PART III

The Theory and Practice of Commercial Policy

CHAPTER 10

Protection and the National Welfare

Free trade supposedly brings benefits to all nations. So why do countries interfere so much with this trade? For centuries most countries have felt compelled to block the smooth flow of commodities by erecting tariff barriers or other obstacles to trade. In the next few chapters we examine the nature of such impediments, ask how they may benefit special groups, and discuss attempts at cooperation in commercial policy, both at the regional level (regional free-trade areas such as the North American Free Trade Agreement or customs unions such as the European Union) and in larger groupings.

The primary weapon of commercial policy used to be the tariff, although successive rounds of GATT (the General Agreement on Tariffs and Trade) negotiations in Geneva and elsewhere lowered the average rate of duty on manufactured goods from more than 40 percent in 1947 to less than 4 percent at the conclusion of the Uruguay Round in 1994. Partly because of these reductions, those interested in protection have cleverly introduced other means of achieving similar ends such as quotas, voluntary export restraints, stringent rules concerning dumping, and so on. Even in the European Union, famous for eliminating most trade barriers among its members, other protective devices discriminate against foreign investment and trade in items such as bananas and genetically modified foods.

In this opening chapter we pay attention to *tariffs,* in full recognition of their relative decline in the arsenal of protective instruments. Nonetheless, tariffs encapsulate the essence of all protective devices—introducing a wedge between prices found in world markets and market prices faced by producers and consumers at home when making choices about purchases and sales of commodities and inputs into production. As well, efforts are being made to reduce some forms of protection devices, for example, quotas on allowable import quantities, by first changing them into the equivalent tariff values, thus making the degree of protection more transparent.

Our focus in this chapter is on the welfare of a nation as well as of the world. The following chapters take a closer look at the set of other rationales for restrictive policies, especially those aimed at helping particular special interests within the country.

10.1 Protection by a Small Country

A *tariff* is a tax on the importation of a commodity from abroad. If the country levying the tariff is small, the tariff has little effect on the world price of the commodity. Instead, the foreign commodity becomes more expensive behind the tariff wall at home, both to producers of the commodity (who can be expected to support the tariff) and to local consumers (who will likely oppose the duty). In general, a tariff attracts resources to the protected sector and shifts demand away from foreign goods. On both counts a tariff reduces a small country's imports.[1]

Tariffs and Partial Equilibrium

We start our discussion of tariffs with a diagrammatic approach often used when focusing on the effect of protection on a single commodity—the so-called partial-equilibium approach. Figure 10.1 shows a small country's downward-sloping demand curve and rising supply curve for some commodity that is being imported. Initial world price, which is also the domestic price in a free-trade equilibrium, is indicated by the horizontal line at P_w, which indicates that unlimited supplies are available to the small country at this price. Points K and L indicate the quantities of this commodity that would be locally supplied and demanded, respectively, at this price; quantity KL would thus represent initial imports. If the country introduces a tariff of height $P_t - P_w$, the world price remains unchanged (the country is too small to affect world prices), and domestic price increases to P_t. Imports are reduced to level MN. In Figure 10.1 four different areas are isolated:

1. The reduction in consumer surplus: This is shown by areas 1 + 2 + 3 + 4—the loss in the area under the demand curve and above the initial market price when that market price rises.
2. The increase in producer surplus: By analogy, this is area 1—above the supply curve and lower than the new market price.
3. The government revenue: This is area 3—the amount collected as tariff revenue.
4. The triangular areas 2 + 4 represent a *dead weight loss:* This is the excess of what consumers have lost over and above what producers gain and what the government receives.

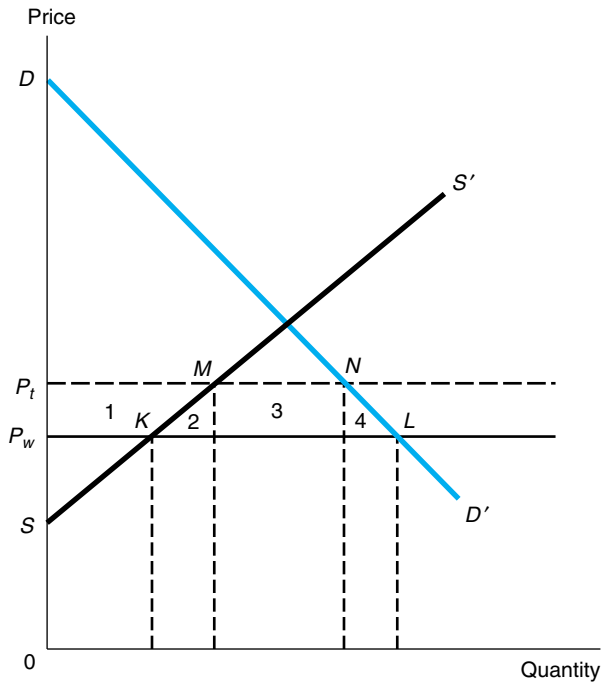
We turn now to a discussion of the effect of a tariff using the tools familiar from our earlier work—transformation schedules and indifference curves. The partial equi-

[1]It will usually be assumed that the tariff rate is quoted on an ad valorem basis; that is, the domestic price of imports, p_F, equals a multiple, $(1 + t)$, of the world price p_F^*. The tariff rate is sometimes quoted as a percentage of the foreign price (e.g., $100t$ might be 28 percent). For a given tariff rate, t, the absolute wedge separating home and foreign prices would increase if the foreign price rises. A different kind of tariff is the *specific* tariff—a rate quoted in absolute dollars per physical unit (e.g., $2.10 a ton). If t' denotes this amount, p_F would equal $(p_F^* + t')$. An inflation of world prices would, in such a case, leave the absolute tariff wedge unchanged (and diminish its relative significance).

FIGURE 10.1

Effects on Welfare and Government Revenue of Tariff on Individual Product

Domestic demand is *DD'*, domestic supply is *SS'*, world price is P_w. Imposing tariff P_tP_w/P_w0 leaves world price unchanged, raises domestic price to P_t, and causes a welfare loss (net) measured by triangular areas 2 and 4.



librium techniques displayed in Figure 10.1 can be augmented to ascertain the effects of protection on other parts of the economy. What happens to production and consumption of *exportables* as a tariff on imports is imposed? We start with the effect on production, then turn to the more subtle analysis of demand.

Tariffs and Production

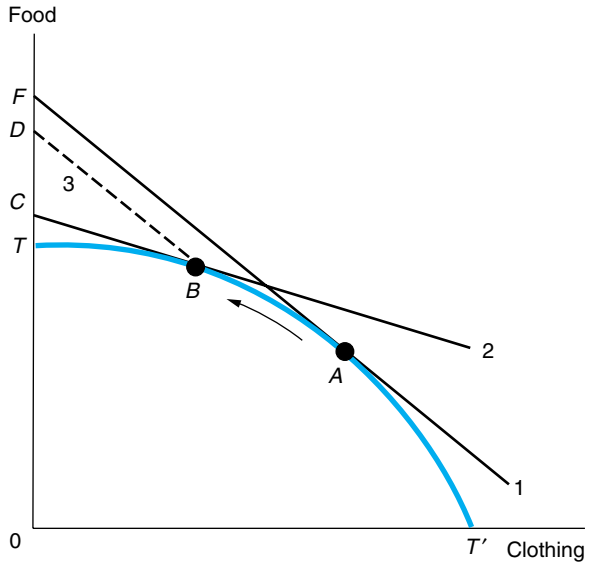
Figures 10.2 and 10.3 are designed to highlight separately the impact of a tariff on production and on demand. Curve *TT'* in Figure 10.2 shows full-employment production possibilities for a small country initially producing food and clothing at point *A* and facing free-trade relative prices shown by the slope of line 1. Suppose the country imports food and proceeds to levy a tariff on food imports, thus raising the domestic relative price of food by the amount of the tariff because the country is assumed to be too small to affect *world* prices. The posttariff *domestic* price ratio is shown by line 2. The tariff attracts resources to food, driving up the opportunity cost in this sector until local costs reflect the new higher domestic food price at *B*.

In terms of domestic prices, production point *B* maximizes the value of national production. Yet output evaluated at *world* prices has fallen: Line 3 is parallel to line 1, showing that national income in food units at world prices is *reduced* from 0*F* to 0*D*. This is a signal that a small country in competitive world markets harms itself by levying a tariff on imports.

FIGURE 10.2

The Effect of a Tariff on Production

The initial free-trade prices are shown by line 1; production is at *A*, and national income, measured in units of food, is 0*F*. A tariff on imports of food raises the domestic relative price of food, as is shown by line 2. Resources are shifted into food; production moves to point *B*. At world prices national income in food units has been reduced to 0*D* (line 3 is parallel to line 1).



Tariffs and Demand

The analysis of the impact of tariffs on demand is more difficult. Why? Because a tariff not only drives up the relative price of food imports to consumers, it also raises revenue. The assumption typically made about the tariff revenue is that it is redistributed back to the public. This may take the form of reductions in other taxes (for example, income taxes) sufficient to balance the budget. In any case, it is assumed that the public's disposable income (and expenditure) consists now not only of produced income but also of tariff revenue.[2] This means, however, that import demand depends partly on how much tariff revenue is raised, and the amount of tariff revenue raised depends on the quantity of imports demanded. Despite this complication, the bottom line is that a tariff reduces the country's demands for imports.

Details of the argument are provided by Figure 10.3. We abstract from production changes by assuming the production possibilities schedule is the right-angled box TAT', with production fixed at point A. The initial free-trade terms of trade are shown by line 1, with the community's best consumption point at G. Distance GK represents the free-trade level of food imports, matched by clothing exports of amount KA.

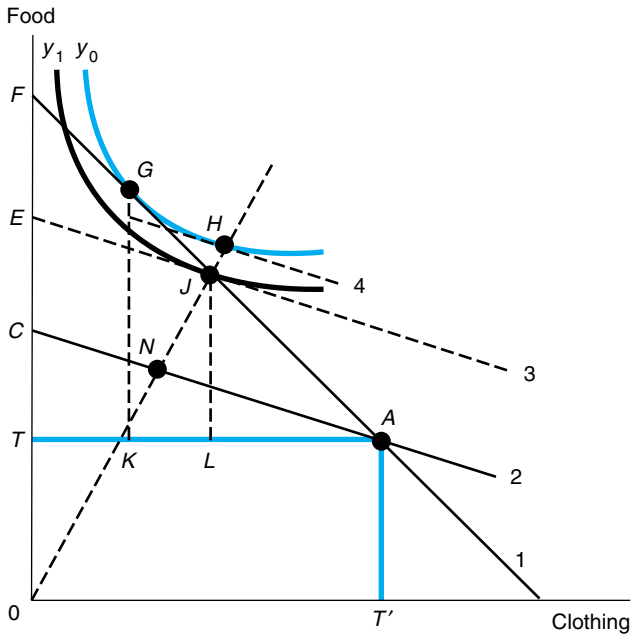
A tariff raises the relative price of food imports to consumers and also results in tariff revenues being collected and redistributed. The dotted line $0NJH$ has been constructed to connect all possible consumption points consistent with the higher relative

[2]An alternative procedure has the government keeping the tariff proceeds and spending them according to its own taste patterns, which may differ from those of the private sector. Having the tariff proceeds redistributed makes it possible to consider a single set of preferences for the entire community.

FIGURE 10.3

The Effect of a Tariff on Demand

Production remains at *A* on the right-angled *TAT′* transformation schedule. A tariff raises the relative domestic price of food to line 2 (parallel to lines 3 and 4). Food consumption falls by the substitution effect (from *G* to *H*) plus an income effect (from *H* to *J*). Distance *EC* measures the tariff revenue in terms of food. The trade triangle shrinks from *GKA* to *JLA*.



domestic price of food. (This locus is called an income-consumption line. For example, points *N*, *J*, and *H* are consumption bundles demanded at the new posttariff domestic prices when incomes are shown by lines 2, 3, and 4, respectively.) If consumers could stay on initial indifference curve y_0, the rise in food's price would evoke the substitution effect involved in moving from *G* to *H*. Income level y_0 cannot be maintained, however. Why not? The value of consumption at world prices must exactly match the value of production. Thus point *J* is the consumption point chosen after the tariff is imposed because it is the only point on 0*NJH* that also lies on line 1 through production point *A*. All points on line 1 satisfy the requirement that quantities of clothing exported match demand for food as imports *at world prices*.

In terms of domestic prices, line 3 is the posttariff budget line. It is above a parallel line, 2, through production point *A*. This reflects the fact that consumers' disposable income exceeds the value of production by the amount of the tariff revenue (*EC* in units of food). However, note that the tariff has harmed consumers—pushing them to consumption point *J*, which lies on a lower indifference curve than does *G*.

To summarize, the effect of a tariff on the demand for imports is tricky to analyze because tariff revenues form part of income, and income is one of the determinants of the demand for imports and thus tariff revenues. To cut through this simultaneity problem, Figure 10.3 shows that demand must satisfy two requirements in equilibrium: (1) The indifference curve must be tangent to a budget line reflecting *domestic* prices, and (2) the value of consumption must match the value of production at *world* prices.

In Figure 10.3 this implies that the consumption bundle must lie both on ray 0*NJH* and on line *AJF*. Note that, *despite* the fact that a tariff raises revenue, it lowers real income. Thus demand for importables falls both because price rises and real income is reduced.

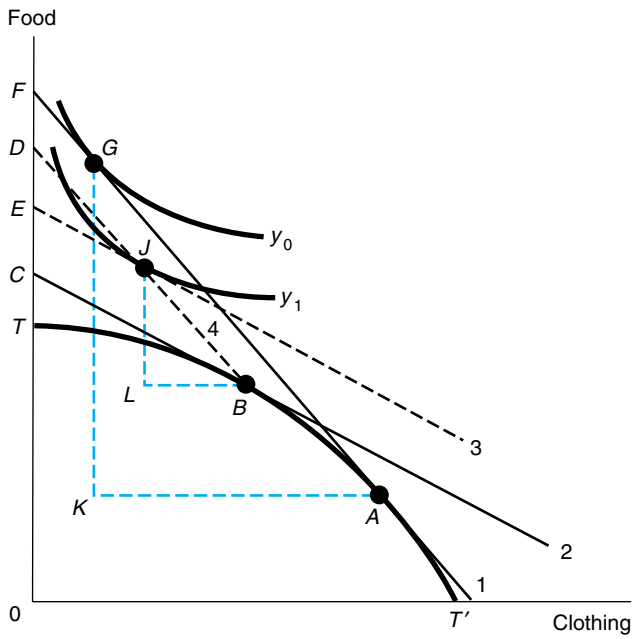
Tariffs and Imports

Now we combine the production and demand responses because a nation's imports reflect both its demand for the importable commodity and its domestic production of that same commodity. Figure 10.2 shows how a tariff encourages greater production of the importable commodity. Production was kept fixed in Figure 10.3 to highlight the effect of a tariff in cutting demand for importables. These two strands are brought together in Figure 10.4. The free-trade equilibrium production and consumption points are represented by points *A* and *G*, respectively, with the slope of line 1 indicating the fixed relative world price of clothing to food. A tariff on food raises the relative domestic price of food and encourages greater local production. This effect is shown by the move from *A* to *B*, where line 2 shows posttariff domestic prices. Line 4 is parallel to line 1 and shows combinations of clothing and food that have the same value at world prices as the production point *B*. The home country's consumption bundle after the tariff must lie somewhere along line 4; specifically, it must rest at *J*, where indifference curve y_1 has a slope equal to the *domestic* price ratio (line 3 is parallel to line 2). The home country's demand for imports has been reduced from *GK* to *JL*—a combination of greater production and lessened demand for food. Thus Figure 10.4 adds details about production and consumption of both commodities to the partial-equilibrium reduction of imports to level *MN* in Figure 10.1.

FIGURE 10.4

The Effect of a Tariff on Imports

A tariff raises the domestic relative price of food (shown by lines 2 and 3) above the fixed world price (shown by lines 1 and 4). Domestic production of food rises from *A* to *B*. Domestic consumption of food falls from *G* to *J*. The trade triangle shrinks from *GKA* to *JLB*.



Tariffs and Welfare

In Figure 10.4 the tariff lowers real income, illustrated by the move from curve y_0 to curve y_1. At given world prices, the tariff has lowered the aggregate value of production (compare $0F$ with $0D$). Furthermore, point J is not even the best consumption point along line 4 because the tariff causes domestic prices (line 3) to be distorted away from world prices (shown by the slope of line 4).

Both domestic prices and world prices have a welfare significance that helps reveal why a tariff for a small country facing competitive foreign suppliers lowers national well-being. *Domestic* prices reflect the community's relative evaluation of commodities. (Marginal rates of substitution are equated to domestic price ratios.) *World* prices reflect costs of obtaining a commodity via trade. If a tariff is erected, the cost to the community of obtaining another unit of food imports (as measured by the required export of clothing at world prices) is lower than the value to the community of consuming another unit of food (as measured by the slope of indifference curves or by the domestic price of food). This discrepancy between value and cost indicates that the purchase (at world prices) of another unit of food would yield more in satisfaction than would be sacrificed in cost. Yet the tariff moves consumption the other way; it has *reduced* imports and thus has lowered welfare. It has reduced imports by reducing demand *and* by increasing local production. (In Figure 10.4 food imports have been reduced from GK to JL.) This loss of welfare is also reflected in the sum of areas 2 and 4 in Figure 10.1—the *deadweight loss*. It is approximated by the reduction in imports times the tariff wedge.

If tariffs reduce imports, what is the effect on exports? As Figure 10.4 reveals, exports have also been reduced, from KA to LB. Popular discussions of commercial policy often focus on the desirability of cutting back on foreign imports, perhaps because of the supposed benefit to employment in that sector of the economy. However, if exports are also cut back by such a move, the benefit via total employment or any other measure is clearly questionable. One of the real advantages of analyzing commercial policies in a manner that makes explicit the consequences for *all* sectors of the economy is avoiding the misleading conclusion that protection is beneficial just because it might favor the sector being protected—misleading because there are changes in other sectors that such an argument ignores.

Tariffs and Export Taxes

An export tax is an instrument of commercial policy that raises the foreign price of exportables above the domestic price. Although barred by constitutional provision in the United States, it is sometimes used by other nations. Indeed, in 1987 Canada levied a 15 percent export tax on shipments of softwood lumber to the United States as part of an arrangement whereby a threatened American import duty of 15 percent on softwood imports was recalled. The net effect: The Canadians pocketed the tax revenue.[3]

[3]Chapters 11 and 12 discuss in more detail the rationale behind the choice of protectionist instruments that, as in this case, divert tariff revenue to foreign hands.

Application: Harmonization and the Environment

These issues have taken on great importance lately in countries' evolving efforts to achieve efficient international trading arrangements (discussed in Chapters 13 and 14). If a nation restricts trade heavily, trade controls and other industrial policies affect mainly its own welfare. As natural processes of globalization and the removal of tariffs knit national markets more tightly, countries perceive their welfare to be affected by other countries' policies toward their own domestic markets.

Consider industries whose activities tend to generate local pollution, in a trading universe consisting of two countries, the "Cleans" and the "Toughs." The Cleans prefer tight controls on polluting industrial processes, whereas the Toughs select less stringent controls. Any pollution controls raise production costs for polluting industries, and the Cleans penalize the polluters more heavily than do the Toughs. The policy difference changes the comparative-advantage pattern of the two nations so that polluting industries' outputs and exports are larger in Tough and smaller in Clean than would otherwise be the case. If we accept each country's choice of public policy as a reflection of its welfare, this outcome (with no restrictions on trade) is efficient. It can lead to policy conflicts, however, in two ways.

1. The dirty industries in Clean perceived themselves to be unfairly penalized by the lower costs of their less restricted competitors in Tough. They demand redress in the form of tariff protection; such pleas based on perceived fairness often receive sympathetic political responses.
2. Clean's most ardent environmentalists not only favor stringent environmental policies at home but also believe their Tough trading partners should feel the same way. When the United States, Canada, and Mexico were negotiating the North American Free Trade Agreement to eliminate most trade barriers among themselves (Section 14.2), environmentalists opposed the pact on the ground that the Mexicans should be required to adopt policies that met their own elevated tastes.

Pollution and environment problems can be either local (assumed so far) or global (global warming and greenhouse effects). Assume that the burning of a given amount of fossil fuel contributes the same amount to global warming, regardless of where it takes place. Even if each country requires the local abatement of pollution to the degree that its citizens desire, each still fails to recognize the harmful effect of its fuel-consumption level on all the other countries. The only solution is international agreement to restrict the total amount of pollutants. Trade policy stays in the picture, however. For global warming, it does not matter where pollution arises, but countries may differ in their marginal cost of cutting back. The efficient solution is a global version of the one that economists propose for dealing with local pollution problems: The government should create a given amount of "rights to pollute," which can be traded among industrial polluters. That is, firms in a polluting industry may choose between incurring the cost of reducing their pollution and buying a right to go on polluting. The price set by competitive bids and offers for such rights then causes abatement to take place where it is least costly. International pollution abatement through rights trading has been discussed but with much heat. There is a distributional question of who should

be given the rights to pollute when the auction starts (the developing countries?). Also, environmentalists are prone to see immorality in something called a "right to pollute," although it simply reflects the fact that eliminating all pollution is neither feasible nor economically desirable.[4]

10.2 Protection by a Large Country

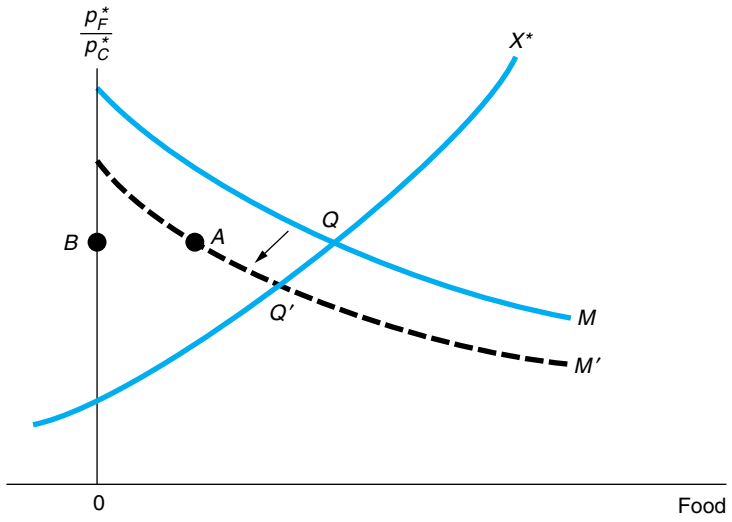
It has been shown that a tariff must reduce import demand and the supply of exports at the initially prevailing world prices. If the tariff-levying country is not small in relation to competitive world markets, its tariff will drive down the world relative price of imports or, equivalently, raise the relative world price of its exports. The tariff can improve a country's terms of trade.

This point can be illustrated by the home net import demand curve, M, and the foreign export supply curve, X^*, in Figure 10.5. The vertical axis measures the world relative price of food (thus the asterisks). Section 10.1 showed that at any given terms of trade a tariff would cut back home demand for imports—from Q to A at the initial terms of trade in Figure 10.5. That is, the home demand curve for imports, M, shifts leftward to M'.

FIGURE 10.5

A Tariff Improves the Terms of Trade

The initial free-trade equilibrium is at Q, with the relative *world* price of food shown at B on the vertical axis. A tariff shifts the home import demand schedule down from M to M' and lowers the world relative price of food to that indicated by Q'.



[4]Many other national policies toward production and consumption get tangled with trade policy. Discussion among policy makers has recently turned to these problems of "deeper integration," how countries can coordinate their policies to achieve efficiency in their domestic production and consumption levels without distorting trade patterns. See Pietro S. Nivola, ed., *Comparative Disadvantages? Social Regulations and the Global Economy* (Washington, DC: Brookings Institution, 1997).

The home country is not small in Figure 10.5. This is revealed by the fact that the new world trade equilibrium at Q' shows that the home country's tariff has lowered the relative price of imported food on world markets. That is, a country can use a tariff to improve its terms of trade. It acts like a seller of a commodity that finds itself with some monopoly power. By controlling supply, the seller can exercise some influence over price. Just as a tariff reduces the home country's import demand at given world terms of trade, so does it reduce the quantity of exports supplied. Looked at in this way, a tariff is a means of forcing up the relative price of a country's exports on world markets. An improvement in the terms of trade means either a reduction in the world relative price of imports or an increase in the relative price of exports—they are the same thing. Remember that although the government of the tariff-levying country can act like a monopolist, it is still assumed that private firms are numerous enough to act competitively.

If a tariff depresses the *world* relative price of imports, the *domestic* relative price of imports cannot rise by the full extent of the tariff. This relationship points to a conflict in the motives lying behind the use of a tariff. Tariffs often aim to protect local import-competing industries that wish to raise the domestic price of the commodities they produce. The more inelastic is the foreign supply curve, the more the foreign price of imports will be driven down by the tariff. The consequence: the greater the improvement in the terms of trade, the less the protective effect of a tariff.[5]

10.3 Taxing Trade: Domestic Welfare

If a large country can improve its terms of trade by commercial policy, why is it not always beneficial to keep levying higher and higher tariffs to obtain ever better terms of trade? The analysis of the small-country case in Section 10.1 provides a warning that there is more to the argument than this. If a country cannot improve its terms of trade, a tariff will actually harm welfare. There are two conflicting forces regarding the impact of a tariff on domestic welfare.

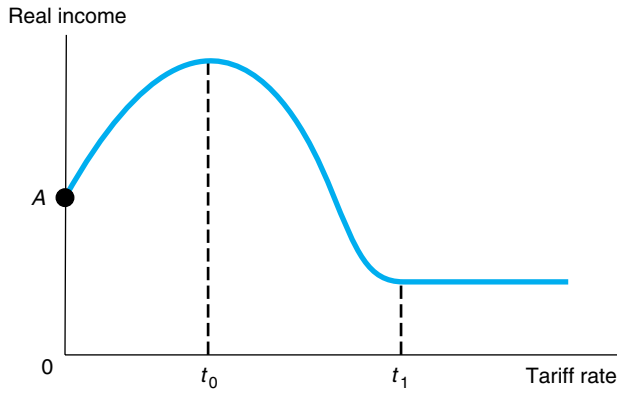
Figure 10.6 shows how welfare is linked to the height of the tariff for a country able to improve its terms of trade by trade restriction. Assume there is some rate of duty, t_1, large enough to choke off all trade. If such a tariff were applied, all gains from trade would be wiped out. (Imposing tariff rates higher than t_1 would have no further effect on real incomes because dutiable imports have already been reduced to zero.) Free trade (a zero tariff) is superior to no trade (with a tariff equal to t_1 or higher), so the curve in Figure 10.6 is lower after t_1 than initially at A. Furthermore, the terms-of-trade improvement that would occur when a small tariff is first levied must improve welfare. Obviously, there must be some intermediate tariff rate, t_0, that is optimal in that it maximizes the level of domestic welfare.

[5]A tariff might depress the foreign price of imports so much that the domestic price actually falls. The appendix illustrates the possibility geometrically and the supplement provides an algebraic account.

FIGURE 10.6

Domestic Welfare Depends on the Tariff Rate

Free trade leads to a level of real income indexed by 0*A*. For a country with some influence on world prices, a tariff can improve its terms of trade and lead initially to a gain in real income. Rate t_0 is the optimum tariff. Higher rates of duty cost more in forgone opportunities to import than is gained by a lowering of import prices. Rate t_1 cuts off all imports and leads to a level of real income identical to that of the no-trade state, which is lower than the free-trade level, 0*A*.



Here we are not concerned with computing the value of the "optimal tariff."[6] Instead, we wish to understand the nature of the conflict between the two effects of a tariff on welfare. A tariff improves the terms of trade, thus serving to raise welfare. However, the terms-of-trade improvement has been deliberately engineered by having the tariff choke off local import demand, and any reduction in imports must serve to lower domestic welfare if the *cost* of obtaining these imports (as shown by *world* prices) is lower than their *value* at home (as shown by *domestic* prices). A tariff is a wedge that raises domestic price above world price. Too high a tariff rate causes a greater loss through forgone opportunities to import than can be compensated for by the favorable price drop on remaining imports.

This discussion has assumed that the foreign country retains a policy of free trade, passively allowing the home country to pursue whatever commercial practices it pleases. This assumption overlooks the very real possibility that the foreign country will retaliate with its own tariff. Any foreign tariff worsens the terms of trade for the home country. If the foreign country does retaliate because of a tariff levied at home, it is no longer clear that the home country can benefit. Many outcomes of such a tariff war are possible. As related in Chapter 13, much of the tariff history of the major trading nations for the past sixty years has been characterized by multilateral attempts to reduce tariff barriers, in full awareness of the dangers of escalation when a single country begins to pursue an active commercial policy on its own.

10.4 Taxing Trade: World Welfare

Supporters of the free-trade doctrine point to the loss in *world* efficiency entailed by taxing trade. Although the protectionist countries might gain, others stand to lose *more*. This argument focuses on the deadweight loss introduced by the *distortion* that a

[6]This is carried out in the supplement to Chapter 10 and is illustrated by means of the offer curve diagram in the appendix.

tariff creates between prices in one country and another. To probe further, the argument will be presented in two stages: the effect of a tariff on world production, and the effect of a tariff on world consumption possibilities *given* the levels of production.

Protection and World Production

A tariff on food in the home country raises the relative price of food above its level in the foreign country. This higher price is reflected in a difference in the slopes of the two countries' transformation curves. Figure 10.7 superimposes the point showing production on the foreign transformation schedule (drawn upside down) on the point showing production at home. The production point is Q for both countries, and the tariff wedge separating relative prices at home and abroad causes price line 1 at home to be flatter than price line 2 abroad. The point 0* shows posttariff *world* outputs of food and clothing relative to the axes through 0. If the tariff were removed, resources in each country would be shifted into the commodity in which that country possesses a comparative advantage—clothing at home and food abroad. Points A and B represent possible free-trade production points. The slope of TT' at A equals the slope of $T^*T^{*\prime}$ at B, and if B were to be superimposed on A, total world outputs would expand from 0* to C.

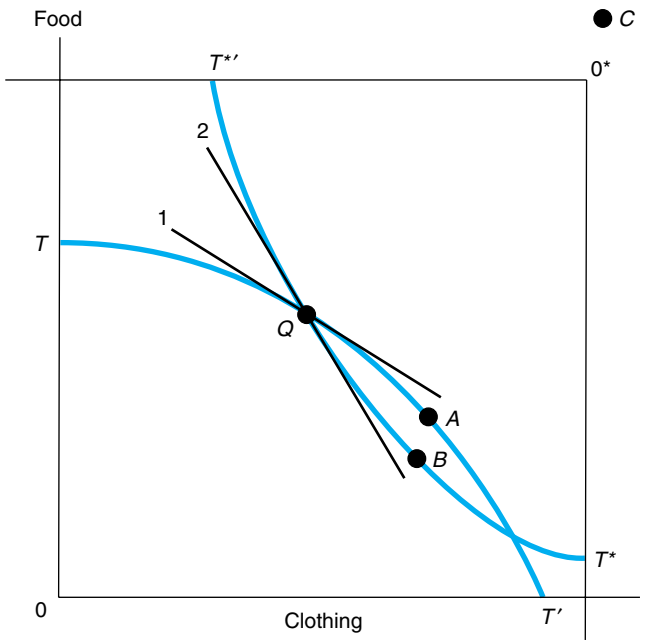
Protection and World Consumption Losses

The imposition of a tariff on food creates a discrepancy between relative prices in the home market and those abroad. The fundamental message of Chapter 2 was that both home and foreign countries can gain by exchanging commodities at a common world

FIGURE 10.7

A Tariff and World Production

Point Q represents production at home and abroad after a tariff has been imposed. The foreign transformation schedule, $T^*T^{*\prime}$ is upside down, so that total world production is shown by 0*. The home country's tariff on food imports leads to a higher relative price of food at home (shown by line 1) than abroad (shown by line 2). If the tariff is removed, both countries face the same price ratio (e.g., the common slope at A and B). If B is superimposed on A, total world production expands from 0* to C (measured from home origin, 0).



price ratio if initially price ratios differ between countries. By creating such a difference, a tariff leads to losses in real incomes in both countries, even out of a *given* set of world outputs. The appendix to this chapter illustrates this by use of the box diagram.

10.5 Summary

Import protection has both positive and normative aspects. The positive aspects refer to the effects of a tariff on prices, consumption, production, and trade. Proceeding first with a small country's tariff, it was shown that resources are shifted into the import-competing sector of the economy and demand is drawn away from the imported commodity. On both counts the country's demand for imports falls at the given world terms of trade. If a country is large enough for its actions to influence world prices, the contraction in import demand induced by the tariff will lower the country's relative price of imports and thus improve its terms of trade. There was a more ambiguous result concerning the relative domestic price of imports. Typically a tariff is protective because it raises the local price of the dutiable item, but if foreign response to price changes is sufficiently inelastic, the relative world price of imports could fall by a lot, perhaps even more than the tariff itself. (In that case a tariff on food would, paradoxically, lower the relative price of food behind the tariff wall.)

The normative aspects of a tariff deal with its effect on welfare at home and abroad. The foreign country is hurt by the tariff—its terms of trade deteriorate. For the home tariff-levying country, however, there is more to consider than the possible improvement in the terms of trade. Once the domestic price of imports is higher than the world price, any further tariff increases may reduce imports of a commodity for which the cost of purchase abroad is less than the valuation at home (as measured by domestic prices). This loss in trade volume must be set against a terms-of-trade improvement in measuring the net benefits of a tariff. The extreme case of a tariff sufficiently high to choke off all trade shows that the optimal tariff must fall short of this. Furthermore, if the foreign country retaliates, the home country may end up with a lower level of real income than it obtained with free trade.

A tariff is an inferior way to redistribute income between countries. The reason? It introduces a distortion between domestic and world prices and causes world outputs to settle at a suboptimal level and lower real incomes for any given levels of output. In this sense, a tariff is a *second-best* instrument from a world point of view. Other means of redistributing income internationally (e.g., a direct gift from the foreign country to the home country) might allow both countries to emerge with a higher level of real income than a distorting tariff provides. This second-best concept has wider applicability to other arguments for protection, as you will see in Chapter 11.

CHAPTER PROBLEMS

1. A "small" country is one with no power to affect the world prices of commodities. Redraw Figures 10.5 and 10.6 for such a country.

2. The foreign supply curve of exports in Figure 10.5, X^*, has been drawn with a positive slope. This implies that foreign import demand for clothing is elastic. Suppose that for prices near the initial equilibrium point Q, foreign import demand is inelastic. Draw the new X^* foreign supply curve of food exports. What is the effect of a tariff on imports of food? Would local food producers favor such a tariff?
3. In Figure 10.5 the tariff has shifted the demand curve for imports. Does the extent of the downward shift fall short of, equal, or exceed the amount of the tariff? (*Hint*: Ask what would happen to demand if world price were to fall by exactly the amount of the tariff—and decompose between substitution and income effects.)
4. Draw an initial free-trade equilibrium (for a small country facing given world prices) with a transformation schedule and indifference curves. Indicate in such a diagram the rate of the tariff that would completely wipe out trade. What happens to production and consumption if legislators are overzealous and the tariff rate is higher than this rate?
5. In the text it was assumed the government redistributes tariff proceeds back to the private sector. Instead, suppose the government spends the tariff revenues in a manner that differs from that of private citizens. Consider the two extreme forms of public spending: (a) The tariff revenue is spent only on clothing, the commodity exported, or (b) the tariff revenue is allocated, instead, to purchases of food. Which scheme is more likely to be favored by producers who have clamored for protection? What might happen to the terms of trade in case (b)?

SUGGESTIONS FOR FURTHER READING

Irwin, Douglas. *Free Trade Under Fire,* 2nd ed. (Princeton: Princeton University Press, 2005). Chapter 2 provides a good background to the free-trade arguments.

Jones, Ronald W. "Tariffs and Trade in General Equilibrium: Comment," *American Economic Review,* 59 (June 1969): 418–424. A brief analysis of basic tariff theory.

APPENDIX

Tariffs and the Offer Curve

The offer curve construction described in the appendix to Chapter 3 is particularly useful in illustrating the impact of a tariff and the concept of the optimal tariff.

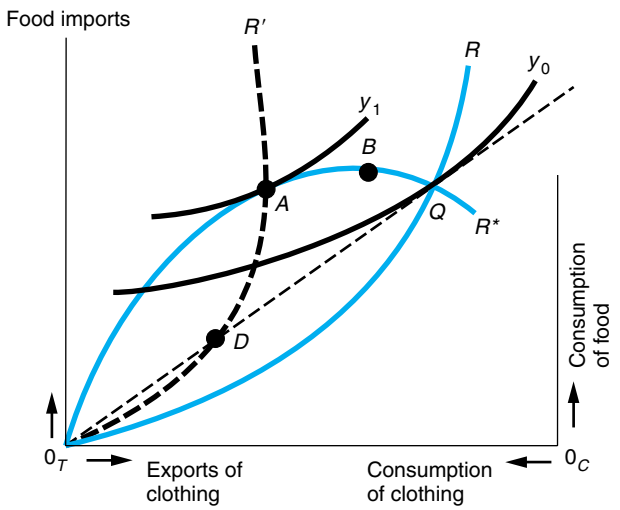
The Optimal Tariff

To pursue the geometry it is useful to introduce a simplifying assumption: The home country is completely specialized in producing its export commodity, clothing. The constant level of clothing output is shown in Figure 10.A.1 by distance 0_T0_C. (0_T refers to the *trading* origin and 0_C to the *consumption* origin.) The home offer curve, 0_TR, intersects

FIGURE 10.A.1

The Optimal Tariff

A tariff that shifts home offer curve 0_TR to $0_TR'$ is optimal. Home real income at point A is greater than at any other point on the foreign offer curve, 0_TR^*.



the foreign offer curve, 0_TR^* at point Q, establishing the slope of ray 0_TQ as the equilibrium terms of trade (the world relative price of clothing). That part of clothing production not exported is available for consumption at home; thus, relative to the 0_C origin, any point in the diagram shows the home consumption bundle of food and clothing.

Two indifference curves have been drawn. The curve y_0 is tangent to ray 0_TDQ; this is why point Q was selected at those prices. Clearly, other points on the foreign offer curve 0_TR^* would represent more favorable trades for the home country. Point B lies on a higher indifference curve (not drawn). The curve tangent to the foreign offer curve, curve y_1, shows the *maximal* utility level possible for the home country.

How does the home country get to point A on the foreign offer curve, 0_TR^*? By levying a tariff. As illustrated in the text, a tariff decreases the demand for imports and the supply of exports at any given world terms of trade. That is, it *shifts* the home offer curve in toward the origin. The *optimal tariff* rate that maximizes the national welfare is that which leads to the home tariff-ridden offer curve $0_TR'$. Such a tariff has caused the relative *world* price of food, the commodity imported at home, to fall. This is shown by the greater slope of a ray from 0_T through point A. The relative *domestic* price of food has increased slightly; the slope of indifference curve y_1 at its point of tangency with the foreign offer curve at A indicates the domestic relative price of clothing. The wedge between the two prices shows the optimal tariff rate. (A formula for this rate is provided in the supplement.)

The Protective Effect of a Tariff

As previously suggested, a tariff may fail to protect the home import-competing industry by improving the terms of trade so much that the relative domestic price of importables falls. The offer curve diagram and yet another concept—*the income-consumption curve*—can usefully illustrate this possibility.

FIGURE 10.A.2

The Tariff May Not Protect

IC is the income-consumption curve for the home country, which cuts the foreign offer curve at *E*. A tariff that leads to an equilibrium in the *EQ* range of the foreign curve (e.g., at *G*) serves to lower the relative domestic price of importables, as shown by the slope of the indifference curve at *G*. A tariff in range *EQ* fails to protect.

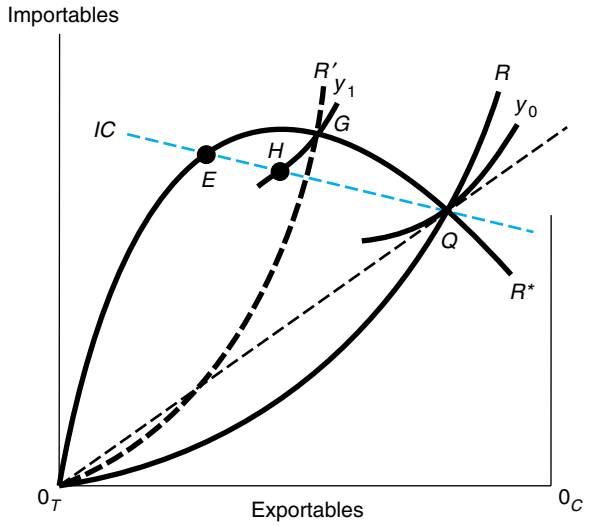


Figure 10.A.2 follows Figure 10.A.1 in illustrating the foreign offer curve, $0_T R^*$, with initial free-trade equilibrium at point Q along an *inelastic* section of the offer curve. The home indifference curve tangent to ray $0_T Q$ has been drawn. The *income-consumption curve* for the home country, *IC*, is the locus of points along home indifference curves for which slopes are the same as at Q (e.g., at point H). This *IC* curve has been drawn so as to cut the foreign offer curve at point E.

As previously illustrated, a tariff levied on home imports of food shifts the home offer curve so that it cuts the foreign offer curve at a point such as G. A higher tariff would shift the home offer curve even more. The principal conclusion is that a home tariff, leading to a new equilibrium anywhere in the stretch EQ along the foreign offer curve, fails to protect the home food sector. The reason: At a point such as G the home indifference curve is steeper than at H (equal to the slope at Q). Therefore, the relative domestic price of food at G is less than the pretariff price at Q. This is called the *Metzler paradox*.[7] However, a tariff sufficiently high to place the new equilibrium point along the $0_T E$ stretch of the foreign offer curve must raise the home relative price of food.

If the income-consumption curve is steeper than the foreign offer curve at Q, any tariff, no matter how small, must be protective. The condition for this, as is proved in the supplement to Chapter 10, is

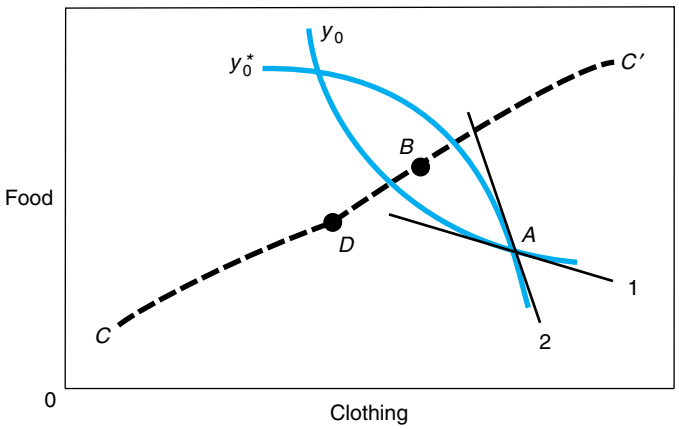
$$\varepsilon^* > 1 - m$$

[7]The argument that a tariff may fail to raise the price of the protected commodity behind the tariff wall is found in Lloyd Metzler, "Tariffs, the Terms of Trade, and the Distribution of National Income," *Journal of Political Economy,* 57 (February 1949): 1–29, reprinted in Caves and Johnson, eds., *Readings in International Economics* (Homewood, IL: Irwin, 1968), Chapter 2. The logic of the argument is explained algebraically in the supplement to this chapter.

FIGURE 10.A.3

The Tariff Pulls Consumption Off the Contract Curve

Initial free-trade equilibrium is on the contract curve at *D*. The home country's tariff improves home welfare (to y_0) and reduces foreign welfare (to y_0^*) but pulls the consumption point off the contract curve (to *A*). A point such as *B* would improve *both* countries' welfare compared with tariff point *A*.



where ε^* is the elasticity of foreign demand for imports along $0_T ER^*$ at Q, and m is the home marginal propensity to import (food). Obviously, if foreign demand is elastic, this condition must be satisfied (as long as both commodities are normal at home, that is, the *IC* curve is negatively sloped).

The Tariff and the Box Diagram

One consequence of a tariff is a reduction of world outputs below the free-trade level. From a world point of view, however, this is not the only consequence. Recall from the appendix to Chapter 2 the discussion of the box diagram and the contract curve (Figure 2.A.1). For convenience, the box is reproduced as Figure 10.A.3, which shows a *given* world total of food and clothing.

The imposition of the tariff on food in the home country causes domestic prices (as shown by the slope of line 1) to differ from foreign prices (given by the slope of line 2). Therefore, the tariff leads to a consumption allocation *off* the contract curve (such as point *A*).World welfare has been reduced in that *A* is worse for *both* parties than some point, such as *B*, on the contract curve.