8

Import Tariffs and Quotas under Perfect Competition

Overview

As trade creates gains between countries and winners and losers within countries, a country's *trade policy* affects the welfare of other nations and redistributes income within its borders. Because one country's policies can negatively affect other countries, the *World Trade Organization* acts as a forum for countries to come to a collective agreement on trade policies and resolves disputes between countries when they arise. The structure and history of the WTO affect all relevant aspects of trade policy.

The chapter introduces a perfectly competitive, partial equilibrium model to analyze the welfare impact of two types of trade policies: the import *tariff* and the import *quota*. The tariff, which is a tax on imports, is the most common way that countries reduce the volume of their imports. The analysis suggests that import tariffs lower the welfare of *small* importing countries but can actually improve the welfare of *large* importing countries. Large countries' gain is at the expense of their trading partners, however, explaining some of the conflicts that arise between countries. The import quota is a direct restriction on the number of imports allowed into a country. In the perfectly competitive model, the welfare effects associated with import *quotas* are much like those of the import tariff. Like tariffs, quotas raise domestic prices above world price and so aid producers and harm consumers. Governments typically enforce quotas in a way that ensures that they lower national welfare.

1 A Brief History of the World Trade Organization

ESSENTIAL CONCEPTS

Prior to World War II the world was in a major economic slump commonly referred to as the Great Depression. During this period, countries used trade policies to aid domestic producers, but the collective effect of a simultaneous rise in tariffs across all major countries was to reduce the volume of trade for all countries. The loss of the gains from trade is generally thought to have contributed to the seriousness of the Depression.

In 1947, the General Agreement on Tariffs and Trade (GATT) was established, with the goal of reducing trade barriers. In addition to providing a forum for negotiating the reduction of trade barriers, the GATT contained 24 articles that regulated countries' use of trade policies. Under the GATT, countries met periodically for negotiations, called *rounds,* with the purpose of lowering trade barriers and introducing rules for the conduct of trade policy.

In 1994 the GATT was replaced by the World Trade Organization. The articles of the GATT were written into the WTO agreement. Unlike the GATT, the WTO is a formal institution that has a mechanism, or procedure, for settling disputes that arise when countries are accused of violating the rules. This subsection introduces some of the key rules of the WTO and the GATT before it.

KEY TERMS

Use the space provided to record your notes on the following key terms.

Trade policy _____

Import tariff _____

Dumping _____

Import quota _____

Export subsidies _____

Regional trade agreements _____

Free-trade areas _____

Customs unions _____

Safeguard provision _____

Escape clause _____

REVIEW QUESTIONS

Problem 1: The following questions test your knowledge of the WTO's rules.

1a. How would you know if a foreign firm was dumping its product in your domestic market? _____

1b. Suppose that several countries decided to reduce tariffs exclusively on each others' products but maintain their tariffs on other countries' products. Would this agreement violate the WTO's "most favored nation" principle? Why or why not? _____

1c. Why is "most favored nation status" called "normal trade relations" in the United States?

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Memorize the appropriate article in GATT for each of the relevant key terms.

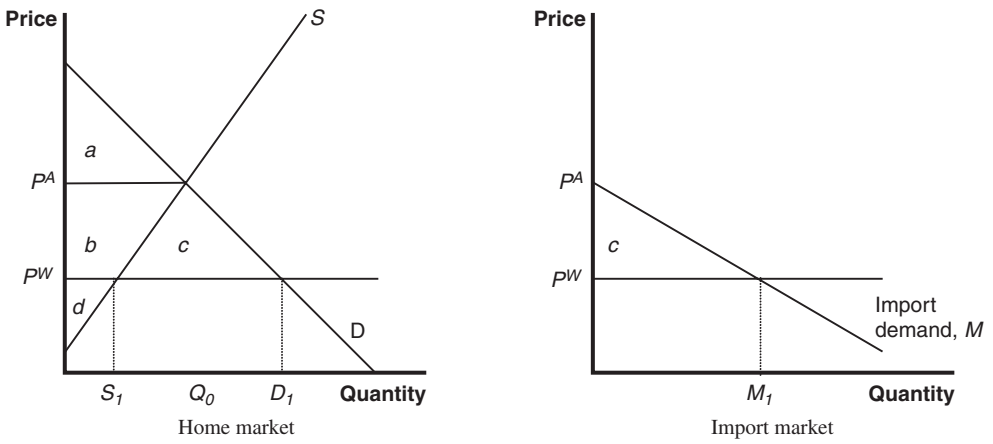
Be patient. Each of the articles highlighted in this section will be featured at some point in the next several chapters.

2 The Gains from Trade

ESSENTIAL CONCEPTS

A simple partial equilibrium framework is introduced to analyze the effect of Home's trade policy on its welfare. There are two types of actors in Home, consumers and producers. In Figure 8-1, Home's consumers are represented by a demand curve (D) and Home's producers are represented by a supply curve (S). When Home is in autarky, the price (P^A) and quantity (Q_0) in this market is determined by the intersection of supply and demand. Now suppose that the country could trade with the outside world at fixed world prices. If the price on the world market is below the price in Home in autarky, then Home's consumers will expand their demand and its producers will contract their supply. When Home's demand exceeds its domestic supply, the country must import the difference. Home's import demand curve is shown on the right-hand panel of Figure 8-1. Given a world price P^W, a country imports M_1, which is equal to $D_1 - S_1$.

FIGURE 8-1



International Trade in Partial Equilibrium

To measure welfare in this framework, we rely on the concepts of *consumer surplus* and *producer surplus.* The surplus that accrues to a consumer who buys D_1 units of a good when the price is P^W is equal to the area under the demand curve up to D_1 (the total utility of consuming that much of the good), less the amount that the consumer had to pay, or price P^W multiplied by D_1 (the foregone utility of consuming other goods). In Figure 8-1, given a price of P^W, the consumer surplus is equal to the sum of the areas *a, b,* and *c.* Because international trade lowers the price of the import good, trade improves the well-being of consumers by the area $b + c$, as shown in the left-hand panel of Figure 8-1.

The producer surplus associated with selling S_1 units at a price P^W is the revenue earned ($P^W \cdot S_1$) less the total payments to variable factors (the area under the supply curve up to S_1). In Figure 8-1, the producer surplus given a price of P^W is the area *d.* International trade lowers the price in an import industry relative to autarky and so harms producers whose revenues fall by more than their variable costs. In Figure 8-1, the loss imposed on producers by international trade is the area *b.*

International trade creates winners and losers in this model, but the gains to the winners exceed the losses to losers. In Figure 8-1, the gains from trade are measured by the area *c.* Notice that this welfare effect is measured by the area of a triangle. The area of a triangle is easy to calculate: It is one half of the product of the base and height of the triangle. Finally, notice that the gains from trade can also be measured by triangles in either diagram.

KEY TERMS

Use the space provided to record your notes on the following key terms.

Consumer surplus _____

Producer surplus _____

_____

_____

Import demand curve _____

_____

_____

Small country _____

_____

_____

REVIEW QUESTIONS

Problem 2: Anne is willing to buy one tomato if the price of tomatoes is $3 and two tomatoes if the price of tomatoes is $2. If the price of tomatoes is $2, what is Anne's consumer surplus?

_____

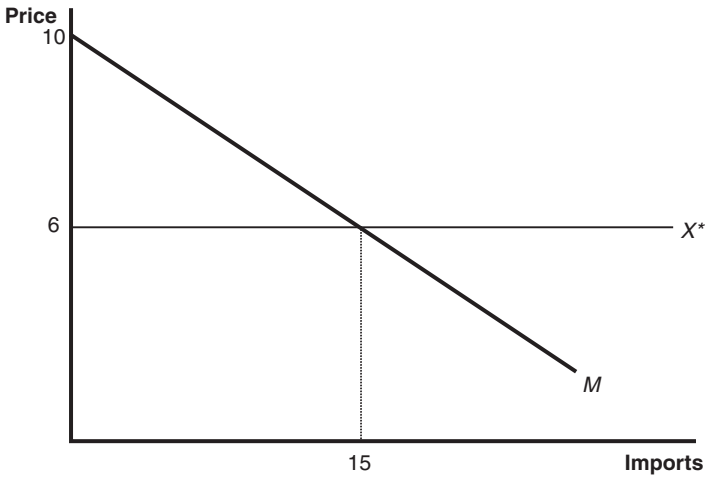
_____

Problem 3: Suppose tomatoes are grown using land (a specific factor) and labor (a mobile factor). If the revenue of tomato growers is $100 and the wage bill (amount paid to the mobile factor) is $60, what is the producer surplus in the tomato industry? _____

_____

Problem 4: Figure 8-2 shows the trading equilibrium for a small country with import demand *M* facing a fixed world price for a good.

FIGURE 8-2



The Import Market

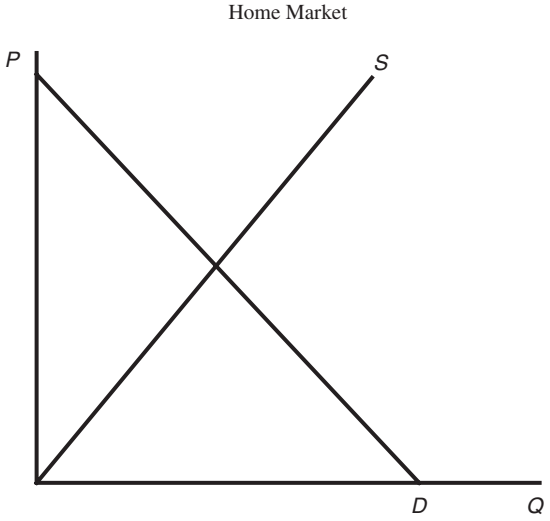
4a. What is the autarky price in this small country? _____

4b. What are the national welfare gains from trade for this economy compared with national welfare in autarky? _____

_____

_____

4c. The following Home Market diagram shows Home's domestic supply and demand for the good. Fill in the information from Figure 8-2 (prices and imports) and your answer to problem 4b (gains from trade) in this diagram.



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When a country goes from autarky to free trade, the price on the world market becomes the price in the importing country. Home's producers would not be able to sell any goods for a price higher than the world level.

The diagrams used in the book have linear supply and demand curves. This means that the measurement of deadweight losses always involves calculating the area of triangles. The area of a triangle is one half of the product of the triangle's base and its height.

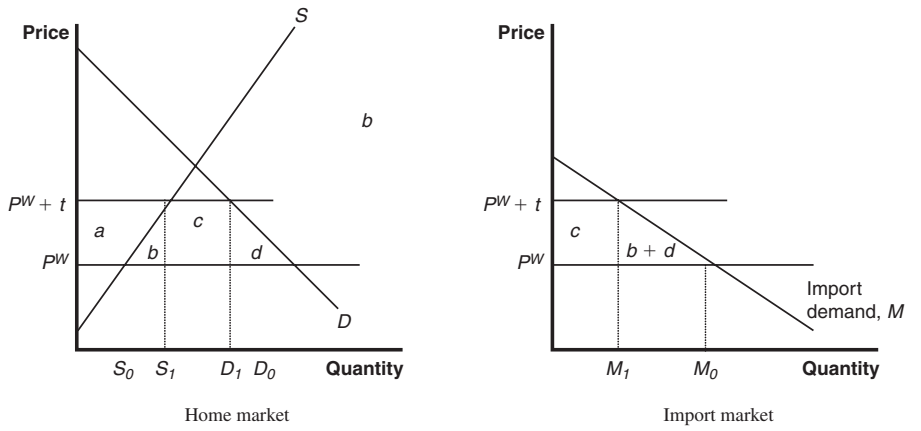
3 Import Tariffs for a Small Country

ESSENTIAL CONCEPTS

A *small country* faces a horizontal export supply curve. It cannot affect the world price of its imports by changing its behavior. When Home puts a tariff of size t into place, the price facing home consumers and producers is equal to the fixed world price P^W plus the tariff t. As shown in Figure 8-3, consumers reduce their demand and producers increase their supply and imports fall.

The increase in the price in the home market lowers consumer surplus by the area $a + b + c + d$. At the same time, the increase in price in Home increases its producer surplus by the area a. Because the country is an importer, the loss of consumer surplus is always greater than the gain in producer surplus. The tariff also raises revenue for the government, however, and this revenue has value equal to $t \ M_1$, where t is the tariff rate and

Figure 8-3



Effect of a Tariff, Small Country

M_1 is the amount of the good imported. In Figure 8-3 (both panels) this is the area *c*. On net, a tariff imposed by a small country must reduce the welfare of that country by the area $b + d$. These welfare losses are called the *deadweight loss* of the tariff and are equal to the sum of the *production loss* (area *b*) and *consumption loss* (area *d*). The deadweight loss appears in both the Home Market and Import Market diagrams and can be easily calculated using the formula for the area of a triangle.

KEY TERMS

Use the space provided to record your notes on the following key terms.

Deadweight loss _____

Production loss _____

Consumption loss _____

Dispute settlement system _____

Tariff war _____

REVIEW QUESTIONS

Problem 5: Consider the information in Figure 8-2. Now suppose that this country puts in a tariff of $2 per unit imported. Suppose that the country's imports fall from 15 units to 7.5 units.

5a. What is the effect of the tariff on the domestic price? _____

5b. What is the value of tariff revenue raised by this tariff? _____

5c. What is the effect of the tariff on national welfare (provide a number)? _____

_____

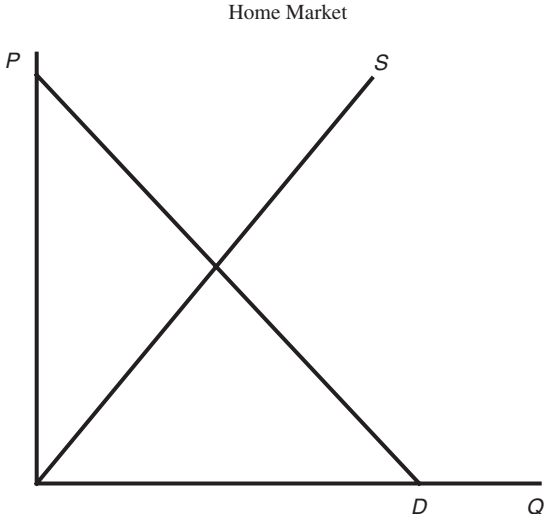
Now suppose that the tariff causes the revenue of domestic firms to rise by $9 and the payments to variable factors of production to rise by $4.

5d. What is the effect of the tariff on producer surplus? _____

5e. Given your answers to questions 5b through 5d, what is the effect of the tariff on consumer surplus? _____

_____

5f. Fill in as much of the information as possible in the following domestic supply and demand diagram.



TIPS You should be comfortable understanding the relationships between the information in the Home Market diagram and the Import Market diagram.

Problem 6: Home has a tariff of $2 on the import of a pair of shoes. Home is small, and the price of shoes on the world market is $15. Home had been producing 100 pairs of shoes and consuming 300 pairs of shoes. Now suppose that Home gets rid of its tariff entirely. As a result, consumption of shoes rises by 25 pairs and production of shoes falls by 25 pairs. Assume that Home's supply and demand curves are linear.

6a. What is the impact of the tariff removal on producer surplus? (Provide a number.)

_____

6b. What is the impact of the tariff removal on consumer surplus? (Provide a number.)

_____

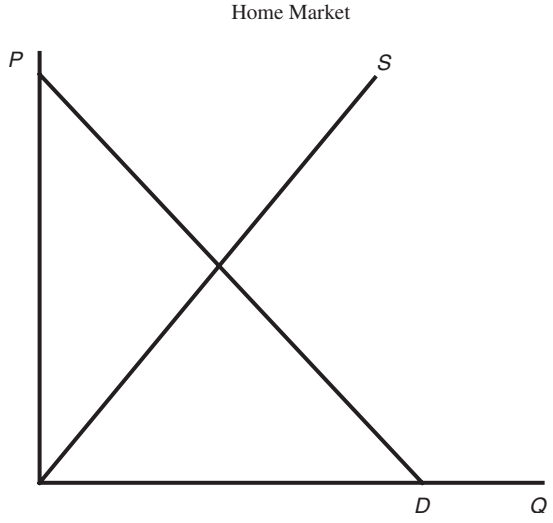
6c. What is the impact of the tariff removal on government revenue? (Provide a number.)

_____

6d. Is the country better or worse off after the tariff is removed and by how much? _____

_____

6e. Use the following diagram to illustrate the information provided in the questions and answers to the other parts of the problem.



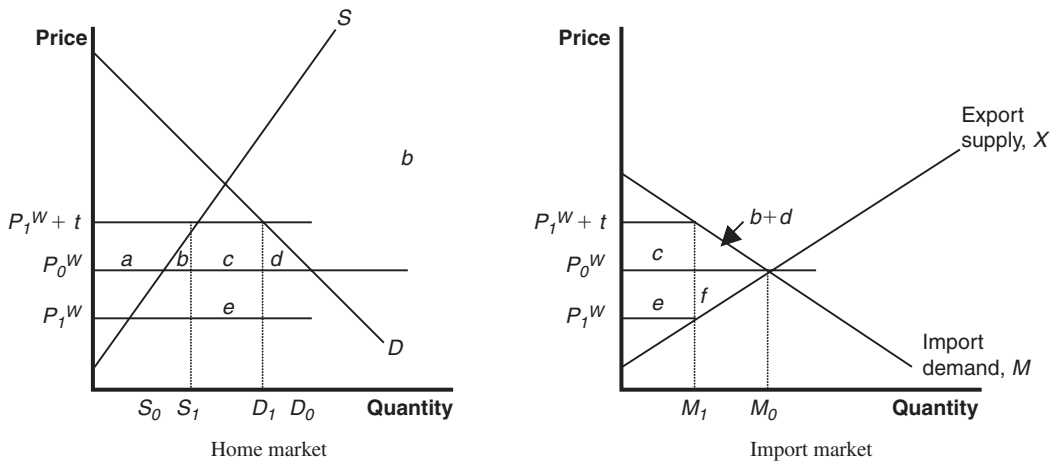
4 Import Tariff for a Large Country

ESSENTIAL CONCEPTS

If Home is a *large country,* it can alter world prices by changing its demand on the world market. To model a large country, we assume that the country faces an export supply curve that has a positive slope, as shown in the right-hand panel of Figure 8-4. By imposing a tariff, the government raises the price in Home, inducing producers to supply more and consumers to demand less so that imports contract for any given world price. This reduction in demand pushes down the world price in Import Market, shown in Figure 8-4 as the decrease in the world price P_0^W to P_1^W. Meanwhile, the domestic price rises from P_0^W to $P_1^W + t$.

The reduction in the world price is called the *terms-of-trade gain* for Home, and it represents an increase in Home's welfare. The gain occurs because Home has pushed some of the incidence of the tariff onto foreign producers. Total tariff revenue accruing to the government is shown in both panels of Figure 8-4 as the area $c + e$, of which the area e is paid by foreign producers. The remainder of the welfare analysis for Home is similar to the case of the small country. Because the price rises in Home (P_0^W to $P_1^W + t$), consumer surplus falls by the area $a + b + c + d$ and producer surplus rises by the area a. The total impact of the tariff on national welfare is then $e - (b + d)$. The key result is that if the government chooses its tariff carefully, then the terms-of-trade gain exceeds the dead-

FIGURE 8-4



Effect of a Tariff, Large Country

weight loss and Home is better off with a tariff than it is with free trade. The tariff rate that maximizes the welfare gain for Home is called the *optimal tariff.*

Home's welfare gain comes at the expense of its trading partner, where producer surplus falls by more than consumer surplus rises in response to the lower world price. Total losses to the exporting country are shown as the area $e + f$ in the Import Market in Figure 8-4. By imposing a tariff, Home might precipitate a *trade war* by inducing its trading partner to impose *retaliatory* tariffs on Home products as punishment. Finally, because free trade maximizes global efficiency, a tariff necessarily leads to welfare losses through production and consumption losses, which are equal to $-(b + d + f)$.

KEY TERMS

Use the space provided to record your notes on the following key terms.

Large country _____

Terms of trade _____

Terms-of-trade gain

Optimal tariff

REVIEW QUESTIONS

Problem 7: Suppose Home is importing 100 units of a good at a world price of $10/unit. Home then puts in a tariff of $2 per unit. As a result of the tariff, the price paid in Home rises to $11 per unit and imports fall to 50 units.

7a. What impact has the tariff had on the world price? _____

_____

7b. What tariff revenue is raised by this tariff? _____

7c. Assuming that the country's import demand curve is linear, what is the deadweight loss in Home caused by this tariff? _____

7d. By how much did this tariff raise or lower Home's welfare?

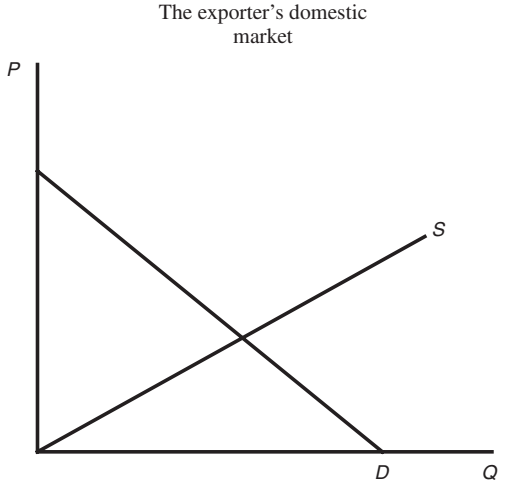
_____

7e. By how much did this tariff raise of lower Foreign welfare?

_____

7f. What is the effect of the tariff on world welfare? _____

7g. Use the following domestic supply and demand diagram for the exporting country to illustrate the welfare impact of Home's tariff on consumer surplus, producer surplus, and national welfare. Where possible, provide numbers.



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When Home imposes a tariff, its consumers and producers react to a price that exceeds the world price by the size of the tariff. When the tariff is imposed, the price in Home increases by *t*, causing consumers to demand less and producers to supply more. The demand for imports then falls, pushing down the price on the world market. The new equilibrium occurs when at the new world price plus the tariff, Home consumers and producers want to import the same quantity that Foreign producers and consumers want to sell at the new world price.

Problem 8: The optimal tariff formula states that the tariff that raises national welfare the most is inversely related to the elasticity of the export supply curve. Provide an intuitive explanation for why this is so. _____

_____

_____

TIPS

A tariff is just a tax on imports. As we know from introductory economics, the incidence of a tax falls on both suppliers and consumers. If we think of the importing country as the consumer and the exporting country as the supplier, then it makes sense that the steeper the supply curve, the more the effect of a tax is borne by the exporting country.

5 Import Quotas

ESSENTIAL CONCEPTS

A quota is a limit on the number of imports allowed into a country. If Home imposes a quota, its government requires anyone importing the good to have a *quota license.* In the presence of a quota, the price in Home rises above the world price in order to make Home's excess demand (equal to domestic demand minus domestic supply) equal the amount of the quota. As in the case of the tariff, a higher domestic price reduces consumer surplus by more than it increases producer surplus. The fact that the price in Home exceeds the world price means that quota licenses have value as they give their owner the right to buy low at the world price and sell high at the domestic price. The total value of quota licenses is called the *quota rent.*

Who gets the quota rents? There are several possibilities. First, if the government auctions the quota licenses in a perfectly competitive market, then the quota rents accrue to the government. In this case, the welfare effect of a quota is *equivalent* to a tariff that restricts imports by the same amount. The diagrams for a quota would be drawn in exactly the same way that they would be for a tariff. Second, the quota rents could be given away. One potential problem with giving the quota licenses away is that people engage in *rent-seeking* behavior: They use real resources to lobby the government in order to obtain quota licenses. In fact, quota rents are often given to the governments of the exporting countries to distribute as they please. When quota rents are given to foreigners, the effect of the quota on national welfare is unambiguously negative in both the small- and large-country cases.

KEY TERMS

Use the space provided to record your notes on the following key terms.

Quota licenses _____

Quota rents _____

Equivalent import tariff _____

Rent seeking _____

Voluntary export restraint (VER) _____

Voluntary restraint agreement (VRA) _____

Multifiber arrangement (MFA) _____

REVIEW QUESTIONS

Problem 9: Consider two scenarios for a small country. In one case, the government imposes a tariff on the import of a good. In the second case, the government imposes a quota that restricts imports by the same amount as the tariff and distributes the quota licenses by selling them on a perfectly competitive market.

9a. Compare and contrast the welfare effects of these two policies given the fixed world price. _____

9b. Now suppose that the protected good's price falls on world markets after the tariff and quota are in place. If you were a producer in the protected market, would you rather be protected by the tariff or by the quota? Explain. _____

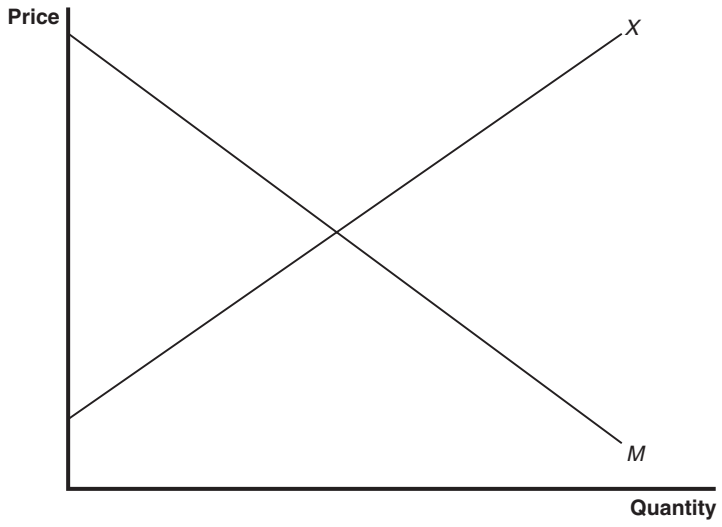
Problem 10: Consider a large country that is importing 100 units of a good at $10 a piece. The government of the importing country puts in a quota of 50 units, which is enforced by having the government of the exporting country distribute these licenses. As a result of this quota the Home price rises to $13 and the price on the world market drops to $8.

10a. What is the value of the quota rent? _____

10b. What is the effect on the export country's total welfare (provide a number)? _____

10c. What is the effect on the import country's total welfare (provide a number)? _____

10d. Illustrate the welfare effects on the importer and exporter countries in the following export-import diagram.



10e. If instead the importing country allowed the exporting country to sell the import licenses, what would be the welfare effect of the quota on the two countries? _____

_____

_____

_____

Problem 11: Why would a country give the quota rents to the exporting country? _____

_____

_____

TIPS

The effect of a quota on national welfare depends on how the quota rents are distributed. Read problems on quotas carefully.