7. Instruments of Trade Policy

Learning Objectives

- Become familiar with the various instruments of trade policy – tariff and non-tariff barriers to trade – and learn the meaning and implications of the effective rate of protection.
- Learn the traditional approach to the cost-benefit analysis of tariffs, export subsidies and import quotas.
- Briefly examine other forms of protection and begin to evaluate their economic and social impact.

Readings

Paul Krugman and Maruice Obstfeld, International Economics, Theory and Policy, 8th ed. (2009). chapter 8, "The Instruments of Trade Policy".

Outline

1. Basic welfare analysis of tariffs (cost-benefit analysis of a tariff)

   a. Figure 1 presents the traditional graphic analysis of a tariff on an import good. Without trade, domestic supply and demand in the two countries will result in equilibrium prices (or "autarky" prices) of *P* in the home country and *P** in the foreign country. For any price below *P*, the home country will generate the import demand, *MD*, in the center panel of the diagram. For any price above *P**, the foreign country will generate the export supply, *XS**. If there is free trade of the good, the trading price will settle between *P* and *P** at a price such as P_W (the "world" price).

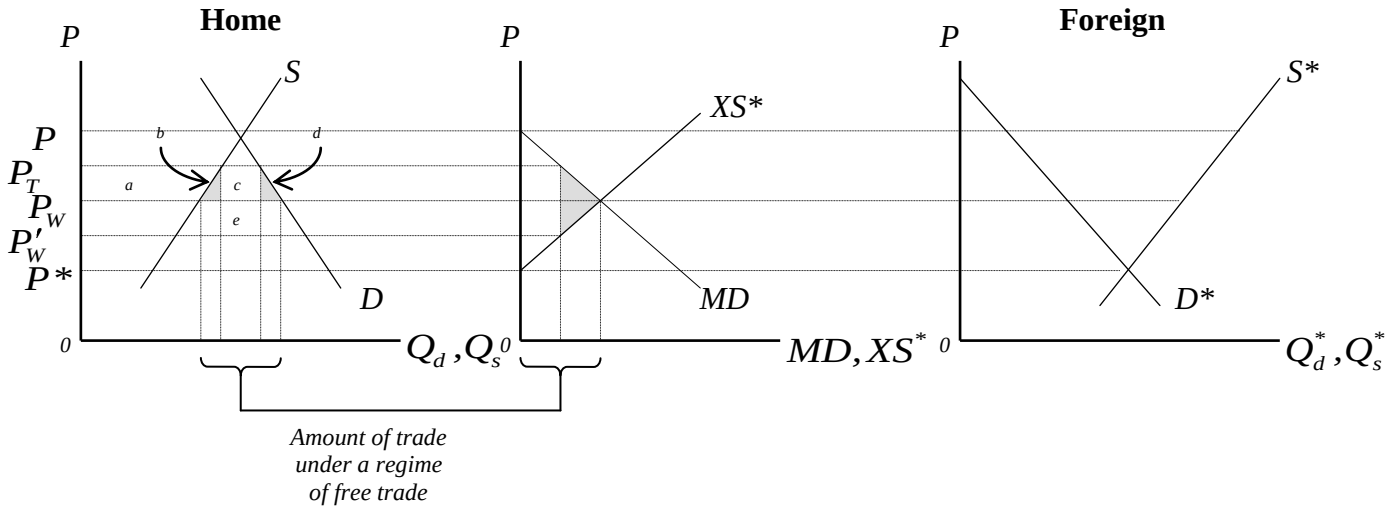
   b. If the home country imposes a tariff on the good, the price will rise above P_W to a price such as P_T. The welfare effects of this at home are usually summarized in terms of changes in surplus. The higher price leads to a reduction in consumer surplus equal to *a* + *b* + *c* + *d*, an increase in producer surplus equal to *a*, and government tariff revenue equal to *c* (assuming that the tariff-imposing country is a "small country" – see point (c) below). In theory, the government can use this tariff revenue to offset some of the welfare loss to consumers of the good, but as the diagram illustrates, this area is insufficient to fully compensate consumers of the good. The uncompensated areas *b* and *d* are usually referred to as the home country's dead weight loss of the tariff. These areas also are sometimes said to represent the distortionary effects of the tariff, with area *b* representing a production distortion and area *d* representing a consumption distortion.

   c. As the left panel shows, when the tariff leads to a higher domestic (or "internal") price in the home country, consumers respond by reducing the quantity demanded and producers respond by increasing the quantity supplied. If the home country is sufficiently large relative to the world economy, these domestic demand and supply responses potentially will have a downward effect on the world price, to a price such as P_W' (the so-called "large country" effect). In this case, the government tariff revenue potentially expands to

include additional area such as *e*. If this effect is large enough, and $e > b + d$, the tariff may actually improve welfare at home. *e* is sometimes referred to as the terms of trade effect of a tariff, because of the alteration of world prices -- in this case a reduction in the world price of an import. For large countries, it may more than offset the distortionary effects represented by *b* and *d*, and actually mean that the optimal tariff for a large country is greater than zero.

d. According to an extension of this traditional analysis by Feenstra[1], if a large country's imposition of a tariff has this effect on world prices, it may generate additional dead weight losses in the rest of the world. The shaded triangle in the center panel represents these effects. The top half of the triangle represents the deadweight loss at home, while the bottom half represents additional dead weight losses generated abroad.

Figure 1



2. Analysis of export subsidies

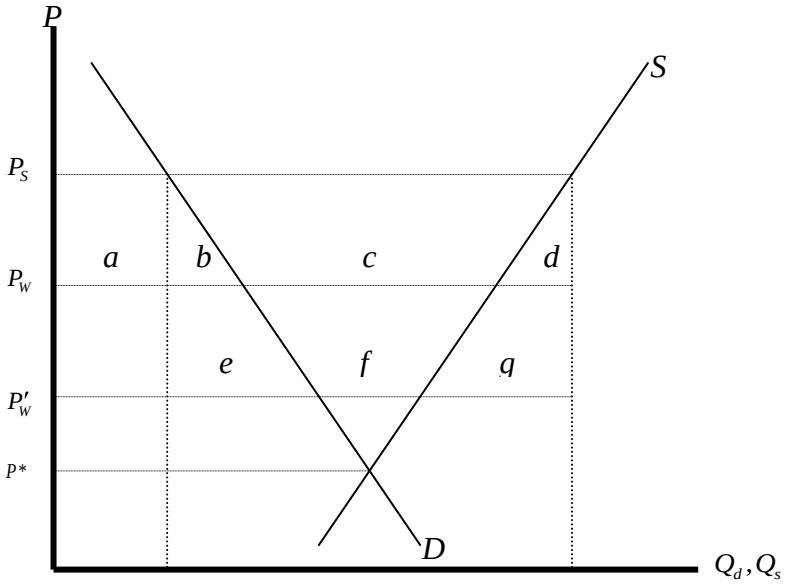
Figure 2 illustrates the traditional cost-benefit welfare analysis associated with export subsidies. The analysis may be thought of as a modification of the right-hand panel of Figure 1. In this case, the exporting country enacts an export subsidy, raising the opportunity cost for an exporter of selling at home. Therefore, prices at home rise. If the country is "large", world prices fall (because of the effect on world supply and demand of the domestic output and consumption responses).

The welfare effects on domestic consumers and producers are straightforward: consumers, paying higher prices, lose welfare equal to areas $a + b$. Producers, the recipients of the subsidy, gain welfare equal to areas $a + b + c$.

The cost of the subsidy is equal to areas $b + c + d + e + f + g$. Areas b and d are the consumption and production distortions – this part of the analysis is identical to the analysis of a tariff. Areas $e + f + g$ are the terms of trade effect, which for a subsidy are negative,

[1] "How Costly is Protectionism?" Robert Feenstra, *Journal of Economic Perspectives*, Summer 1992, 159-178.

because they result in higher costs for the subsidy-granting government (as opposed to higher revenues in the tariff case). Since this terms of trade effect is always negative, it never offsets the consumption and production distortions (as is possible in the case of a tariff), but always add to them. Hence this analysis indicates that an export subsidy unambiguously leads to costs greater than benefits – an export subsidy always decreases aggregate welfare.



3. Analysis of import quotas

   The analysis of an import quota is nearly identical to that for an import tariff, except that, unless the government sells the quota rights to highest bidders, the areas representing revenue in the tariff analysis become quota rents. These quota rents may be distributed arbitrarily, depending upon the method chosen to allocate the quota rights. If the government sells the quota rights in a competitive bidding system, the analysis is identical to that for an import tariff.

4. Other instruments of trade policy (non-tariff barriers to trade)

   a. Anti-dumping regulations / duties (See notes for section 5 of the course.)

   b. "Orderly Marketing Agreements" / Voluntary export restraints

   c. Export credit subsidies

   d. Domestic content provisions

   e. Domestic procurement policies

   f. Social and environmental regulations ("harmonization")

   g. Bureaucratic or "red tape" restrictions – These often have the effect of raising costs for foreign firms attempting to enter a market. See "Forbidden Fruit", *Far Eastern Economic Review*, August 8, 1996, for an example.

5. The effective rate of protection

Countries sometimes impose higher tariff rates on final commodities than on the raw materials used to produce them. One possible explanation for this is the encouragement of domestic production and employment. As the concept of effective rate of protection illustrates, relatively small tariff rates can stimulate large domestic production responses.

a. Example[2]:

Suppose that $80 of material goes into a $100 suit, and that a country imposes a 10% tariff on suits but allows free importation of the material used to make the suit. The price of an imported suit is $110 (small country case).

While consumers only see a $10 increase in the price of a $100 suit (a *nominal* tariff rate of 10%), producers realize a 50% increase in their markup over input costs. Without the tariff domestic producers generate $20 in *value added* (calculated as the end-user price less the input costs), while with the tariff this amount rises to $30, a 50% increase. This 50% is defined as the *effective rate of protection*, and is a gauge of how great the incentive is to increase domestic production when an import tariff is imposed. It is of great interest to producers.

b. Method of calculation:

The rate of effective protection, *v*, is usually calculated as follows:

$$v = \frac{t_i - a_i t_j}{1 - a_i}, \text{ where} \begin{cases} t_i = \text{the nominal tariff rate on a final good} \\ t_j = \text{the nominal tariff rate on an input used in production of the final good} \\ a_i = \text{the ratio of the cost of the imported input to the free-trade price of the final good} \end{cases}$$

In the example above, the nominal tariff rate on the final good is 10%, the nominal tariff rate on the input is 0 (duty free), and the ratio of the cost of the imported input to the free trade price of the final good is 0.8. Hence the effective rate of protection is 50%:

$$v = \frac{0.1 - (0.8) * 0}{1 - 0.8} = 0.5$$

6. Case Studies

a. U.S. sugar program

b. Europe's CAP

c. Steel, 2002

[2] This example is adapted from Dominick Salvatore, *International Economics*, 7th ed. (2001), p. 251.

Assignment 7

Discussion Questions

1. What factors influence the magnitude of the production distortion, consumption distortion, and government revenue that arise from the imposition of a tariff?

2. The two deadweight triangles are the *Consumption distortion* and *Production distortion* losses. It is easy to understand why the *Consumption distortion* constitutes a loss for society. After all it raises the prices of goods to consumers, and even causes some consumers to drop out of the market altogether. It seems paradoxical that the *Production distortion* is considered an equivalent burden on society. After all, in this case, profits increase, and additional production (with its associated employment) comes on line. This would seem to be an offset rather than an addition to the burden or loss borne by society. Explain why the *Production distortion* is indeed a loss to society, and what is wrong with the logic that leads to the apparent paradox.

Problem Set

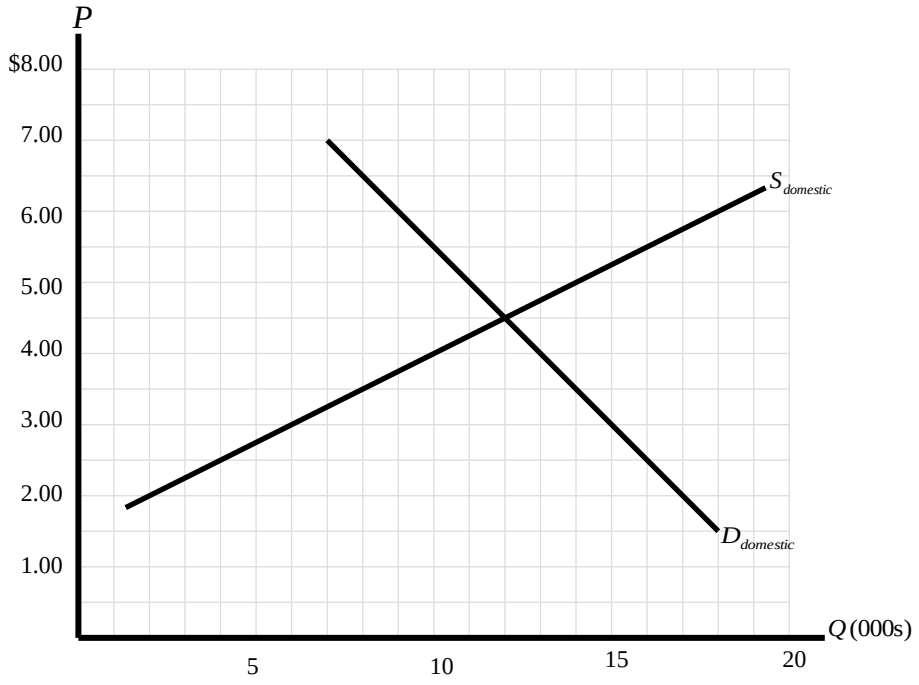
Krugman and Obstfeld, problems 1 through 7 and 9 from pages 201 – 202.

Extra graphing problem: Consider the diagram below.

a. If the rest of the world supplies this good elastically at a price of $2.50, how much of the good will the economy depicted by the diagram import?

b. Modify the diagram to show the effects of an import quota of 6,000 units.

c. Calculate the dead weight loss of the quota for this economy.



Excerpts from "Forbidden Fruit," *Far Eastern Economic Review*, August 8, 1996, pp. 50 – 51.

A Japanese plant pathologist's suicide demonstrates there's often more than meets the eye in U.S.-Japan trade disputes.

By Nigel Holloway in Washington

Akio Tanii was a plant pathologist toiling away quietly at a government research station on the island of Hokkaido, until he co-authored an academic paper which concluded that a disease called fire blight was present in Japanese apple and pear trees. When his paper was presented at a conference in Canada in August 1995, the spotlight fell on his work. News of the research outraged officials at the Agriculture Ministry in Tokyo and fruit farmers in Hokkaido.

After learning of the report and the attention it received at the conference, Japanese officials demanded to know more about Tanii's work. They ordered farmers to cut down all pear trees around the infected areas; the farmers, in turn, talked of suing Tanii for taking samples from orchards without the owners' permission.

In the end, the pressure on Tanii became intolerable; he killed himself last October by swallowing pesticide.

Tanii's research had embroiled him in one of the longest-running agricultural disputes between Japan and the United States. American apple exporters had tried for 24 years to sell their fruit in Japan, but officials in Tokyo threw up all sorts of obstacles. One of the biggest of these was the ministry's contention that Japan was entirely free of fire blight, a disease which damages trees and is endemic in the U.S. Tanii's research implied that the ministry had either been misinformed—or had deliberately misled the Americans.

American apples are not the only type of food that Japan has tried for years to keep out. In the 1980s, officials contended that Japanese intestines were not shaped to digest American beef. Japanese rice was said to be imbued with mythical properties not found elsewhere in the staple. All these markets have eventually opened up to varying degrees in the past few years. But the case of apples shows how difficult it is to export even when Japanese barriers do come down.

American farmers were only able to ship their apples to Japan in January 1995, after they had set up an expensive programme of testing to ensure, among other things, that their apples were not contaminated with fire blight. "We had known from the beginning" that the fire-blight issue was bogus, says Mike Saunders, co-owner of Northwestern Fruit & Produce in Washington state. "The testing and quarantine programme we have to undertake to export to Japan is absolutely unbelievable," he says.

News of the circumstances surrounding the death of Tanii, first published in English on July 22 in the *Los Angeles Times*, come at an awkward time for the apple trade between Japan and the U.S. In 1995, Washington state sold 500,000 42-pound cases of apples to Japan. But in the apple season of 1996 (they go on sale for a mere six weeks of the year—a Japanese custom for seasonal fruit), exports amounted to only 55,000 cases, an 89% drop.

One American academic posted a message on the Internet suggesting the political demise of Tom Foley, formerly speaker of the House of Representatives, had led to the slump in apple exports. Foley, a Democrat from Washington state, lost his seat in the November 1994 election after a long congressional career in which he had tried hard to open the Japanese market to apples.

Actually, the decline had more to do with market forces, with Japanese demand slipping as the yen weakened and the novelty of American apples wore off. But even there, the fire-blight issue played a role. Japan allows the U.S. to export only two types of apple—Red and Golden Delicious—both of which are new to Japanese consumers. Two other varieties grown in Washington that are better suited to Japanese tastes—Fuji and Gala—await the results of extensive tests at orchards in Washington before they, too, might be allowed into Japan. Those tests include research to see whether the apples might carry fire blight to Japan.

Officially, the apple market was opened in 1971; but thereafter only small quantities were allowed in from North and South Korea. The main hurdles to imports from elsewhere were Japanese phytosanitary regulations. "Each time we met their standard for control of diseases and pests, they'd change the standard," says Jim Thomas, communications director for the Washington Apple Commission, a trade organization. This went on for almost 20 years. "It was only when we approached it as a political issue that results finally came," he says.

The U.S. and Japan finally agreed on phytosanitary standards for apples in August 1994, after Washington threatened trade sanctions. Under the agreement, American growers have to allocate what is called a "core area" of their orchards to grow apples specially for Japan. The core area has to be surrounded by a 500-metre-wide "buffer" of apple trees—fruit not grown for Japan, but of the same disease-free standard as in the core area.

Inspectors from the Japanese Agriculture Ministry visit the orchards three times a year, at the growers' expense, to check every tree. After the harvest, the apples have to be kept in cold storage for 55 days; they cases are then submerged in chlorine before being shipped to Japan, where they are inspected again before distribution to wholesalers.

Despite the costs of transport and of inspection at the orchard ($417,000 in total for all the exporters in 1994-95), Washington apples were retailed last year for ¥70-100 (65-95 cents) apiece, compared with similarly sized local apples costing ¥200-300. Exporters did a roaring trade and sold their entire shipment of 500,000 boxes.