External economies and international distribution of production

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External economies and trade

- In previous chapters trade was motivated by differences in labour productivity or relative factor endowments.
- Trade was based on comparative advantage.
- This type of trade is called interindustry trade. (agricultural goods are exchanged for manufactures)
- This chapter introduces trade motivated by economies of scale in production.
- Intraindustry trade: one type of manufactured good is exchanged for another type of manufactured good.
- Trade can occur when there are *increasing returns* in production.

Overview of today's lecture

- Types of economies of scale
- Economies of scale and market structure
- The theory of external economies
- External economies and international trade
- Dynamic increasing returns
- International trade and economic geography

Economies of scale

- In the models of comparative advantage, we have examined so far, we have assumed that there are constant or diminishing returns to scale:
- Constant returns:
- when inputs to an industry increase at a certain rate, output increases at the same rate.
- Diminishing returns?
- when inputs to an industry increase at a certain rate, output increases by less.

Introduction (continued)

- There can be increasing economies of scale (or simply economies of scale)
  - This indicates that when inputs to an industry increase at a specific rate, the output grows at a faster rate.
  - The large scale is more efficient: the cost per unit of output falls as the output of an industry or firm increases.

Economies of scale (continued)

- For example, suppose that a firm produces toys using one input, labour.
- The amount of labour required depends on the number of toys produced.
- The presence of economies of scale may be understood from the fact that doubling the input of labour, more than doubles the industry's output.
- The average amount of labour needed to produce each toy decreases, as the industry produces more toys. (falling cost)

Economies of scale and international trade

- Mutually beneficial trade between two countries can arise because of economies of scale.
- International trade allows each country to produce a limited range of goods, without sacrificing variety in consumption.
- With international trade, a country can take advantage of economies of scale to produce more efficiently, than if it tried to produce everything for itself.

Economies of scale and the market structure

- Economies of scale may depend on either the size of the industry or the size of the firm.
- External economies of scale occur when the firm's cost of each unit of production depends on the size of the industry.
- Internal economies of scale occur when the cost of each unit of production depends on the size of the firm.

Economies of scale and market structure (continued)

- Internal economies as well as external economies of scale are important causes of international trade.
- internal and external economies of scale have different implications for the market structure:
- In industries where economies of scale are primarily external, the market typically consists of numerous small firms operating under perfect competition.
- Internal economies of scale result when large firms have a cost advantage over small firms, causing the industry to become imperfectly competitive.

The theory of External Economies of scale

- Examples of industries, characterized by external economies:
  - In the US, the semiconductor industry is concentrated in Silicon Valley,
  - investment-banking industry in New York and London
  - the entertainment industry in Hollywood.
  - IT information services in some places, such as Bangalore, the IT capital of India.

The theory of external economies (continued)

- In economies such as China, external economies are widespread in the manufacturing sector.
- One town in China may produce most of the world's underwear, another nearly all cigarette lighters, buttons….
- External economies have played an important role in the emergence of India, as a leader in exporting IT services.

The external economies of scale

For a variety of reasons, concentrating production of an industry in one or a few locations can reduce the industry's costs.

External Economies of scale lead to a clustering of firms in one location, for three main reasons:

1. Specialized suppliers: by locating next to firms producing similar products, a firm can specialize in certain aspects of production and outsource other stages of production to neighboring firms.

   For example, Silicon Valley in California has a large concentration of silicon chip companies, which are serviced by companies that make special machines for manufacturing silicon chips. This equipment is cheaper and more readily available in Silicon Valley compared to other places.

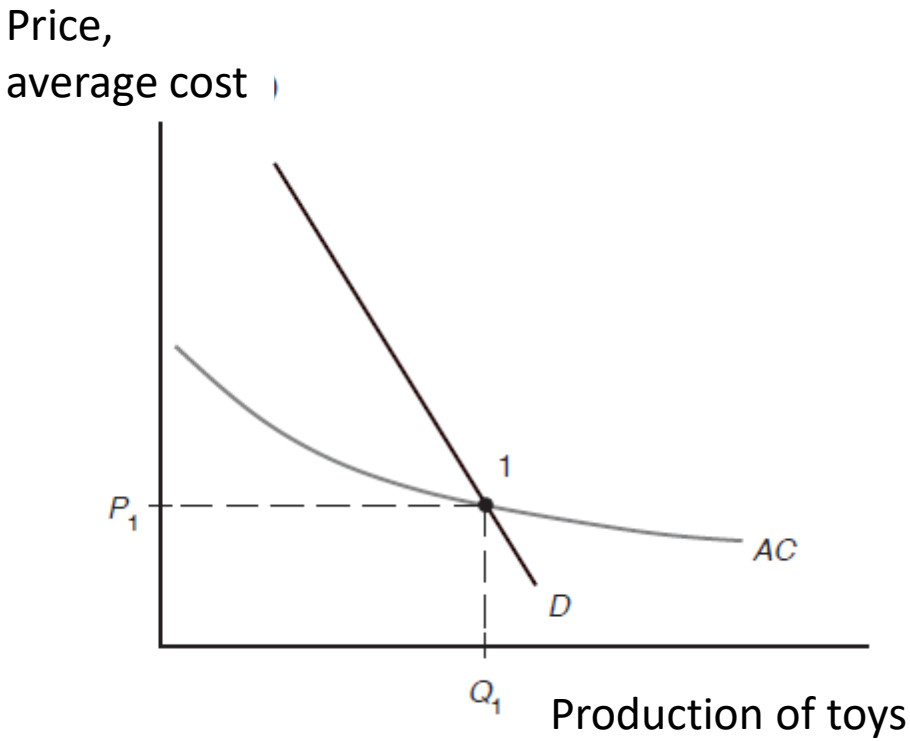
2. Labour market concentration**:** a large and concentrated industry can attract a pool of workers with special skills, reducing the cost of searching and hiring staff for each firm.

3. Knowledge spillovers: these occur when workers in different firms can more easily share innovative ideas in a large, concentrated industry.

The theory of external economies (continued)

- When external economies exist:
- the unit cost of production in an industry decreases, as its size increases.
- If the unit cost of production determines the price of the product, then
- the supply curve is downward sloping: the larger the industry's output, the lower the price at which firms are willing to sell.
- Without international trade, the unusual slope of the supply curve is not very important.

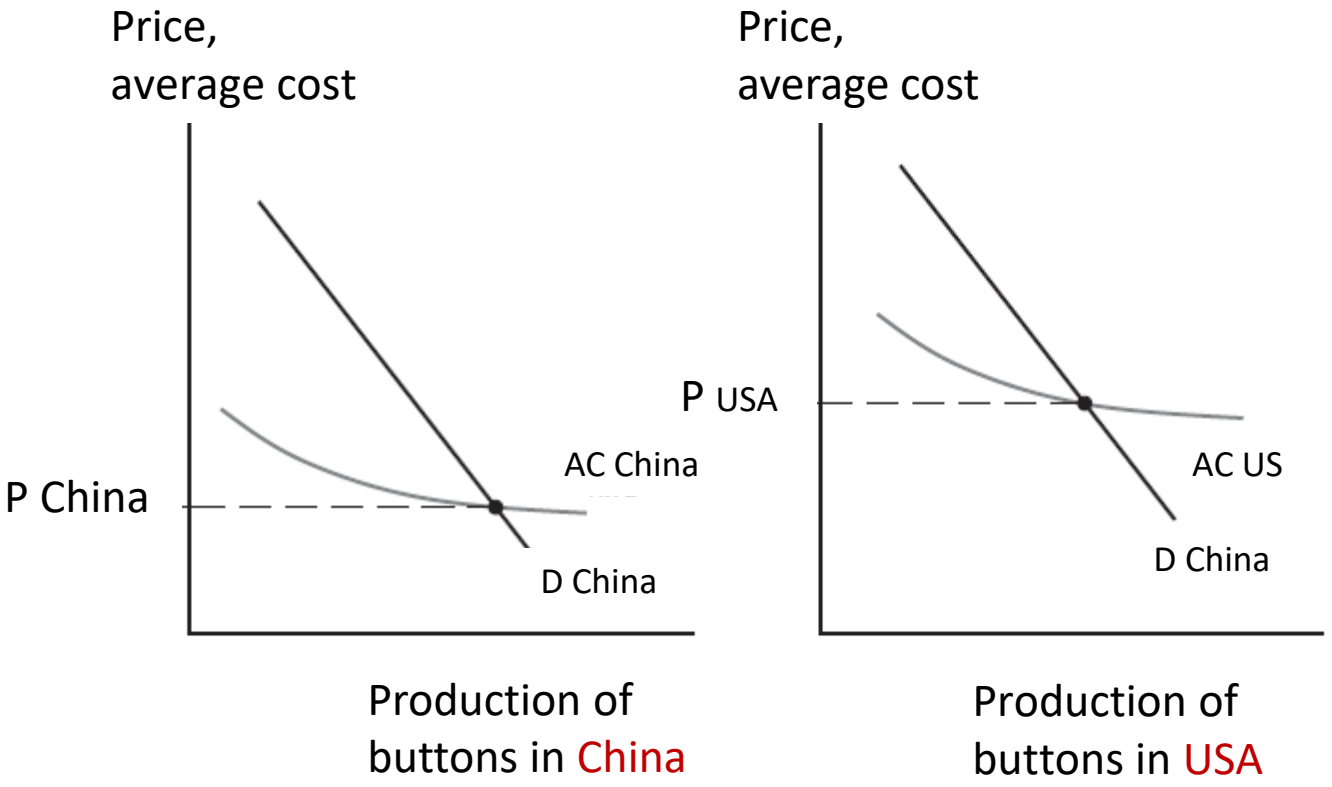
External economies and equilibrium



External economies and international trade

- Without international trade, equilibrium in each country is reached at the point where the domestic supply curve crosses the domestic demand curve.
- Let's take the case of China and USA:
- Button Industry
- Suppose Chinese button prices - in the absence of trade- would be lower than US button prices.

Figure 7-2: External economies before international trade



External economies and international trade (continued)

- What will happen when the countries open the potential for trade in buttons?
- The button industry in China will expand, while the button industry in the US will contract.
- ***As button output grows in China, the cost falls. As button output decreases in the US, the cost rises.***
- ***(the process feeds itself)***
- Finally, all production of buttons will take place in China.

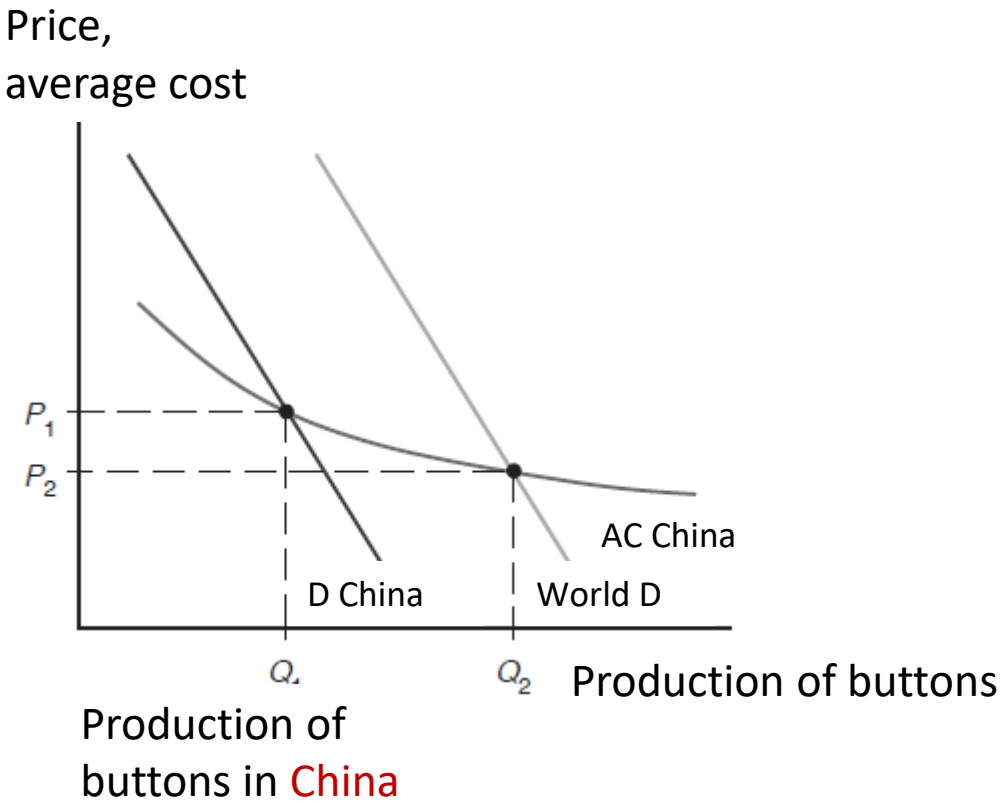
External economies and international trade (continuation)

- How does the concentration of production affect prices?
- Before trade, prices of buttons in China were lower than button prices in USA.
- As production rises in China, prices fall.
- Eventually,
- international trade leads to a reduction in the price of buttons in both countries!

External economies and international trade (continued)

- Different implications of models without increasing returns:
- In the standard trade models (Ricardo, Heckscher-Ohlin) relative prices ***converge*** because of international trade.
- *In the presence of external economies, international trade* ***reduces*** *prices everywhere.*

Figure 7.3: International Trade and prices



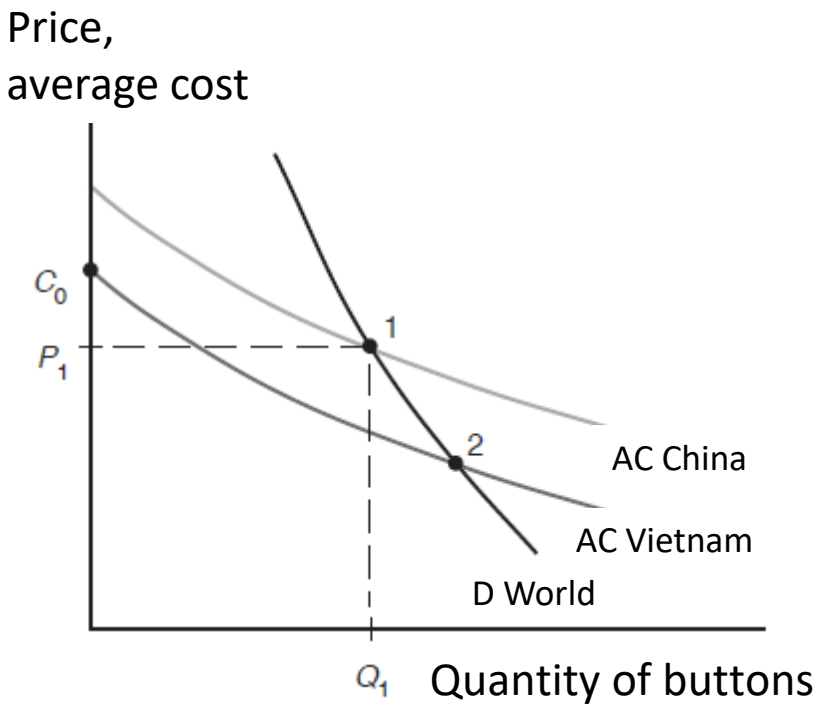
External economies and international trade (continued)

- ***What might cause one country to have an initial advantage due to a lower price?***
  One possibility is ***comparative advantage,*** which arises from differences in technology and resources.
- If external economies are present, however, the pattern of trade may arise from ***historical accidents***:
- Countries that start as large producers in certain industries tend to remain large producers, even if another country could potentially produce the same commodity more cheaply.

External economies and international trade (continued)

- For example:
- We assume that the cost curve of *Vietnam* is below the cost curve of *China*, because wages in Vietnam are lower than wages in China.
- At each given level of output, Vietnam can produce buttons at a lower cost than China.
- This does not necessarily imply that Vietnam will supply the world button market.
- Suppose that China establishes its button industry first.
- ***If China has a head start,*** China will keep the lead.
- There is a pattern of specialization established by historical accident.
  ⇒
- *A commodity characterized by external economies may not always be produced by the most suitable country, specifically the country that can produce it at a lower cost.*

Figure 7.4: The importance of an established advantage



Which country produces what:

External economies

- potentially give a strong role to a historical accident in determining who produces what.
- may allow established patterns of specialisation to persist even when they contradict comparative advantage.

External economies and international trade: effect on welfare

- International trade based on external economies has an ***ambiguous*** effect on the welfare of a country.
- The world economy benefits when the production of industries characterized by external economies is *geographically concentrated*.
- It is possible that a country is worse off with trade than it would have been without trade: a country may be better off if it produces everything for its domestic market rather than pay for imports.

External economies and international trade: effect on welfare

- For the world, it is better for every industry with external economies to be concentrated somewhere.

Dynamic economies of scale

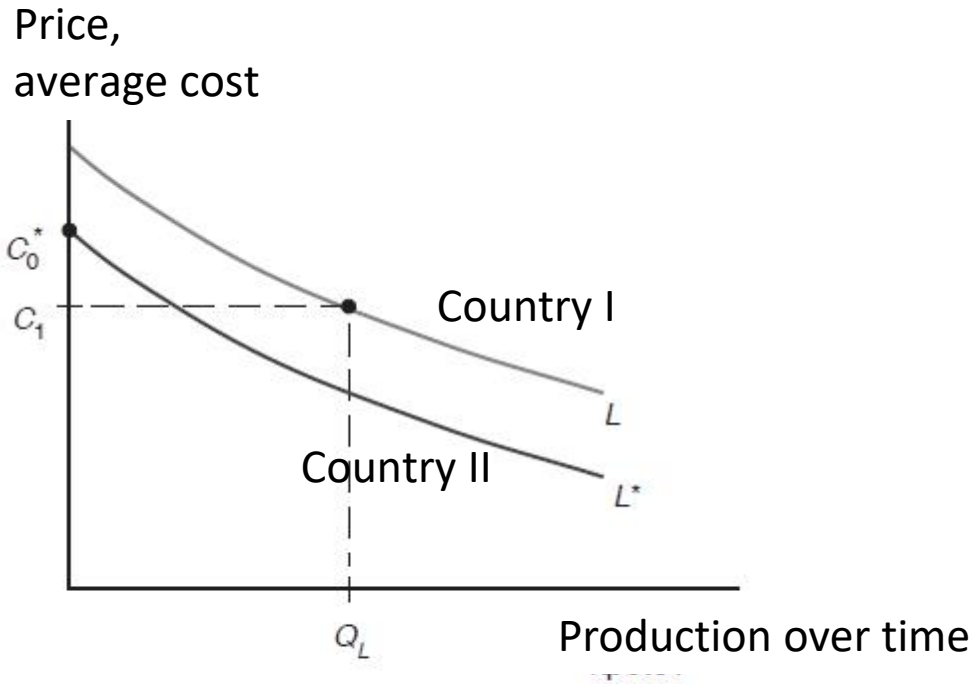
- Until now, we have examined cases where external economies depend on the *current amount of production* at a certain point in time.
- But external economies may also depend on the ***cumulative*** *amount of output*, over time.
- **Dynamic economies of scale** exist when average cost decreases, as the cumulative output rises over time.
  - The existence of dynamic increasing returns imply that there are dynamic external economies of scale.

Dynamic economies of scale

- Dynamic economies of scale may occur when the cost of production depends on the accumulation of *knowledge* and *experience* during the production process, over time. This is referred to as a case of dynamic increasing returns.

A graphical representation of dynamic increasing returns to scale is called a ***learning curve***.

Figure 7.6: The learning curve



L is the learning curve of country I, which pioneered in an industry. L* is the learning curve of country II, which has lower input costs but less production experience. Country II will not be able to enter the market, provided I has a sufficiently large head start.

Dynamic economies of scale

- **Dynamic economies of scale** can lead to an initial advantage, or a head start in an industry.
- Also, dynamic economies of scale may justify **protectionism**:
  - The *temporary* protection of industries enables them to gain experience: "the argument of the "infant" industry".
  - But "*temporary*" is often a long time… Hence it is difficult to identify when and where external economies of scale really exist, in the case of protection.

Interregional trade and economic geography

- External economies also play an important role in shaping the structure of interregional trade within the same country.
- Many movie production companies are based in Los Angeles and produce films for consumers across the U.S.
- Many financial firms are located in New York and provide financial services for customers throughout the US.

Interregional trade and economic geography (continued)

- Some non-tradable goods or services, such as veterinary services, newspaper publishing, haircuts, savings institutions, entertainment…must be offered locally.
- What determines the location of tradable industries?
- Natural resources or raw material …(oil industries, cement, …)
- External economies are the main reason for regional specialization and the interregional trade.
- When there are external economies, the structure of trade might result from historical accidents:
- Regions that start as large producers in specific sectors tend to remain large producers, even when another region could potentially produce at a lower cost.

Interregional trade and economic geography (continued)

In general, economic geography refers to the study of international, or interregional trade and the organization of economic activity in metropolitan and rural areas.

Economic geography studies how people transact across different geographic locations.

Changes in communication, such as the Internet, e-mail, cell phones, AI, and modern transportation, change the way people trade goods and services across regions and countries.