Public Affairs 856
Trade, Competition, and Governance in a Global Economy

Lecture 6

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Introduction

- The argument from the Ricardian model that trade generates gains for *all* workers was too simple because labor is the only factor of production.
- We relax that assumption with the **specific-factors model** where land is specific to the agriculture sector and capital is specific to the manufacturing sector; labor is used in both sectors.
- From the Ricardian model, we learned that free trade affects relative prices, and this in turn affects the earnings of factors of production.
- The question addressed by the specific-factors model is how trade, through changes in *relative prices*, affect the earnings of labor, land, and capital.

1 Specific-Factors Model

The specific factor model we will develop have the following features:

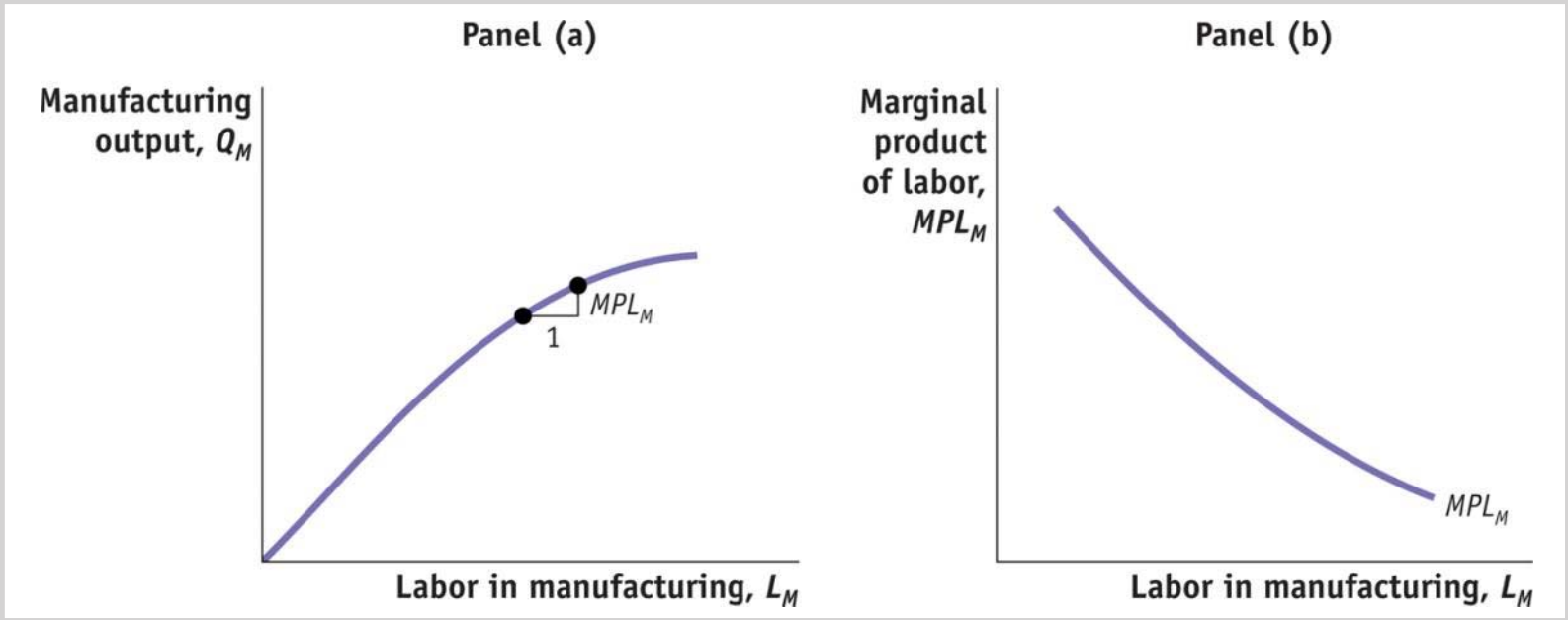
- once again there are two countries: Home and Foreign,
- manufacturing uses labor and capital, and agriculture uses labor and land, and
- in each industry, increases in the amount of labor used are subject to **diminishing returns**, that is, the marginal product of labor declines as the amount of labor used in the industry increases.

For now lets focus on the home country.

1 Specific-Factors Model

The Home Country

FIGURE 3-1



Panel (a) Manufacturing Output As more labor is used, manufacturing output increases, but it does so at a diminishing rate.

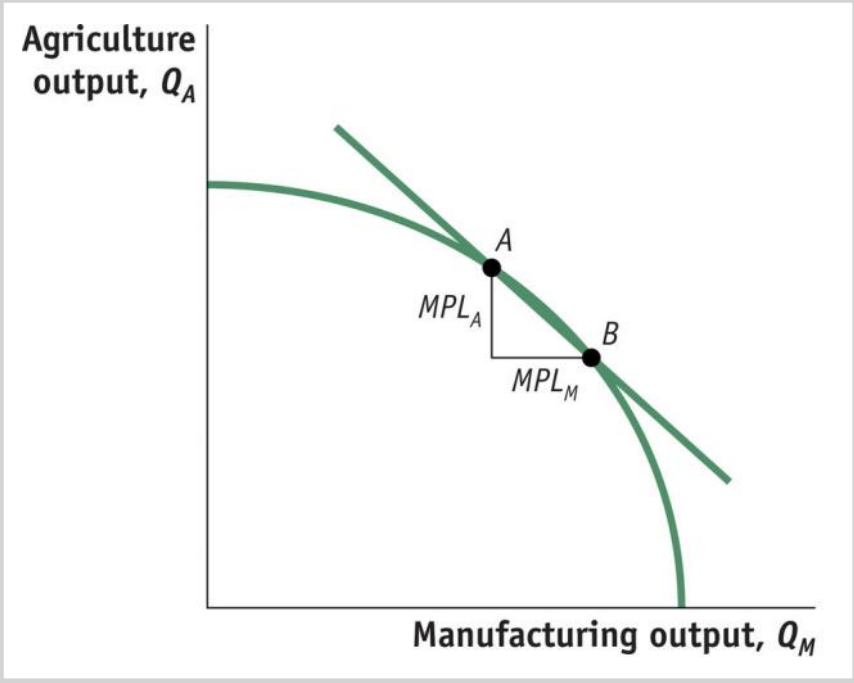
Panel (b) Diminishing Marginal Product of Labor An increase in the amount of labor used in manufacturing lowers the marginal product of labor.

1 Specific-Factors Model

The Home Country

Production Possibilities Frontier

FIGURE 3-2



Production Possibilities Frontier

The production possibilities frontier shows the amount of agricultural and manufacturing outputs that can be produced in the economy with labor.

1 Specific-Factors Model

The Home Country

Opportunity Cost and Prices

- As in the Ricardian model, the slope of the PPF equals the opportunity cost or relative price of the good on the horizontal axis: here it is manufacturing.

- Firms hire labor up to the point where the cost of one more hour of labor (the wage) equals the value of one more hour of labor in production.

$$W = P_M \cdot MPL_M$$

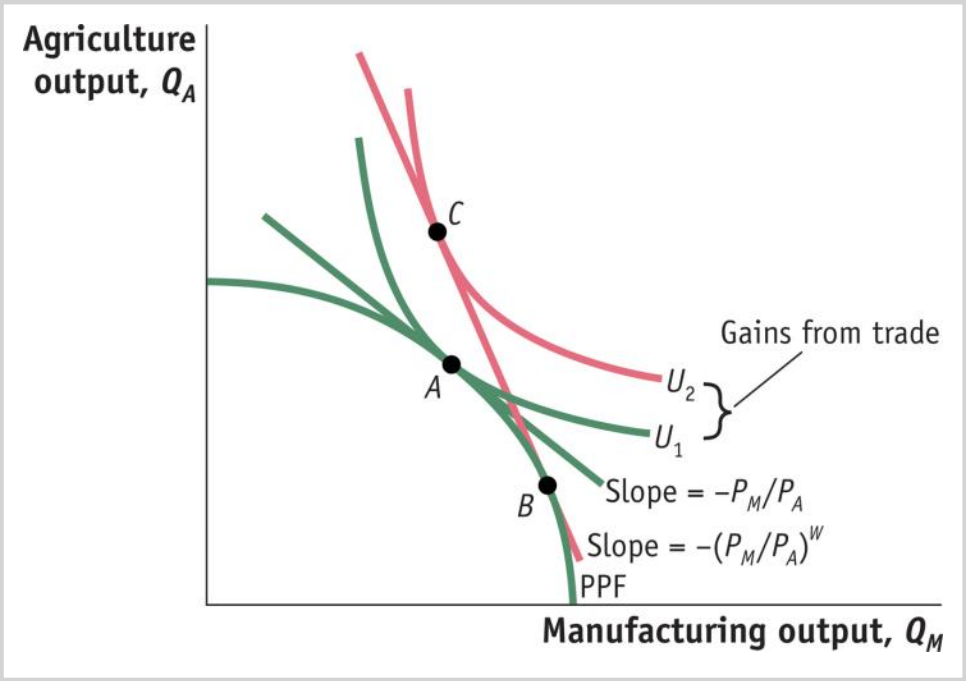
$$W = P_A \cdot MPL_A$$

1 Specific-Factors Model

The Home Country

Opportunity Cost and Prices

FIGURE 3-3 Increase in the Relative Price of Manufactures



In the absence of international trade, the economy produces and consumes at point *A*.

The relative price of manufactures, P_M/P_A, is the slope of the line tangent to the PPF and indifference curve U_1, at point *A*.

With international trade, the economy is able to produce at point *B* and consume at point *C*.

The world relative price of manufactures, $(P_M/P_A)^W$, is the slope of the line *BC*.

The rise in utility from U_1 to U_2 is a measure of the gains from trade for the economy.

1 Specific-Factors Model

The Foreign Country

- Let us assume that the Home no-trade relative price of manufacturing is *lower* than the Foreign relative price.

$$(P_M/P_A) < (P^*_M/P^*_A)$$

- This means that Home can produce manufactured goods relatively cheaper than Foreign.
- Put another way, Home has a comparative advantage in manufacturing.

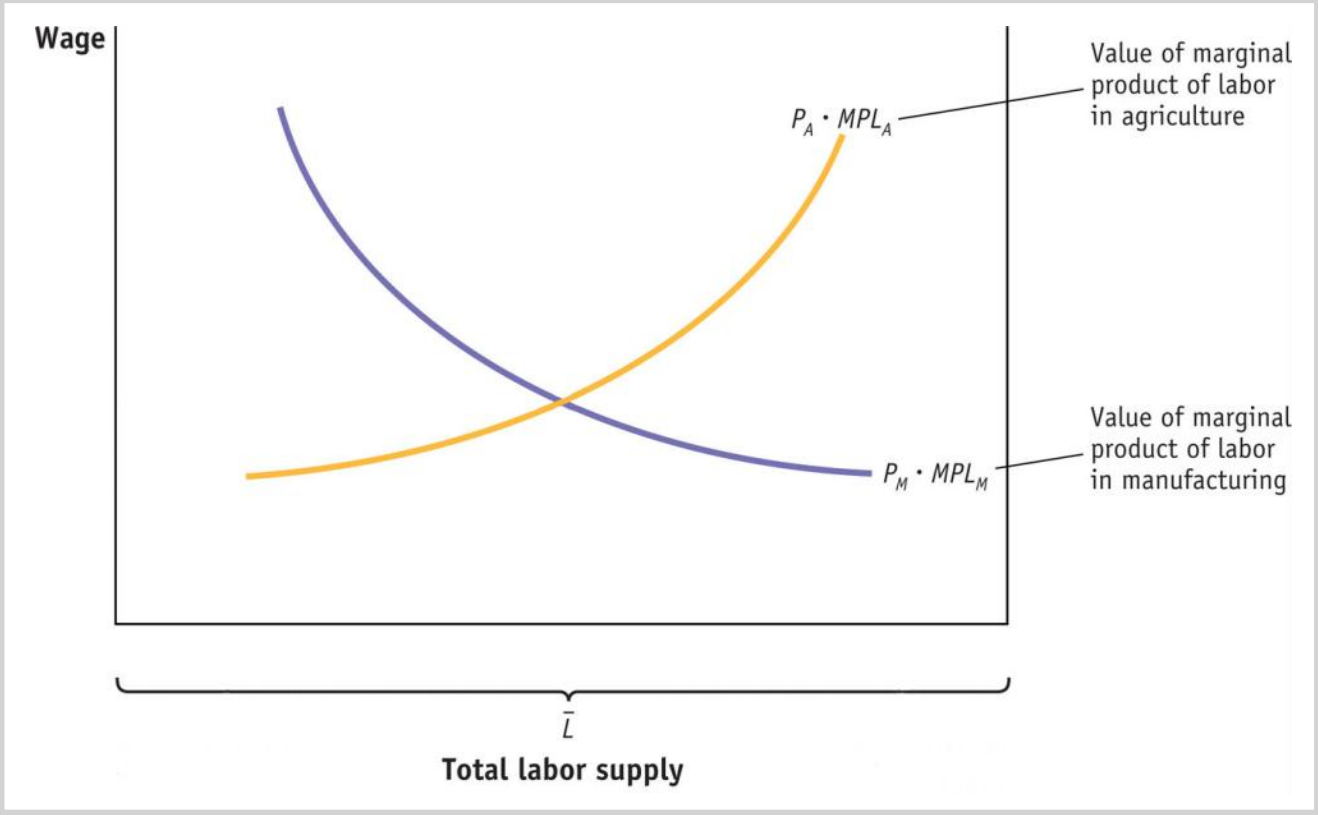
Overall Gains from Trade

- The good whose relative price goes up (manufacturing, for Home) is exported.
- The good whose relative price goes down (agriculture, for Home) is imported.
- By exporting manufactured goods at a higher price and importing food at a lower price, Home is better off than it was in the absence of trade.

2 Earnings of Labor

Determination of Wages

FIGURE 3-4 (1 of 2) Allocation of Labor Between Manufacturing and Agriculture

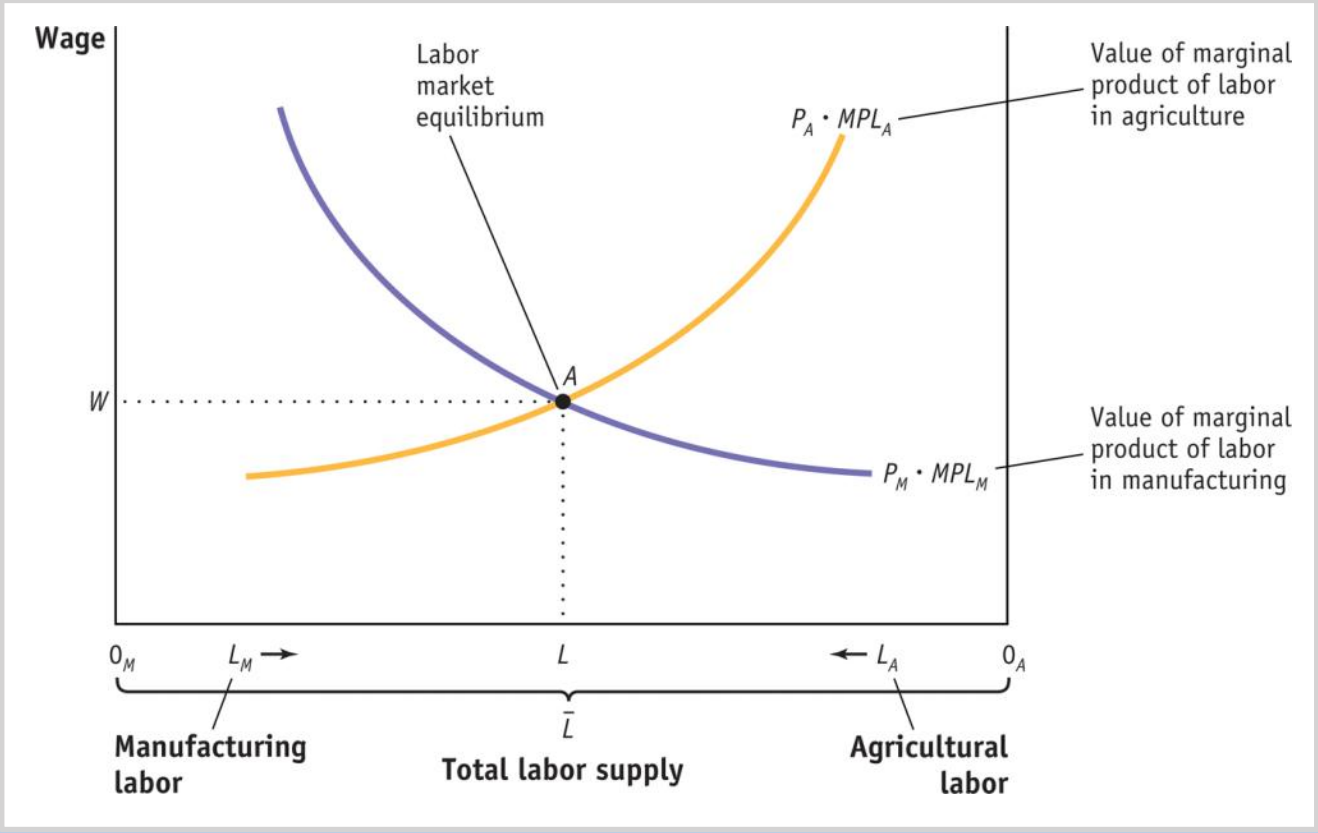


The amount of labor used in manufacturing is measured from left to right along the horizontal axis, and the amount of labor used in agriculture is measured from right to left.

2 Earnings of Labor

Determination of Wages

FIGURE 3-4 (2 of 2) Allocation of Labor Between Manufacturing and Agriculture (continued)



Labor market equilibrium is at point A. At the equilibrium wage of W, manufacturing uses $0_M L$ units of labor and agriculture uses $0_A L$ units.

Change in Relative Price of Manufactures

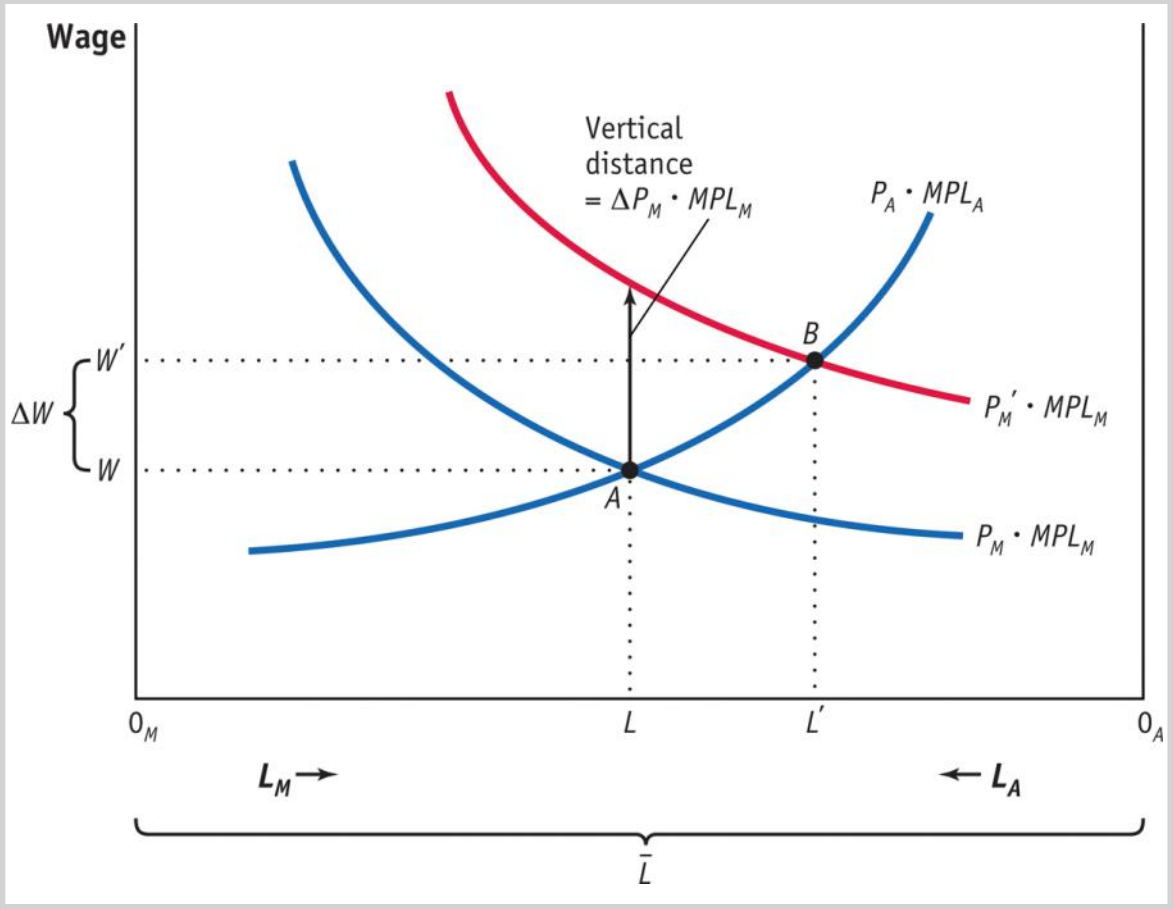
Now consider an increase in the price of the manufactured good (P_M).

- With an increase in the price of the manufactured good the curve $P_M \bullet MPL_M$ shifts up.
- Therefore, the labor used in manufacturing rises, and labor used in agriculture falls.
- The wages also increase, but this increase is less than the upward shift $\Delta P_M \bullet MPL_M$.

2 Earnings of Labor

Change in Relative Price of Manufactures

FIGURE 3-5



Increase in the Price of Manufactured Goods

With an increase in the price of the manufactured good, the curve $P_M \bullet MPL_M$ shifts up to $P_M' \bullet MPL_M$ and the equilibrium shifts from point A to B.

The labor used in manufacturing rises from $0_M L$ to $0_M L'$, and labor used in agriculture falls from $0_A L$ to $0_A L'$.

The wage increases from W to W', but this increase is less than the upward shift $\Delta P_M \bullet MPL_M$.

2 Earnings of Labor

Change in Relative Price of Manufactures

Effect on Real Wages

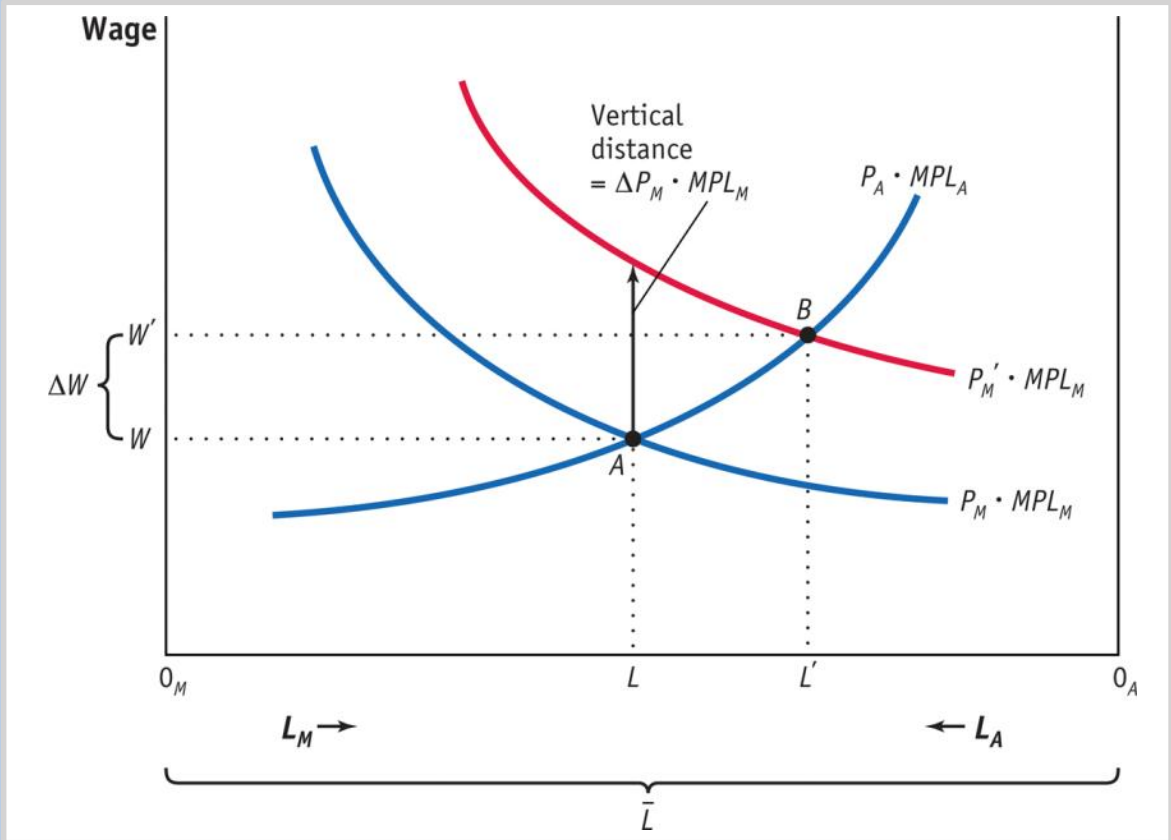
- As we can see from Figure 3-5, the increase in the wage from W to W' is *less than* the vertical increase $\Delta P_M \cdot MPL_M$
- Since $\Delta W/W < \Delta P_M/P_M$, the percentage increase in the wage is *less than* the percentage increase in the price of the manufactured good.
- This inequality means that the amount of the manufactured good that can be purchased with the wage has fallen.
- Therefore, the ***real wage*** *in terms of the manufactured good* W/P_M has decreased.

2 Earnings of Labor

Change in Relative Price of Manufactures

Effect on Real Wages

FIGURE 3-5



Once again, since $\Delta W/W < \Delta P_M/P_M$, the percentage increase in the wage is *less than* the percentage increase in the price of the manufactured good.

The manufactured good that can be purchased with the wage has fallen.

Therefore, the *real wage in terms of the manufactured good W/PM* has decreased.

2 Earnings of Labor

Change in Relative Price of Manufactures

Overall Impact on Labor

- In the specific-factors model, the increase in the price of the manufactured good has an ambiguous effect on the real wage and therefore an *ambiguous* effect on the well-being of workers. Although ambiguous, this conclusion is important.
- The result is different than what was found in the Ricardian model, where labor unambiguously earned a higher real wage.
- This warns us that one cannot make unqualified statements about the effects of trade on workers.
- The effect of trade on real wages can be complex.

2 Earnings of Labor

Change in Relative Price of Manufactures

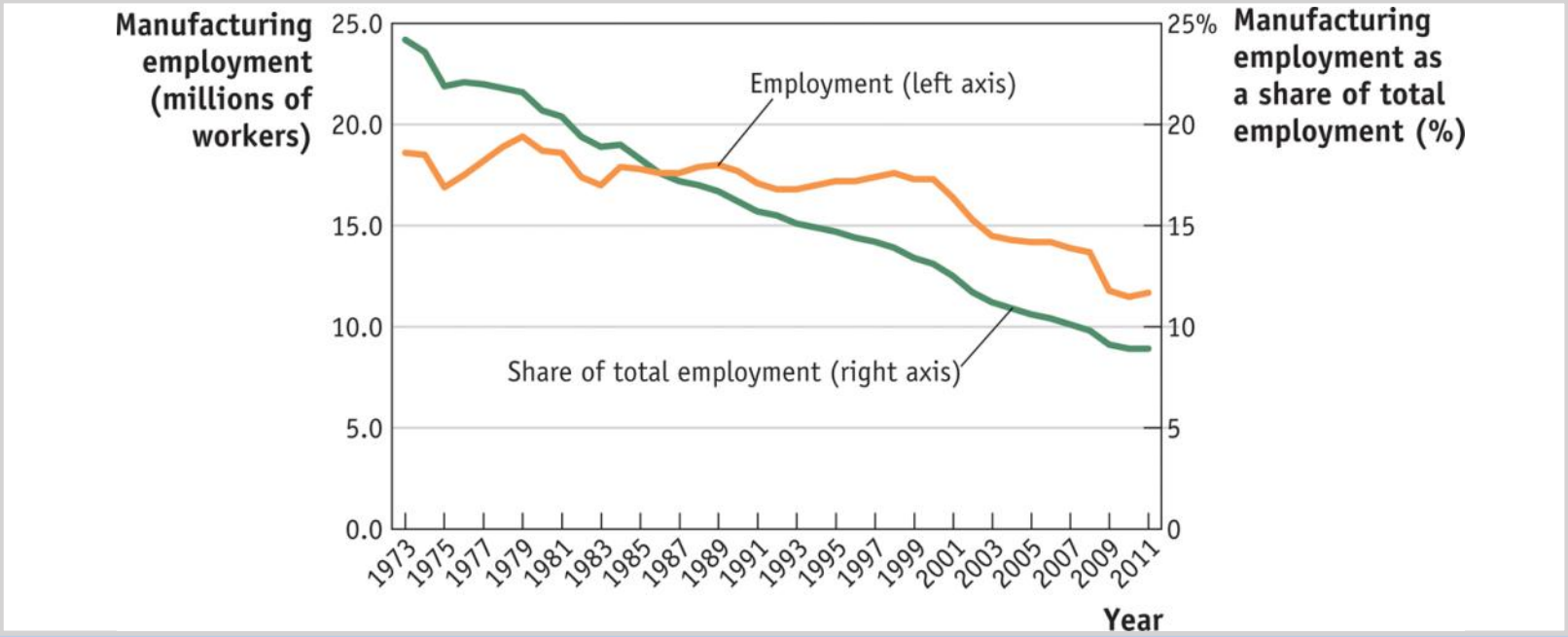
Unemployment in the Specific-Factors Model

- It is hard to combine business cycle models with international trade models to isolate the effects of trade on workers.
- Once we recognize that workers can find new jobs—possibly in export industries that are expanding—so we still cannot conclude that trade is necessarily good or bad for workers.
- Next we look at some evidence from the United States on the amount of time it takes to find new jobs and on the wages earned, and at attempts by governments to compensate workers who lose their jobs because of import competition. This type of compensation is called **Trade Adjustment Assistance (TAA)** in the United States.

APPLICATION

Manufacturing and Services in the United States: Employment and Wages Across Sectors

FIGURE 3-6 U.S. Manufacturing Sector Employment, 1973–2011

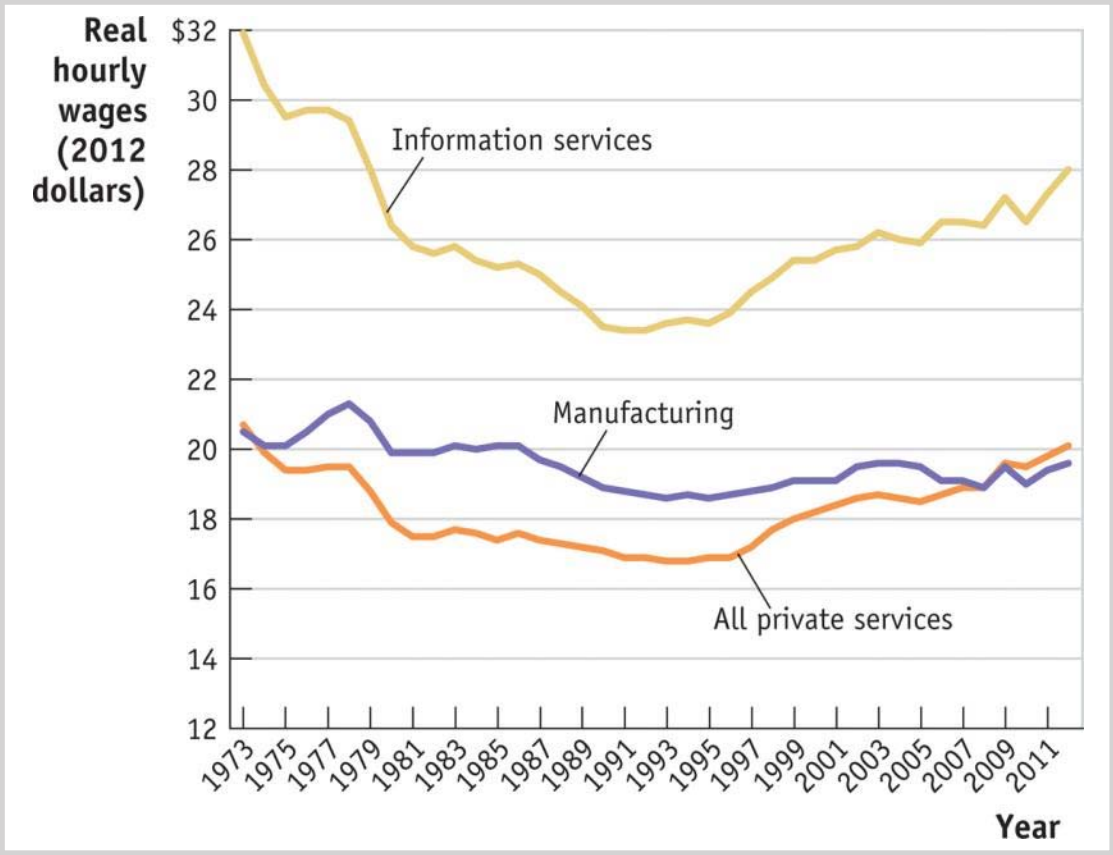


Employment in the U.S. manufacturing sector is shown on the left axis, and the share of manufacturing employment in total U.S. employment is shown on the right axis. Both manufacturing employment and its share in total employment have been falling over time, indicating that the service sector has been growing.

APPLICATION

Manufacturing and Services in the United States: Employment and Wages Across Sectors

FIGURE 3-7 (1 of 2) Real Hourly Earnings of Production Workers



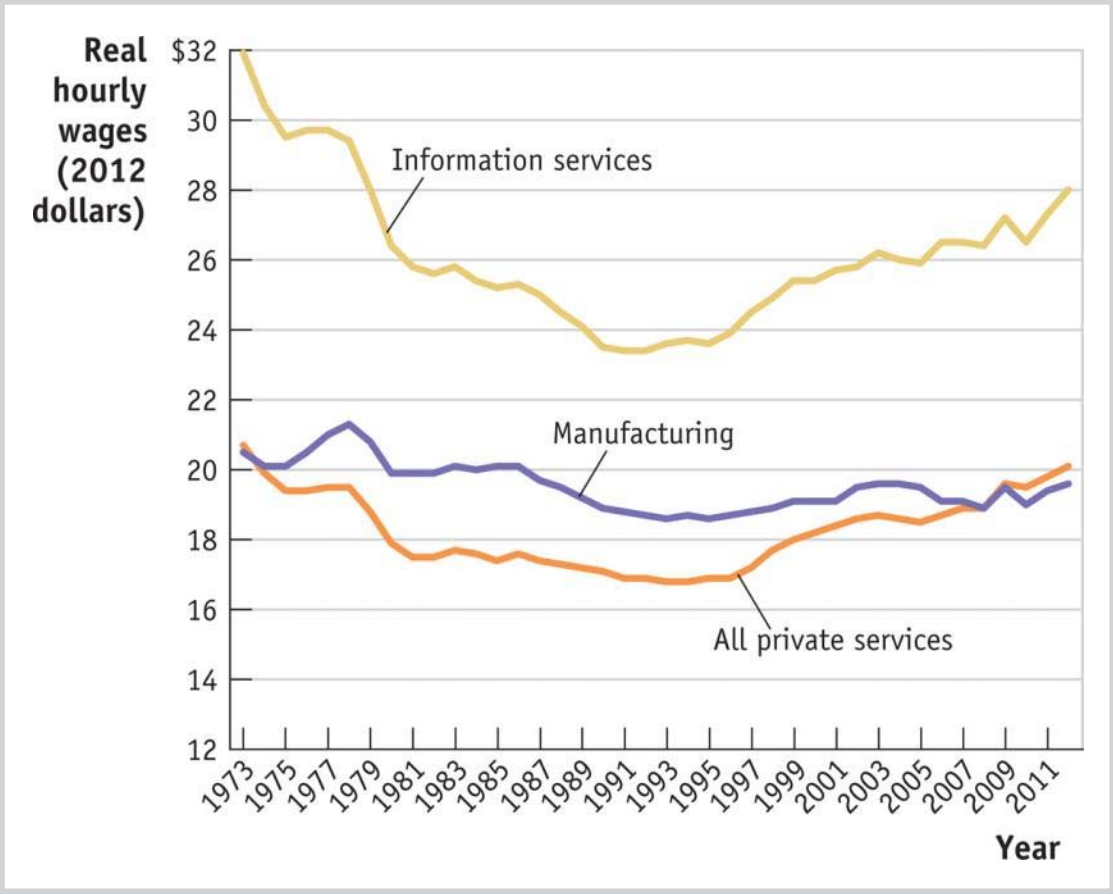
This chart shows the real wages (in constant 2012 dollars) earned by production workers in U.S. manufacturing, in all private services, and in information services (a subset of all private services).

Services includes wholesale and retail trade, finance, law, education, information technology, software engineering, consulting, and medical and government services.

APPLICATION

Manufacturing and Services in the United States: Employment and Wages Across Sectors

FIGURE 3-7 (2 of 2) Real Hourly Earnings of Production Workers (continued)



While wages were slightly higher in manufacturing than in all private services from 1974 through 2007, all private service wages have been higher since 2008.

This change is due in part to the effect of wages in the information service industry, which are substantially higher than those in manufacturing.

APPLICATION

Manufacturing and Services in the United States: Employment and Wages Across Sectors

TABLE 3-1

Job Losses in Manufacturing and Service Industries, 2009-2011

This table shows the number of displaced (or laid-off) workers in manufacturing and service industries from 2009 to 2011.

Industry	Total Displaced Workers (thousands) January 2009–December 2011	PERCENTAGES		
		Workers Reemployed by January 2012	Of the Workers Reemployed:	
			Earn Less in New Job	Earn Same or More in New Job
Total	6,121	56%	54%	46%
Manufacturing industries	1,183	56%	65%	35%
Service industries	2,613	57%	49%	51%

In the three years from January 2009 to December 2011 about 1.2 million workers were displaced in manufacturing and 2.6 million in all service industries. Roughly 56% of the workers displaced from 2009 to 2011 were re-employed by January 2012. In manufacturing about two-thirds (65%) earning less in their new jobs, while about half of workers reemployed in service industries were earning more at their new job.

APPLICATION

Trade Adjustment Assistance Programs: Financing the Adjustment Costs of Trade

- The unemployment insurance program in the United States provides some compensation, regardless of the reason for the layoff.
- In addition, the Trade Adjustment Assistance (TAA) program offers additional unemployment insurance payments and health insurance to workers who are laid off because of import competition and who are enrolled in a retraining program.
- Other countries also have programs like TAA to compensate those harmed by trade.
- Recently, as part of the jobs stimulus bill signed by President Obama on February 17, 2009, workers in the service sector (as well as farmers) who lose their jobs due to trade can now also apply for TAA benefits.

HEADLINES

Services Workers Are Now Eligible for Trade Adjustment Assistance

- Kennedy first introduced the Trade Adjustment Assistance (TAA) in the United States in 1962, for workers in manufacturing.
- Kennedy's concerns remain relevant: Technology and trade mean growth, innovation, and better living standards, but also change and instability.
- TAA was recently extended to include service workers.
- Kennedy's innovation is thus adapted to the 21st-century economy, guaranteeing today's workers the support their grandparents enjoyed.

3 Earnings of Capital and Land

Determining the Payments to Capital and Land

If Q_M is the output in manufacturing and Q_A is the output in agriculture, the revenue earned in each industry is $P_M \bullet Q_M$ and $P_A \bullet Q_A$, and the payments to capital and to land are:

$$\text{Payments to capital} = P_M \bullet Q_M - W \bullet L_M$$
$$\text{Payments to land} = P_A \bullet Q_A - W \bullet L_A$$

3 Earnings of Capital and Land

Determining the Payments to Capital and Land

The earnings of one unit of capital (a machine, for instance), which we call R_K, and the earnings of an acre of land, which we call R_T, are calculated as:

$$R_K = \frac{\text{Payments to capital}}{K} = \frac{P_M \cdot Q_M - W \cdot L_M}{K}$$

$$R_T = \frac{\text{Payments to land}}{T} = \frac{P_A \cdot Q_A - W \cdot L_A}{T}$$

Economists call R_K the **rental on capital** and R_T the **rental on land**.

3 Earnings of Capital and Land

Determining the Payments to Capital and Land

Change in the Real Rental on Capital

- As more labor is used in manufacturing, the marginal product of capital will rise because each machine has more labor to work it.
- In addition, as labor leaves agriculture, the marginal product of land will fall because each acre of land has fewer laborers to work it.
- The general conclusion is that *an increase in the quantity of labor used in an industry will raise the marginal product of the factor specific to that industry, and a decrease in labor will lower the marginal product of the specific factor.*

3 Earnings of Capital and Land

Determining the Payments to Capital and Land

- With labor leaving agriculture, the marginal product of each acre falls, so R_T/P_A also falls.
- The fact that R_T/P_A falls means that the real rental on land in terms of food has gone down, so landowners cannot afford to buy as much food.
- Thus, landowners are clearly worse off from the rise in the price of the manufactured good because they can afford to buy less of both goods.

3 Earnings of Capital and Land

Determining the Payments to Capital and Land

Summary

An increase in the relative price of an industry's output will increase the real rental earned by the factor specific to that industry but will decrease the real rental of factors specific to other industries.

This conclusion means that:

- the specific factors used in export industries will generally gain as trade is opened.
- the relative price of exports rises.
- the specific factors used in import industries will generally lose as trade is opened and the relative price of imports falls.

Application: Steel 1970-80's

2 Steel Protection in the 1980s: The Waning Influence of Big Steel?

Michael O. Moore

Volume Title: The Political Economy of American Trade Policy

Volume Author/Editor: Anne O. Krueger, ed.

2.3.2 Application to the Integrated Steel Sector

The highly effective coalition that has developed over the last few decades to limit steel imports has attributes consistent with the successful lobbying characteristics described above. The outstanding feature of the effort has been the stability of the alliance between integrated steel firms and the steelworkers' union. The most important sources of the steel coalition's integrity have been the relatively small number of actors in the group and the immobility of the factors employed in the integrated industry. These two elements have allowed the industry to consistently overcome the transaction costs of organizing an coalition to fight for import barriers.

Application: Steel 1970-80's

The immobility of steel industry inputs also enhances coalition building in favor of protection. Capital is highly specialized in the steel industry and generally very long lived. The relatively unskilled nature of steelworker tasks and higher than normal compensation for the manufacturing sector mean that economic rents can be substantial for steelworkers. Steel industry wages have consistently been much higher than average manufacturing wages. This suggests that steelworkers have strong incentives to resist transfer to other occupations. This immobility provides further incentives for steelworkers and capital owners to work together to obtain protection. It also leads to stability of the relationships, which in turn helps the AISI and USW work together effectively.

The Effects of U.S. Trade Protection for Autos and Steel
Author(s): Robert W. Crandall
Source: *Brookings Papers on Economic Activity*, Vol. 1987, No. 1 (1987), pp. 271-288

Table 1. U.S. Steel Consumption, Imports, and Prices, 1970–86
Dollars per metric ton unless otherwise indicated

Year	*Apparent consumption*[a] *(millions of tons)*	*Imports (millions of tons)*	*Import share (percent)*	*U.S. producers' price*[b]	*Antwerp spot export price*[c]	*U.S. price minus Antwerp price*
1970	97.1	13.4	13.8	149	n.a.	. . .
1971	102.5	18.3	17.9	159	n.a.	. . .
1972	106.6	17.7	16.6	169	n.a.	. . .
1973	122.5	15.2	12.4	179	249	−70
1974	119.6	16.0	13.4	238	354	−116
1975	89.0	12.0	13.5	261	237	24
1976	101.1	14.3	14.1	276	283	−7
1977	108.4	19.3	17.8	298	251	47
1978	116.6	21.1	18.1	330	315	15
1979	115.0	17.5	15.2	365	369	−4
1980	95.2	15.5	16.3	376	382	−6
1981	105.4	19.9	18.9	412	357	55
1982	76.4	16.7	21.8	399	332	67
1983	83.5	17.1	20.5	376	293	83
1984	98.9	26.2	26.4	389	296	93
1985	96.4	24.3	25.2	366	273	93
1986	89.7	20.7	23.1	361[d]	302	59

Sources: Consumption and imports are from American Iron and Steel Institute, *Annual Statistical Report*, various years. Average prices are calculated by the author using data from U.S. Department of Commerce, Bureau of the Census, *Steel Mill Products 1985*, Current Industrial Reports, Series MA33B (Government Printing Office, 1986) and earlier issues; and Paine Webber, Inc., *World Steel Dynamics: The Steel Strategist*, various issues.

n.a. Not available.

a. Apparent consumption excludes changes in inventories.

b. Weighted average of the prices of six carbon steel categories, using 1979 shipment shares as weights.

c. Weighted average Free on Board (FOB) spot export price of six carbon steel products from Antwerp.

d. Author's estimate.

Table 4. U.S. Steel Industry Profits and Investment, 1970–85
Billions of 1967 dollars

Year	*Profits*	*Investment*
1970	0.50	1.41
1971	0.51	1.03
1972	0.68	0.83
1973	1.05	0.93
1974	1.84	1.34
1975	1.09	1.83
1976	0.86	1.74
1977	0.01	1.50
1978	0.71	1.25
1979	0.62	1.42
1980	0.77	1.39
1981	1.16	1.28
1982	−1.38	1.30
1983	−1.48	1.13
1984	−0.10	1.23
1985	−0.46	1.43

Sources: Total profits of U.S. steel companies are from AISI, *Annual Statistical Report*, various years, adjusted by author for nonreporting companies and deflated by the overall consumer price index from the *Economic Report of the President, 1987*, table B-55. Investment is new plant and equipment expenditures from *Survey of Current Business*, vol. 66 (February 1986), deflated by the implicit price deflator for total private nonresidential investment from *Economic Report of the President, 1987*, table B-3, rebased to 1967.