7.2.2 Case 2: What are the effects of an export quota (or voluntary export restriction) imposed by a large exporter?

In this section we consider the case where the *export quota* or *VER* is imposed by a large country. This case is nearly identical to the preceding one. The prominent difference is that the exporter, rather than the importer, imposes the restriction. The other prominent difference is that the license holders to the rents tend to be the firms or government of the exporting country, rather than the importing country. Thus, the welfare effects of the policy are altered by the nationality of the license holders.

Figure 7.1 can be used again to illustrate the markets for the good in the large country case. We can introduce an export quota or VER into this simple framework in Panel (b) of Figure 7.1. This export restriction essentially creates a "quantity limit" on the good supplied and demanded in the international market in the same way as the import quota. The size of the export quota or VER is the horizontal

distance q in Panel (b). All of the price and quantity effects of the previous case apply as a result of this export restriction, so we do not repeat them here.

The welfare effects of the export quota or VER for the home and foreign countries can also be seen in Figure 7.1 and are summarized in Table 7.1 (Case 2). Panel (a) of Figure 1 shows the welfare effects for the importing country. As shown, the producer's welfare increases by the surplus amount $+(a)$ as a result of the export quota or VER. The consumer's welfare decreases by the surplus amount $-(a + b + c + d)$. The net country welfare then is the sum of the producer, consumer, and license holder welfare changes. If we assume that the license holders to the rents are foreign firms or the government of the exporter, then we cannot include the rent in our calculation of the home country's welfare. Rather, the net welfare effect for the home country is $-(b + d + c)$. Area $-(c)$ is a welfare transfer from the importing country to the exporting country. Areas $-(b + d)$ are deadweight losses incurred by producers and consumers. Area $-(b)$ is a *production distortion* and area $-(d)$ is a *consumption distortion*. In net, the importing country is unambiguously worse off as a result of the export quota or VER.

Panel (c) shows the welfare effects of the export quota or VER for the exporting country. As shown, the producer's welfare decreases by the surplus amount $-(a^* + b^* + c^* + f^* + g^*)$ as a result of the restriction. The consumer's welfare increases by the surplus amount $+(a^* + b^*)$. Assuming that license holders are of foreign nationality, then the rents are $+(c^* + e^*)$. The net country welfare then is the sum of the producer, consumer, and license holder welfare changes. Adding these effects together, we get $+(e^*) - (f^* + g^*)$. Area $+(e^*)$ is a *net transfer* of license rents from the importer to the exporter. This transfer is net of the terms of trade effect. Areas $-(f^* + g^*)$ are deadweight losses incurred by consumers and producers. Area $-(f^*)$ is a *consumption distortion* and area $-(g^*)$ is a *production distortion*. As shown, the exporting country is worse off as a result of the restriction if the distortions exceed the net transfer from the importer to the exporter, and vice versa.

7.2.3 Case 3: What are the effects of a ban imposed between two large countries?

In this section, we consider the case where a ban or embargo is imposed between two large countries. Figure 7.2 shows the markets for the good in this large country case.

As before, the intersection of import demand and export supply in Panel (b) determines the equilibrium world price (P^w). The equilibrium world price is where the quantity of import demand by the home country equates with the quantity of export supply by the foreign country. At this equilibrium world price, the quantity of imports (M_0) in Panel (a) equates with the quantity of exports (X_0^*) in Panel (c). The quantity of imports in Panel (a) is the excess of demand (Q_0^D) over supply (Q_0^S) at the world price. Similarly, the quantity of exports in Panel (c) is the excess of supply (Q_0^{S*}) over demand (Q_0^{D*}) at the world price.

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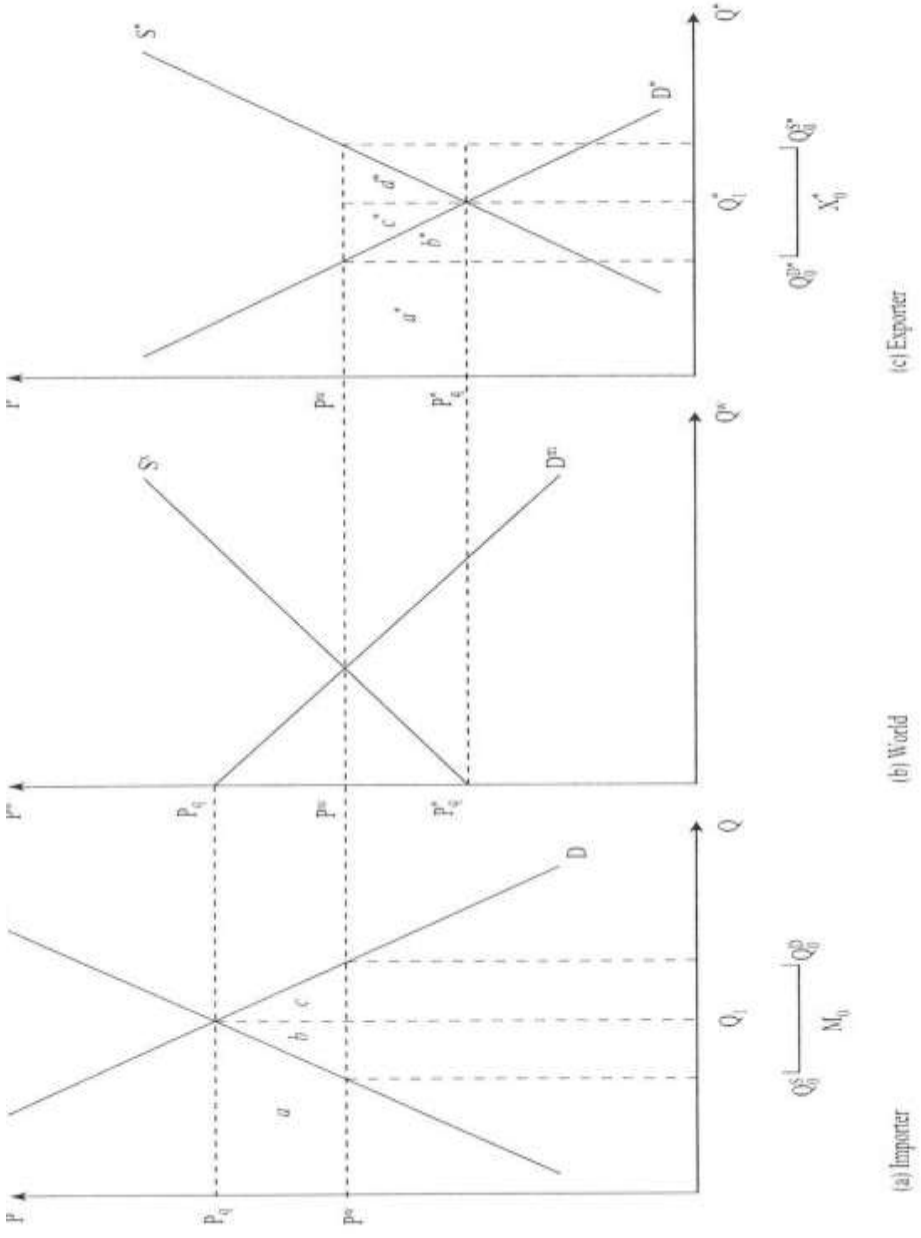

Figure 7.2 Ban – imposed by a large country.

We can now introduce a ban into this simple framework in Panel (b) of Figure 7.2. A ban essentially creates a "zero quantity limit" on the good supplied and/or demanded in the international market. That is, the ban restricts the quantity of the traded good between the two countries to zero. We can imagine placing a zero quantity limit on import demand and/or export supply in Panel (b). The effect is that prices for the good revert to the autarky prices of the two countries. When we impose a ban, the price of the good increases from the world price (P^w) to a higher price (P_q) on the restricted good in the home country. This corresponds with a movement along the import demand curve (in Panel (b)) and a decrease in the quantity of imports demanded by the importing country.

From the exporter's point of view, the price of the good decreases from the world price (P^w) to the new lower price after the ban is in place (P^*_q). This corresponds with a movement along the export supply curve (in Panel (b)) and a decrease in the quantity of exports supplied by the exporting country. In this case, the price effect of the ban is shared by both the importing and exporting countries. This price sharing occurs irrespective of which country imposes the ban. The sharing of the price effect occurs because the trading partners are large.

The ban also affects the quantities of the good supplied, demanded and traded in both the home and foreign countries (in Panels (a) and (c), respectively). The home country experiences an increase in the quantity supplied domestically (Q_0^S to Q_1) and a decrease in the quantity demanded domestically (Q_0^D to Q_1). In contrast, the foreign country experiences a decrease in the quantity supplied domestically (Q_0^{S*} to Q_1^*) and an increase in the quantity demanded domestically (Q_0^{D*} to Q_1^*). Consequently, both countries experience a decrease in trade. The home country's imports decrease (M_0 to zero) and the foreign country's exports decrease (X_0^* to zero).

Intuitively, the effects of a ban on prices and quantities tell us about the impact on both producers and consumers. At home, producers are supplying more in their domestic market at a higher price. They have gained from the ban in terms of revenue from sales of the good. At home, consumers are demanding less at a higher price. They have lost from the ban in terms of the cost of the good. Alternatively, in the foreign country, producers are supplying less at a lower price. They have lost. And foreign consumers are demanding more and a lower price. They have gained. Further, the mix of consumption of domestic and traded goods changes as a result of the ban. Consumers in the home country now consume more domestically produced goods and no imports. Consumers in the foreign market continue to consume only domestically produced goods, but more of them.

The welfare effects of the ban for the home and foreign countries can also be seen in Figure 7.2 and are summarized in Table 7.1 (Case 3). Panel (a) of Figure 7.2 shows the welfare effects for the importing country. As shown, the producer's welfare increases by the surplus amount $+(a)$ as a result of the ban. The consumer's welfare decreases by the surplus amount $-(a + b + c)$. The rent associated with the ban is zero. The net country welfare then is the sum of the producer and consumer

welfare changes. Adding these effects together we get $-(b + c)$. These areas are deadweight losses incurred by producers and consumers. Area $-(b)$ is a *production distortion* and area $-(c)$ is a *consumption distortion*. In net, the importing country is unambiguously worse off as a result of the ban.

Panel (c) shows the welfare effects of the ban for the exporting country. As shown, the producer's welfare decreases by the surplus amount $-(a^* + b^* + c^* + d^*)$ as a result of a ban. The consumer's welfare increases by the surplus amount $+(a^* + b^*)$. The net country welfare then is the sum of the producer and consumer welfare changes. Adding these effects together we get $-(c^* + d^*)$, where area $-(d^*)$ is a *consumption distortion* and area $-(d^*)$ is a *production distortion*. In net, the exporting country is unambiguously worse off as a result of the ban.

7.3 Summary Remarks

What are quantitative restrictions, their types and purpose? Quantitative restrictions are limitations on the amount of a good that is either exported from or imported into a country. Quantitative restrictions include import quotas, export quotas, voluntary export restraints, and bans. An import quota is a restriction imposed by the importer on the quantity of a good imported. The purpose of this policy is to restrict the purchase of goods from foreign origins in order to protect domestic producers. An export quota is a restriction imposed by the exporter on the quantity of a good exported. The primary purpose of this policy is to restrict the supply of the good in the international market in order to stabilize the world price of the good. A voluntary export restraint is a variant of the export quota, where the policy is imposed by the exporter at the request of the importer. The purpose of this policy is to forestall an official protective action by the importer. A *ban* or *embargo* is the extreme version of these policies, where either the exporter or importer restricts the quantity of trade in a good to zero. Quantitative restrictions create a rent associated with the traded good. The rent is the product of the markup in the price of the restricted good and the quantity of the good traded. This rent goes to the holder of the license rights to the traded good. In the case of a ban or embargo, the rent is zero.

What are the effects of quantitative restrictions? The effects of quantitative restrictions depend on the conditions in the importing and exporting countries. They also depend on the type of quantitative restriction. We considered three cases in this chapter. The first was the case of an import quota imposed by a large country that can affect the world price of the good. The second was the case of an export quota or VER imposed by a large country that can affect the world price of the good. The third was the case of a complete ban or embargo on trade imposed between two large countries. Below, we summarize the effects of the policies in each case.

First, what are the effects of an import quota imposed by a large importer? When the importing country is large, an import quota affects the price in the importing

country and the world price of the good. Specifically, an import quota increases the price of the good in the importer and decreases the price of the good in the exporter. As a result, agents in both the importer and exporter are affected. In the importing country, producers supply more in their domestic market at a higher quota-induced price. They have gained from the import quota in terms of revenue from domestic sales of the good. At the same time, consumers demand less at the higher quota-induced price. They have lost from the quota in terms of the higher cost of the good. Alternatively, in the exporting country, producers supply less to the international market at a lower world price. They have lost from the quota in terms of revenue from international sales of the good. And consumers demand more at the lower world price. They have gained from the quota in terms of the lower cost of the good. Furthermore, the mix of consumption of domestic and traded goods changes as a result of the quota. Consumers in the importing country now consume more domestically produced goods and fewer imports. Consumers in the exporting country continue to consume only domestically produced goods, but more of them.

The import quota also results in welfare changes in both the importing and exporting countries. In the importer, the producer's welfare increases, the consumer's welfare decreases, and the license holder captures a rent. If we assume that the license holders are domestic in the case of an import quota, then we can include this rent in the welfare calculation for the importer. Consequently, the net country welfare includes a positive net rent and negative production and consumption distortions. The importing country is worse off as a result of the import quota if the distortions exceed the positive net rent, and vice versa. Alternatively, in the exporter, the producer's welfare decreases and the consumer's welfare increases. The net country welfare effect includes a negative net rent transfer to the importer and negative production and consumption distortions. The exporting country is unambiguously worse off as a result of the import quota.

Second, what are the effects of an export quota (or VER) imposed by a large exporter? The effects of an export quota or VER imposed by a large country are nearly identical to the case of the import quota. All of the price and quantity effects are the same. The prominent economic difference is that the exporter, rather than the importer, imposes an export quota or VER. Furthermore, in the case of an export restriction, the license holders to the rents tend to be the firms or government of the exporting country, rather than the importing country. Thus, the welfare effects of the policy are altered by the nationality of the license holders.

The export restrictions result in welfare changes in both the importing and exporting countries. In the exporter, the producer's welfare decreases, the consumer's welfare increases, and license holders to export receive the rent. The net country welfare effect includes a positive net rent and negative production and consumption distortions. The exporting country is worse off as a result of the export restriction if the negative distortions exceed the positive net rent, and vice versa. Alternatively, in the importer, the producer's welfare increases and the consumer's welfare decreases. The net country welfare effect includes a negative net rent

transfer and negative production and consumption distortions. The importing country is unambiguously worse off as a result of the export restriction.

Third, what are the effects of a ban imposed between two large countries? The effects of a ban or embargo imposed between two large countries are an extreme version of the previous cases. The ban (or embargo) restricts the quantity of the traded good between the two countries to zero. The effect is that prices for the good revert to the autarky prices of the two countries. Specifically, the ban increases the price of the good in the importer and decreases the price of the good in the exporter. As a result, agents in both the importer and exporter are affected. This price sharing occurs irrespective of which country imposes the ban. In the importing country, producers supply more in their domestic market at the higher autarky price. They have gained from the ban in terms of revenue from domestic sales of the good. At the same time, consumers demand less at the higher autarky price. They have lost from the ban in terms of the higher cost of the good. Alternatively, in the exporting country, producers no longer supply to the international market. They have lost from the ban in terms of revenues from international sales of the good. And, consumers demand more at the lower autarky prices in the exporter. They have gained from the ban in terms of the lower cost of the good. Further, the mix of consumption of domestic and traded goods changes as a result of the ban. Consumers in the home country now consume more domestically produced goods and no imports. Consumers in the foreign market continue to consume only domestically produced goods, but more of them.

The ban also results in welfare changes in both the importing and exporting countries. In the importer, the producer's welfare increases and consumer's welfare decreases. The net country welfare effect includes negative production and consumption distortions. The importing country is unambiguously worse off as a result of the ban. Alternatively, in the exporter, the producer's welfare decreases and the consumer's welfare increases. The net country welfare effect includes negative production and consumption distortions. The importing country is also unambiguously worse off as a result of the ban. Further, given that trade is reduced to zero, there is neither a rent nor a terms of trade effect to counterbalance the negative distortions. Thus, bans are welfare deteriorating in economic terms from national and global perspectives.

This chapter did not consider several aspects of quantitative restrictions. We did not assess the implications of the small country case where the country imposing the restriction cannot affect the world price. We did not assess the implications of alternative elasticities of export supply and import demand. And, we did not assess the implications of liberalizing quantitative restrictions. We encourage the reader to do this independently, using the tools developed in the previous chapters. Furthermore, we did not account for political and non-economic explanations for bans or embargos as a policy tool. These aspects fall under the topic of the political economy of trade policy. Finally, we did not discuss the effects of the hybrid policy known as tariff rate quotas. This topic is discussed in the following Chapter 8 in the context of policy comparisons.