

# EC 131 - International Trade Welfare Analysis

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## 1 Opening to Trade

When a small economy opens to trade, the effective price used domestically is going to be the world price ( $P^w$ ). Comparing  $P^w$  with the equilibrium price  $P^*$  allows us to determine whether the country will export or import the good for which the market is being represented:

- If  $P^w < P^*$ , the country will *import* the product
- If  $P^w > P^*$ , the country will *export* the product
- If  $P^w = P^*$ , there are no gains from trade, and so trade may not occur.

### 1.1 Example

Suppose that the following equations describe the domestic market for a product:

$$Q^D = 300 - 5P$$

$$Q^S = 5P$$

Suppose, also, that this country will open to international trade, where  $P^w = 35$ . What will be the effects of such opening? The first thing we should do is to find the market equilibrium:

$$Q^D = Q^S \implies 300 - 5P = 5P$$

$$300 = 10P$$

$$P^* = 30$$

	Before trade	After trade	Change
CS	$\frac{1}{2}(60 - 30)(150) = \$2,250$	$\frac{1}{2}(60 - 35)(125) = \$1,562.50$	-\$687.50
PS	$\frac{1}{2}(30)(150) = \$2,250$	$\frac{1}{2}(35)(175) = \$3,062.50$	+\$812.50
TS	\$4,500	\$4,625	+\$125

Figure 1: Welfare effects of opening to trade

Plugging back to the supply function:

$$Q^* = 5 \times 30 = 150$$

Thus, since  $P^w > P^*$ , this country will *export* this product. In order to see how much will be exported, we simply plug the effective domestic price (that is, the world price  $P^w$ ) in the demand and supply functions:

$$Q^D = 300 - 5 \times 35 = 300 - 175 = 125$$

$$Q^S = 5P = 5 \times 35 = 175$$

Exports are the difference between quantity supplied and consumed domestically, that is,  $Q^S - Q^D = 175 - 125 = 50$ . Exports revenues are, thus,  $50 \times 35 = \$1,750$ . Revenues from domestic sales are  $125 \times 35 = \$4,375$ .

We can now proceed to welfare analysis. In order to do so, we first need to know the intercepts of the demand and supply curves:

- The demand curve intercepts the vertical axis when  $Q^D = 0$ , that is, where  $0 = 300 - 5P$ , thus  $300 = 5P$  and  $P = 60$ . Thus the curve intercepts the vertical axis at  $P = 60$ .
- The demand curve intercepts the horizontal axis when  $P = 0$ , which again by plugging in the demand function,  $Q = 300$ , which is the intercept at the horizontal axis.
- Supply curves have only one intercept. When  $P = 0$ ,  $Q^S = 0$ , and thus the unique intercept is at the origin (where  $P$  and  $Q$  equal zero)

You can draw the curves with the intercepts to find the values shown in figure 1.1.

The \$250 positive change in total surplus are the *gains from trade*.

## 1.2 Tariffs

One possible source of revenue for a government is to charge an imports tariff. With the tariff, a tax of  $t$  is charged for each unit imported. Thus, given the world price  $P^w$ , the effective price for imports will be  $P^w + t$ . Of course, if  $P^w + t > P^*$  then no consumer will want to import, so in order for the tariff to take place, it must be that  $P^w + t < P^*$ .

	Before tariff	After tariff	Change
CS	$\frac{1}{2}(60 - 20)(200) = \$4,000$	$\frac{1}{2}(60 - 25)(175) = \$3,062.50$	-\$937.50
PS	$\frac{1}{2}(20)(100) = \$1,000$	$\frac{1}{2}(25)(125) = \$1,562.50$	+\$562.50
Government	0	\$250	\$250
TS	\$5,000	\$4,875	-\$125

Figure 2: Welfare effects of import tariffs

Moreover, the domestic price will then be  $P^w + t$ , since no firm will be able to sell for more than that price.

Suppose that the economy is the same as the one above, but that  $P^w = \$20$  and the government will impose a tariff of \$5 on imports.

First, since  $P^w < P^*$ , there will be imports. First, we should evaluate the economy *before the tariff*.

$$Q_f^D = 300 - 5 \times 20 = 300 - 100 = 200$$

$$Q_f^S = 5P = 5 \times 20 = 100$$

Consumers will import 100 units, thus. With the tariff, the effective domestic price will be  $\$20 + \$5 = \$25$ :

$$Q_t^D = 300 - 5 \times 25 = 300 - 125 = 175$$

$$Q_t^S = 5P = 5 \times 25 = 125$$

With the tariff, thus, imports will be of  $175 - 125 = 50$  units. The government revenue is, thus,  $50 \times 5 = \$250$ .

By drawing the curves and both prices, you can find the surplus values shown in figure 1.2.