Chapter 16
The Labor Market Effects of International Trade and Production Sharing

Summary

Freeing up resources so that they can be used more productively in other industries is the logic behind international trade. As trade protection has decreased and telecommunications and shipping technologies have improved, the movement of goods, services, and information across national borders has increased significantly. However, this has also led to increased competition between American workers and foreign workers as jobs are outsourced to other countries.

The basis for trade lies in differences in the internal costs of producing goods or services without trade, and this same logic applies whether we consider individuals or countries. Individuals must decide every day about which items to produce themselves versus purchasing, essentially “outsourcing” household tasks to others. Individuals, like countries, engage in trade, specializing in one or more activities and using the income obtained to purchase other goods and services through the market. For both individuals and countries, there are two types of costs involved in the decision to make something (produce something domestically) versus purchase it (trade for it). First, neither individuals nor firms are specialists in everything, and thus cannot produce all goods as efficiently or as well. Secondly, use of time or resources in the production of a good has an opportunity cost, the other goods that could be produced instead, or other ways in which the time could be spent. These opportunity costs arise because the same resources, whether time or production inputs, can only be used once.

Resources used to grow food, for example, are then no longer available to produce clothing, and the cost of the food is best measured by the amount of clothing the same resources could have produced. The relative costs of each good can be represented by the slope of each country’s production possibilities curve. Such a curve shows (for two goods) all the different combinations of goods that can be produced when a country efficiently uses all of its resources. Trade will cause shifts in employment between industries, but countries with high living standards and high wages need not fear permanent employment losses because of trade. While shifts in employment opportunities associated with free trade can cause temporary unemployment and hardship for those workers producing goods that will no longer be produced domestically, the overall effects of trade are higher living standards for both trading partners. The reason for this gain, and the irrelevance of a country’s internal wage rates to the process of trade, is explored in the following example.

Example

Suppose the United States is endowed with resources and technology such that producing an additional 1 unit of food ($F$) means that it must give up producing 1/3 a unit of clothing ($C$). Conversely, an additional 1 unit of clothing would require giving up 3 units of food. Furthermore, suppose the maximum amount of clothing that can be produced is 300 million units, and the maximum amount of food production is 900 million units. Provided the tradeoff between food and clothing is constant, this production possibilities curve can be represented by the equation

$$C = 300 - (1/3)F.$$
This curve is shown as line \( ab \) in Figure 16-2a.

In comparison, suppose Mexico can only produce a maximum of 200 units of clothing or 200 units of food. Its production possibilities curve can then be represented by the equation

\[
C = 200 - F.
\]

This curve is shown as line \( vw \) in Figure 16-2b. This curve implies that the real cost of an additional 1 unit of clothing is 1 unit of food, and an additional 1 unit of food involves a real cost of 1 unit of clothing.

From these production possibilities frontiers, we can infer the **comparative advantage** of each nation. Note first that the United States has an **absolute advantage**; the United States can produce absolutely more of both goods. But both nations are still able to gain from trade due to the difference in their opportunity costs of production. To find the opportunity costs of production, consider the slope of the production possibilities frontiers. The United States can produce 300 units of clothing or 900 units of food or any combination in between. Thus for every unit of food that the United States produces, it gives up \( \frac{1}{3} \) unit of clothing. This is the opportunity cost of food production in the United States. Similarly, Mexico can produce 200 units of clothing or 200 units of food or any combination in between. For every unit of food produced, Mexico gives up 1 unit of clothing; the opportunity cost of food production in Mexico is 1. Since the U.S. opportunity cost of food production is less than the Mexican opportunity cost of food production, we say that the United States has a comparative advantage in food. Similarly, we can show that Mexico’s opportunity cost of clothing is 1, while the U.S. opportunity cost of clothing is 3. Mexico has a comparative advantage in clothing production.

Both nations can thus gain from trade, regardless of initial wage levels. Suppose that before trading, the United States devoted two-thirds of its resources to food and one-third to clothing, producing the combination \( F = 600, C = 100 \) (point \( c \)). As a starting point for Mexico, suppose three-fourths of the resources are devoted to food and one-fourth to clothing, resulting in an initial combination of \( F = 150, C = 50 \) (point \( x \)). If we assume there are 100 million workers in the United States and 50 million in Mexico, then it is clear that living standards (i.e., real consumption per capita) would be higher in the United States than in Mexico. United States workers would average 6 units of food and 1 unit of clothing compared to 3 units of food and 1 unit of clothing for Mexican workers. Another way of interpreting this is to say that real wage rates are higher for American workers (since real per capita consumption is closely connected to real per capital income, which in turn reflects the real wages of the workers). Do these higher real wage rates pose a problem for American workers if the two countries now decide to trade?
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The answer is clearly no. Since it does not have unlimited resources, Mexico must make choices. If it chooses to produce more clothing and export some to the United States, it will be giving up the chance to produce food. The only way it makes sense for Mexico to export clothing to the United States is if it can replace the food production it is giving up by purchasing it more cheaply from the United States. Does such an opportunity exist in this example? Recall that 1 additional unit of food costs 1 unit of clothing in Mexico, while in the United States 1 additional unit of food costs only 1/3 unit of clothing. If, for example, the terms of trade were set at 1 unit of food for 1/2 unit of clothing, then indeed Mexico could obtain food more cheaply than it could produce itself. Similarly, the United States would benefit through the purchase of the clothing exports from Mexico. At the stated terms of trade, 1 unit of clothing only costs the United States 2 units of food, whereas every unit of clothing the United States produces on its own costs 3 units of food. But will not importing clothing from Mexico result in lost jobs? It is true that jobs in the clothing industry will be lost, but at the same time, those resources will be needed to produce the food that will be exported to Mexico. The result will be a transfer of jobs out of clothing production and into food production, not a permanent loss of overall jobs as is commonly assumed.

What benefits will result from this transfer of resources? Assume each country first specializes in the good for which they are the low-cost producer (United States in food and Mexico in clothing), and assume again the terms of trade are set at 1 unit of food for 1/2 unit of clothing, or conversely, 2 units of food for 1 unit of clothing. Depending on exactly how many units of food are traded, the United States now can consume along the line ad in Figure 16-2a. Point a represents the point of specialization in food production, point d the amount of clothing attainable if all the food were traded away. Similarly, Mexico now sees its consumption possibilities as lying along the line wy. Point w represents its point of specialization in clothing production, point y the maximum it could attain in food if all the clothing were traded away. If the actual amount traded were 150 units of clothing for 300 units of food, the United States would move to point e and Mexico would move to point z. Notice Mexico now consumes the same amount of clothing as it did at the start, but now has 150 more units of food. The United States has the same amount of food as at the start, but now has 50 more units of clothing. Living standards as indicated by per capita consumption levels (real wage rates) have gone up in each country as a result of trade. Each country has had to undergo a transformation in terms of the type of work its people do, but each country has continued to utilize all its resources. The shifting out of the production possibilities curve is analogous to what would happen if the United States experienced a technological improvement in clothing production, and Mexico experienced technological improvement in food production.

In practice, it is difficult to determine whether international trade increases the output of a country, and, due to data collection and measurement issues, it is even difficult to determine whether countries that are more open to trade have faster growth rates. We will also see that, although the theoretical effects are clear, it is also difficult to determine the effect on the demand for labor due to trade.

In theory, the effect of international trade on the demand for labor is very similar to the effects of technological change, discussed in Chapter 4. Greater international trade generally means that a nation’s imports and exports will expand. Thus the demand for labor will tend to increase in export industries, and wages will rise, and the demand for labor will fall in import industries, and wages will fall. To the extent that international trade also increases income, it will also increase the demand for goods and services overall.

The mix of these influences will have both wage and employment effects and will also be likely to influence the price level and real wages. For example, suppose that demand expands in an export-related industry. The increase in the demand for labor will tend to increase employment and raise wages, but the relative size of the employment and wage effects will depend, all other things equal, on the elasticity of labor supply in the market. Where labor supply is relatively elastic, employment will expand considerably with little increase in the wage, but in markets where labor supply is inelastic, the wage will rise considerably with little effect on employment. In import-related markets, labor demand will fall, so the effects will be similar but will involve falling wages and employment. Additionally, since international trade tends to lower the prices of at least some goods and services, real wage changes will be less than nominal wage changes in declining industries (and greater than nominal wage changes in expanding industries).
In recent years, trade has also meant the relocation of American production facilities to lower-wage countries, essentially bringing American workers into direct competition with lower-wage foreign workers. When the cost of an alternative factor of production falls, there is a cross-wage effect. This effect is the sum of the income and substitution effects of the wage change. The substitution effect of lower wages depends not on the wage alone but on the ratio of wages to marginal productivity in both countries. For it to be cost-effective to relocate to another country, the ratio of wages to marginal productivity in that country must be lower than in the United States.

If that is the case, the size of the substitution effect depends on the laws of derived demand. First, it must depend on the supply response of American workers (the shape of the U.S. supply of labor in this particular market). If the U.S. labor supply curve is relatively inelastic, then a fall in the demand for labor will also reduce wages considerably, offsetting some of the substitution effect. The second important factor is the elasticity of substitution between U.S. and foreign workers. Where workers can easily be substituted, or in other words, where it is easy to produce and transport goods in another country, and where relative skill levels are comparable, substitution effects will be large. But where skill levels are very different or transportation costs are very high, substitution is limited.

The scale effect depends on the reduction in production costs from relocating production. Decreases in costs will tend to increase supply and lower price, thus increasing the quantity demanded and the scale of production. The increase in the scale of production will tend to offset some of the substitution effect, so the overall effect on the number of jobs in the industry is unclear and depends on the size of both effects. Again, the size of the scale effect depends on the laws of derived demand. Where the elasticity of demand for the final product is high, the scale effect will be large, as a small fall in price will lead to a relatively large change in the quantity of output demanded. Where the share of foreign labor in total cost of production is high, the effect on product price will be more significant, and the scale effect will be relatively large.

Trade also tends to increase the elasticity of labor demand and the elasticity of final product demand by making more substitutes available at both stages of production. The net effect of all these factors on labor demand is difficult to quantify, although there are factors that are more likely to indicate winners or losers from trade. Losses are most likely to occur in industries with less specialized labor and in cases where product demand is relatively inelastic, so cost differences do not impact the quantity demanded very much. Displaced workers are likewise most likely to suffer when it is difficult for them to switch jobs or industries. Winners occur in output sectors and in sectors where jobs are complements to foreign production.

Empirical estimates of the effect of trade on employment have shown relatively small percentage losses in affected industries, although these estimates vary and do not show the total effect of trade, since they consider only declining and not expanding industries. Much of the net effect depends on the flexibility of the labor market. If wages adjust rapidly and displaced workers can move easily, then spells of unemployment are likely to be short.

However, even if markets adjust rapidly, displaced workers have losses due to the costs of finding and qualifying for new jobs and may experience falling wages, particularly if they had above-market wages to begin with. Empirical estimates again suggest that wage effects in the United States have been small as compared to other influences (such as technological change) on wages. Others find that trade has increased wages for skilled labor and decreased wages for unskilled labor.

In principle, the absence of trade barriers might cause wages between all nations to converge eventually, as firms move production to lower-wage countries, increasing the demand for labor in those countries (and reducing demand for labor in high-wage countries). This could only happen completely if the ratio of wages to marginal productivities were equal throughout the world, or in other words, if workers everywhere were equally productive. This is unlikely to occur, due to a variety of difference’s, from capital stocks and the availability of resources to education and cultural differences. Also, lower wage to marginal productivity ratios may cause firms to consider relocation, but there are a variety of other factors that influence that decision, including the higher cost of trading across international borders.
Overall, we can conclude that expanded trade is likely to increase national income and consumption but impose costs on some segments of society, often the least skilled and least able to easily adjust. Normative considerations imply that it may be desirable for the government to implement policies that reduce the costs to these groups. These policies include subsidizing human capital investment by displaced workers, encouraging displaced workers to attempt to become reemployed quickly through earned income tax credits, and subsidizing employment through payroll subsidies. Since the costs of international trade are not born solely by displaced workers and others directly affected, a broad “safety net” of policies may be selected in order to reduce risks and enhance gains from growing trade opportunities.

**Review Questions**

Choose the letter that represents the **BEST** response.

**International Trade and Comparative Advantage**

In answering Questions 1–7, please refer to Figure 16-3. The production possibilities curve for wheat \(W\) and corn \(C\) facing the United States is the line \(ab\), and the production possibilities curve for Canada is the line \(vw\).

1. What is the internal tradeoff between wheat and corn facing the United States?
   a. 1 unit of wheat costs 5 units of corn
   b. 1 unit of wheat costs 1/5 unit of corn
   c. 1 unit of corn costs 5 units of wheat
   d. both b and c

![Figure 16-3a](image1)

![Figure 16-3b](image2)

2. What is the internal tradeoff between wheat and corn facing Canada?
   a. 1 unit of corn costs 1/2 unit of wheat
   b. 1 unit of wheat costs 2 units of corn
   c. 1 unit of corn costs 1/2 unit of wheat
   d. both b and c
3. Suppose that the initial production levels in each country are represented by points $c (W = 40, C = 200)$ and $x (W = 45, C = 150)$. Also suppose that the number of workers in the United States is 100 million, and the number of workers in Canada is 50 million. If per capita consumption levels can be taken as indicators of the real wage rate in each country then
   a. real wages are higher in the United States.
   b. real wages are higher in Canada.
   c. real wages are the same in both countries.
   d. real wages are higher in the United States for corn producers, but lower for wheat producers.

4. Terms of trade acceptable to both countries would be
   a. 1 unit of wheat for 4 units of corn.
   b. 1 unit of corn for 1/3 a unit of wheat.
   c. 1 unit of wheat for 2-1/2 units of corn.
   d. all of the above.

5. Suppose the actual terms of trade agreed to by both countries are reflected in the lines $bd$ and $vy$. The actual terms of trade are
   a. 1 unit of corn for 4 units of wheat.
   b. 1 unit of wheat for 1/4 a unit of corn.
   c. 1 unit of wheat for four units of corn.
   d. both b and c.

6. Suppose the final consumption combinations of the two countries are point $e (W = 50, C = 200)$ and $z (W = 70, C = 200)$. The actual trade that took place must have been
   a. 70 units of wheat for 200 units of corn.
   b. 50 units of corn for 70 units of wheat.
   c. 20 units of wheat for 240 units of corn.
   d. 50 units of wheat for 200 units of corn.

7. The effect on employment and wages of international trade between the two countries has been
   a. lower real wages and job losses in the country that initially had the highest wages.
   b. higher real wages in both countries.
   c. a change in the mix of employment opportunities.
   d. both b and c.

**International Trade Effects on the Demand for Labor**

8. Suppose that the wage of foreign workers falls. Which of the following best describes the *scale* effect on the demand for U.S. labor?
   a. Lower foreign wages mean that U.S. companies will substitute foreign workers for U.S. workers, decreasing the U.S. demand for labor.
   b. Lower foreign wages mean that U.S. companies will substitute foreign workers for U.S. workers, increasing the U.S. demand for labor.
   c. Lower foreign wages mean that U.S. companies will have lower production costs, increasing output and thus increasing the U.S. demand for labor.
   d. Lower foreign wages mean that U.S. companies will have lower production costs, increasing output but decreasing the U.S. demand for labor.
   e. Lower foreign wages will not shift the U.S. demand for labor.
9. Suppose that the wage of foreign workers falls. Which of the following best describes the substitution effect on the demand for U.S. labor?
   a. Lower foreign wages mean that U.S. companies will substitute foreign workers for U.S. workers, decreasing the U.S. demand for labor.
   b. Lower foreign wages mean that U.S. companies will substitute foreign workers for U.S. workers, increasing the U.S. demand for labor.
   c. Lower foreign wages mean that U.S. companies will have lower production costs, increasing output and thus increasing the U.S. demand for labor.
   d. Lower foreign wages mean that U.S. companies will have lower production costs, increasing output but decreasing the U.S. demand for labor.
   e. Lower foreign wages will not shift the U.S. demand for labor.

10. A fall in the wage of foreign workers would be likely to increase the demand for U.S. labor under which of the following conditions?
    a. Skill levels of domestic and foreign workers are similar.
    b. Foreign labor is a large share of the total cost of production.
    c. The goods produced by domestic and foreign workers are substitutes in production.
    d. The elasticity of demand for the final product is very small (inelastic).

**Effects on Employment and Wages of International Trade**

11. Most empirical studies suggest that the overall effects of international trade on domestic employment are
    a. positive and large.
    b. positive but small.
    c. zero.
    d. negative but small.
    e. negative and large.

12. If the wage to marginal productivity ratio in another country is lower than in the domestic country, firms will
    a. move production to the other country.
    b. move production to the other country only if the benefits outweigh the higher transactions costs from foreign production.
    c. move production from the other country to the domestic market.
    d. move production from the other country to the domestic market only if there are tariffs and other trade barriers.

13. Wage convergence is most likely for
    a. occupations with very similar skill levels.
    b. products that are bulky and hard to transport.
    c. service and other occupations that need to be located near the end user.
    d. high-skilled, specialized labor.
Policy Issues
14. Which of the following is a good argument for using government policies to assist workers harmed by trade?
   a. International trade reduces total social welfare.
   b. International trade lowers wages for workers, which is unfair.
   c. International trade reduces the efficiency of the economy.
   d. The least-skilled workers are most at risk of losing from trade.

15. An argument for broad government policies that assist workers and citizens in all areas, not just those directly displaced by trade is that
   a. to be fair, the government should assist all workers.
   b. governments of other countries assist workers, so it is necessary to level the playing field.
   c. the costs of trade are also borne by workers not directly affected, due to increased uncertainty and other factors.
   d. the efficiency of society will be increased by increasing benefits to all workers.

Problems
International Trade and Comparative Advantage
16. Suppose the following equations represent the production possibilities curves for food ($F$) and clothing ($C$) in the United States and China. Both $C$ and $F$ are measured in millions of units.
   
   United States: $C = 100 - 0.25F$,  
   China: $C = 300 - 0.5F$.

   Suppose there are 100 million workers in the United States and 600 million in China. The initial production combinations are $F = 240$, $C = 40$ in the United States, and $F = 120$, $C = 240$ in China.

16a. What is the cost in the United States of 1 unit of food? Of 1 unit of clothing?

16b. What is the cost in China of 1 unit of food? Of 1 unit of clothing?

16c. Which country is the low-cost producer of food? Of clothing?

16d. What are the effective real wage rates in each country as indicated by the per capita consumption of its workers?

16e. How should each country allocate its capital and labor resources in order to maximize its future gains from trade?

16f. What are the limits of the terms of trade (i.e., what is the maximum amount of clothing a unit of food could trade for, what is the minimum amount clothing a unit of food could trade for)?

16g. Consider a trade of 150 units of food for 50 units of clothing. Show the effects of the trade on living standards in each country.

17. Despite the advantages that free trade offers, why do so many countries construct barriers to free trade like import quotas?

18. How are the employment effects of technological change like those associated with international trade?
International Trade Effects on the Demand for Labor

19. While a number of factors may be part of this empirical observation, it is generally true that in the United States, manufacturing industries have had greater job losses than service industries since the expansion of international trade.

19a. Why in general would you expect manufacturing industries to be more vulnerable to job losses due to trade than service-related industries?

19b. Using the concepts of substitution and scale effects, explain why the clothing industry in the United States has suffered large job losses due to trade.

Effects on Employment and Wages of International Trade

20. In an article published in The Wall Street Journal shortly before the 1992 presidential election, economist Robert J. Barro made the following statement:

“The prize for poor economic analysis must surely go to Ross Perot. [H]is theory of international trade goes something like this: Wage rates in the United States are $15 per hour, whereas those in Mexico are $1 per hour. If we eliminated all barriers to trade, the U.S. businesses would move to Mexico to take advantage of the cheap labor; in the end, wage rates in the two countries would stabilize at about $7 to $8 per hour.”


20a. Assuming this is an accurate portrayal of Mr. Perot’s view, why is this a poor economic analysis of the effects of free trade among countries?

20b. Do trade barriers such as import quotas really help American workers?