International Trade

L13

Economies of scale

- HO Theorem- markets are perfectly competitive- Monopoly profit always competed away

- With economies of scale-increasing returns-large firms may have advantage over small ones-market tend to dominated by one firm (monopoly) or more often by few firms (Oligopoly) or trade based on product differentiation (monopolistic competition).

- Thus, trade analysis has to take into account the effects of imperfect competition

Economies of scale

- Economies of scale (also referred to as increasing returns)- implies production is more efficient the larger the scale at which it takes place.

- EoS (or IRS)= doubling the inputs to an industry will more than double the industry's production

Economies of Scale

- Widgets are produced using only one input, labor; The table shows how the amount of labor required depends on the number of widgets produced.

- To produce 10 widgets, for example, requires 15 hours of labor, while to produce 25 widgets requires 30 hours.

- The presence of economies of scale may be seen from the fact that doubling the input of labor from 15 to 30 more than doubles the industry's output—in fact, output increases by a factor of 2.5.

- Equivalently, the existence of economies of scale may be seen by looking at the average amount of labor used to produce each unit of output:

- If output is only 5 widgets, the average labor input per widget is 2 hours, while if output is 25 units, the average labor input falls to 1.2 hours.

Output	Total Labor Input	Average Labor Input
5	10	2
10	15	1.5
15	20	1.333333
20	25	1.25
25	30	1.2
30	35	1.166667

Economies of scale-Incentive for international trade

- Thus, mutually beneficial international trade can arise as a result of economies of scale.

- Each country **specializes** in producing a limited range of products, which enables it to produce these goods more **efficiently** (and in **large scale**) than if it tried to produce everything for itself; these specialized economies then trade with each other to be able to consume variety of goods.

Economies of scale: Internal and External

- Economies of scale – two types- internal and external

- **External economies of scale** occur when the cost per unit depends on the size of the industry but not necessarily on the size of any one firm.

- **Internal economies of scale** occur when the cost per unit depends on the size of an individual firm but not necessarily on that of the industry.

External economies of scale

- External economies-at the level of industry rather than at firm level

- Examples of powerful external economies:

- In the United States, - the semiconductor industry, concentrated in California's famous Silicon Valley; the investment banking industry, concentrated in New York; and the entertainment industry, concentrated in Hollywood.

- In the rising manufacturing industries of China, external economies are pervasive— one town in China accounts for a large share of the world's cigarette lighters; yet another produces a third of the world's magnetic tape heads; and so on.

- External economies have also played a key role in India's emergence as a major exporter of information services, with a large part of this industry still clustered in and around the city of Bangalore.

- Similarly, Bangladesh accounts for large textile exports

External economies of scale: Sources

- There are three main reasons why a cluster of firms may be more efficient than an individual firm in isolation:
    - The ability of a cluster to support **specialized suppliers;**
    - The way that a geographically concentrated industry allows **labor market pooling;** and
    - The way that a geographically concentrated industry helps foster **knowledge spillovers.**

External economies of scale: Specialized suppliers

- In many industries, the production of goods and services or the development of new products—requires the use of specialized equipment or support services; *yet an individual company does not provide a large enough market for these services to keep the suppliers in business.*

- A localized industrial **cluster** *can solve this problem by bringing together* **many firms that collectively provide** *a* **large** *enough* **market** *to support a wide range of* **specialized suppliers**.

- Example: the availability of the dense network of specialized suppliers has given high-technology firms in Silicon Valley some considerable advantages over firms elsewhere. ***Key inputs are cheaper and more easily available*** **because there are** ***many firms competing to provide them***, and firms can concentrate on what they do best *contracting out* other aspects of their business.

- A company that tried to enter the industry in another location (in same country or another country) would be at an immediate disadvantage because it would lack easy and cheap access to specialized suppliers

External economies of scale: Specialized suppliers

- **External economies in Silicon Valley:**

- As the local industry grew, engineers left established semiconductor companies to start firms that manufactured capital goods such as diffusion ovens, step-and-repeat cameras, and testers, and materials and components such as photomasks, testing jigs, and specialized chemicals.

- **This independent equipment sector promoted the continuing formation of semiconductor firms by freeing individual producers from the expense of developing capital equipment internally and by spreading the costs of development.**

- It also reinforced **the tendency toward industrial localization**, as most of these specialized inputs were not available elsewhere in the country.

External economies of scale: Labor Market Pooling

- A second source of external economies is the way that a cluster of firms can create a pooled market for workers with highly specialized skills.

- Such a pooled market is to the advantage of both the producers and the workers, as the producers are less likely to suffer from labor shortages and the workers are less likely to become unemployed

- Example: In Bangalore – it is common for both IT companies to expand rapidly by hiring more skilled workers and for workers to change employers

External economies of scale: Knowledge Spillovers

- Companies can acquire technology through their own research and development efforts.

- They can also try to learn from competitors by studying their products and, in some cases, by taking them apart to "reverse engineer" their design and manufacture.

- An important source of technical know-how, however, is the informal exchange of information and ideas that takes place at a personal level. And this kind of informal diffusion of knowledge often seems to take place most effectively when an industry is concentrated or where there is a cluster, so that employees of different companies mix socially and discuss about technical issues.

- Example: This kind of informal information flow means it is easier for companies in the Silicon Valley area to stay near the technological frontier than it is for companies elsewhere; indeed, many multinational firms have established research centers and even factories in Silicon Valley simply in order to keep up with the latest technology.

External economies of scale and International Trade

- External economies drive a lot of trade both within and between countries

- For example, New York exports financial services to the rest of the United States, largely because external economies in the investment industry have led to a concentration of financial firms in Manhattan.

- Similarly, Britain exports financial services to the rest of Europe largely because those same external economies have led to a concentration of financial firms in London.

External economies of scale and International Trade

- Effects of trade due to External economies of scale: **Output and Prices**
  - Industry with external economies advantage will be able to **produce more outputs and cheaper price**. Hence mostly these industries become the global leaders and exporters of such products
  - This is different from the implication of earlier models without IRS , where we have seen relative prices converge as a result of trade – if a product (say cloth) is cheap in Home and relatively expensive in Foreign before trade opens, the effect of trade will be to raise cloth prices in Home and reduce them in Foreign.
  - In contrast, with external economies of scale the effect of trade is to reduce prices everywhere.
- The reason for this difference is that when there are external economies of scale, international trade makes it possible *to concentrate* world production in a single location, and therefore, to *reduce costs* by reaping the benefits of even stronger external economies.

External economies of scale and International Trade

- Effects of trade due to External economies of scale: **Pattern of Trade**

- What leads to concentration of industry in a location and such initial advantage?

A) Comparative advantage- like differences in technology and resources

- Example: High-technology industries in Silicon Valley require a highly skilled work force, and such a work force is much easier to find in the United States, where 40 percent of the working-age population is college-educated, than in Mexico where it is below 16%.

- China- low wage-leads to labour-intensive industry clustering

External economies of scale and International Trade

- Effects of trade due to External economies of scale: **Pattern of Trade**

- What leads to concentration of industry in a location and such initial advantage?

B) Another main reason- Historical contingency

- Example: London became Europe's dominant financial center in the 19th century, when Britain was the world's leading economy and the center of a world-spanning empire. It has retained that role even though the empire is long gone and modern Britain is only a middle-sized economic power.

- Silicon Valley's existence may owe a lot to the fact that a couple of Stanford graduates named Hewlett and Packard decided to start a business in a garage in that area.

- Bangalore might not be what it is today if vagaries of local politics had not led Texas Instruments to choose, back in 1984, to locate an investment project there rather than in another Indian city.

External economies of scale and International Trade

- Effects of trade due to External economies of scale: **Pattern of Trade**

- What leads to concentration of industry in a location and such initial advantage?

B) Another main reason- Historical contingency

- One consequence of the role of history in determining industrial location is that **industries aren't always located in the "right" place**: Once a country has established an advantage in an industry, it may retain that advantage even if some other country could potentially produce the goods more cheaply.

External economies of scale and International Trade

- Effects of trade due to External economies of scale: **Welfare**

- In general, we can presume that external economies of scale lead to gains from trade over and above those from comparative advantage. The world is more efficient and thus richer because international trade allows nations to specialize in different industries and thus reap the gains from external economies as well as from comparative advantage.

- The importance of established advantage means that there is no guarantee that the right country will produce a good subject to external economies. In fact, it is possible that trade based on external economies may actually leave a country worse off than it would have been in the absence of trade.

Internal Economies of Scale

- **Internal economies of scale** imply that a firm's average cost of production decreases the more output it produces
- Internal economies of Scale- Imperfect competition- Monopoly, Oligopoly, Monopolistic Competition
- Monopoly profit maximising output at MR=MC
- Product differentiation-Price makers
- Interdependence-market leadership- price& output strategies

Imperfect competition & Trade

- Underlying the application of the monopolistic competition model to trade is the idea that trade increases market size.

- The monopolistic competition model can be used to show how trade improves the trade-off between scale and variety that individual nations face.

- In industries where there are economies of scale, **both the variety of goods** that a country can produce **and the scale of its production** are constrained by the size of the market. By trading with each other, and therefore forming an integrated world market that is bigger than any individual national market, nations are able to loosen these constraints.

- Each country can thus **specialize in producing a narrower range of products** than it would in the absence of trade; yet by buying from other countries the goods that it does not make, each nation can simultaneously **increase the variety of goods** available to its consumers.

- As a result, trade offers an opportunity for **mutual gain** *even when countries do not differ in their resources or technology*

Intra- Industry trade

- Two-way exchange of similar goods

- Intra-industry trade proportion has steadily grown in recent decades

- The measurement of intra-industry trade relies on an industrial classification system that categorizes goods into different industries

- International Standard for Industrial Classification (ISIC Rev 4)- UNSD (UN Statistics Division - Department of Economic and Social Affairs) .

- Intra-industry trade plays an even more prominent role in the trade of manufactured good- Recent pattern shows developing countries producing components and exporting to other countries for compilation

ISIC Rev 4 Broad Classification

Section	Divisions	Description
A	01–03	Agriculture, forestry and fishing
B	05–09	Mining and quarrying
C	10–33	Manufacturing
D	35	Electricity, gas, steam and air conditioning supply
E	36–39	Water supply; sewerage, waste management and remediation activities
F	41–43	Construction
G	45–47	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	49–53	Transportation and storage
I	55–56	Accommodation and food service activities
J	58–63	Information and communication
K	64–66	Financial and insurance activities
L	68	Real estate activities
M	69–75	Professional, scientific and technical activities
N	77–82	Administrative and support service activities
O	84	Public administration and defence; compulsory social security
P	85	Education
Q	86–88	Human health and social work activities
R	90–93	Arts, entertainment and recreation
S	94–96	Other service activities
T	97–98	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U	99	Activities of extraterritorial organizations and bodies

Intra- Industry trade

- Two-way exchange of similar goods

- Product differentiation and internal economies of scale lead to trade between similar countries with no comparative advantage differences between them.

- This is a very different kind of trade than the one based on comparative advantage, where each country exports its comparative advantage good.

- Here, both Home and Foreign export similar products to one another. Home pays for the imports of some models (those produced by firms in Foreign); with exports of different types of models (those produced by firms in Home)—and vice versa

- After trade both Home and Foreign will benefit from variety of products in same industry

Intra- Industry trade: Automobile industry within ASEAN-4

- ASEAN-4—Indonesia, Malaysia, the Philippines, and Thailand—between 1998–2002

- The automobile industry in ASEAN-4 was propelled by a series of deregulation and liberalization measures, including trade liberalization steps like AFTA (the ASEAN Free Trade Agreement in 1998), and it experienced significant growth. Since 2002 it has recovered its losses due to the 1997 Asian crisis, and has reached a level of production of 1.4 million automobiles.

- Within the ASEAN-4, Thailand had assumed a leading role as an export-hub, with other countries concentrating mostly on production of automobile parts. European countries were the main destination for the ASEAN-4 automotive exports, attracting 60 percent of total automotive exports; Australia was also becoming a major destination for the trade relations.

Intra- Industry trade: Automobile industry within ASEAN-4

- Automobile intra-industry trade reflects the standard dichotomy between **quality differentiation (vertical differentiation) and attribute differentiation (horizontal differentiation- design, size, color etc).**

- For the ASEAN-4 countries, there seemed to be significant differences relating to the importance of this vertical and horizontal differentiation.

- While the share of horizontal differentiation in automobile parts exhibited a low and constant amount, vertical differentiation rose by a robust 50 percent and placed the ASEAN-4, with a share of 63.5 percent, at the top of the list of major trading blocks in terms of vertical differentiation.

- Again, the horizontal intra-industry trade remained relatively stable; however, the vertical intra-industry trade exhibited remarkable growth, increasing overall shares of intra-industry trade for all the ASEAN-4members, except the Philippines, to 70 percent by 2002

- The most important automobile components traded among the ASEAN-4 countries were engines and engine parts, and transmissions and machinery

Intra- Industry trade: Automobile industry within ASEAN-4

- Trade differences also existed among countries; for example, Indonesia's main export was electric parts, which accounted mostly for one-way trade, while Malaysia's main exports were transmission and machinery, which accounted primarily for intra-industry trade.

- economies of scale explain a good part of intra-industry trade in automobiles and automobile components for the ASEAN-4 countries. For example, the total market size, the declining differences in market sizes, and the size of the automobile industry itself all contributed positively to the overall automobile intra-industry growth.
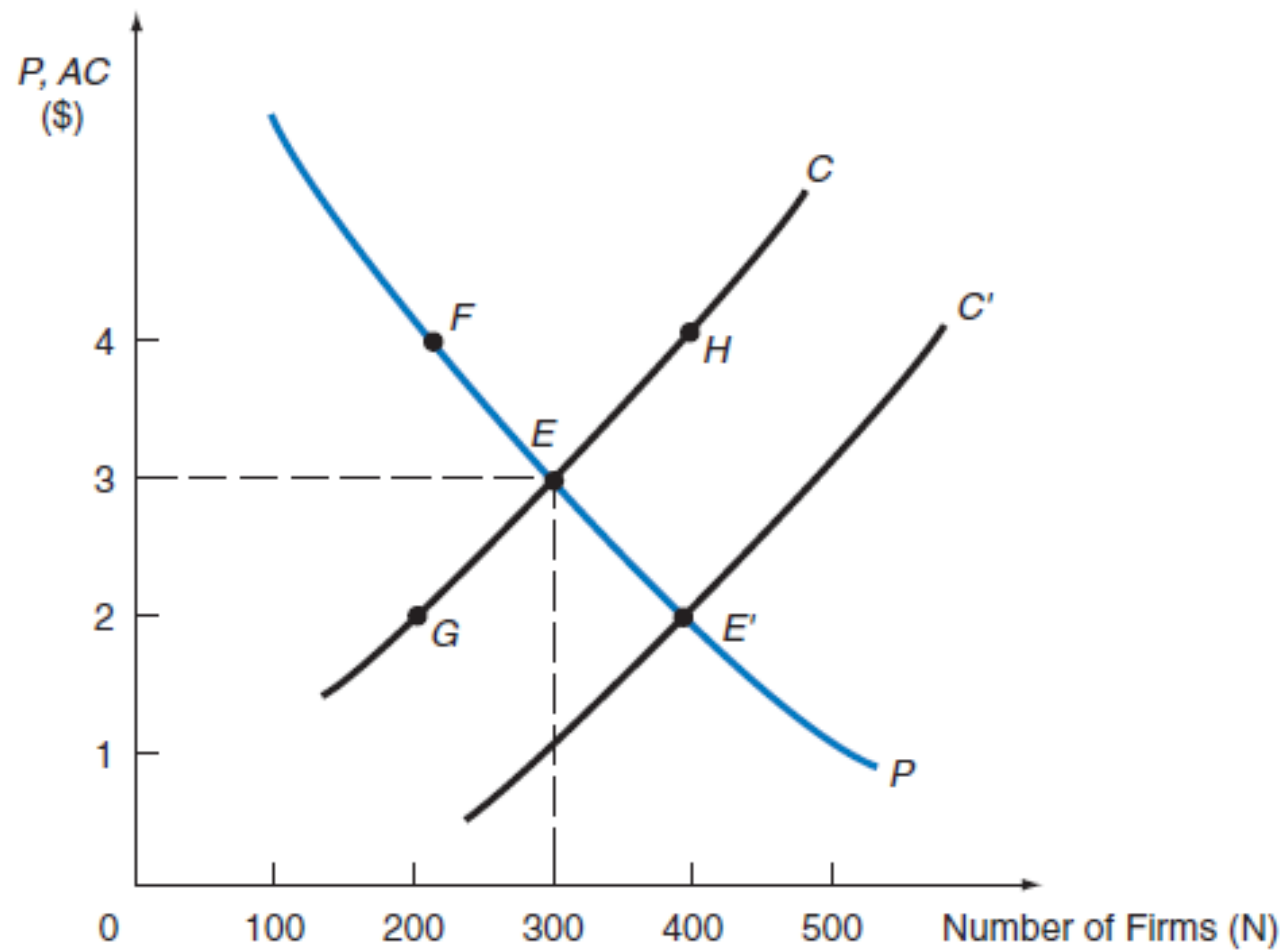
Intra- Industry trade: Measure

- Intra- Industry trade index T

$$T = 1 - \frac{|X - M|}{X + M}$$

- X- value of exports; M- value of imports

- The value of T ranges from 0 to 1. $T = 0$ when a country only exports or only imports the good in question (i.e., there is no intra-industry trade). On the other hand, if the exports and imports of a good are equal, $T = 1$ (i.e., intra-industry trade is maximum).

Monopolistic Competition And Intra-Industry trade

Monopolistic Competition And Intra-Industry trade

- Curve P shows the relationship between the number of firms in the industry and the product price. Curve P is negatively sloped, showing that the larger the number of firms in the industry the lower is the product price because competition is greater or more intense with more firms in the industry

- Curve C, on the other hand, shows the relationship between the number of firms in the industry and their average cost of production for a given level of industry output. Curve C is positively sloped, showing that the larger N is, the greater their AC is. The reason is that when more firms produce a given industry output, each firm's share of the industry output will be smaller, and so each firm will incur higher average costs of production

Monopolistic Competition And Intra-Industry trade

- The intersection of curve *P* and curve *C* defines equilibrium point *E*, at which $P = AC = \$3$ and $N = 300$ and each firm breaks even (i.e., makes zero profits).

- With 200 firms, $P = \$4$ (point *F*), while $AC = \$2$ (point *G*). Since firms will then be earning profits, more firms will enter the industry until long-run equilibrium point *E* is reached.

- On the other hand, with $N = 400$, $P = \$2$ (point *E*), while $AC = \$4$ (point *H*). Since now all firms incur losses, some firms will leave the industry until long-run equilibrium point *E* is reached.

- By opening up or expanding international trade and thus becoming part of a much larger integrated world market, firms in each nation can specialize in the production of a smaller range of products and face lower average costs of production.

- Consumers in each nation would benefit both from lower product prices and from the larger range of commodities. This is shown by the downward shift of curve *C* to curve C in the figure.

Monopolistic Competition And Intra-Industry trade

- The Curve *C* shifts down to curve *C'* because an increase in market size or total industry sales increases the sales of each firm, for any given number of firms in the industry and lowers the average production cost of each firm.

- The downward shift in curve *C* to curve *C* leads to new long-run equilibrium point *E*, *P* = *AC* = $2 and *N* = 400, as compared with original equilibrium point *E* (with *P* = $3 and *AC* = $3).

- Note that the increase in total industry sales does not affect the *P* curve