

# Part Two: International Trade Policy

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## Chapter 8 Trade Restrictions: Tariffs

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*“To prohibit by a perpetual law the importation of foreign corn and cattle, is in reality to enact, that the population and industry of the country shall at no time exceed what the rude produce of its own soil can maintain.”*

Adam Smith, *Wealth of Nations*, Book IV, Chapter II.

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### II. Chapter Summary and Review

A **tariff** is one form of **commercial policy**, also known as **trade policy**, which has been used by nations to influence international commerce. A tariff is simply a tax on imports (**import tariff**) or exports (**export tariff**), although in the United States, export taxes are unconstitutional. Tariffs, like any tax, can be **ad valorem**

(a fixed percentage of the value traded), **specific** (a given dollar amount per unit traded), or **compound** (a combination of ad valorem and specific tariffs).

Economists generally view import tariffs as harmful to the overall welfare of a nation. The popular appeal of tariffs is due to the benefits they confer on special interest groups within the nation imposing the tariff. Very simply, a net buyer of a product is hurt by an increase in prices because purchases of the product exceed production of the product. An importing nation is a net buyer (buying more domestically than it is domestically producing) from the rest of the world, so a tariff that raises the price of goods may produce gains to sellers, but those gains are exceeded by the losses to buyers.

The **Stolper-Samuelson theorem** states that as the price of a good or service increases, the real return to the factor that is used intensively in the production of that good or service increases. A tariff on the imports of a good will increase the price of the good, so for a nation that imports labor-intensive goods, the Stolper-Samuelson theorem states that a tariff on the labor-intensive imports will increase the real wages earned by labor. Consequently, although a tariff reduces national welfare, labor would gain at the expense of greater losses for the rest of society.

The conclusion that a tariff hurts national welfare assumes that a nation is too small to affect world prices (the terms of trade). If, however, a nation is a large buyer of goods from other countries, where "large" means the ability to affect world prices (the terms of trade), then import tariffs could provide some benefits. A nation imposing a tariff reduces its imports (demand for foreign products), which for a large importer, will lead to a reduction in the prices charged for the imports by foreign producers. The import tariff, by reducing the price of imports, shifts some of the burden of the import tariff onto the foreign producer. Foreign producers pay part of the tariff by being forced to accept lower prices for the products they export to the nation imposing the import tariff. Domestic consumers will still face higher total prices due to the import tariff, but the shifting of import taxes to foreign producers in the form of lower prices may more than offset these losses.

If a nation can affect the terms of trade through import tariffs, it does not follow that import tariffs should always be higher. If a tariff is too high it will prohibit all imports (a **prohibitive tariff**) so no import taxes can be shifted to foreign producers. There is, therefore, an **optimum tariff** for a large nation somewhere between zero and a prohibitively large tariff. Nevertheless, even if a

large country can estimate the optimum import tariff, there is still a risk in imposing a tariff on other nations. The danger is that trading partners will retaliate by imposing their own tariffs, which further reduces the overall volume of trade and makes both countries worse off. Also note that even if the optimum tariff can be successfully applied, the tariff is optimum only for the country that imposes the tariff. From a global perspective, the tariff is sub-optimal because some production has been shifted by the tariff from low-cost producers to high-cost producers. A tariff produces a sub-optimal allocation of resources, so the gains to the nation imposing the optimum tariff are more than offset by the losses to the rest of the world.

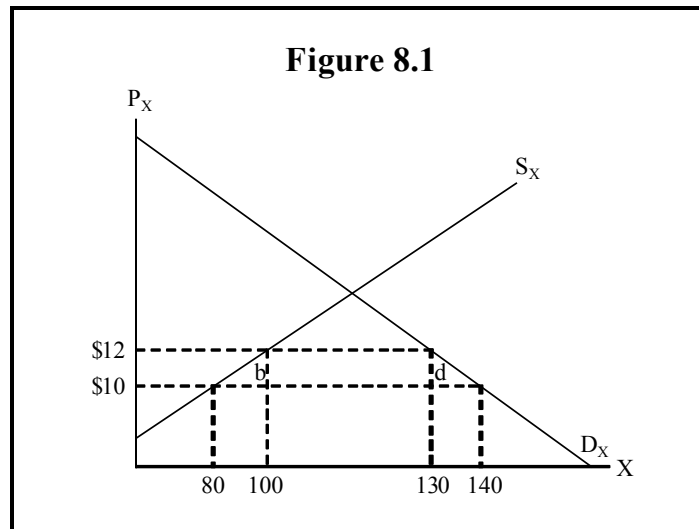
If a nation imposes a tariff either for reasons associated with the optimum tariff argument and/or due to pressure from special interest groups, it is important to distinguish between the **nominal tariff** and the **rate of effective protection**. If a nation imposes a 10% tax on an imported finished good, then the nominal tariff is 10%. If, however, an input in the production of a good also bears an import tariff, then the import tariff on the input is indirectly a tax on domestic producers because they face higher production costs directly due to the import tariff on the input. Thus, the nominal tariff of 10% on the imported finished good may not indicate the degree to which the domestic industry is "effectively protected" by import tariffs. A measure of domestic economic activity that includes both outputs and inputs is **domestic value added**. Domestic value added is the difference between the value of the finished good and the value of imported inputs. By calculating the effect of tariffs on domestic valued added, in percent terms, both the effect of the tariff on the finished good and the effect of the tariff on the imported input are considered. This percent change in domestic value added due to tariffs on the good and its inputs is a measure of the effective rate of protection. If high tariffs are imposed on imported inputs and low tariffs imposed on finished goods, then domestic value added may actually be reduced as a result of this structure of tariffs.

### III. Questions

1. Fig. 8.1 shows the effect of an import tariff.
  - a) Is the tariff shown in Fig. 8.1 an ad valorem tariff or a specific tariff?
  - b) What is the dollar amount of the tariff per unit?

c) Is the analysis in Fig. 8.1 partial equilibrium analysis or general equilibrium analysis?

d) According to Fig. 8.1, how does the tariff affect the world price of good X?



e) By how much does the tariff affect the price to consumers in the importing country?

f) After all adjustments, what happens to the price of domestic production of good X as a result of the import tariff?

g) Is the demand curve in Fig. 8.1 the demand by domestics or the demand for domestic products?

2. Using the numbers given in Fig. 8.1, indicate the following:

a) Consumption effect of the tariff

b) Production effect of the tariff

c) Trade effect of the tariff

d) Revenue effect of the tariff

3. Continue to use the numbers given in Fig. 8.1 to answer the following

questions:

a) What is the dollar value of the welfare cost (**loss in consumer surplus**) of the tariff to consumers?

b) What is the dollar value of the welfare benefit (**gain in producer surplus**) of the tariff to producers?

c) What is the dollar value of the total benefits of the tariff? What is the dollar value of the total costs of the tariff?

d) Subtract the total dollar costs you found in part c of this question from the total dollar benefits you found in part c of this question in order to get the total net benefit of the tariff. How does this total net benefit compare to the **deadweight loss** shown as areas b and d in Fig. 8.1?

e) Directly calculate the size of areas b and d in Fig. 8.1 to verify your answer to part d of this question.

**4.** Determine the size of the nominal tariff relative to the effective rate of protection under the following conditions:

a) There are no imported inputs and the tariff on a finished good is 10%

b) A country imposes a 10% tariff on all finished goods and inputs, and imports 50% of the inputs it uses in the production of a finished good

c) A country imposes a 10% tariff on finished goods, a 20% tariff on inputs, and imports 50% of the inputs it uses in the production of a finished good

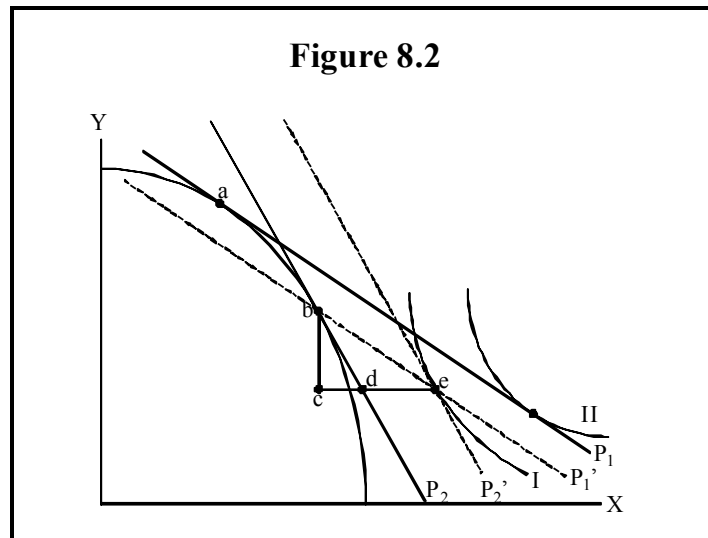
d) The tariffs on finished goods and inputs are as in part c of this question, but imported inputs make up 70% of the inputs used in the production of a finished good

**5.** The general equilibrium effects of a tariff for Country A are shown in Fig. 8.2.

a) What is the relative price of good X before the imposition of a tariff on good X?

b) What is the relative price of Good X for domestic consumers and producers after the imposition of a tariff on good X?

c) From a national perspective, what is the relative price of Good X after the imposition of the tariff?



d) After the imposition of the tariff, what is the quantity of good X imported and the quantity of good Y exported?

e) Using the letters along the trade triangle **bce**, how much is collected in tariff revenues?

f) Why does consumption end up along price line  $P_2'$  rather than along  $P_2$ ?

g) Why must consumption occur at the intersection of lines  $P_1'$  and  $P_2'$ ?

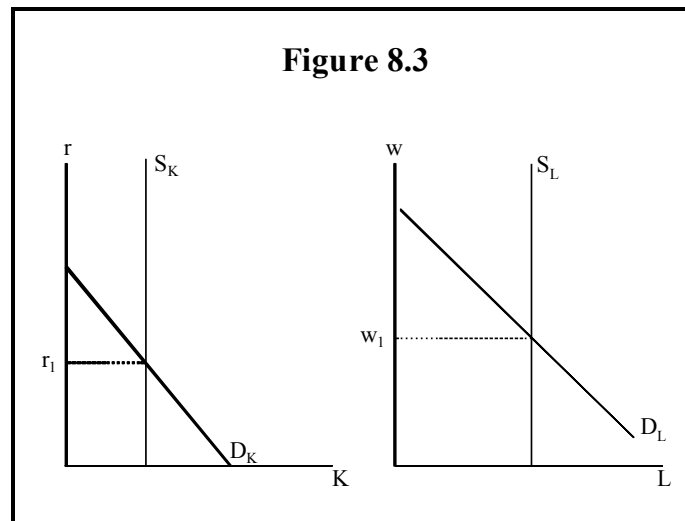
h) What is the net effect of the tariff on the welfare of country A?

**6.** Assume that Country A from Question 5 is labor rich and Good X is capital intensive. The market for capital and labor in Country A is shown in Fig. 8.3. The given endowments of capital and labor for Country A are indicated by vertical supply curves, and the demand curves have the usual shape. The equilibrium return to capital is  $r_1$ , and the equilibrium return to labor is  $w_1$ . Both returns in Fig. 8.3 are measured nominally.

a) What will happen to the nominal return to capital as a result of the tariff on

Good X in country A?

b) What will happen to the nominal wage rate as a result of the tariff on Good X in Country A?



c) The tariff on Good X will increase the price of Good X for residents of Country A. Assume that the price of Good Y is unchanged as a result of the tariff. In part b of this question, you should have found that the nominal return to labor decreases. What must happen to the *real* wage rate in Country A? (Hint: Labor spends income on goods X and Y; the price of X increases and the price of Y is unchanged.)

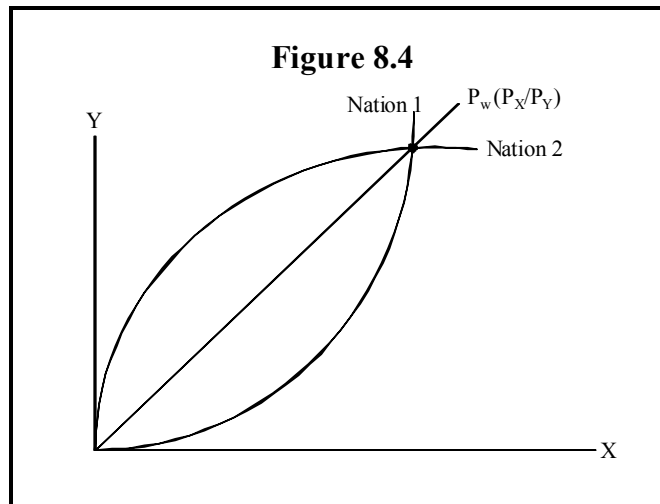
d) In part a of this question, you should have found that the nominal return to capital increases. If the price of Good X increases, then the *average cost of production of Good X increases* by the same amount. (Price equals average cost in long-run equilibrium in competitive markets.) If the cost of labor (the nominal wage rate) decreases, then *the cost of capital (the nominal return to capital) must increase by more than the average cost of production*. What does this imply happens to the real return earned by capitalists in Country A? (Hint: The nominal return to capital goes up by more than the price of Good X, and the price of Good Y is unchanged.)

e) Are your answers to parts c and d of this question consistent with the **Stolper-Samuelson Theorem**?

f) In questions c and d you should have found that the real wage rate decreases and the real return to capital increases as a result of the tariff on Good X. Which

change has a larger effect on income? (Hint: What effect does a tariff have on national income?)

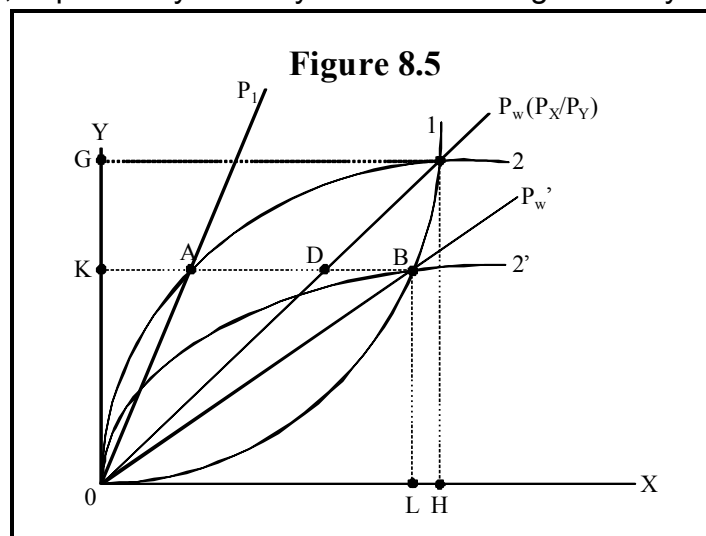
7. a) What happens to the offer curve of Nation 1 in Fig. 8.4 if it imposes a tariff on imports?



b) What will happen to the price of X relative to the price of Y as a result of Nation 1 imposing a tariff on imports?

c) What will be the net effect on the price of X relative to the price of Y if an import tariff by Nation 1 leads to Nation 2 imposing an import tariff of similar size?

8. a) In Fig. 8.5, explain why Country 2 must be a large country.





- b) If Country 2 were a small country, how would Fig. 8.5 differ?
- c) Fig. 8.5 shows the pre- and post-tariff equilibrium for a large country. The pre-tariff price is  $P_w$ , which is expressed as  $P_x/P_y$ , as you are reminded by the parentheses in Fig. 8.5. Which good and how much of the good is exported by Country 2 prior to the tariff? Which good and how much of the good is imported by Country 2 prior to the tariff?
- d) Explain why the offer curve of Country 2 shifts down (from 2 to 2') as a result of the tariff.
- e) Measured at the post-tariff equilibrium, what is the amount of tariff revenues collected in kind ("in kind" means measured in the *quantity* of the import good)? Measured at the post-tariff equilibrium, what is the tariff rate? (The tariff rate is the tariff as a fraction of the imports received by consumers.)
- f) What price do domestic producers and consumers face as result of the tariff? Indicate whether the tariff has increased or decreased  $P_x/P_y$  for domestic producers and consumers.
- g) Prior to the tariff, if Country 2 exported OK units of Good Y, how much of Good X could be imported?
- h) After the tariff, if Country 2 exported OK units of Good Y, how much of Good X can be imported if tariff revenues purchase Good X? (This is equivalent to the assumption that tariff revenues are distributed to members of the private sector, who use them to buy Good X.)
- i) Comparing your answer to g and h, has the tariff made the terms of trade less or more favorable to Country 2?
- j) Is the post-tariff equilibrium necessarily superior or necessarily inferior to the pre-tariff equilibrium for Country 2?
- k) Is the post-tariff equilibrium necessarily superior or necessarily inferior to the pre-tariff equilibrium for Country 1?
- l) What does your answer to part k of this question suggest will be Country 1's response to the imposition of a tariff by Country 2?

9. Table 1 gives the effect of a tariff on cotton sweaters. (Assume there is no difference between domestically produced sweaters and foreign-produced sweaters.)

**Table 1**

	Free Trade	With a \$4.00 Tariff
World Price of sweaters	\$42.00	\$42.00
Tariff per sweater	0	\$4.00
Domestic Price of sweaters	\$42.00	\$46.00
Sweaters consumed domestically (million sweaters/year)	60	52
Sweaters produced domestically (million sweaters/year)	12	18
Sweaters imported (million packs/year)	48	34

- a) Using partial equilibrium analysis, estimate the amount domestic consumers lose from the tariff (give a dollar number).
- b) Estimate the net effect on the country's welfare as a result of the tariff (give a dollar number).
- c) Based on the information given in Table 1, would the optimum import tariff on sweaters be negative, zero, or positive? Why?