Tradable and Nontradable Goods

So far, we have assumed that all commodities are subject to international trade. Now, in this chapter, we introduce a simple and important reality that has profound implications for the workings of an economy. The fact is that some goods are nontradable. Nontradable goods, of course, can only be consumed in the economy in which they are produced; they cannot be exported or imported. And their presence affects every important feature of an economy, from price determination, to the structure of output, to the effects of macroeconomic policy.

Consider the proverbial barber shop. The barber’s clientele probably comes from the neighborhood, and it certainly comes from within the domestic economy. If the demand for the barber’s services drops, he cannot conveniently export the excess capacity to give haircuts. If foreign barbers raise their prices for haircuts, the local barber will not experience a rush in international demand for his services. Haircuts in India are much cheaper than they are in the United States, perhaps $20 per haircut cheaper, but it does not make sense to buy a $2,000 air ticket from, say, New York to New Delhi to save $20 on a haircut.

This nontradable character of the barber’s services has several direct implications. Without the possibility of net exports or imports, local demand and supply must balance. Without international trade, a drop in domestic demand cannot be met by an increase of net exports, and domestic prices can differ from foreign prices without setting in motion a shift of international demand.

There are many goods and services like haircuts that are not part of international trade. Housing rental markets are generally nontradable as well. Even if rents are cheaper in Santiago, Chile, than in Tokyo, it is hard for a Japanese household to take advantage of that fact. Thus, housing rentals differ widely, often by thousands of percent, among cities in different parts of the world. Various activities of service sectors, those of lawyers, doctors, teachers, housekeepers, and the like, also provide largely nontradable goods and services.

Although we recognized the existence of nontradable goods in earlier chapters (especially in Chapter 10, where we pointed out that non-
tradable goods undermine the case for purchasing power parity), we have based our formal models on the assumption that all goods enter into international trade. In Chapters 4 to 10, we assumed that only one good is produced and consumed in the world economy, and that that good is traded between the home country and the rest of the world. In Chapters 13 to 16, we made a distinction between imported and domestic goods, within the framework of the differentiated goods model. But in that model as well, all the goods that are produced are assumed to trade internationally.

Explicit consideration of the role of nontradable commodities was given early on by the classical economists such as John Stuart Mill and David Ricardo. Their analysis, however, generally considered all final goods to be tradable, and production inputs—capital, labor, and land—to be nontradable. Only in the late 1950s and early 1960s has the role of nontradable goods been considered in formal economic models.\(^1\)

Perhaps the most important implication of the presence of nontradable goods is that the internal structure of production in an economy tends to change when the trade balance changes. In particular, as absorption rises or falls relative to income (so that the trade balance rises or falls), the mix of production in the economy between tradable goods and nontradable goods tends to change. And as we shall see, some of those production shifts, which involve the movement of workers and capital between the nontradable and tradable sectors of the economy, can be quite wrenching in their economic and even political impact.

Suppose, for example, that a government which has borrowed heavily in the past now needs to repay its foreign debt. In order to do this, it increases taxes. As a result, consumption declines. If all the goods in the economy are tradable, the effect of this fall in consumption will be a rise in output relative to absorption, and thus an increase in net exports. Steel manufacturers facing a fall in domestic demand for their product, for example, will simply export more steel abroad.

But this adjustment can take place only with tradable goods. If some goods are not tradable, the process cannot be so easy. Take the barber who faces the fall in domestic demand. He cannot simply sell more haircuts abroad when fewer local customers show up at his shop. And he may not be able to cut his prices much either, if his costs remain unchanged. Perhaps haircut prices will fall (relative to steel prices), but at the same time some barbers will go out of business, unable to cover costs at the lower prices. Unemployed barbers will have to look for other jobs, presumably in sectors of the economy in which production is being sustained (or increased) by exports.

Thus, the presence of nontradable goods in an economy makes the process of adjusting to downturns more complex and often more painful than

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it was in the economies we described in the previous chapters. In general, the prices of nontraded goods fall relative to the prices of traded goods, and at the same time, production of nontraded goods declines while production of traded goods rises. As workers shift out of the nontradable sector into the tradable sector, there is likely to be a period of at least temporary unemployment while they take time to match up with new job opportunities.

21-1 DETERMINANTS OF TRADABILITY AND A BROAD CLASSIFICATION OF GOODS

Now that we have described nontradable goods and offered some examples, let us see what kinds of goods tend to be nontradable or tradable. In principle, two main factors determine tradability or nontradability.

First, and most important, are transport costs, which create natural barriers to trade. The lower transport costs are as a proportion of the total cost of a good, the more likely it is that the good will be traded internationally. Goods with very high value per unit weight (and thus low transport costs as a proportion of value) tend to be highly tradable. The prime example is gold, which is nearly perfectly tradable, with almost identical prices on any given day in any of the major trading cities of the world. At the other extreme, remember the haircut that costs $25 in New York and $5 in New Delhi. It was the high transport costs that rendered this service nontradable. Many, but not all, services share this characteristic of high transport costs per unit of value. Technological progress in communications has recently allowed for the international trade of several kinds of financial services, including personal banking accounts, insurance, and so forth. Indeed, the developing world’s exports of services have recently started to grow at a significant pace, especially in areas like data processing, engineering, computer software, and tourism. Workers in Jamaica, Manila, and South Korea, for example, feed basic information into computers for several multinational firms stationed in the United States.

The second factor that determines tradability or nontradability is the extent of trade protectionism. Tariffs and trade quotas can block the free flow of goods across national borders, even where transportation costs are low. The higher these artificial barriers to trade, the less likely it is that a good will be traded. Consider, for example, a 100 percent tariff on furniture. Suppose, for purposes of illustration, that a piece of furniture, say, a chair, costs $80 in the rest of the world, and it costs $20 to ship it to the domestic economy. The chair, then, would cost $100 at the port of entry in the domestic country. If the country imposes a 100 percent tariff, the domestic cost of the imported chair is now $200. Now suppose that the local industry sells this same chair at $150. Clearly, there will be no imports because the domestic industry can undersell the imports. But at the same time, there will be no exports because the domestic industry could not hope to compete in foreign markets with foreign producers whose costs are only $80. Thus, this chair will be neither imported nor exported: protectionism has rendered it a nontraded good.

The categories of what is tradable and what is nontraded are not immutable, of course. Technological improvements that reduce transport costs are likely to make more goods tradable. By contrast, increases in protectionism tend to increase the list of nontradable goods.
In practice, then, which goods belong to one category and which to the other? There are hundreds of thousands of goods and services, and we cannot hope to answer this question for each good. But we can try to classify goods into broad categories. One well-known classification used in most countries is the standard industrial classification (SIC) of the United Nations. According to the SIC, goods and services are divided into nine different categories by major industry:

1. Agriculture, hunting, forestry, and fishing
2. Mining and quarrying
3. Manufacturing
4. Electricity, gas, and water
5. Construction
6. Wholesale and retail trade, restaurants, and hotels
7. Transport, storage, and communications
8. Financing, insurance, real estate, and business services
9. Community, social, and personal services

Very roughly speaking, goods included in the first three categories, agriculture, mining and manufacturing, are typically the most tradable, while goods in the other categories are generally assumed to be nontradable. As a rule, construction (for example, homebuilding), services (categories 8 and 9), and domestic transportation (for example, bus and train services), are not easily tradable. But there are obvious and important exceptions. On the one hand, high transport costs render many kinds of agricultural products, such as garden vegetables, nontradable, while tariff barriers in agriculture and industry often impose formidable obstacles to trade. On the other hand, some construction activities are highly tradable, as shown by the work of huge South Korean construction firms on large building projects in the Middle East during the 1970s and 1980s. Some transportation services, such as international air travel and shipping, are obviously engaged in international trade. And, as we have noted, recent technological advances in communications have rendered many kinds of financial services internationally tradable.

21-2 THEORETICAL FRAMEWORK

Let us now try to develop a simple theoretical model of tradable and nontradable goods, which we shall call the TNT model. We turn first to the supply conditions in the model.

Aggregate Supply in the TNT Model

Suppose that the home country produces and consumes two goods, tradables (T) and nontradables (N). At this stage of the discussion, we shall assume that the production processes for the two goods use only labor and that production in each sector is a linear function of the labor input:

$$Q_T = a_T L_T \quad \text{(tradable goods)} \quad (21.1a)$$

$$Q_N = a_N L_N \quad \text{(nontradable goods)} \quad (21.1b)$$
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$L_T$ and $L_N$ are the amounts of labor used in the production of tradables and nontradables, respectively, and $a_T$ and $a_N$ are the coefficients representing the marginal productivities of labor in the production of the two kinds of goods. An additional unit of labor in sector $T$ leads to $a_T$ units more of output. Because the production functions are linear in $L_T$ and $L_N$, the coefficients $a_T$ and $a_N$ represent the average productivities of labor as well as the marginal productivities.

It is useful to derive the production possibility frontier (PPF) of the economy in the TNT model. We assume that there is a given amount of labor $(L)$ that may be employed in sector $T$ or sector $N$. Therefore, assuming that labor is fully employed, we have

$$L = L_T + L_N \quad (21.2)$$

Using equations (21.1a) and (21.1b), we can write the expression in terms of output levels and the productivity coefficients. Because $L_T = Q_T/a_T$ and $L_N = Q_N/a_N$, we can rewrite (21.2) as follows:

$$L = \frac{Q_T}{a_T} + \frac{Q_N}{a_N} \quad (21.3)$$

This equation can, in turn, be rearranged to express $Q_N$ as a function of $Q_T$ (as well as $L$, $a_T$, and $a_N$, which are assumed to be fixed):

$$Q_N = a_N L - \left( \frac{a_N}{a_T} \right) Q_T \quad (21.4)$$

Expression (21.4), then, is the equation for the production possibility frontier (PPF). It expresses the maximal amount of $Q_N$ that can be produced for each amount of $Q_T$ produced in the economy. For example, if $Q_T = 0$ (all labor is working in the nontradable sector), then $Q_N = a_N L$. If $Q_T$ is maximized instead, by allocating all labor to tradables production, then $Q_T = a_T L$ and $Q_N = 0$. In general, positive amounts of labor will be employed in both sectors.

The production possibility frontier is represented graphically in Figure 21-1. The $X$ axis measures the production of tradable goods and the $Y$ axis, the production of nontradables. If all labor is devoted to tradables, then production is at point $A$, with $Q_T = a_T L$ and $Q_N = 0$. If, instead, all labor is devoted to the nontradables sector, then production is at point $B$, with $Q_N = a_N L$ and $Q_T = 0$. The rest of the PPF consists simply of the line segment connecting points $A$ and $B$, as shown in Figure 21-1. Any point on this line segment represents a possible combination of production of tradables and nontradables.

The slope of the PPF is equal to the relative price of tradables in terms of nontradables. Let us see why. For each type of good, the price of output is just equal to the cost of labor used in the production of a unit of the good (this results from the assumption of a production technology which is linear in labor input). Each unit of tradable output requires $1/a_T$ units of labor. With a wage level $w$, the labor cost of producing a unit of $T$ is simply $w/a_T$. The labor cost of producing a unit of $N$ is simply $w/a_N$. Thus,

$$P_T = \frac{w}{a_T}$$

$$P_N = \frac{w}{a_N} \quad (21.5)$$
Figure 21-1
The Production Possibility Frontier with Labor as the Only Input

Note that the equation can also be interpreted as the profit-maximizing condition that the marginal product of labor should be equated to the product wage, where the product wage is measured as the ratio of the wage to the output price. That is, \( a_T = w/P_T \) and \( a_N = w/P_N \).

From (21.5) we see that \( P_T/P_N = a_N/a_T \). We also know from (21.4) that \( -a_T/a_T \) is equal to the slope of the PPF. Thus, the steeper the PPF, the higher the relative price of tradable goods to nontradable goods in the economy. This simple fact has important implications later on.

In the TNT model, it is usual to label the relative price of tradable goods in terms of nontradable goods as "the real exchange rate." Letting \( e \) be the real exchange rate in this model, we have

\[
e = \frac{P_T}{P_N} = \frac{a_N}{a_T}
\]  

(21.6)

Obviously, the slope of the PPF is also equal to the negative value of the real exchange rate \((-e)\). (Note here an important semantical confusion in standard economics terminology. In models with differentiated products, like those in Chapters 13 and 14, the term "real exchange rate" is used to measure \( E\bar{P}^g/P \). In the TNT model, the same term is used to measure \( P_T/P_N \).)

Aggregate Demand in the TNT Model

Now that we have talked about the supply side of the economy, it is time to introduce aggregate demand. We shall concentrate on consumption decisions and neglect investment spending,\(^2\) a simplification that allows us to focus on the most important novelties of the TNT model.

Total absorption is equal to spending on tradable goods and nontradable goods. More formally, \( A = P_T C_T + P_N C_N \), where \( A \) is total absorption.

\(^2\) In this basic scenario, we do not distinguish between the private sector and the government; thus, \( C \) should be interpreted as total consumption.
and $C_T$ and $C_N$ are the levels of consumption (in real terms) of tradable and nontradable goods. Absorption is divided between the two goods, and we would expect that consumption of each type of good would depend on the overall level of absorption and the relative price of the two kinds of goods. For our purposes, we can simplify this further and suppose (unless otherwise noted) that households consume $C_T$ and $C_N$ in fixed proportions, regardless of relative prices—that is, we assume that the ratio $C_T/C_N$ is fixed. When total spending rises, both $C_T$ and $C_N$ rise in the same proportion; when total spending falls, both $C_T$ and $C_N$ fall in the same proportion.

With this assumption in mind, we can graph the spending choices of households, as shown in Figure 21-2. Household consumption choices lie on the line $OC$. When absorption is low, spending is at a point like $B$, where both $C_T$ and $C_N$ are low. When absorption is high, spending is at a point like $D$, where both $C_T$ and $C_N$ are high. Notice, however, that the ratio $C_T/C_N$ is fixed as absorption rises and falls along the $OC$ line.

The $OC$ line will play a key role in the determination of market equilibrium, which is the subject of the next section.

**Market Equilibrium in the TNT Model**

The central assumption of the TNT model is that because there can be no exports or imports of $N$, the domestic consumption of $N$ must equal domestic production of $N$. By contrast, tradable goods can be imported or exported, and thus domestic consumption of $T$ can differ from domestic production. Specifically, we have the following key relationships:

$$Q_N = C_N$$
$$TB = Q_T - C_T$$

(21.7)

Note that the trade balance (in units of the tradable good) is equal to the excess of production of tradables over consumption of tradables. We know from Chapter 6 that $Q_T - C_T$ can also be written as $X_T - IM_T$, where $X_T$ is the level of exports of $T$ and $IM_T$ is the level of imports of $T$.

Let us consider the nature of market equilibrium in the TNT model by superimposing the $OC$ schedule on the PPF, as we do in Figure 21-3. Suppose that household consumption is at point $A$ on the $OC$ curve. At that point, consumption of nontradables is given by $C_N^A$, and consumption of tradables

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**Figure 21-2**

A Graphical Representation of the Consumption Path in the TNT Model
is given by \( C_T^A \). With consumption of nontradables equal to \( C_N^A \), the production of nontradables must also be \( C_N^A \). That is, \( Q_N^A = C_N^A \), as we said earlier. Thus, the production point must lie on the PPF at exactly the point where \( Q_N \) is equal to \( C_N \). To be precise, the production point corresponding to absorption \( A \) must be at point \( B \), which lies on the same horizontal line as point \( A \).

Notice that at point \( B \) the production of tradables is at the level \( Q_T^A \), which is greater than the absorption of tradables, given by \( C_T^A \). Thus, when absorption is at \( A \), and production is therefore at point \( B \), the economy has a trade surplus, since \( Q_T^A > C_T^A \). Consumption and production of nontradables are equal (as they must be). Now consider the situation if absorption is at point \( D \). In this case, production must be at point \( F \), which lies on the same horizontal line as point \( D \). (Production must be at point \( F \) when absorption is at point \( D \), of course, so that the nontradable goods market is in balance.)

Comparing the two absorption points, \( A \) and \( D \), we can draw an important lesson. When overall absorption is high, there is more spending on both tradable and nontradable goods. The higher demand for nontradable goods requires greater production of nontradable goods in order that demand and supply for nontradable goods be in balance. But higher production of nontradables can occur only by shifting resources out of the tradable sector and into the nontradable sector. Higher overall demand therefore leads to a rise in the production of nontradable goods, but a fall in the production of tradable goods. This asymmetry reflects a simple fact. An increase in demand for nontradables can only be satisfied by greater domestic production; by contrast, an increase in demand for tradables can be satisfied by imports.

Point \( E \) at the intersection of the PPF and the \( OC \) curves, is the point at which consumption and production are equal for both tradable and nontradable goods. At this point, the trade account is exactly balanced; that is, the consumption of tradables, \( C_T \), equals the production of tradables, \( Q_T \). Point \( E \) is sometimes called the point of internal balance and external balance.
"Internal balance" refers to the fact that the demand for nontradables equals the supply of nontradables (which is always satisfied); "external balance" refers to the fact that the trade account is zero.

**Borrowing and Repayment in the TNT Model**

We can now use the apparatus just developed to enrich our analysis of international borrowing and lending. In earlier chapters, we noted that borrowing in one period requires repayment in later periods. Specifically, trade deficits must be balanced later on (in present value terms) by future trade surpluses. Now we can show a crucial point, that *a shift from a situation of borrowing to repayment also requires a corresponding shift in the patterns of domestic production.*

Suppose, for example, that an economy has been consuming more than its income and that domestic residents have been borrowing abroad to maintain this expensive lifestyle. In Figure 21-4, this pattern is depicted by consumption at point $D$ and production at point $F$. The country’s net debt (not shown in the diagram) builds up over time as the economy’s firms, households, and government, in the aggregate, borrow from the rest of the world. But the country’s intertemporal budget constraint dictates that the situation must eventually change. At some point, the economy must shift back to trade surplus so that domestic residents can service the international debts they have accumulated.

We want to examine very closely the economic effects of the shift back to trade surplus. The shift from trade deficit to surplus, of course, requires a drop in consumption relative to output. Say that consumption falls from point $D$ to point $B$ on the $0C$ curve. When that happens, the demand for nontradable goods in the economy declines (as does the demand for tradables). Workers in the nontradable sector—the barber from our initial example, together with fellow workers in construction and other services—begin to lose their jobs because domestic demand for their goods is declining. These workers now must find jobs in the tradable sector of the economy where, indeed, there is still growth. Despite the fall in domestic demand,

**Figure 21-4**

The Case of Foreign Borrowing and Repayment

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*Note: The figure illustrates the relationship between consumption ($C$) and net exports ($Q_N$) with a shift from point $D$ to point $B$, indicating a shift from a trade deficit to a trade surplus.*

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firms in the tradable sector have expanded production because they can sell their output abroad on the world market.

Thus, the shift from trade deficit to trade surplus involves a shift in domestic production from point F to point G (which is on the same horizontal line as point B). Note that in the process of generating a trade surplus, the production of tradables has increased, while the production of nontradables has declined. To put this another way, the trade surplus comes about not merely because of a fall in demand, but also because of a shift in supply from nontradables production to tradables production.

A clear example of resources shifting from nontradables to tradables occurred in Chile after 1982. In the late 1970s, Chileans borrowed heavily, indeed too heavily, on the international capital markets. As happened in much of the developing world, international credits for Chile dried up in the early 1980s, after the period of heavy borrowing. Creditors became fearful of the ability of Chileans to service their debts, especially after the rise in world interest rates in the early 1980s. Chileans had to stop running large trade deficits and start running trade surpluses, as seen in Table 21-1. Domestic demand in Chile plummeted. In effect, absorption fell from a point like D to a point like B in Figure 21-4.

### Table 21-1

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Agriculture and Fishing</th>
<th>Construction</th>
<th>Industry</th>
<th>Building Permits and Starts (area, thousands of squared meters)</th>
<th>Trade Balance/GDP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>13.6</td>
<td>7.3</td>
<td>28.9</td>
<td>12.5</td>
<td>3,591</td>
<td>-1.7</td>
</tr>
<tr>
<td>1980</td>
<td>10.4</td>
<td>5.0</td>
<td>18.7</td>
<td>11.2</td>
<td>4,643</td>
<td>-2.8</td>
</tr>
<tr>
<td>1981</td>
<td>11.3</td>
<td>6.2</td>
<td>25.8</td>
<td>11.8</td>
<td>5,638</td>
<td>-8.2</td>
</tr>
<tr>
<td>1982</td>
<td>19.6</td>
<td>9.4</td>
<td>50.8</td>
<td>26.6</td>
<td>2,365</td>
<td>0.3</td>
</tr>
<tr>
<td>1983</td>
<td>14.6</td>
<td>5.8</td>
<td>38.2</td>
<td>17.9</td>
<td>2,771</td>
<td>5.0</td>
</tr>
<tr>
<td>1984</td>
<td>13.9</td>
<td>5.5</td>
<td>30.7</td>
<td>14.2</td>
<td>3,209</td>
<td>1.9</td>
</tr>
<tr>
<td>1985</td>
<td>12.0</td>
<td>4.9</td>
<td>23.8</td>
<td>5.4</td>
<td>3,831</td>
<td>5.3</td>
</tr>
</tbody>
</table>

* Figures correspond to the National Employment Survey, compiled every year by the National Bureau of Statistics in the period October–December. Source: Central Bank of Chile.

The economy had to undergo a major reallocation of resources of the sort we have just described. As we see in Table 21-1, the shift from trade deficit to trade surplus was accompanied by the shift out of nontradables production, especially construction, and into tradables production, led by the agricultural sector. There was a large increase in unemployment among

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3 We discuss the origins of the international debt crisis in Chapter 22.
Box 21-1

Structural Adjustment Programs

The movement of resources from nontradable goods production to tradable goods production requires a significant economic restructuring of the economy. Many complications can arise during such structural transitions, especially high unemployment if workers are laid off jobs in nontradables production more rapidly than they can find new jobs in tradables production. The delay in finding new jobs may result from the costs of moving to where the new jobs are, wage rigidities in the tradables sector, problems in disseminating information about what the new work is and where it is, and so on. To minimize these social costs, governments may implement a package of policies, sometimes called structural adjustment programs, in order to facilitate the transfer of resources and to remove barriers that restrict factor mobility. These policy actions support the shift in resources to the tradables sector and reduce the economic rigidities that can hamper adjustment.

On the microeconomic side, structural adjustment programs often include the following kinds of measures: (1) policies that improve efficiency in the use of resources by the public sector, including the rationalization of public investment, the restructuring of state-owned companies, and the privatization of some public enterprises; (2) measures that improve the structure of economic incentives, such as trade liberalization (to develop the export sector and reduce the distortions caused by tariffs, quotas, and other trade restrictions) and reforms of the price system, especially in agriculture and public enterprises; and (3) measures that strengthen the economic institutions that are crucial for the success of the adjustment program, like the customs service and tax administration. These microeconomic measures, designed to enhance the flow of resources in the economy and the shift of labor and capital to the tradables sector, are typically supplemented by macroeconomic measures, which include fiscal austerity, a tight monetary policy, and often a currency devaluation (for reasons described shortly).

During the 1980s, the World Bank played a visible role in helping countries to design structural adjustment policies and in lending money to countries to help them reduce the costs of restructuring. At the same time, the International Monetary Fund (IMF) supervised the introduction of accompanying macroeconomic measures, including cuts in budget deficits and exchange-rate devaluations. The policy packages implemented jointly by the World Bank and the IMF generated considerable controversy, both as to their effectiveness and as to the adequacy of the money they were willing to lend to support the policy measures. Several criticisms have been aimed at the role of the World Bank in its support of adjustment programs. Among them, it has been said that (1) the amount of resources devoted to adjustment loans by the Bank has been insufficient in relation to the countries' needs; that (2) the conditions on which the loans were based have occasionally been unrealistic, being too optimistic either about the response of private agents to price incentives, or about the political sustainability of the programs; and that (3) the World Bank may pay too little attention to equity issues, some critics having suggested
that the overriding concern behind some of these programs has been economic efficiency at the cost of equity. Of course, these views are very different from the way the Bank evaluates its own role in supporting adjustment.

However well designed the policy packages, it is clear that the costs of transition from trade deficits to trade surpluses among the debtor developing countries during the 1980s have been extremely high. Such countries have seen large increases in unemployment, and sharp declines in production and employment of nontradables have not been promptly matched by large increases in tradables production and employment.

collection workers, and many of these workers shifted to work in the fruit export business or in agroindustry.

In reality, the adjustment process is far from painless, as the Chilean experience attests. As we see in Table 21-1, unemployment soared at the time that workers were laid off from construction. Workers need time for retraining in order to adjust their skills to the newly available jobs. Also, as is frequently true, the economic restructuring in Chile required a geographical reallocation of labor, which took more time and occasioned significant economic and social costs. These factors, among others, explain why the unemployment rate increased so substantially when Chile underwent the fundamental economic restructuring that was necessary to bring about the shift from trade deficit to trade surplus.

**The Dutch Disease**

The shift of production between tradables and nontradables tends to occur whenever there are large shifts in the level of domestic spending. This can happen when an economy starts to repay its debts, but it can occur for other reasons as well. One common case that has received considerable attention from economists is that of a country which experiences a large change in wealth because of shifts in the value of natural resources held by the residents of the country. A nation can find itself dramatically enriched after major discoveries of natural resources in its territory (as when Norway discovered the magnitude of its North Sea oil deposits in the 1970s) or when the world price of its natural resources changes dramatically (as when the oil-exporting countries enjoyed a large jump in income at the end of the 1970s).

The effects of large changes in wealth resulting from resource discoveries or resource price changes can be very dramatic, indeed so dramatic that they have been given a special name, *the Dutch disease.*

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comes from the fact that the Netherlands, a large holder of natural gas deposits, experienced major shifts in domestic production following the discovery of substantial gas deposits in the 1960s. As the exports of this natural resource boomed, the guilder appreciated in real terms, thereby squeezing the profitability of other exports, especially manufactures. We shall see, however, that the "disease" part of the term is something of a misnomer. The shifts in production occasioned by changes in resource wealth are not really a "disease" of the economy.

Let us consider the effects of a discovery of oil in a country which, say, had a tradables sector that consisted solely of non-oil industries, such as manufacturing, before the discovery. Suppose that the new oil reserves increase tradable output by the amount $Q_0$. Before the oil discovery, the production possibility frontier is given by the PPF line ($PF$) in Figure 21-5. After the oil discovery, the country can now produce $Q_0$ more units of tradable goods than it could before the oil discovery, so that the PPF shifts horizontally to the right by the amount $Q_0$, as shown in the figure.

Suppose, now, that before and after the oil discovery, the country's trade is balanced; that is, given world interest rates and household preferences, there is no desire for borrowing or lending. Thus, before the oil discovery, economic equilibrium is at the point $A$ in Figure 21-5, at the intersection of the PPF and the OC curve. After the oil discovery, economic equilibrium shifts to point $B$. Note that the oil discovery has, naturally, led to an expansion of demand (reflecting the increased wealth of the nation) and that this expansion of demand has caused an increase in consumption of both tradable and nontradable goods.

Now let us look closely at the effects of this spending increase on the production patterns in the economy. The shifts in production patterns are somewhat subtle. As we can see in Figure 21-5, production of nontradables increases as a result of the spending boom, from point $Q_N^A$ to $Q_N^B$. Production

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**Figure 21-5**

Effects of Oil Discovery in a Hypothetical Country: A Case of Dutch Disease

![Diagram showing the effects of oil discovery on production patterns.](image)
of tradables also increases, but in a more complicated way. At point $B$, production of "traditional" non-oil tradables is at the level $Q_T^b$ and production of oil is at the level $Q_o$. Total tradable production is therefore at the level $Q_T^b + Q_o$. Thus, when we compare tradable production before and after the oil discovery, we find three things. First, non-oil production has fallen, from $Q_T^b$ down to $Q_T^a$. Second, oil production has risen, from zero to $Q_o$. And, third, total tradable production, that is, the sum of the two subsectors, has gone up, from $Q_T^a$ to $Q_T^b + Q_o$.

The Dutch disease, then, is the term applied to the fact that non-oil tradable production declines as a result of the oil discovery. In concrete terms, an important discovery of oil—or gas, or diamonds, or other natural resource—is likely to lead to a shrinkage in traditional manufacturing. The reason should be clear. The positive wealth effect of the natural resource boom draws resources away from the traditional tradables sector and into the nontradables sector. And, as we have said, the higher demand for nontradables can only be met by greater domestic production of nontradables, while the higher demand for tradables can be satisfied by an increase in imports (with an actual drop of domestic production).

Note that the "disease"—the shrinkage of the manufacturing sector—may seem like a disease, especially to workers and owners in that sector, but in fact the production shift is the optimal response to an increase in wealth. It is only through the decline in tradables production that domestic households can enjoy the benefits of increased consumption of nontradables.

The Dutch disease phenomenon was evident in the major oil-exporting countries in the late 1970s when world oil prices soared. In these countries, the higher oil wealth prompted a shift toward nontradables, especially construction, and put a squeeze on traditional tradable sectors, including agriculture and industry exposed to international trade. When world oil prices collapsed in the mid-1980s, the Dutch disease was reversed. Domestic demand in the oil-rich countries plummeted, causing significant unemployment in the construction industry and a shift of employment back to agriculture and other tradable goods sectors.

A prime example of Dutch disease in Latin America (and one unrelated to oil) appeared in Colombia in the second half of the 1970s. Traditionally, Colombia has been heavily dependent on coffee, which accounted for almost two-thirds of its exports in the late 1960s and about 45 percent of its exports in 1974. Weather problems in Brazil and an earthquake in Guatemala contributed in 1975 to a significant scarcity of coffee in world markets. Thus, coffee prices boomed, increasing almost five times over the next two years.

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Coffee production in Colombia was quick to respond, and it increased by 76 percent between 1974 and 1981. As a consequence of this boom, Colombia enjoyed a surge in export revenues of almost 300 percent over the next five years. But, as the theory predicts, the country’s real exchange rate appreciated considerably — about 20 percent between 1975 and 1980 — and this hurt the competitiveness of the noncoffee tradables sector. The evolution of the real price of coffee and the real exchange rate is shown on Figure 21-6 for the period 1974–1980 (as usual, a fall in the real exchange rate in the graph signifies a real appreciation).

Thus, Colombia experienced a boom in the coffee sector and a substantial expansion of nontradable activities, especially in construction and government services. However, the growth rate of output among other tradable goods was reduced substantially, principally among manufactures, as shown in Table 21-2.

The general symptoms of the Dutch disease, although most widely associated with a natural resource boom, can also arise when other forces cause a large shift in domestic demand. For example, countries that receive vast increases in foreign aid are likely to experience a consumption boom. Recipients of foreign aid often find that the financial assistance from the outside world inadvertently squeezes the tradable sectors within its economy. When this happens, aid can actually damage precisely those economic sectors most in need of development.

Note that a domestic fiscal expansion is likely to have the same effects on production as a resource boom. Higher fiscal spending that is not offset by a decline in private spending can lead to an overall shift in demand toward nontradable goods and thus to a shift of production from tradables to nontradables. When Stephen Marris examined the sectoral effects of the large fiscal expansion during the first half of the 1980s in the United States, he

**Figure 21-6**
The Real Exchange Rate and the Real Price of Coffee in Colombia, 1975–1980

*(From Linda Kamas, "Dutch Disease Economics and the Colombian Export Boom," World Development, September 1986.)*
TABLE 21-2

(ANNUAL AVERAGE PERCENT GROWTH OF PRODUCTION IN SELECTED SECTORS)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nontradables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction and public works</td>
<td>3.3</td>
<td>5.8</td>
<td>+2.5</td>
</tr>
<tr>
<td>Residential rent</td>
<td>3.7</td>
<td>4.3</td>
<td>+0.6</td>
</tr>
<tr>
<td>Government services</td>
<td>4.1</td>
<td>8.6</td>
<td>+4.5</td>
</tr>
<tr>
<td>Personal services</td>
<td>2.8</td>
<td>2.8</td>
<td>+0.0</td>
</tr>
<tr>
<td>Tradables (noncoffee)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Textiles, clothing, and leather</td>
<td>5.1</td>
<td>-0.6</td>
<td>-5.7</td>
</tr>
<tr>
<td>Paper and printing</td>
<td>9.3</td>
<td>5.3</td>
<td>-4.0</td>
</tr>
<tr>
<td>Refined petroleum products</td>
<td>8.0</td>
<td>0.3</td>
<td>-7.7</td>
</tr>
<tr>
<td>Chemicals and rubber</td>
<td>10.2</td>
<td>3.7</td>
<td>-6.5</td>
</tr>
<tr>
<td>Manufactures of metals</td>
<td>6.1</td>
<td>3.6</td>
<td>-2.5</td>
</tr>
<tr>
<td>Other manufactures</td>
<td>4.8</td>
<td>1.9</td>
<td>-2.9</td>
</tr>
<tr>
<td>Transport materials</td>
<td>12.6</td>
<td>4.6</td>
<td>-8.0</td>
</tr>
<tr>
<td>Machinery and equipment</td>
<td>10.5</td>
<td>4.8</td>
<td>-5.7</td>
</tr>
<tr>
<td>Coffee</td>
<td>4.1</td>
<td>10.8</td>
<td>+6.7</td>
</tr>
</tbody>
</table>


found that significant parts of the tradables sector were squeezed, while the nontradable goods sector boomed. Historically, episodes of economic populism as well as sharp increases in military expenditures have also provided vivid examples of large increases in fiscal spending which constricted production in the tradables sector.

21-3 TRADEABLES, NONTRADEABLES, AND THE PRICE LEVEL

One of the striking regularities in the world economy is that rich countries are "more expensive" than poor countries. Tourists and international businessmen find that it is more expensive to visit Europe and Japan than it is to visit Latin America or Africa. Careful studies have confirmed what most of us believe, that the cost of living, represented by a basket of commodities

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