Lecture 8 Scale Production and Monopolistic Competition

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Reference: Feenstra and Taylor, 2017, CH6 Increasing Returns to Scale and Monopolistic Competition

"Traditional theory builds on the idea that countries differ in resources like capital and labor, thereby explaining why poor countries export agricultural products and import industrial goods from richer countries. But traditional theory does not explain why, in reality, world trade is dominated by rich countries trading similar goods with each other. For instance, a country like Sweden exports Volvo and SAAB cars but also imports BMW and Toyota cars. Krugman's ideas can explain these trade patterns. His theory stresses the importance of "economies of scale", the fact that many goods can be produced more cheaply in long series. The diagram shows how the average cost declines as fixed costs like research and development are absorbed by larger volumes. Consumers like variety. Some might prefer simple, generic jeans, for example, while others search out exclusive designer clothes. Because of these demands, small scale producers catering for local markets are often transformed into large firms exporting to the world market, where firms with similar products, but different brands, compete with each other. Worldwide trading allows firms to specialize and to exploit economies of scale. This leads to lower prices and more product variety for consumers."

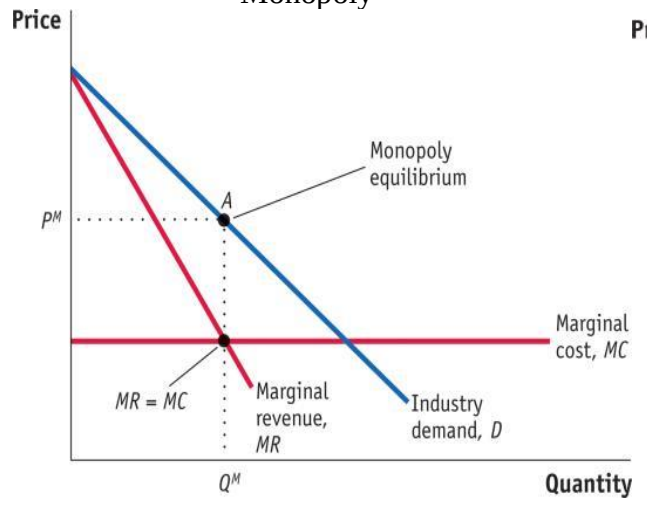
—2008 Nobel Prize in Economics Illustration

I. Model Assumptions

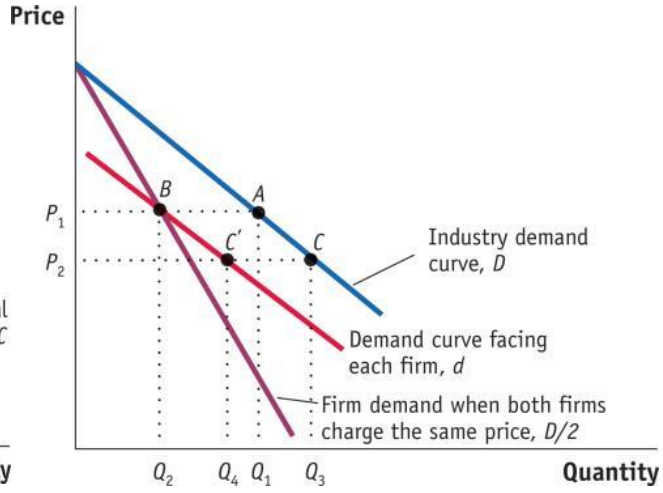
1. Each firm produces a good that is similar to but differentiated from the other firms' products.
2. There are many firms in the industry engaging in monopolistic competition.
3. Firms produce using a technology with increasing returns to scale.
4. Firms can enter and exit the industry freely. Monopoly profits are zero in the long run.

II. Monopoly and Competitive Firms

Monopoly



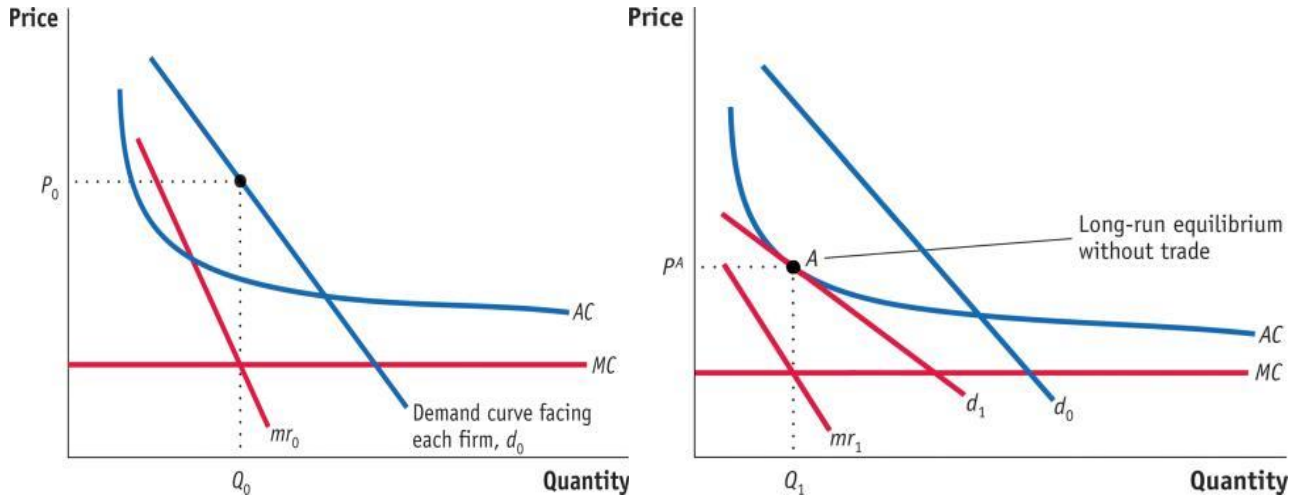
Duopoly



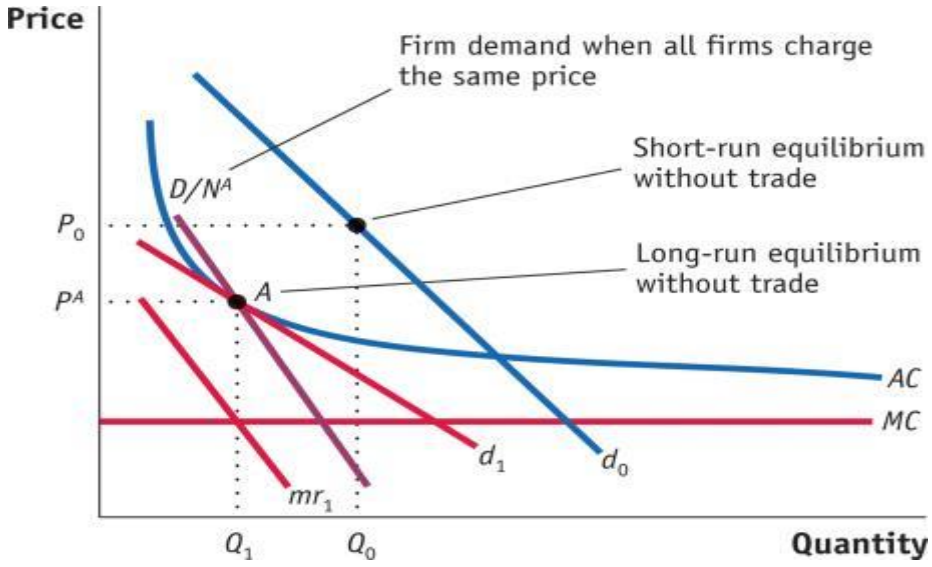
1. Monopoly equilibrium: MR=MC profit maximization.
2. Duopoly: identical product implies that all firms split the market demand curve equally whereas differentiated products implies more elastic demand facing each firm than the identical firms.
3. D is the market demand curve, D/2 is individual firm's demand curve under duopoly with identical product, and d is the demand curve facing a monopolistic firm with differentiated product.

III. Autarky Equilibrium

1. Short-run monopolistic competition: positive economic rent.
2. Long-run monopolistic competition: zero economic rent.

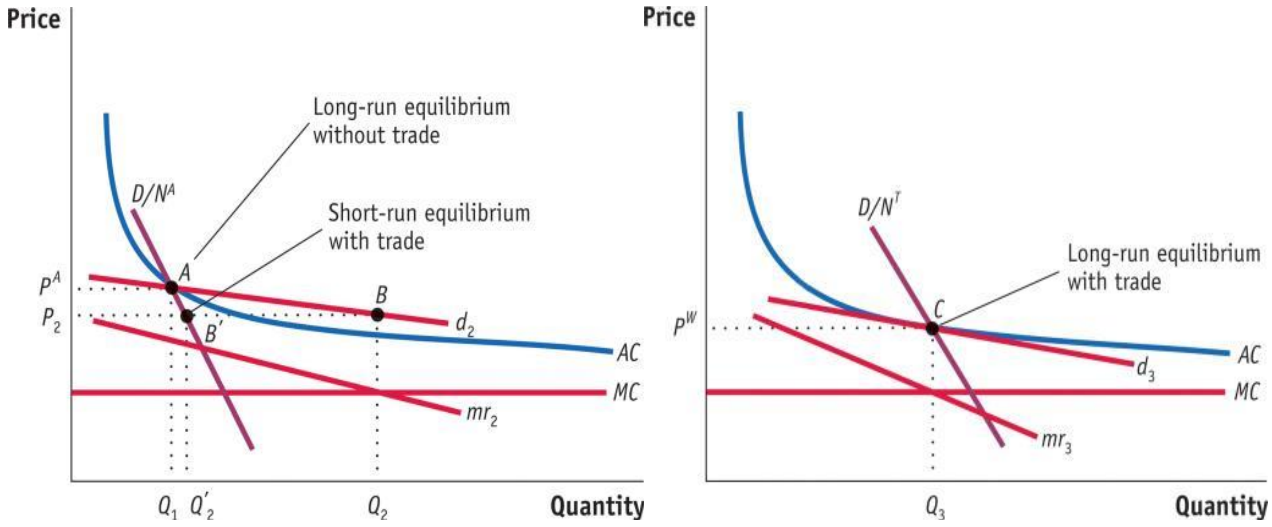


3. In the long-run equilibrium, firms earn zero monopoly profits and there is no entry or exit. The quantity produced by each firm is less than in short-run equilibrium. Q_1 is less than Q_0 because new firms have entered the industry. With a greater number of firms and hence more varieties available to consumers, the demand for each variety d_1 is less than d_0. The demand curve D/N^A shows the no-trade demand when all firms charge the same price were the product identical.



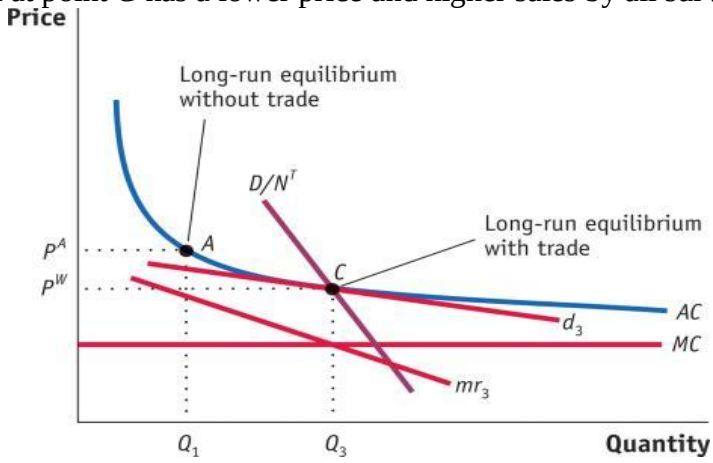
IV. Trade Equilibrium (short-run positive rent competes away in the long-run)

1. When trade is opened, the larger market makes the firm's demand curve more elastic, as shown by d_2 (with marginal revenue curve, mr_2). The firm chooses to produce the quantity Q_2 at which marginal revenue equals marginal costs; corresponding to price of P_2. With sales Q_2 at price P_2, the firm makes monopoly profits since price is greater than AC.



2. The number of firms in the no-trade equilibrium in each country is N^A. The quantity demanded from each firm when all firm charges the same price is D/N^A. When trade opens, the number of customers doubles. Since there are twice as many consumers, but also twice as many firms, the ratio stays the same. The product varieties also double. With the greater number of varieties available, the demand for each individual variety will be more elastic. ($P_2<P_A$, $Q_2>Q_A$, $N_T<N_A$)
3. Assume Home and Foreign are exactly the same (number of consumers and their preferences, technology and cost curves, number of firms in the no-trade equilibrium). Without economies of scale, there would be no reason for trade. Similarly: Under the Ricardian model, countries with identical technologies would not trade. Under the H-O model, countries with identical factor endowments would not trade. *Under monopolistic competition, two identical countries will still engage in trade!*
4. When all firms lower their prices to P_2, however, the relevant demand curve is D/N^A, which indicates that they can sell only Q'_2 at price P_2. At this short-run equilibrium (point B'), price is less than average cost and all firms incur losses. Thus, some firms are forced to exit the industry.
5. Long run monopolistic competition: Since firms are making losses, some of them will exit the industry. Firm exit will increase demand for the remaining firms' products and decrease the available product varieties to consumers. We now have N^T firms which is fewer than the N^A firms we had before (note that $\boldsymbol{N^T<N^A<2N^T<2N^A}$). The new demand D/N^T lies to the right of D/N^A.
6. The long-run equilibrium with trade occurs at point C. At this point, profits are maximized for each firm producing Q_3 (which satisfies $mr_3 = MC$) and charging price P^W (which equals AC). Since monopoly profits are zero when price equals average cost, no firms enter or exit the industry.

7. Compared with the long-run equilibrium without trade, d_3 (along with mr_3) has shifted out as domestic firms exited the industry and has become more elastic due to the greater total number of varieties with trade, $2N^T > N^A$. Compared with the long-run equilibrium without trade at point *A*, the trade equilibrium at point *C* has a lower price and higher sales by all surviving firms.



8. The long-run equilibrium at point *C* has two sources of gains from trade for consumers: *A drop in price.* The lower price is a result of increased productivity of the surviving firms coming from increasing returns to scale. *An increase in variety.* Although there are fewer product varieties made within each country (by fewer firms), consumers have more product variety because they can choose products of the firms from both countries after trade.
9. Adjustment costs associated with monopolistic competition: as some firms shut down or exit the industry. Workers in those firms experience a spell of unemployment. Over the long run, however, we could expect those workers to find new jobs, so these costs are temporary.

VI. Empirical evidence

1. The index of intra-industry trade: the minimum of import and export divided by half of total import and export. It tells us what proportion of trade in each product involves both imports and exports: A high index (up to 100%) indicates that an equal amount of the good is imported and exported, whereas a low index (0%) indicates that the good is either imported or exported but not both.

Table: Index of Intra-Industry Trade for the United States, 2014

Product	Value of Imports ($ millions)	Value of Export ($ millions)	Index of Intra-Industry Trade (%)
Vaccines	3,557	2,406	81
Frozen orange juice	15	10	79
Whiskey	1,740	1,095	77
Natural gas	12,639	7,312	73
Golf clubs	399	157	56
Small cars	86,400	24,263	44
Mattresses	201	54	42
Apples	18	89	34
Sunglasses	1,287	248	32
Golf carts	12	138	16
Telephones	468	32	13
Large passenger aircraft	10,057	168,171	11
Men's shorts	881	24	5

2. Intra-industry trade: golf clubs
   1) The United States imports and exports in large quantities of golf clubs, which illustrates how a country can both buy a product and sell it to other countries.

(a) IMPORTS

Rank	Country	Value of Imports ($ thousands)	Quantity of Golf Clubs (thousands)	Average Price ($/club)
1	China	339,965	13,510	25
2	Taiwan	24,708	396	62
3	Vietnam	24,399	1,187	21
4	Japan	7,152	62	115
5	Mexico	940	24	39
6	Thailand	754	9	88
7	Hong Kong	312	12	26
8	United Kingdom	219	14	15
9	Australia	182	4	51
10	Canada	172	3	68
11	Bangladesh	139	58	2
12	Cameroon	25	1	41
13–21	Various countries	43	1	45
	All 21 countries	399,010	15,280	26

(b) EXPORTS

Rank	Country	Value of Imports ($ thousands)	Quantity of Golf Clubs (thousands)	Average Price ($/club)
1	Canada	53,136	642	83
2	Japan	31,627	264	120
3	Korea	25,122	181	139
4	Australia	12,790	143	89
5	Hong Kong	10,845	64	168
6	United Kingdom	7,268	67	109
7	Singapore	5,206	40	130
8	Mexico	2,542	28	90
9	New Zealand	1,471	17	87
10	Thailand	1,078	8	135
11	Argentina	899	10	93
12	Chile	677	8	88
13–66	Various countries	4,429	39	113
	All 66 countries	157,091	1,512	104

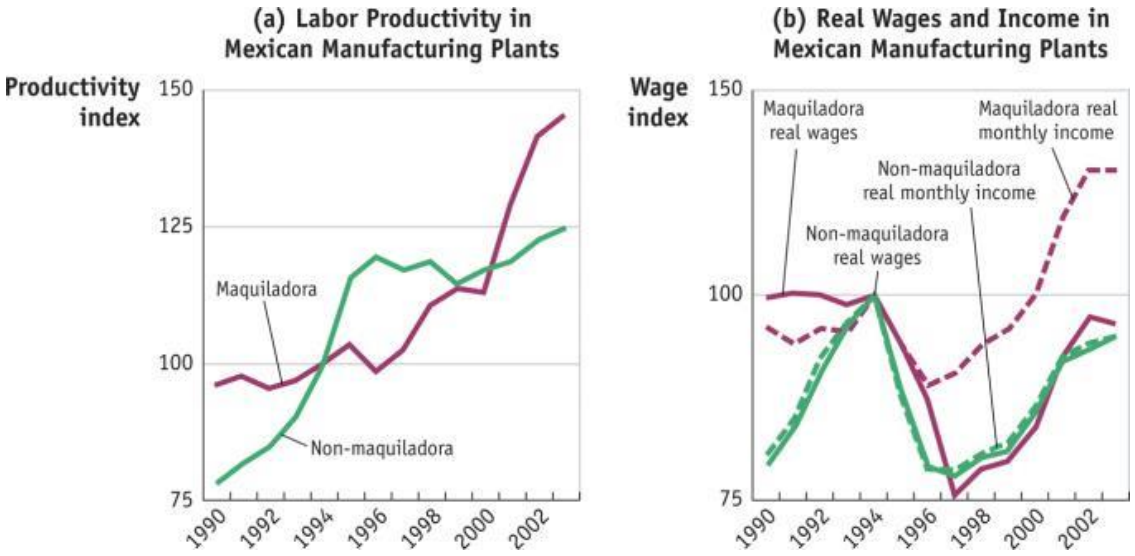
3. NAFTA gains and losses

1) The monopolistic competition model has two sources of gains from trade: 1) The rise in productivity due to expanded output by surviving firms, which leads to lower prices. 2) The expansion in the overall number of varieties of products available to consumers with trade. However, since some firms exit the market, there are short-run adjustment costs due to worker displacement.
2) Written on the twentieth anniversary of NAFTA, two articles (2014 NY Times and Financial Times) give starkly different accounts of the impact of NAFTA on American workers. a) Adam Posen emphasizes only positive impacts of NAFTA, such as the consumer gains from lower prices and the potential for job creation in the U.S. as U.S. companies expanded in both countries. b) David Bonior. He emphasizes only the negative impact of NAFTA, and argues that it led to large job losses in the United States as firms moved to Mexico.

Table: Mexico's export variety to the U.S. 1990-2001

	Agriculture	Textiles and Garments	Wood and Paper	Petroleum and Plastics	Mining and Metals	Machinery and Transport	Electronics	Average
1990	42%	71%	47%	55%	47%	66%	40%	52%
2001	51	83	63	73	56	76	66	67
Annual growth	1.9	1.4	2.6	2.5	1.7	1.3	4.6	2.2

3) Adjustment Costs in the United States: From 1994 to 2002, about 525,000 workers, or about 58,000 per year, lost their jobs and were certified as adversely affected by trade under the NAFTA-TAA program. The annual number of workers displaced in manufacturing was 4 million or 444,000 workers per year. The NAFTA layoffs of 58,000 workers would correspond to about 13% of total displacement—this is a substantial amount. Suppose that the average length of unemployment for laid-off workers is 3 years. If the average yearly earnings for manufacturing workers was $31,000 in 2000, then each displaced worker lost $93,000 in wages. This amounts to $5.4 billion per year during the first nine years of NAFTA.
4) Gains and adjustment costs for Canada: University of Toronto Professor Daniel Trefler studied the short-run effect of the Canada–United States Free Trade Agreement on employment in Canada, and the long-run effect on productivity and wages. In Canada, there were very large initial declines in employment. Over time, however, these job losses were more than made up for by the creation of new jobs elsewhere in manufacturing. Productivity growth in Canada allowed for a modest rise in real earnings.
5) Gains and Adjustment Costs for Mexico: NAFTA increased the productivity of the maquiladora plants over and above the increase in productivity that occurred in the rest of Mexico. Productivity and real monthly income grew faster in the maquiladora plants because of increased trade with the United States. For workers, however, there was a fall of more than 20% in real wages in both manufacturing and agriculture, despite a rise in productivity. The unexpected declines are attributed to the devaluation of the peso during the financial crisis shortly after Mexico joined NAFTA.



6) Summary NAFTA: For the United States, the long-run gains have consisted of an expansion of varieties, and a fall in consumer prices. It is clear that for Canada and the United States, the long-run gains considerably exceed the short-run costs. In Mexico, the gains have not translated into the growth of real wages for workers. However, the real earnings of higher-income workers in the maquiladora sector have risen. They have been the principal beneficiaries of NAFTA so far.

Appendix

Firms' demand curve and international trade: Increased competition—absent any increase in market size—leads to an inward shift of each firm's residual demand curve. On the other hand, holding competition fixed, a larger market rotates out the residual demand curves for all firms.

Readings

Information about the Prize in Economic Sciences 2008: www.kva.se, http://nobelprize.org, www.nobelmuseet.se

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