

Hock

Chapter 9

ELEMENTS OF AGRICULTURAL TRADE  
POLICIES

# Import and Consumption Subsidies

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Most of the agricultural trade policy schemes in force around the world are directed in one way or another toward producer protection. Their costs are borne by consumers, taxpayers, the rest of society, and foreign sellers. However, some trade interventions on the import side strive to benefit the consumers or users of foreign products. These are import or consumption subsidies. When used, they tend to lower domestic prices and therefore promote consumption of the favored product. These objectives are achieved at the expense of taxpayers, domestic producers, or both.

Though the distinction is not clear-cut, we can identify two main categories of agricultural products that are likely candidates for import or consumption subsidies. The first category might include crucially important staple food products that are consumed by low-income, vulnerable groups—perhaps rice consumed by poor urban wage earners or wheat for unemployed or underemployed peasants. These particular examples suggest that import or consumption subsidies for staple products are mostly to be encountered in low-income, food-deficit, developing nations. In fact, such schemes may be funded partly or wholly by foreign donor nations engaged in programs of technical and economic assistance.

The second category includes agricultural production inputs like fertilizer, chemicals, hybrid seeds, and machinery. The idea behind such subsidies is to reduce the direct production costs of commodities for which they are inputs. In reducing the direct supply price of these commodities, self-sufficiency in

or even exports of the favored final products are promoted. As we discussed in Chap. 7, deliberately reduced input costs via an import or consumption subsidy also can be viewed as a production subsidy from the standpoint of protected growers.

However, if we wish to focus on the markets for the import- or consumption-subsidized inputs themselves, we can visualize the relevant input demand functions as "derived demands." Derived demands for productive inputs in agriculture have their origin in the technical production processes and prices for the final commodities in which they are employed. For example, the demand for agricultural fertilizers depends on the per-unit value of the extra output of corn, wheat, or cotton that successive additional applications of those fertilizers generate.

The partial equilibrium economics of import-promoting interventions is basically the same no matter what kind of products are being subsidized. First we will consider import subsidies, then consumption (or user) subsidies. Then we will examine the partial equilibrium welfare aspects of these policy schemes.

### IMPORT SUBSIDY

Assume that the government of Nation K decides to subsidize the importation of rice to benefit low-income urban workers and their families. We can easily suppose that this group within the society of Nation K is a large and perhaps politically unstable element. The partial equilibrium analysis of such an import subsidy scheme is shown in Fig. 9.1.

Instead of a tariff on imports, the subsidy program provides a payment to import merchants or firms of the per-unit amount  $s$ . This payment is made on each ton of rice imported. The impact of this subsidy is to shift Nation K's excess demand curve from  $ED$  to  $ED^*$  (Fig. 9.1*b*). The vertical distance between  $ED^*$  and  $ED$  is the subsidy amount  $s$ . The effective rice import demand function shifts to the right because the subsidy enables importers to buy rice at the world price and sell at a lower price inside Nation K. The subsidy initially will allow imports to undercut domestic rice prices.

As internal prices fall, the quantity demanded domestically expands, but domestic production decreases. Subsidy-induced rice imports expand to fill the gap. The total cost of the government's import subsidy is the per unit subsidy  $s$  times the new, higher volume of imports.

In Fig. 9.1, imports increase from the equivalent of  $ab$  to  $cd$  (Fig. 9.1*b*). The small-nation assumption, as reflected in this illustration, means that international rice prices remain at  $P_1$ , but internal prices fall to  $P_2$ , and  $P_2 = P_1 - s$ . Total subsidy outlays are indicated by the shaded area  $aecd$  in Fig. 9.1*b*. On the domestic market in Nation K, the subsidy-induced price decrease causes domestic rice production to fall along  $S$  from point  $f$  to point  $g$ . Domestic rice consumption expands along  $D$  from point  $h$  to point  $j$ . Original imports are  $fh$  in Fig. 9.1*a*, but with the subsidy, imports expand to  $gi$ . Observe that

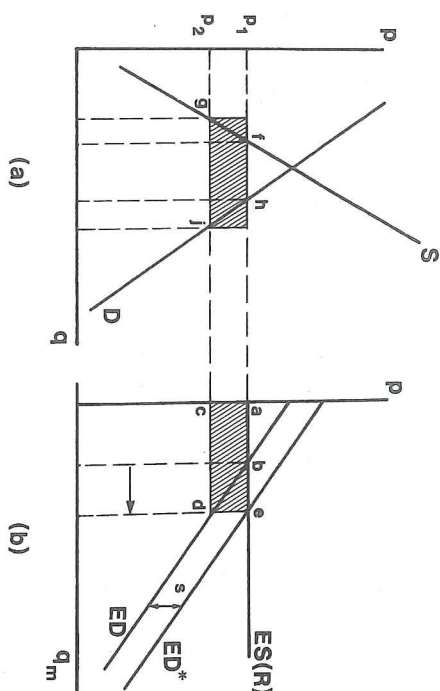


Figure 9.1 Import subsidy

$fh = ab$  and  $gh = cd$ . Total import subsidy outlays are also shown as a shaded area in Fig. 9.1*a*.

A monopolistic, government rice-importing board could easily provide an import subsidy equivalent to  $s$  by making domestic rice sales at  $P_2$ , having purchased its import inventory at  $P_1$ . The subsidy value  $aecd$  would appear in the board's financial accounts as a net loss on rice import transactions. The smaller the role imports play in total domestic consumption, the smaller the subsidy required to keep internal prices down. However, if imports are relatively small, domestic rice producers bear a large share of the burden for keeping internal prices low.

It is also worth noting that when an import subsidy is in operation, some method to control *exports* must be in place. This is because the domestic, subsidized market price is lower than the international price. In the absence of such export controls, producers or merchants would be anxious to buy supplies at low internal prices and sell them internationally at higher world prices.

### DIRECT CONSUMPTION SUBSIDY

As a price-decreasing policy, a consumption subsidy bears a similar relationship to the import subsidy as a production subsidy bears to the tariff in raising producer prices. A consumption subsidy is a direct payment (or some form of rebate) that lowers the per-unit consumption cost of the affected commodity to all users. Imports are not directly affected, but they are indirectly stimulated. A consumption subsidy can be and is applied to staple food products like rice or wheat with much the same motivation as the import subsidy example just discussed. However, in the following illustration we consider a consumption subsidy for a production input.

Assume that Nation L embarks on a policy designed to expand its pro-



duction of bananas for export. As part of this effort, the government chooses to subsidize the application of pest control chemicals used in modern banana cultivation. All users of these products, which we assume are partly imported and partly produced domestically, are given a cash rebate (or bounty) from the government on presentation of appropriate purchase receipts.

Figure 9.2 illustrates the partial equilibrium aspects of this policy on the assumption that Nation L is a large purchaser of these particular chemicals on the international market. Because the consumption subsidy  $s$  applies to all users, the effective domestic market demand moves rightward from  $D$  to  $D^*$ , a vertical distance  $s$  (Fig. 9.2a). This is because more chemicals are demanded at each market price or, stated another way, the market demand price for chemicals is increased at each consumption amount because of the available subsidy.

An effect of this increase in domestic market demand is to shift the excess demand function to the right, from  $ED$  to  $ED^*$  (Fig. 9.2b). The horizontal distance of this latter shift at each price is the same as the horizontal movement of  $D$  to  $D^*$ . This import demand expansion boosts the international price from  $p_1$  to  $p_2$ , as imports expand by the amount  $ab$ . The availability of the subsidy pushes the internal user's per-unit cost of chemicals down to  $p_3$ , where  $p_3 = p_2 - s$ . However, the international market price still rules for market transactions inside Nation L. So, although there is a net increase in domestic consumption of amount  $ab$ , there is no negative production effect. Actually, the supply price to domestic chemical producers increases from  $p_1$  to  $p_2$ , as a consequence of the large-nation assumption and the subsidy-induced expansion in domestic demand.

Two "prices" prevail inside Nation L for agricultural chemicals. One is

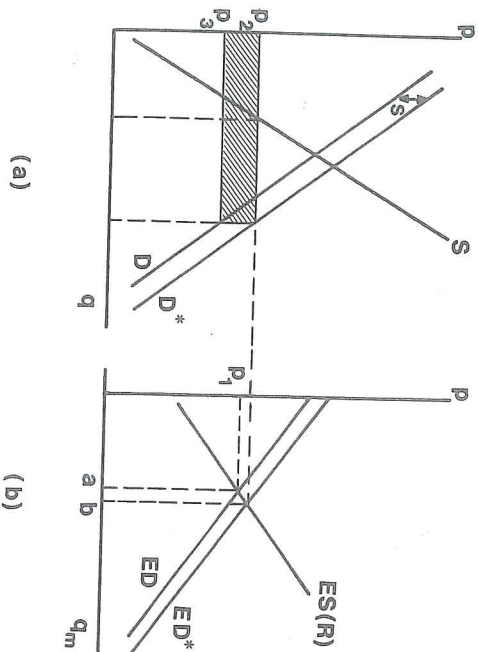


Figure 9.2 Consumption subsidy

$p_2$ , the market price of chemicals at which actual purchases and sales are made. The second is  $p_3$ , the lower net price to buyers, including the subsidy. The total consumption subsidy is shown in Fig. 9.2a as the shaded area. The consumption subsidy basically transfers value away from taxpayers toward users of the favored commodity.

As the ratio between imports and domestic consumption increases, the import subsidy approaches the consumption subsidy in its overall effects. In the extreme case, where there is no domestic production of the subsidized product, import and consumption subsidies become exactly the same. This is because the excess demand ( $ED$ ) on which an import subsidy is paid becomes the same as the domestic demand ( $D$ ) on which a consumption subsidy is paid.

## WELFARE EFFECTS

We explore the partial equilibrium welfare aspects of import and consumption subsidies with the same basic approach we used for import tariffs and quotas. In Fig. 9.3,  $D$  and  $S$  are domestic demand and supply functions respectively. The unsubsidized price is  $p_1$ , and  $p_2$  is the per-unit value in the domestic market after the subsidy is applied.

First consider the import subsidy. In this case, the price to both consumers and producers falls from  $p_1$  to  $p_2$ . Buyers gain the area  $A + B + C + D + E$  in added consumers' surplus. Producers lose the area  $A + E$  in producer surplus value. Taxpayers cover subsidy payment costs, which amount to  $E + B + C + D + F$ . Netting out gains and losses, we see that the society sustains net losses equivalent in value to the areas  $E$  and  $F$ .

The area  $E$  reflects a net loss of producer surplus occurring as the fixed factors of production in the domestic economy are underutilized because of the artificially low price. The area  $F$  is difficult to describe simply. It is that part of the government payment used to acquire the product at  $p_1$  and sell it domestically at  $p_2$ , which is not reflected in additional consumer surplus. This occurs because the larger amount of  $q$  demanded at  $p_2$  would not be purchased at  $p_1$ .

The welfare effects of a consumption subsidy are slightly different. Recall that in this case, consumers benefit from the lower price of  $p_2$ , which includes the subsidy. However, the market price to domestic producers remains at  $p_1$ . Consumer surplus increases by the area  $A + B + C + D + E$  in Fig. 9.3. Producers as a group neither gain nor lose, but taxpayers lose subsidy payments of  $A + B + C + D + E + F$ . This is because the subsidy covers all units consumed, not just those imported. The net social loss in this instance is only area  $F$ . Domestic producers do not lose producer surplus with the consumption subsidy as they do with the import subsidy.

These comparative results are qualitatively similar to welfare conclusions that emerge from comparing a tariff (or quota) to production subsidy payments.

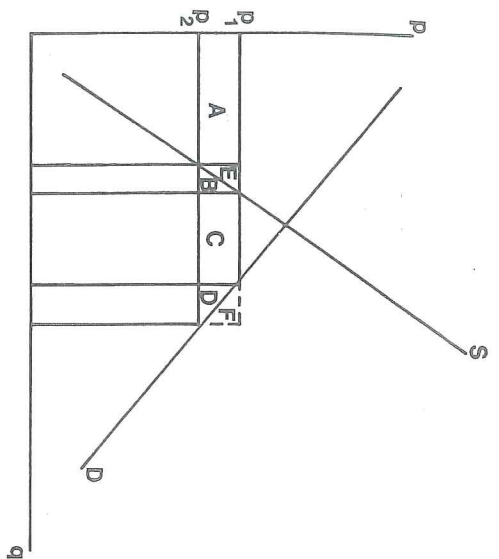


Figure 9.3 Welfare gains and losses from import subsidy

Both production and consumption subsidies typically involve larger taxpayer outlays than occur with equally protective tariffs or import subsidies. But they entail smaller net social losses, there being no consumer surplus loss with a direct production subsidy and no producer surplus loss with a direct consumption subsidy.

## SUMMARY

Nations may sometimes intervene to expand the import volume of selected products to keep domestic prices lower than they otherwise would be. Either an import or a consumption subsidy can accomplish this. Crucial, staple food products or imported agricultural inputs are likely candidates for such favored treatment. With either an import or consumption subsidy, domestic consumption expands, internal prices to buyers fall, and imports expand. Government expenditures will rise and, with an import subsidy, domestic production (if any) will fall.

The transfer of economic value that occurs with this kind of trade policy involves gains by consumers of the favored products at the expense of the taxpayers, domestic producers, or both. As with other trade policy schemes, there are net social losses. They can be viewed as the society's costs of pursuing the price-reducing, consumption-expanding goals of import or consumption subsidies.

## QUESTIONS

9.1 Niceland decides to apply a fixed per-unit import subsidy to its purchases of feed

grains from the world market. This subsidy is available to all Nicelandic importers, who are numerous. Discuss and illustrate the economics of this policy assuming that Niceland is a large importer of feed grains from the world market and also has numerous domestic feed grain producers. Who benefits and who is injured by this policy? Why might such a policy be adopted by the Nicelandic government? How would your analysis of the previous question change if the Nicelandic government adopted a generally equivalent ad valorem import subsidy based on world corn prices?

9.3 Government officials of the developing nation of Aquador have decided to keep the price of its staple food commodity, wheat, low and stable to benefit low-income wage earners. This decision was taken even though only about half of domestic wheat consumption comes from imports. The debate within Aquador is now focused on whether to pursue this policy by means of an import subsidy or a direct consumption subsidy available to all consumers of wheat. Advise the government as a trade policy economist.

9.4 The nation of Fiberia wishes to promote and expand its cotton-growing sector. To do this, it has decided to subsidize its imports of cotton harvesting machines. The Fiberian parliament has appropriated a fixed annual fund to be used for this purpose. Illustrate the economics of this policy and its accompanying constraint, knowing that Fiberia is a relatively small importer of farm machinery on the world market and has no domestic farm machinery industry.

## ADDITIONAL READINGS

Grennes, T. 1984. *International Economics*, Prentice-Hall, Englewood Cliffs, New Jersey, pp. 218-222. (Discussion of an import subsidy in partial equilibrium style)



## Chapter 10

# Export Expansion with Price Guarantees, Subsidies, and Promotion

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It would be a serious mistake to think that only importing nations can protect either their producers or consumers by intervention in agricultural trade. Export trade policy offers a rich tradition of elaborate and effective schemes for protection. So in the next few chapters we turn our attention from importers' trade policy to exporters' trade policy. First we will examine several schemes designed to protect domestic producers. Then we will look at some designed to protect domestic buyers of an exported good. Naturally, any export protection or export control scheme will have economic effects that extend beyond its immediate goals. We will consider these effects.

### EXPORT EXPANSION AND DUMPING

Export expansion is a powerful theme in the agricultural and trade policies of many nations. Though exports may be taxed or occasionally controlled, more often than not the underlying goal of public policy over the long run is to seek overseas outlets for expanding farm production. Large and growing exports for surplus agricultural producing nations are associated with strong farm prices and the accumulation of foreign exchange earnings.

The subject of this chapter and the next is how export producer protection via trade policy operates. The basic line of discussion in this chapter is how special support or protection for producers in agricultural exporting nations leads to output expansion. This output growth is pushed wholly or part-

ly onto world markets by means of one trade policy scheme or another. Here we will consider the economics of export subsidies, the export consequences of production subsidies, the role of export promotion as a deliberate policy and, finally, food aid and trade expansion.

When countries pursue an expansionary trade policy, they are sometimes accused of export "dumping" by importer countries whose domestic products are displaced by lower-priced imports. Dumping allegations also may be leveled by competing exporters whose traditional markets are captured by the expansionary exporter. There is no precise or widely accepted economic definition of dumping. However, there are two general ways by which export dumping is identified and described. One occurs when the good being exported is sold abroad to some buyers at prices lower than those charged either to domestic buyers or to other importers. A second occurs when the export good is sold abroad at a price less than its cost of production. Although the second criterion is often difficult to establish with clarity, the first is relatively straightforward.

A pervasive consequence of export dumping is that the dumping nation's exports are larger than they would be without it. As we shall see, trading nations that pursue export and production subsidies usually can be said to be dumping.

## EXPORT SUBSIDIES

Export subsidies, even when not masquerading under other names, come in numerous forms. They may be specific, as fixed or ad valorem payments made on the volumes exported. In this case, they are the reverse, in trade policy economics, of fixed or ad valorem import tariffs. They may be open-ended or variable payments. Then they are the reverse of the variable import levy.

Export subsidies occur when the government gives an exporter a direct per-unit payment on the volume of goods cleared for foreign destinations. Such a payment enables an export firm to purchase the product internally at a higher price and sell it externally at a lower price.

Export subsidies also can be provided indirectly by marketing agencies or boards that buy on the domestic market and have monopoly rights to sell on the international market. Such agencies provide an export subsidy if they purchase a commodity at a higher price domestically than they sell it internationally.

If the export subsidy is specific in its per-unit amount, the internal market price rides above the international price by the subsidy amount. If the internal market price is fixed (guaranteed), the per-unit subsidy must fluctuate to accommodate the difference between internal and world prices. In the first instance, the export subsidy is like a tariff. In the second, it resembles a variable import levy.

## Specific Export Subsidy

Consider first an export subsidy whose per-unit value is a specified amount. Such an export subsidy might take the form of a cash payment to the exporter upon shipment of the product in question, or it might be a rebate or exemption from a domestic sales or excise tax. It might also occur as subsidized access to credit, which lowers exporting costs by a specific per-unit amount. For example, a fixed export subsidy on butter from Nation A might be the equivalent of, say, 50 cents per kilogram no matter what the size of the shipment or its international destination. This intervention would ensure that the domestic price was 50 cents per kilogram higher than the world price expressed net of transfer and transportation costs.

The economics of a fixed export subsidy is depicted in Fig. 10.1 for a small export nation. Since our attention is now on the export side, we draw the excess supply curve of the nation in question as  $ES$  in the right-hand quadrant of Fig. 10.1. The horizontal excess demand curve for the rest of the trading world is  $ED(R)$ .

The per-unit export subsidy is shown as the vertical distance  $s$  in Fig. 10.1b. Its effect is to lower the supply price of exports by the value of  $s$  per unit, generating a new excess supply curve faced by foreign buyers,  $ES^*$ . The new intersection of  $ES^*$  with  $ED(R)$  indicates an expansion of export volume by an amount equal to  $ab$ . The small-nation assumption employed here means that the international price remains at  $P_1$ , but internal prices increase. This increase in domestic prices occurs as exporters, eager to earn subsidy payments, expand export sales and bid up prices paid for export goods. In this simple illustration,  $P_2 = P_1 + s$ . (There is no reason why the value of  $s$  could not be set in some ad valorem relation with  $P_1$ .)

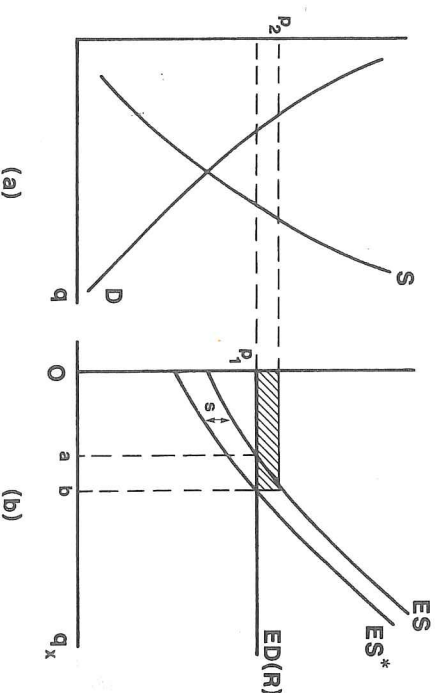


Figure 10.1 Fixed export subsidy



As domestic market prices increase, internal consumption is curtailed but production expands (Fig. 10.1*a*). Hence, exports can and do increase. Export subsidy outlays are shown as the shaded area in Fig. 10.1*b*. They can occur as outright government expenditures or as excise tax revenues foregone.

When an exporting nation elevates a domestic market price above international levels, by whatever means and for whatever purpose, it must also curtail its imports of that product and its close substitutes. Otherwise, identical or similar products will flow into that nation seeking the higher domestic price. The government will find itself trying to support the international price for the whole world. This could be very expensive.

### Variable Export Subsidy

Next consider the variable or open-ended export subsidy. The large-nation case is employed here for illustration and comparison (Fig. 10.2). The variable export subsidy is quite interesting from an agricultural policy viewpoint because it usefully disconnects domestic prices from world prices.

In Fig. 10.2*a*, the guaranteed domestic price for our illustrative commodity  $q$  is set at  $p_2$ . Note that  $p_2$  is assumed to be considerably higher than  $p_1$ , which is the free-market equilibrium price. At  $p_2$ , domestic production is stimulated and domestic consumption is curtailed compared with the situation at  $p_1$ . The excess supply function reflecting the guaranteed internal price  $p_2$  is vertical at  $ES^*$  for international prices below  $p_2$ . To move this additional excess supply volume onto the world market, suppose that an export subsidy is introduced. The quantity  $0e$  (or  $ab$ ) in Fig. 10.2*b* is the volume of exports required if  $p_2$  is to be the ruling and guaranteed domestic price.

This export volume  $0e$  can only be exported at the lower international price  $p_1$ , where  $ED(R)$  and  $ES^*$  intersect. Because this particular export nation is large, exports above the free market amount will press the world price down below  $p_1$ . An export subsidy of  $bc$  per unit sold abroad will be required to maintain  $p_2$ . The total subsidy expenditure will be  $abcd$ . If the amount exported to maintain  $p_2$  is large and/or if the effect on world prices is sizable, an open-ended export subsidy like this could be quite expensive to the subsidizing government. Moreover, the subsidy expenditures, like deficiency payments, are a clear, obvious transfer item in the national budget, open to scrutiny by all.

Competing producers around the trading world in both importing and other exporting nations will be damaged to the extent that subsidized exports drive down international prices and replace nonsubsidized production and sales. Whenever a large trading nation uses an export subsidy, specific or variable, foreign nations with agricultural interests are bound to sense intrusion and damage. The public effect of one nation's trade policy on foreign countries is perhaps most obvious with export subsidies. This is because they involve overt, positive actions that depress international prices and narrow the market outlets for other producers.

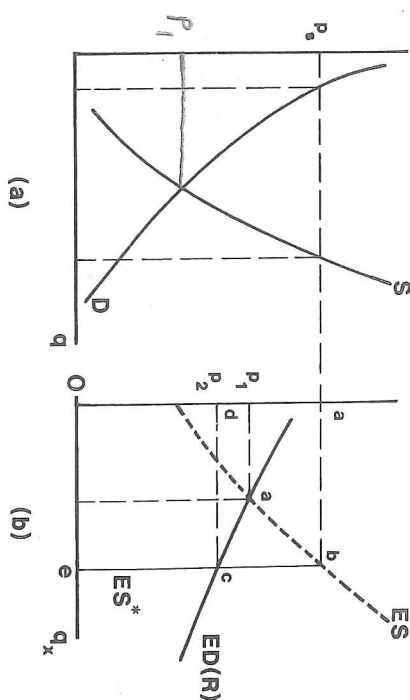


Figure 10.2 Variable export subsidy

The price- and market-depressing consequences of import restrictions are slightly more subtle since they arise because the restricting nations do not purchase as much as they otherwise would. This is less blatant than actually making unprofitable exports that directly result in lower world prices and drawing financial support for such expenditures from the public treasury.

### Trade Reversal and Export Subsidy

A high enough price guarantee coupled with either an open-ended export subsidy or a large enough fixed subsidy can convert an importing nation into an exporter of the commodity in question. This can happen even without domestic supply or demand changes or changes in the international economy. This possibility is illustrated in Fig. 10.3, which depicts only the relevant international market. The horizontal axis registers imports to the left of 0 and exports to the right of 0. The particular nation's excess demand and supply function is shown as  $ED-ES$ , with point  $f$  as the isolation equilibrium price, at which neither exports nor imports occur.

For convenience only, imagine that this nation is small in the world market so that the world price  $p_1$  corresponds to the excess supply and demand function for the rest of the world,  $ES(R)-ED(R)$ . With no particular intervention by the government, this nation would import  $0e$  units of  $q$  at the world price  $p_1$ . In this circumstance,  $p_1$  also would be the domestic price.

Now suppose the government instituted a high, domestic price guarantee ( $p_2$ ) for  $q$  and sustained it by an open-ended export subsidy plus appropriate import controls. Note that this guaranteed price is higher than the isolation equilibrium price  $f$ . At domestic prices below  $f$ , this nation is an importer, producing less than is demanded domestically. But domestic prices above  $f$  generate an excess supply. More is produced than is demanded internally. In the absence of other policy measures, this excess supply must be exported. At  $p_2$  in Fig. 10.3, the excess supply amount is indicated by  $0f$  (or  $ab$ ). The export subsidy



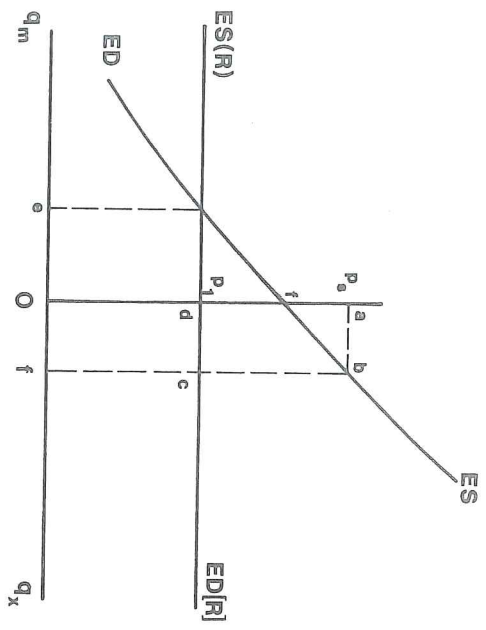


Figure 10.3 Trade reversal and export subsidy

required to move  $Of$  onto the international market is  $bc$ , with total subsidy payments being  $abcd$ .

If the nation pursuing this kind of trade reversal policy is a large trader in this particular commodity, the relevant portion of  $ES(R)-ED(R)$  will slope downward to the right. This means that world prices for  $q$  will be lower for all traders than if the reversal nation were still an importer or even simply self-sufficient. Needless to say, producers and exporting nations around the world who are affected by international prices for  $q$  are likely to be even more vigorously opposed to this protective policy than if the subsidizing nation were an exporter to begin with.

### WELFARE ANALYSIS OF EXPORT SUBSIDIES

In this section we return to the relatively simple concepts of producer and consumer surplus to analyze economic gains and losses caused by an export subsidy. Fig. 10.4 reflects the same basic demand, supply, and price conditions as in Figs. 5.5 and 9.3.

In this particular case,  $p_1$  is the world price and  $p_2$  is the higher, protected internal price. The difference,  $p_2 - p_1$ , is covered by an export subsidy. Without intervention,  $0c$  is produced,  $bc$  is exported, and  $0b$  is consumed domestically. With intervention at  $p_2$ ,  $0d$  is produced and  $0a$  is consumed, leaving  $ad$  to be exported with the subsidy.

This policy increases producer surplus by the area  $A + B + C$ . In addition, variable inputs are pulled into this sector so that output can expand by the amount  $cd$ . Output elsewhere in the economy falls by the value of the area under the supply curve between points  $c$  and  $d$ . A subsidy is paid on all exports generated at  $p_2$ . Its value is  $B + C + D$ .

Producers gain  $A + B + C$ , consumers lose  $A + B$ , and taxpayers distribute  $B + C + D$  in export subsidy outlays. The net social losses are areas  $B$  and  $D$ . Area  $B$  is the consumer surplus loss occurring as the amount  $ab$  is internally priced at  $p_2$  and exported rather than consumed domestically at  $p_1$ . Area  $D$  is the part of the treasury payment that covers the extra variable costs of drawing resources into the production of  $cd$ . Since the extra output volume  $cd$  earns only  $p_1$  on the world market, area  $D$  is an efficiency loss to the society. It represents the fall in net value of the economy's output as resources are transferred from elsewhere into subsidized production of  $q$ .

### PRODUCTION SUBSIDIES AND EXPORTS

Recall that in Chaps. 6 and 7 we examined how deficiency payments and other production subsidies for agricultural products work to shrink imports and protect producers. These schemes tend to be less objectionable to foreign exporters than tariffs or quotas because they have less effect on trade, and they are less visible in the day-to-day operation of markets. Much the same line of argument is appropriate for production subsidies applied by export nations.

Such subsidies are not trade policy schemes in the strict sense, but they may have significant consequences for international trade. Hence, production subsidies are sometimes referred to as implicit export subsidies. We consider two major types of production subsidies that parallel the two export subsidy categories—specific and open-ended.

#### Specific (or Limited) Production Subsidy

Consider the trade policy implications of a limited production subsidy that is either fixed in its per-unit value or applied as a deliberate, cost-reducing in-

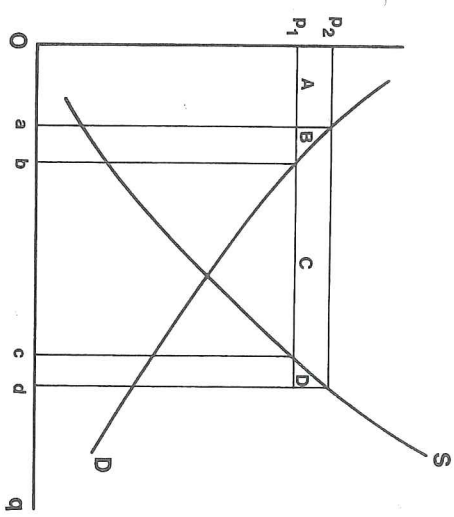


Figure 10.4 Welfare gains and losses from export subsidy



intervention for one or more production inputs, as discussed in Chap. 7. Such a limited subsidy is shown in Fig. 10.5a as a downward shift in the domestic supply function from  $S$  to  $S^*$ . The vertical displacement of  $S$  reflects the per-unit value of the subsidy as it lowers the cost of production and, in turn, the market supply price of the product in question.

This policy-induced change in the domestic supply function leads to a downward shift in the nation's excess supply curve from  $ES$  in Fig. 10.5b to  $ES^*$ . For a small export nation facing a completely horizontal  $ED/R$  function, as in Fig. 10.5, this intervention causes an expansion in exports of amount  $cd$  (Fig. 10.5b). Because the international and domestic market price of  $q$  does not change in this case, the export expansion occurs solely because domestic output increases from  $a$  to  $b$  (Fig. 10.5a). Furthermore, all additional production generated by this subsidy moves onto the export market— $ab$  equals  $cd$ .

This cost-reducing production subsidy requires a total government outlay equal to the shaded area in Fig. 10.5a. It is the per-unit value of the subsidy  $s$  applied to the now-larger, total production volume. Gross returns to domestic producers expand because of the subsidy-enhanced per-unit value of output ( $p_1$  and  $s$ ) and larger domestic production. Because the domestic consumption price does not change from  $p_1$ , consumers are not punished by this output- and export-expanding policy. However, the society sustains a technical efficiency loss like area  $D$  in Fig. 10.4 as output elsewhere in society is sacrificed to expand production behind this subsidy.

The picture alters somewhat if the subsidizing nation is a large exporter, although the fundamental economic reasoning stays much the same. We consider the large-nation case in the following discussion of the open-ended production subsidy. An extension of this illustration back to the specific subsidy case should be clear.

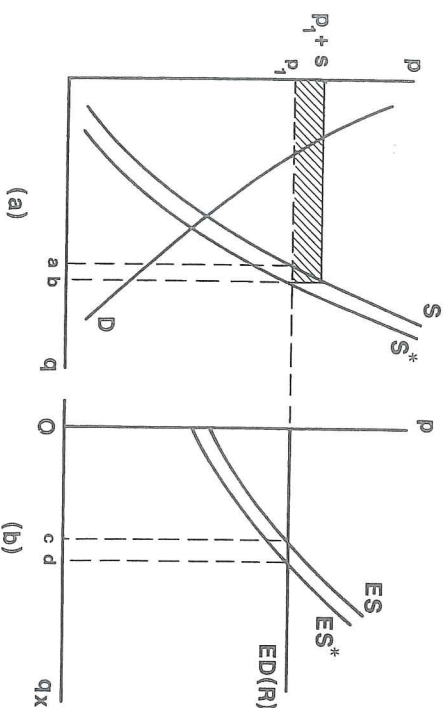


Figure 10.5 Specific production subsidy

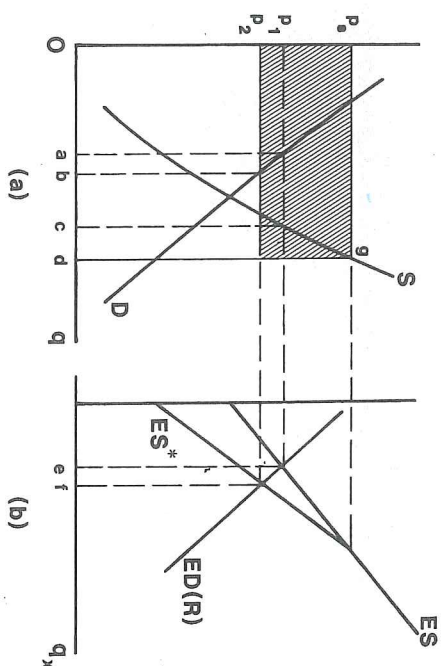


Figure 10.6 Open-ended production subsidy

### Open-Ended Subsidy (Deficiency Payments)

Producer price guarantees for export commodities can be sustained by variable production subsidies made as deficiency payments. As with import-competing sectors, deficiency payments are made to producers to cover the difference between the price guarantee and the open-market, international price. In the simple case discussed here, payments are made on all units of domestic output. The open market then allocates the total supply between domestic consumption and exports. As we will see, such a scheme always will expand exports and, in the large-nation case, may increase domestic consumption of the subsidized product.

Consider Fig. 10.6a. The domestic producer price guarantee is fixed at  $p_2$  by political action, a mathematical formula, or some other process. If deficiency payments are used to secure this guarantee for farmers, the excess supply  $ES$  in Fig. 10.6b is transformed into  $ES^*$ . This new excess supply curve is defined by the horizontal difference between the domestic demand  $D$  and the vertical line segment  $gd$  (up to point  $g$ ), and then by the difference between  $D$  and the domestic supply curve  $S$  for possible prices above  $p_2$ . Since the producer price guarantee fixes output at point  $g$  on the domestic supply curve, the only market adjustment in export volume comes from changes along the domestic demand curve.

This  $ES^*$  function is analytically similar to  $ED^*$  in the price-guarantee, deficiency-payment scheme of Fig. 6.3. In Fig. 10.6, the slope of  $ES^*$  is the same as that of  $D$  except it is positive. This is because exports adjust to international prices only to the extent that the amount demanded domestically changes. Supply volume is steady in this illustration because of the fixed producer price guarantee at  $p_2$ . Figure 10.6b includes a downward sloping excess demand curve for the rest of the world, reflecting the large-nation assumption



committed to the program. The shaded area in Fig. 10.7a is the value of the government's expenditure for this project.

The impact on the international commercial market is shown in Fig. 10.7b as  $ES$  moves to  $ES^*$  in response to additional government demand for food aid supplies. In this large-nation case, the international price moves from  $p_1$  to  $p_2$ , causing Nation A's commercial exports to fall as indicated. This occurs even though domestic production expands from  $a$  to  $b$  along  $S$  and domestic demand, net of food aid, falls along  $D$  from  $c$  to  $d$ . The government food aid purchases of  $de$  more than offset these adjustments, causing a fall in commercial shipments. However, *total* export volume expands from  $ca$  to  $db$ .

What is done with this quantity of powdered milk ( $de$ ) is another story with its own economic and political consequences in the recipient nation. However, as long as the disposition of this product is fully isolated from the commercial international market, the direct effects are as indicated in Fig. 10.7.

### Surplus Disposal

Next suppose that surplus disposal is the central motivation for an exporter's noncommercial shipments. Fig. 10.8 illustrates how such a program might unfold. Imagine that exporter Nation B wishes to maintain its domestic prices of wheat at  $p_1$ . However, the systematic adoption of new production technology has moved the partial equilibrium domestic supply curve relentlessly from  $S$  to  $S^*$ . In the absence of intervention, Nation B's excess supply curve would shift from  $ES$  to  $ES^*$ , pushing domestic and world prices below  $p_1$ . The equilibrium shown at point  $a$  Fig. 10.8a indicates this potential effect.

Now suppose that the government of Nation B responds by taking the volume  $de$  in Fig. 10.8a off the domestic wheat market via direct purchases or other official acquisitions. (Note that  $de$  in Fig. 10.8a is equal to  $bc$  in Fig.

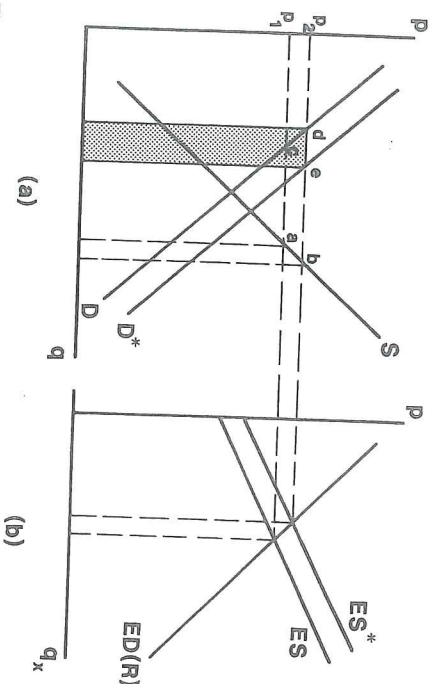


Figure 10.7 Emergency relief food aid

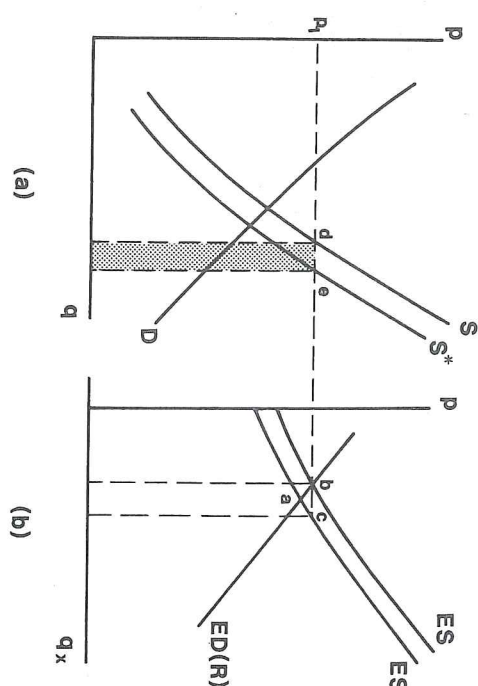


Figure 10.8 Surplus disposal food aid

10.8b). Wheat prices will remain at  $p_1$ . Volumes moving in the commercial and domestic markets will not change as a result of this program. Hence, total export volume will expand if  $de$  is shipped abroad. Government expenditures in Nation B for price support via these acquisitions are indicated by the shaded area in Fig. 10.8a. The wheat thus obtained is available for transfer to recipient nations as noncommercial aid. However, the primary motivation for acquisition in this case was price support.

As an aside to this international food aid discussion, we note that there is nothing inherent in this description or analysis that necessarily restricts the disposition of the commodities to foreign recipients. Part or all of the milk or wheat acquired by the governments could be used for noncommercial distribution to disadvantaged individuals and groups within Nations A and B. The price and trade impacts would be the same as indicated as long as the use of the supplies was insulated from and additional to ordinary commercial transactions.

### SUMMARY

Nations pursuing an expansionary export trade policy are sometimes accused of dumping on international markets. Dumping occurs when goods are sold abroad at less than their production costs or at prices lower than those prevailing in domestic markets. Export and production subsidies cause exports to be larger than they otherwise would be and typically generate internal prices and/or production costs that are higher than comparable values on international markets.

As with most trade policy intervention schemes, there are net social losses and redistributions of economic value within any society providing



export-expanding subsidies. Export promotion activities financed with public funds attempt to shift the excess demand for a nation's exports outward sufficiently far enough to generate significant increases in export volume and possibly prices. Food aid exports on noncommercial terms provide additional foreign outlets for products acquired by governments either directly for relief assistance or as an adjunct of domestic price-support operations.

## QUESTIONS

- 10.3 Assume you are an economic adviser to the minister of trade for the nation of Westonia. The minister wishes to know the general trade, price, and economic welfare effects of a fixed-price guarantee for Westonian butter producers. Westonia is a large butter exporter to the world market. The price guarantee in this case is to be sustained by deficiency payments, not a direct export subsidy. Advise the minister.
- 10.2 You are still advising the Westonian minister of trade. The problem now is to assess the economic effects, including welfare aspects, of shifting from a deficiency payments scheme to an export subsidy on butter in order to maintain a fixed producer-price guarantee. Advise the minister.
- 10.3 The Westonian Dairy Promotion Board is a private organization of dairy farmers and related interests. The board argues vigorously that a butter export subsidy will bring about undesirable side effects, including trade policy retaliation by importers and other butter exporters. They propose, instead, a publicly financed promotion campaign (managed by the board) that would expand exports sufficiently so that no other policy intervention would be needed to maintain the original producer-price guarantee. Discuss the partial equilibrium economics of this proposal, including the demand expansion that would be required for this proposal to be successful. How large a promotion budget could be justified? Industria has decided to subsidize its exports of plywood to all buyers. The subsidy  $S$  is to be calculated according to the following formula:  $S = 1/(p_w + k)$ , where  $p_w$  is the world price of plywood and  $k$  is a fixed number. Illustrate this particular subsidy policy using partial equilibrium supply and demand relations. Discuss its economic implications for Industria, including the timber industry.
- 10.4

## ADDITIONAL READINGS

- Corden, W. M. 1971. *The Theory of Protection*, Clarendon Press, Oxford, England, pp. 14-27. (Protection of exportables is covered here, including export subsidies, production subsidies, and trade reversal.)
- Greenaway, D. 1983. *Trade Policy and the New Protectionism*, St. Martin's Press, New York, New York, pp. 146-147. (A short, partial equilibrium analysis of export subsidies.)
- Grennes, T. 1984. *International Economics*, Prentice-Hall, Englewood Cliffs, New Jersey, pp. 179-181 and 317-318. (These two short passages focus on export subsidies and food aid respectively.)
- Hartland-Thunberg, P. and Crawford, M. H. 1982. *Government Support for Exports*, Lexington Books, Lexington, Massachusetts. (An entire book devoted to export

subsidies with a United States focus; see especially Chaps. 1 and 2.)

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- Michaely, M. 1977. *Theory of Commercial Policy*, University of Chicago Press, Chicago, Illinois, pp. 51-54. (A general equilibrium discussion of export subsidies using diagrams.)
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- Sorenson, V. L. 1975. *International Trade Policy: Agriculture and Development*, Michigan State University International and Business Studies, East Lansing, Michigan, pp. 115-117. (A short discussion of food aid exports.)