VOUSDEN

CHAPTER 4

Protection for a large country

The analysis of Chapters 2 and 3 was conducted in terms of an economy which was too small to affect the prices at which it bought and sold goods in world markets. Such an approach offers both a simple means of obtaining insights into the workings of various policies and a reasonably accurate representation of most real world economies. However, it is an inadequate tool for analysing the trade relations among such major trading countries or blocs as the United States, Japan and the EEC. In this chapter we temporarily leave the small-country case and consider economies which are large enough to use their buying and selling power to influence world prices. For the time being, we retain the assumption that producers are atomistic price takers. The logical starting point for any analysis of protection in a large-country context is the observation that a country which can, by its own actions, affect the price at which it buys or sells a traded good may gain by using a tariff or an export tax to restrict trade. The resulting gains from an improved terms of trade must be balanced at the margin against the increased domestic deadweight losses from a higher trade tax. The outcome of this exercise is the so-called optimal tariff. In the first section we consider how the optimum tariff is derived. We then employ a two-country model to consider the outcome when one country's optimal tariff induces the other country to impose a retaliatory tariff. The equilibrium of such a trade war is seen to depend crucially on whether trade is restricted by a price-related tool such as a tariff or a quantitative device such as a quota. An alternative policy tool which has become increasingly popular in recent years is the voluntary export restraint (VER). VERs are analysed in some detail in Section 4.4. In the final section of the chapter we consider variable import levies and export subsidies, policies which are a central part of the EEC's Common Agricultural Policy.

4.1. The optimal tariff

Consider a two-good economy which is a large buyer in the world market for its importable good. In Figure 4.1, *DD* is the country's demand curve for imports, and because the country is large, it faces an upward-sloping foreign supply curve of imports, *SS*. Although *SS* represents the marginal cost curve for foreign exporters, from the home economy's point of view it is the *average cost of imports;* it tells us what the home economy must pay for each unit it imports.

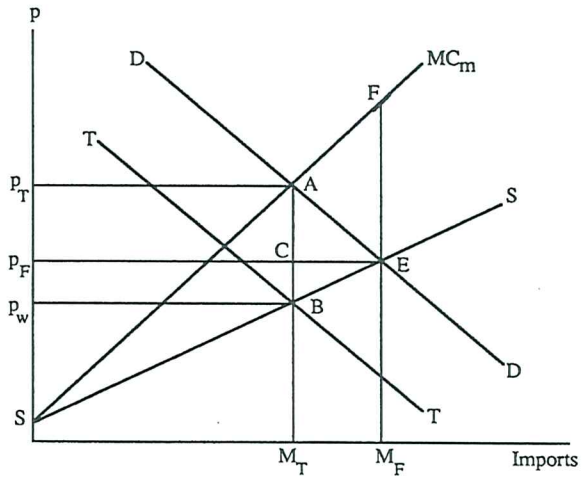

Figure 4.1

Because this curve is upward-sloping (i.e. foreign producers export more only if a higher price is offered), the *marginal cost of imports* to the home economy is also upward-sloping and lies above *SS*. This is because the cost to the economy of an extra unit of imports includes not only the price of the marginal unit (as given by *SS*) but also the added cost of paying for the inframarginal units (because their price rises with the price of the marginal unit). This marginal cost-of-imports curve is shown as MC_m in Figure 4.1.

In a free-trade situation, world equilibrium is at the point *E*, where the domestic demand curve and the foreign supply curve intersect, giving price p_F and quantity imported M_F. However at this point, the value to the home country of an extra unit of imports is less than the marginal cost of that unit (by an amount *EF*). The home country can therefore increase its welfare by reducing imports to level M_T, determined by the point of intersection (*A*) of the demand curve and MC_m; the resulting gain is equal to the area *FAE*. This gain has come about because the home country's restriction of import demand has reduced the equilibrium relative price at which it buys imports – that is, its terms of trade have improved, p_w denotes the new world relative price of imports. So far the story should be a familiar one: a country which is a monopsonist gains by reducing its demand for a good, thereby forcing down its price, in much the same way as a firm which is a monopsonistic buyer of labour can obtain its labour more cheaply by employing fewer workers. The difference in the present case is that import restriction is not realized without government intervention because the agents of the economy are too small to exercise any monopsony power. On the other hand, the government can move the economy from the sub-

optimal free-trade point E to the optimal point A by imposing a trade-restricting policy such as a tariff. A tariff of AB per unit will shift the demand curve for imports down to TT in Figure 4.1, and equilibrium in the world market will be realized at B with world price p_w and domestic price p_T. The tariff of $p_w p_T$ per unit is termed the *optimal tariff*.

The foregoing amounts to the so-called *terms of trade argument for protection*: if an economy in a freely trading world is large enough to use trade restrictions to improve its terms of trade then it gains by doing so. If it also wishes to achieve some domestic non-economic objective, then it should use the instrument appropriate to that objective (e.g. a production subsidy), using the tariff separately to improve its terms of trade. This principle (which is a straightforward extension of the principle of targeting instruments to objectives, enunciated in Chapter 2) is established formally in Appendix 2, where we also derive the standard formula for the optimal tariff in a two-good world.

Although a large country can secure improved terms of trade by imposing a tariff, it does so at the cost of increased domestic deadweight losses (the Harberger triangles of Chapter 2). Because of this trade-off, it does not pay a country to increase its tariff indefinitely. The two effects are illustrated in Figure 4.1. Relative to free trade, domestic consumers lose the area $p_T AE p_F$ (this is net of transfers to domestic producers because we are using the demand curve for imports, not importables). Against this, we must count the recycled tariff revenue, $p_T AB p_w$. Of this, $p_T ACP_F$ is transferred from domestic consumers to domestic taxpayers and $p_F CB p_w$ is transferred from foreign producers to domestic taxpayers. The net gain (AFE) from the tariff is thus seen to equal the excess of area $p_F CP p_w$ (the terms of trade gain) over area AEC (the domestic deadweight loss). The optimal tariff is such that the marginal gain from the terms of trade improvement associated with a small tariff increase equals the marginal loss via domestic distortion costs. In particular, the optimal tariff must be less than the prohibitive tariff (the tariff which eliminates imports) because a small reduction of the tariff below the prohibitive level involves no terms-of-trade loss (because imports are zero) but yields a gain by reducing the domestic distortion cost of the tariff: accordingly, the economy must gain by reducing the tariff below the prohibitive level.

Note that there are several implicit assumptions in this model which ensure that the optimal tariff is positive. In particular, the monotonic forms we have assumed for SS and DD (positively sloped and negatively sloped, respectively) effectively exclude the possibility that the export supply of the foreign country (for example) may be non-unique for some prices. If this possibility is admitted, then a negative optimal tariff (i.e. an import subsidy) may be the outcome (for further discussion of this possibility, see Riley, 1970). In addition, we have confined our attention to impact effects. A tariff imposed by the home country may have significant effects on income distribution in the foreign country. If

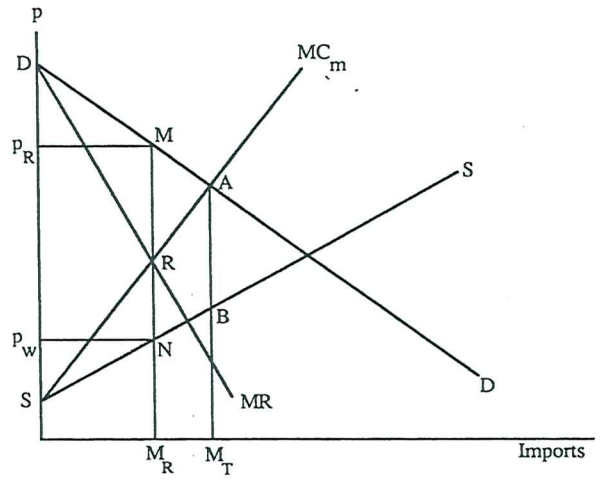

Figure 4.2

such redistributions reduce the foreign supply of exports, shifting SS to the left, then the home country's marginal cost of imports will be increased. If such an effect outweighs the other gains from a positive tariff, then the home country would have done better by imposing an import subsidy (see Kemp, 1967).

Finally, we note that although an individual large country can make itself better off by imposing its optimal tariff, the welfare of the world as a whole will be reduced by such an action. This is readily illustrated with the aid of Figure 4.1 in which total world welfare can be measured as the sum of domestic net "consumer surplus" from imports plus foreign net producer surplus from exports, that is, the area below the demand curve DD and above the foreign supply curve SS up to the quantity of goods traded. When the home country imposes its optimal tariff, this area is reduced by the triangle ABE (the tariff revenue being merely an inter-country transfer), indicating a fall in total world welfare.

This presentation of the optimal tariff argument is helpful because it presents the argument in terms of the simple textbook model of monopsony, and because it illustrates the trade-off between gains and losses in arriving at the optimal tariff.[1] It can also be used to compare the optimal tariff with the tariff which yields the government the highest revenue, the so-called *maximum revenue tariff*. This comparison is made with the aid of Figure 4.2.

The government, as collector of the tariff revenue, is equivalent to a monopolistic firm which buys imports from abroad at an average cost given by curve SS and sells them at a price given by the demand curve, the profits being the tariff revenue. For the case illustrated in Figure 4.2, there is a unique tariff level at which tariff revenue is maximized. This maximum is attained at point R where

the marginal revenue curve derived from D (MR in Figure 4.2) intersects MC_m. Such an equilibrium clearly involves a lower level of imports than under the optimal tariff (M_R as opposed to M_T) and therefore requires a higher tariff per unit (MN as opposed to AB). We have thus shown, for the case in which tariff revenue is a single-peaked function of the tariff level (as it is in Figure 4.2), that the maximum revenue tariff exceeds the optimal tariff.[2] In other words, if governments are using tariffs primarily as a revenue-raising device, then it is likely that they will restrict trade more than is optimal from their country's point of view.

The export tax equivalent of this result is also of interest, not least because it has implications (perhaps surprisingly) for government tax policy towards monopolistic exporting bodies such as grain-marketing firms. Recall that the Lerner symmetry theorem tells us that an export tax is equivalent to a tariff at the same rate. This implies the following analogue of the previous tariff result: the maximum revenue export tax exceeds the optimal export tax. Now consider the case of a monopolistic domestic marketing firm which buys, say, wheat from domestic producers (at their marginal cost of production) and exports it to foreign consumers. It uses its monopoly power to maximize profits from exporting but is constrained to charge domestic consumers the price paid to domestic producers (i.e. a zero profit constraint on its domestic sales). The profit maximization problem of such a firm is the same as the problem faced by a government using an export tax to maximize revenue (both wish to maximize the profits that accrue from the excess of the export price over the domestic supply price). Both restrict exports below the optimal level. Accordingly, a government pursuing welfare (rather than revenue) optimization would have to subsidize exports by the firm. This case and other types of export monopolies (e.g. producer cartels and marketing boards) are analysed in detail in Just, Schmitz and Zilberman (1979). The optimal government tax or subsidy policy towards such monopolies varies from case to case, the particular example given here being intended merely as an illustration of how simple techniques can be applied to this type of problem.

We now digress briefly and reconsider the basic optimal tariff problem of Figure 4.1, using the alternative representation of offer curves and trade indifference curves (see Chapter 1). This provides us with a more convenient framework for use in the next two sections in which we consider tariffs and quotas in the presence of retaliation. It is also the standard treatment of the subject in most trade textbooks. Figure 4.3 illustrates this approach.

In a two-country world, OR denotes the home country's offer curve, and OR^* is the foreign country's offer curve under free trade. The equilibrium terms of trade are given by the ray OE. At the world equilibrium point E, the terms-of-trade line is tangent to trade indifference curves u and u^* for the home and foreign countries, respectively. It is clear from Figure 4.3 that, if the foreign country pursues free trade, the home country can attain a higher trade indifference curve by imposing a tariff. A tariff has the effect of shifting the home country's offer curve inward along any price ray through the origin (because the tariff reduces the volume of trade at any terms of trade). The offer curve OR_1 is the tariff-distorted offer curve that puts the home country on its highest possible trade indifference curve consistent with the foreign country's offer curve – this is the indifference curve u_1 which is tangent to OR^* at A. The domestic price ratio at A is given by the slope of u_1 at A, and the associated tariff is the home country's optimal tariff. We thus see again that if the foreign country has a zero tariff, the home country gains by imposing a positive tariff.

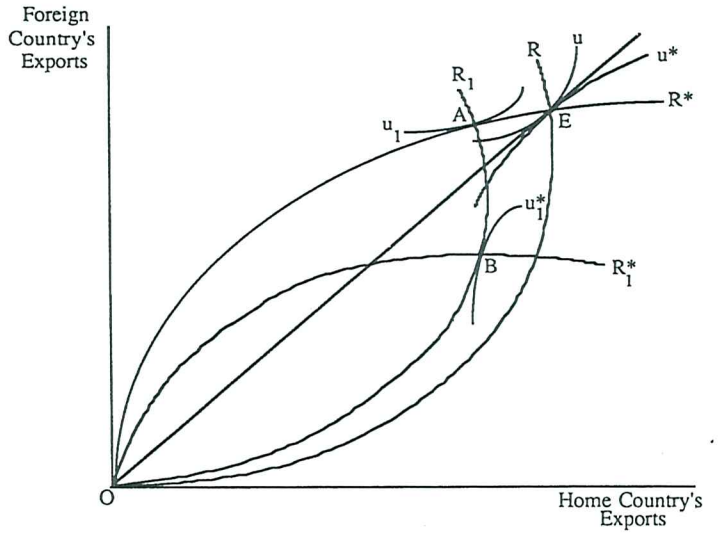

Figure 4.3

It seems unlikely that the foreign country will react passively to this tariff. After all, it stands to gain by imposing its own retaliatory tariff. A tariff which shifts its offer curve down to position OR_1^* will maximize its utility subject to the home country's offer curve OR_1 (at point B on indifference curve u_1^*). In the presence of such retaliation, two questions must be asked: what equilibrium is likely to emerge from such non-cooperative behaviour and can the home country still be better off than under free trade? To answer these questions, we now turn to a more thorough analysis of tariffs and retaliation.

4.2. Tariffs and retaliation

Let us assume that each country chooses its tariff to maximize its welfare, taking the tariff of the other country as given – so-called non-cooperative Nash behaviour. The outcome of this behaviour is a *non-cooperative Nash equi-*

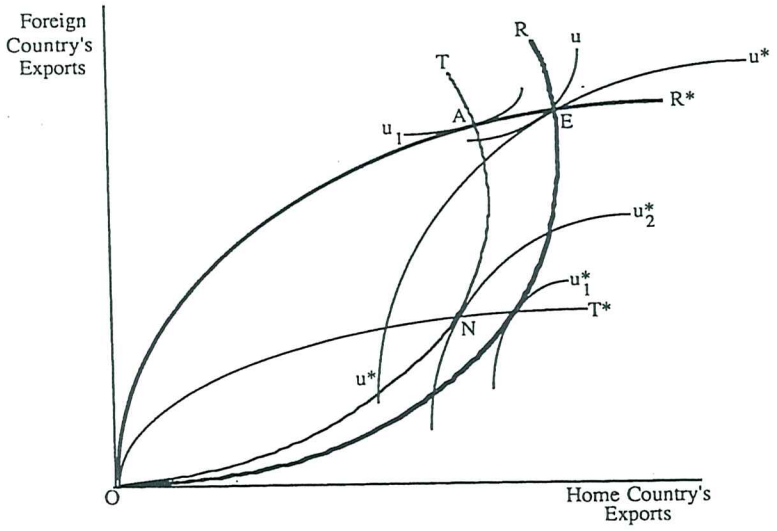

Figure 4.4

librium, a term used to describe an equilibrium of a contest between a number of agents in which each agent is at an optimum, given the actions of all other agents in the contest. It is to be distinguished from a cooperative Nash equilibrium in which the agents collude to maximize their joint welfare. Unless stated otherwise, the term *Nash equilibrium* will be taken to mean a non-cooperative equilibrium.

To derive the Nash equilibrium in the present problem we shall use the standard device of deriving reaction curves showing how each country's optimal behaviour depends on the other country's tariff. The point of intersection of these reaction curves then determines the Nash equilibrium volume of trade and the two countries' tariff levels. In Figure 4.4, curve OT represents the locus of tangencies of home country trade indifference curves and foreign offer curves; in other words, it represents the locus of the home country's optimal responses to various levels of the foreign tariff. Similarly, OT^* is the foreign country's reaction curve, being the locus of tangencies between foreign trade indifference curves and home country offer curves. As one country increases its tariff towards the level which would eliminate trade, the optimal tariff for the other country approaches zero (there can be no terms-of-trade gain when there is zero trade). This occurs at the origin on both reaction curves. Furthermore, at the origin, OT has the same slope as the home country's free-trade offer curve OR, and OT^* has the same slope as the foreign free-trade offer curve OR^*. However, when positive quantities are traded, each country gains by imposing

a positive tariff for any given non-prohibitive tariff of the other country. Thus OT lies to the left of OR, and OT^* lies below OR^* as shown in Figure 4.4.

Point N represents the Nash equilibrium. The origin is not an equilibrium (although it looks like one in Figure 4.4) because it requires one country to impose a prohibitive tariff while the other responds with free trade. In such a situation, the country imposing the tariff would clearly do better by moving to its optimal tariff, which we know to be below the prohibitive rate (Section 4.1). This would then allow positive trade to take place, and the other country would gain by imposing a retaliatory tariff: the system moves away from O towards N. Thus, one conclusion of this model is that tariff retaliation which yields a Nash equilibrium does not eliminate trade. Of course, it is still possible that trade may be eliminated asymptotically with successive retaliations taking the world economy closer to O (but never actually reaching O). However, Tower (1976b) shows that this possibility can also be ruled out, provided neither country would be completely specialized under autarky. In other words, in a world in which incomplete specialization is the rule, a tariff war would allow trade to continue at a strictly positive level. As we shall see in the next section, this is in marked contrast to the outcome when a trade war is conducted using quantitative trade restrictions.

Figure 4.4 can also be used to illustrate the possibility (originally noted by Johnson, 1953) that one of the two countries may be better off at N than under free trade at E. In the diagram as drawn, the foreign country is on trade indifference curve u_2^*, which is superior to the free-trade indifference curve u^*. In other words, even in the presence of retaliation, one country may gain by imposing a tariff.

The determination of the Nash equilibrium tariff levels can also be illustrated by drawing the reaction curves in the tariff plane (Figure 4.5). This representation gives us another way of looking at the problem and will also be useful when we analyse negotiated tariff reductions in Chapter 10. In Figure 4.5, we confine our attention to the simple case in which each country's reaction curve is downward sloping and there is a unique Nash equilibrium. The tariff levels for the home and foreign countries are denoted by t and t^*, respectively. The reaction curve $t(t^*)$ shows the home country's welfare-maximizing tariff for given values of t^*. The foreign country's tariff reaction curve $t^*(t)$ is similarly defined. The intersection point of the two reaction curves at N yields the Nash equilibrium tariff levels for the two countries. Each country's tariff reaction curve (i) is single valued (i.e. there is a unique best tariff response to any tariff set by the other country), (ii) has a positive intercept on its own axis at its optimal tariff rate ($\hat{t}$ and $\hat{t}^*$ for the home and foreign countries, respectively), (iii) involves a positive tariff when the other country is imposing its optimal tariff (e.g. the foreign country's retaliatory move to u_1^* in Figure 4.3 corresponds to a tariff of t_1^* in Figure 4.5a), and (iv) intercepts the other country's

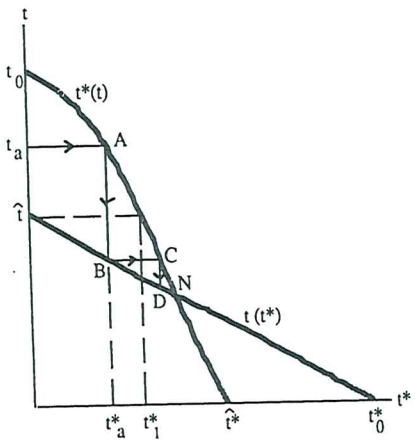

Figure 4.5a

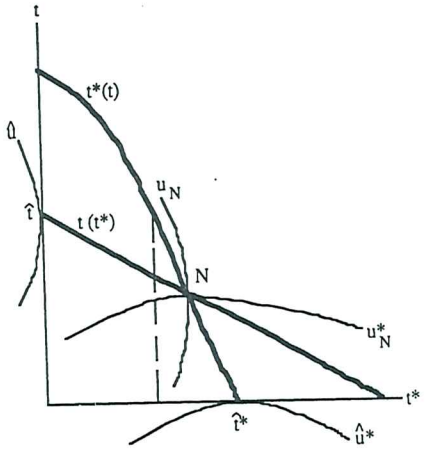

Figure 4.5b

tariff axis at that country's prohibitive tariff (t^*_0 and t_0, respectively, on the horizontal and vertical axes of Figure 4.5a) which is greater than its optimal tariff (we argued in Section 4.1 that the optimal tariff is not prohibitive). These properties are sufficient to ensure that the Nash equilibrium N is not associated with the elimination of trade.

It is also possible to use Figure 4.5 to analyse the welfare consequences of a tariff war. To do this, we first ascertain the form of each country's indifference curves in the (t^*,t)-plane. For the home country, we begin by noting that, below its reaction curve, its tariff is below the Nash optimal level (the optimum being on the reaction curve) so that, at a given level of t^*, an increase in t would increase the home country's welfare. For its welfare to remain constant, the other country's tariff t^* would also have to rise. Thus, in the region below $t(t^*)$, the home country's indifference curves are upward sloping. Above $t(t^*)$ a rise in t would reduce home country welfare (by moving the tariff further away from its optimum) unless there were a compensating fall in the other country's tariff. This implies a negative slope for the home country's indifference curves in the region above $t(t^*)$ with the curves crossing $t(t^*)$ vertically. Curves further to the left correspond to higher levels of home country welfare (because of the lower level of the foreign tariff). Thus the indifference curve through $\hat{t}$, labelled $\hat{u}$ in Figure 4.5b, corresponds to a higher level of welfare than the curve u_N passing through the Nash equilibrium. By similar reasoning, the foreign country's indifference curves are positively sloped to the left of its reaction curve $t^*(t)$ and negatively sloped to the right of $t^*(t)$, crossing the reaction curve with a zero slope. Lower curves correspond to higher levels of foreign welfare because of the lower home country tariff. Thus u^*_N, the foreign indifference curve through

N in Figure 4.5b, represents a lower level of foreign welfare than the curve $\hat{u}^*$ passing through the foreign optimal tariff point $\hat{t}^*$. In fact, it is easy to see that a country's welfare falls as it moves along its reaction curve away from its optimal tariff towards a zero tariff (i.e. as trade is increasingly restricted by higher tariffs imposed by the other country).

In the case illustrated in Figure 4.5, the Nash equilibrium at N is unique and is also stable in the sense that Nash behaviour by the two countries moves the system towards point N. The reader can easily use Figure 4.5a to verify that N is stable by assuming some arbitrary initial tariff for, say, the home country. Suppose it is t_a. Then the foreign country will maximize its welfare, given t_a, by choosing its tariff at level t^*_a to put it on its reaction curve at point A. Given t^*_a, the home country will move to point B on its reaction curve, and so on, with the system in Figure 4.5a adjusting towards N along the path $ABCD$. Although this type of sequential adjustment is an idealized version of what might actually take place, it is a useful way of illustrating stability without resorting to mathematics. In fact, N can be seen to be stable within a "neighborhood" of equilibrium whenever the home country's reaction curve is flatter than the foreign country's reaction curve (the case illustrated). The reader may also like to use a diagram to verify that the equilibrium is unstable when the home country reaction curve is steeper than the foreign curve.

Finally, it is important to note that Figure 4.5 illustrates only one of many possible outcomes. It is also theoretically possible to have multiple equilibria (some stable, some unstable) or a tariff cycle (in which a particular sequence of tariff responses is repeated ad infinitum) (see Johnson, 1953, for details of these cases). Despite this range of possibilities, one result is quite firm: in the absence of complete specialization, trade is not eliminated. In addition, one country may gain from imposing a tariff, even in the presence of retaliation.[3] Both of these results stand in marked contrast to the outcome when the two countries employ trade quotas as their means of protection. This is the subject of the next section.

4.3. Quotas and retaliation

Rodriguez (1974) and Tower (1975) have independently established that when two countries exhibiting non-cooperative Nash behaviour employ import or export quotas as their means of trade restriction, (i) trade is asymptotically reduced to zero, and (ii) neither country can gain relative to free trade by initiating quota warfare. These results are illustrated using Figure 4.6.

As before, OR and OR^* are, respectively, the home and foreign country undistorted offer curves. Free-trade equilibrium is at E. If the home country is the first to restrict trade, it moves to point A where its trade indifference curve u_1 is tangent to OR^*. In the present case we assume that this is achieved by the

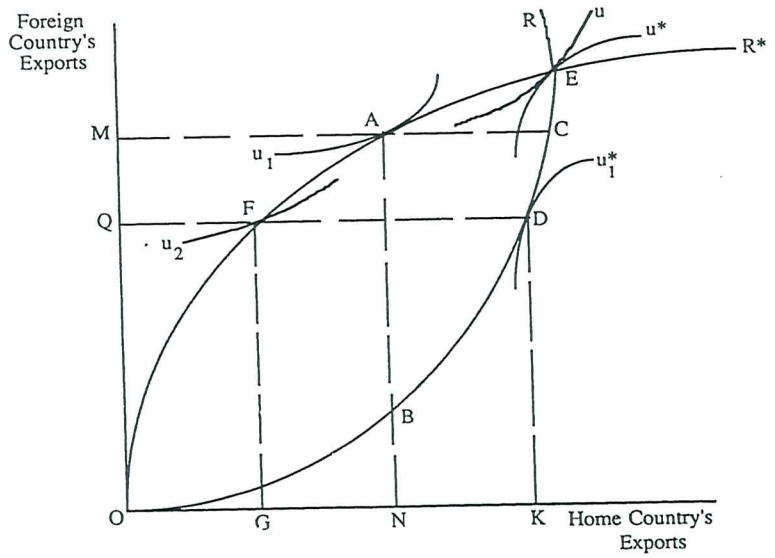

Figure 4.6

home country imposing an import quota of OM, in which case the home country's offer curve becomes $OCAM$[4] with the home country on indifference curve u_1.

How will the foreign country retaliate? The answer depends, in part, on which segment of the home country's quota-distorted offer curve the foreign country's optimum point is located. If it is in the segment BC (say at point D where foreign indifference curve u_1^* is tangent to $OCAM$), then retaliation by means of an import quota does not work because foreign imports under the required quota (OK) would be greater than their level at A (ON); that is, the foreign country's quota would not be binding. In such a case, point D can only be realized by means of an export quota of OQ. On the other hand, if the foreign country's optimum is in the segment OB of the home country's offer curve, then it is immaterial whether it uses an export or an import quota (because segment OB coincides with the undistorted segment of OR, the foreign country's optimizing choice in such a case is the same as if the home country had not restricted trade at all).

A difficulty arises if the foreign country's optimum occurs at C. An export quota designed to place it at C (with an associated offer curve OAC) cannot be relied on to achieve that result because foreign country imports are indeterminate; any point in the interval AC (the intersection of home country offer curve

$OCAM$ and foreign country offer curve OAC) is an equilibrium. Accordingly, to enforce its retaliatory quota, the foreign country must impose an export quota slightly less than OM, say OQ, with the foreign offer curve becoming OFD and equilibrium occurring at D. The home country's new optimum is now at the corner point F on indifference curve u_2 (the closest it can get to its preferred point A), which it can attain by imposing an export quota of OG. It can also respond by imposing an import quota strictly less than OQ (a quota on imports of exactly OQ would be unenforceable because equilibrium may lie anywhere in the interval FD). If the reader is left a little confused by the analysis of this case, the following intuition may be helpful. The basic point is that a country cannot enforce a favourable terms-of-trade shift (e.g. from the ray OA to the ray OC for the foreign country) by imposing an export quota which coincides with the other country's import quota. Although both wish to achieve the same level of trade restriction of this particular good, they have different preferred levels of trade in the other good. To enforce the desired level of trade in the other good (and hence the desired terms-of-trade shift), the retaliating country must impose a marginally tighter trade restriction than currently prevails (e.g. OQ rather than OM).

It should now be clear that in all possible cases, each stage of the retaliatory process necessarily involves further reduction of one country's imports with no subsequent increase in those imports at a later stage. In the long run, the volume of trade asyptotically approaches zero. Although trade is never actually eliminated, under quotas there is no Nash equilibrium associated with a non-zero level of trade as was the case with tariffs. Furthermore, it is possible to show that this result (asymptotic elimination of trade) holds so long as one country uses a quota (even if the other country uses a tariff) (see Tower, 1975). Clearly both countries must be worse off in a situation of no trade than they are under free trade; that is, in the presence of retaliation, neither country stands to gain by imposing a quota. Recall that when tariffs were the sole instrument, it was possible to construct cases in which one country gained at the expense of the other by initiating a round of retaliatory tariffs. This is clearly not possible here.

Thus, in contrast to the case in which tariffs are the sole retaliatory device, use of quotas in a trade war is likely to cause severe contraction in the volume of international trade and be very damaging to the participants. Despite this clear disadvantage of quota protection (to which can be added several other disadvantages – see Chapters 3 and 5), quantitative trade restrictions of all kinds have been favoured in the last two decades both by governments and trade negotiations.[5] One of the more notable features of the spread of this type of trade barrier has been the pervasiveness of *voluntary export restraints* (VERs). We now consider in detail the properties of this particular variant of the simple import quota.

4.4. Voluntary export restraints

A VER is a quota imposed by an exporting country on its exports to another country in response to pressure by the importing country (in the form of threats of various types of import restriction). Although not strictly "voluntary" (being imposed under an implicit or explicit threat), VERs are the outcome of negotiations between the two governments involved and, therefore, may reflect some preferences of the exporting country. Because they implicitly remove any threat of retaliation, they are sometimes viewed as a cooperative alternative to the asymptotic elimination of trade which may occur when non-cooperative strategies are pursued by means of quotas.

A VER has several features which differentiate it from other forms of trade restriction such as tariffs and import quotas. Firstly, it is a policy designed to protect producers in the importing country which is administered by the exporting country. Secondly, it is "source specific" in the sense that it applies to a small number of specified exporters (possibly only one) unlike tariffs and import quotas which usually apply to imports from most of a country's suppliers. An interesting implication of this property is that exporters which are not covered by a particular VER may increase their exports to the importing country when the VER is imposed. These "nonrestraining exporters" (Takacs, 1978) tend to be primarily countries which are too small to warrant the costs of negotiating an agreement. Thirdly, VERs are typically implemented for a specified period in contrast to other types of trade barrier which are imposed for an indefinite period (although this may make little difference in practice).

As noted in Chapter 2, VERs are a convenient means for countries to restrict trade outside the framework of GATT and have therefore become quite widespread. They have become most pervasive in the textiles and clothing area, applying to 80 per cent of the world trade in these industries through the various bilateral agreements which constitute the Multifibre Arrangement (MFA). The MFA is the culmination of several decades of growing protectionism in textiles and clothing trade, having its humble origins in a temporary agreement between the United States and Japan in the 1930s. VERs are also particularly in evidence in the steel industry, in which they limit steel exports from Japan and the EEC to the United States, and the automobile industry, in which they restrict exports from Japan to the United States, Germany, France, the United Kingdom and Italy. More recently they have begun to be applied to a range of electronic consumer goods.

We begin by considering the properties of VERs in a simple two-country framework. Figure 4.7 illustrates the effects of a VER for a large country (country H) which imports from one other country (A). In Figure 4.7a, D represents country H's demand curve for imports and S_A is country A's supply curve of exports in free trade. All markets are assumed to be competitive[6] (except for

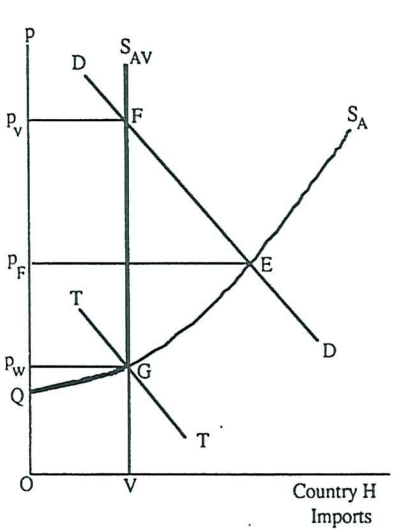

Figure 4.7a

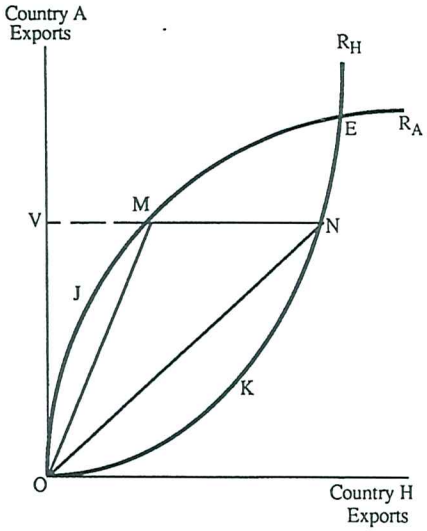

Figure 4.7b

market power at the national level). Under free trade, equilibrium is at E, and the price in both countries is p_F. A VER restricting exports to OV units restricts A's supply curve to QGS_{AV} and equilibrium moves to F with the world price of the commodity rising to p_v. This is also the domestic price in country H.

Compare this outcome with a tariff (or its import quota equivalent) which yields the same level of imports (OV) for country H. This would be achieved by a tariff which shifted H's demand curve for imports down to position T, intersecting S_A at point G. In this case, the world price is p_w while the domestic price in country H is p_v, the same as under the VER. Relative to a tariff or quota, the VER implies a worsened terms of trade for the importing country. Under the tariff, country H captures the tariff-revenue–quota-rents rectangle p_vFGp_w whereas under the VER the rectangle goes to the exporting country. Note, however, that, in general, the domestic price in H is not the same under the two policies because of income effects associated with changes in the terms of trade. These are not captured in the partial equilibrium analysis of Figure 4.7a, but the same general point can be made in a general equilibrium framework using offer curves as in Figure 4.7b. OR_H and OR_A represent country H's and country A's offer curves, respectively. Free trade is at E. A VER which restricts A's exports to OV changes A's offer curve to $OJMN$. Equilibrium is at N with the world relative price (and A's domestic price) given by the slope of the ray ON. The domestic price is determined by preferences, and other factors in H.[7] On the other hand, a tariff or import quota yielding the same level of imports for

H as the VER would distort H's offer curve to *OKNV*. Equilibrium would be at *M* with terms of trade given by *OM*. Clearly country H is on a lower trade-indifference curve at *N* than at *M*, whereas country A is better off at *N*. Thus, in this simple case of import equivalence with only two countries, the country imposing the VER gains relative to a tariff or import quota, and the importing country loses. The result is entirely due to the worsened terms of trade for the importing country under the VER. Note that domestic relative prices in H would normally be different at *M* and *N* because the slopes of the country H trade-indifference curves through *M* and *N* will usually be different. Thus, a VER and a tariff which are import-equivalent are not, as a rule, equivalent with respect to domestic price. The case in which the two policies are price-equivalent is considered by Brecher and Bhagwati (1987).

The foregoing analysis presents one aspect of what can be regarded as the conventional wisdom on VERs. One reason VERs are seen as being acceptable to exporting countries is that the country administering the restriction captures the premium on the scarce imports. In particular, if an exporting country knows that its exports are about to be restricted by a foreign country imposing an import quota, it is clearly in its interests to pre-empt such a quota by introducing a VER and thus ensure that the rents from the restricted exports accrue to it rather than the foreign country. Moreover, the importing country may view this transfer of rents as an acceptable price to pay for being able to appear less protectionist. For cases in which the threat of import restrictions by an importing country is credible (i.e. they are not ruled out absolutely by GATT rules), these considerations would appear to offer another reason for the popularity of VERs.

Despite the spread of VERs, there remain markets in which the more traditional tools of import restriction continue to be used. It is therefore interesting to identify situations in which an exporting country does better by passively accepting the import restrictions of foreign countries (or possibly retaliating with similar restrictions of its own) than by implementing a VER. An obvious case in which VERs have little or no role is if the importing country is small. However, even if the importing country is large, an exporting country may prefer foreign import restrictions to a VER.

One such case involves the presence of a second exporting country (country B) which is not subject to a VER. This is illustrated in Figure 4.8, in which S_B is country B's export supply curve. S_{A+B} is the horizontal sum of S_A and S_B. As before, free trade is at E and p_F is the free trade price. The imposition of a VER restricting A's exports to H to *OV* units restricts A's supply curve to QNS_{AV}. The aggregate supply curve becomes S_V, the horizontal sum of QNS_{AV} and S_B (i.e. *QNAJF*). The new equilibrium is at F where S_V intersects D. The world price of the commodity (and its domestic price in country H) rises to p_v.

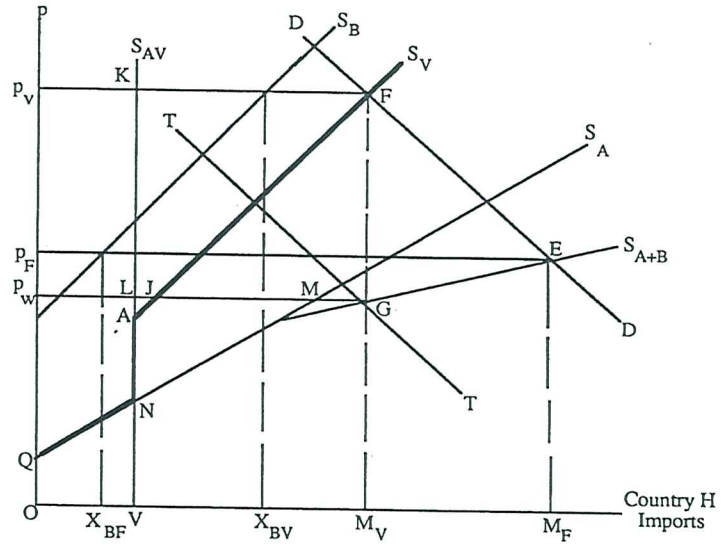

Figure 4.8

The nonrestraining exporter, country B, responds to the VER by increasing its exports from X_{BF} to X_{BV}. The volume of trade is reduced from M_F to M_V. This same level of imports into H can be achieved by a tariff which shifts H's demand curve for imports down to position T intersecting S_{A+B} at G. Under the tariff, the rectangle p_vFGp_w goes to H whereas under the VER, only part of the rectangle, the area p_vFJp_w, goes to the two exporting countries. The remainder, area *FJG*, is an excess deadweight loss (for the world as a whole) of the VER relative to a tariff or quota; it reflects the inefficiency associated with the resources attracted into exporting in the nonrestraining country. Clearly the importing country is worse off under the VER than under the import-equivalent tariff while the nonrestraining exporter is better off.

However, country A may also be worse off than under a tariff if its additional rents (relative to the tariff) on the *OV* units sold under the VER (area p_vKLp_w) are less than the rents it may lose on units produced up to price p_w (area *LMN*). Of course, this outcome is unlikely if country B is a small part of the market. However, it is a distinct possibility if country A shares the world market with another large exporter (country B) who refuses to enter an agreement to limit exports. In such a case, it would not pay country A to use a VER to preempt imposition of a tariff or quota by H because the VER would cause substantial rents to be shifted from A to the unrestraining exporter.[8]

Another aspect of VERs which deserves mention is their tendency to increase the average quality of restricted exports. Given that VERs are expressed in volume terms, they are no different in this regard from a volume import quota. In the previous chapter, we found that volume quotas applied to a heterogeneous class of close substitutes (e.g. different grades of steel and textiles) increased the proportion of higher-grade expensive items in the total class of restricted imports. Clearly the same effect is at work in the case of VERs: restriction of the volume exported leads to a uniform premium per unit for export licences across all goods in the restricted class. As we saw in Chapter 3, this makes more expensive items relatively cheaper compared with free trade, thus favouring a shift in the composition of exports towards those items. Contrary to what is often suggested, no collusive behaviour is required on the part of foreign exporters to produce this result. However, as shown by Falvey (1979), the same effects are observed when the exporter is a monopolist, the case people probably have in mind when they speak of exporting countries "getting around" VERs by exporting higher-quality goods. Certainly, the possibility of upgrading makes a volume constraint on exports less binding on the exporter than an "equivalent" value constraint (in which the relative prices of the different grades are much the same as under free trade and hence there are no gains from upgrading). Finally, it is worth noting that some of the observed shift to higher-quality, more expensive imports can be explained by a switch in imports towards non-restraining exporting countries which specialize in higher-quality varieties. However, most empirical research on the subject has recognized this possibility and made explicit allowance for it.

This completes our analysis of VERs for the time being. Further insights can be obtained by considering the case of oligopolistic industries in which firms in both countries can gain from a VER. This case will be considered in Chapter 6. The interested reader can find a useful discussion of other aspects of VERs in Hamilton (1985).

4.5. Variable import levies and export subsidies

Another type of policy which is of particular interest in the large country case is the variable import levy or export subsidy. These are policies in which the rate of duty or subsidy is varied according to movements in world price of a particular good, the objective being to stabilize the good's domestic price (i.e. world price + the tariff or subsidy) so that the rate of duty (subsidy) rises (falls) when the world price falls (rises). The most widely documented instance of variable levies in the modern world is the EEC's Common Agricultural Policy (CAP). The policy employs a variable levy on imports to support prices at an artificially high level in the EEC. In the event that these high internal prices bring about an excess supply of particular goods, those goods will be exported

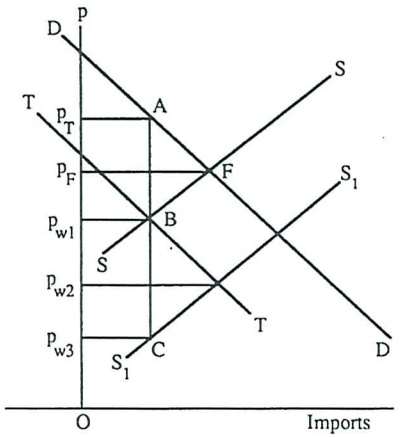

Figure 4.9a

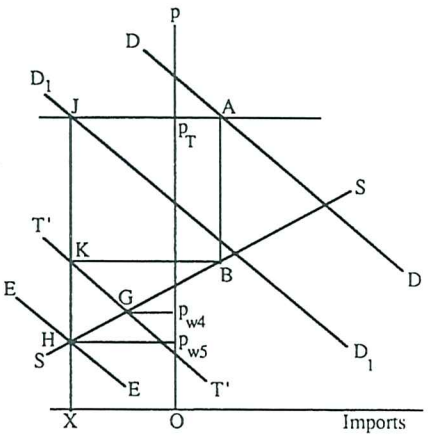

Figure 4.9b

at a price supported by variable export subsidies (*restitution payments*). The ad valorem rates of these levies and subsidies tend to be very high by any standard. For example, for the years 1978–80, the average rate of implicit producer subsidy for wheat was approximately 110 per cent, for coarse grains 83 per cent and for ruminant meats 94 per cent (see Chisholm and Tyers, 1985).

Aside from the obvious distortions created by the CAP in the European Community, the policy (with a similar use of direct quantitative trade restrictions by China, the Soviet Union and Japan) has had significant effects on world markets. In particular, it is seen as being an important contributing factor towards the increased volatility of world prices of agricultural commodities in the past two decades (see Johnson, 1975). Chisholm and Tyers (1985) have estimated that complete liberalization of OECD and NIC[9] trade in wheat would almost halve the coefficient of variation of world wheat prices, while similar trade liberalization for coarse grains and ruminant meats is estimated to reduce the coefficient of variation of world prices for these products by more than 25 per cent (see Chisholm and Tyers, 1985, p. 198, table 3).

The way in which a variable levy can contribute to world price volatility is illustrated in Figure 4.9. *DD* represents the (undistorted) demand curve for imports by the country imposing the levy (to the left of the vertical axis it represents that country's supply curve of exports) and *SS* is the rest of the world's supply curve of exports to the country in question (to the left of the vertical axis it becomes the rest of the world's demand curve for imports). In the absence of any intervention, equilibrium will be at the free-trade point *F* where *SS* and *DD* intersect, with an associated world (domestic) price of p_F (Figure 4.9a). Now suppose that the country in question wishes to support the domestic

price of the good at the constant level p_T. Given the initial values of the parameters, this can be accomplished by a tariff or levy on imports of AB per unit (which causes the tariff-distorted domestic import demand curve TT to intersect SS at point B). The world price of the good is driven down to p_{w1}, the usual terms-of-trade improvement for a large country imposing a tariff on its imports. So far, everything is much the same as in Figure 4.1, with the exception that the tariff per unit is not necessarily the country's optimal tariff.

Now consider the effect of various parametric changes. First, suppose that the foreign export supply curve shifts to the right from SS to S_1S_1 (either because of a good harvest or because a foreign government subsidizes production or exports of the good). This case is illustrated in Figure 4.9a. At the initial tariff of AB per unit, this drives down the market-clearing world price to p_{w2}, determined by the intersection of TT and S_1S_1. The domestic price in the levy-imposing country would also fall. However, because the government of that country is committed to a domestic price of p_T, it increases the levy per unit to AC, driving the world price down below p_{w2} to p_{w3}. Thus the use of the variable levy is seen to magnify world price fluctuations caused by exogenous factors. Moreover, if the fall of the foreign supply curve from SS to S_1S_1 is entirely the result of a foreign export or output subsidy (equal to the vertical distance between the supply curves), then the foreign government's subsidy payments on the exported units ($p_{w1}BCp_{w3}$) will be fully captured as revenue by the levy-imposing country (whose revenue from the levy increases from p_TABp_{w1} to p_TACp_{w3}). Clearly (as Sampson and Snape, 1980, have noted), the exporting countries, faced with a variable levy which renders their total exports inelastic, should collude to impose an export tax; this would have the opposite effect to a subsidy, shifting revenue from the government imposing the variable levy to the governments of the exporting countries. However, in the absence of such collusion among exporters, an individual exporting country may lose by imposing a tax on its exports if the levy-imposing country shifts its demand to other countries which are not imposing such a tax. Indeed, there may be gains to individual countries from subsidizing their exports if this enables them to shift rents away from other exporting countries. This possibility is explored further in an oligopoly framework in Chapter 6.

Regardless of the relative merits of various policy responses for other countries, it is clear that the response of world price to an exogenous shift in the foreign export supply curve is larger than it would have been in the absence of the variable levy. This point can be further illustrated by considering the effect of an exogenous shift in the DD curve. Suppose DD shifts down to D_1D_1 in Figure 4.9b, perhaps because of a seasonal increase in the domestic supply of the "importable". In the case illustrated, the levy-imposing country becomes an exporter of the good at price p_T (exporting amount OX), so that, to maintain the domestic price at p_T, the variable levy becomes a variable export subsidy of

JH per unit (the subsidy-distorted demand-for-imports–supply-of-exports curve EE intersecting SS at point H), which drives the world price down to p_{w5}. This involves "restitution payments" funded by the taxpayer of an amount given by the area $Jp_Tp_{w5}H$. As well as illustrating how the variable import levy can become a variable export subsidy when parameters change (e.g. during different parts of the season), this case offers further evidence of the role of variable levies in destabilizing world price. In the absence of the variable subsidy, the fall in world price caused by, say, a higher than usual harvest in the EEC would be markedly less. At a subsidy–tariff at the original rate of $JK = AB$ per unit, the distorted demand curve would be $T'T'$, which would intersect SS at point G, implying an equilibrium world price of p_{w4}, which is seen to be higher than the price p_{w5} prevailing under the variable subsidy.

In summary, we have seen that use of a variable levy–subsidy to insulate a large economy from exogenous shocks magnifies the effects of those shocks in the rest of the world. The implication appears to be that the considerable volatility exhibited by commodity prices throughout the 1970s and 1980s may be as much due to government policies as to natural forces. In addition, such policies exhibit the usual feature of any tariff or export subsidy imposed by a large country: they depress the world price (in this case the mean world price) of the good to which the policy is applied.

4.6. Summary

When a country is large enough to affect the prices of the goods it buys or sells in world markets, it can usually gain by restricting trade below the free-trade level even though this reduces welfare for the world as a whole. As is clear from the Lerner symmetry theorem, it does not matter if this trade restriction is effected by imposing a tariff on imports or a tax on exports (or, indeed, the quota-equivalent of either). We chose to deal in terms of tariffs. A tariff serves to improve the country's terms of trade by restricting demand for imports, thereby driving down their market-clearing world price. The optimal tariff for a large country is arrived at by trading off this terms-of-trade gain against the domestic distortion cost of the tariff. It is never optimal for a country to set a tariff which eliminates trade.

The optimal tariff is derived on the assumption that foreign countries react passively. If a foreign country retaliates by levying its own tariff, the gain to the country imposing the first tariff is reduced. Although the outcome of such a tariff war may make both countries worse off than they are under free trade, it is possible to construct cases in which one country can gain relative to free trade. One important result is that a tariff war never completely eliminates trade and, in the absence of complete specialization, it results in a strictly positive volume of trade. This is in contrast to the case in which import or export quotas are the

instruments used for trade restriction – a trade war conducted using quotas reduces trade asymptotically to zero. This offers yet another instance of the non-equivalence of tariffs and quotas and provides further evidence of the superiority of tariffs.

One of the most pervasive of quota-type trade restrictions is the voluntary export restraint (VER). Exporting countries may introduce VERs to pre-empt the likely imposition of import quotas or tariffs by a foreign country; in this way they capture the rents arising from the restricted volume of goods sold. However, there are situations in which it may pay an exporting country to accept a foreign import restriction rather than impose its own VER, most notably the case in which there is a large exporting country not subject to a VER. When applied to classes of heterogeneous products, VERs (like volume-based import quotas) induce a shift towards more expensive items in the class of restricted exports – the so-called "upgrading" effect.

Variable import levies (export subsidies) are another type of policy which has become widespread. These policies, which are used to maintain a stable domestic price in the face of fluctuating demand and supply, shift the burden of adjustment onto world prices. They are thought to be responsible for much of the increased volatility exhibited by world commodity prices in the 1970s and 1980s.

PART II

Protection and imperfect competition