantage of lower labor costs abroad
 - ▶ Capital can move: Factor price equalization all over again!
- ▶ Horizontal FDI
 - ▶ Proximity-Cost tradeoff
 - ▶ Language developed by my professor, Steven Yeaple (along with Melitz)
 - ▶ Low transport cost, export more
 - ▶ High transport cost, build factor abroad
 - ▶ Prediction consistent with data

Outsourcing and Offshoring

- ▶ In both flavors of FDI, keep transactions in the firm?
- ▶ Vertical
 - ▶ Should you buy intermediates from foreign firm?
 - ▶ Or build a factor abroad?
- ▶ Horizontal
 - ▶ Should you license technology to local producer?
 - ▶ Or open a foreign factory yourself?
- ▶ These are deep and difficult questions
- ▶ Depend on the theory of the firm
 - ▶ Economics about the power of the market
 - ▶ Each firm is a tiny communist country

Offshoring increasingly important

- ▶ Intermediates are 40% of manufactures trade (which are around 55% of world trade)
- ▶ Intra-firm trade is 30% of world trade
- ▶ Frontier of research, no definitive motive for internalization

Chapter 8: Summary

- ▶ Monopolistic Competition
- ▶ Fixed cost give increasing return to scale
- ▶ Model for analyzing firms and trade (why?)
- ▶ Trade grows productive firms, shrinks unproductive firms
- ▶ Effect like productivity growth
- ▶ Frontier of research: FDI and internalization decisions