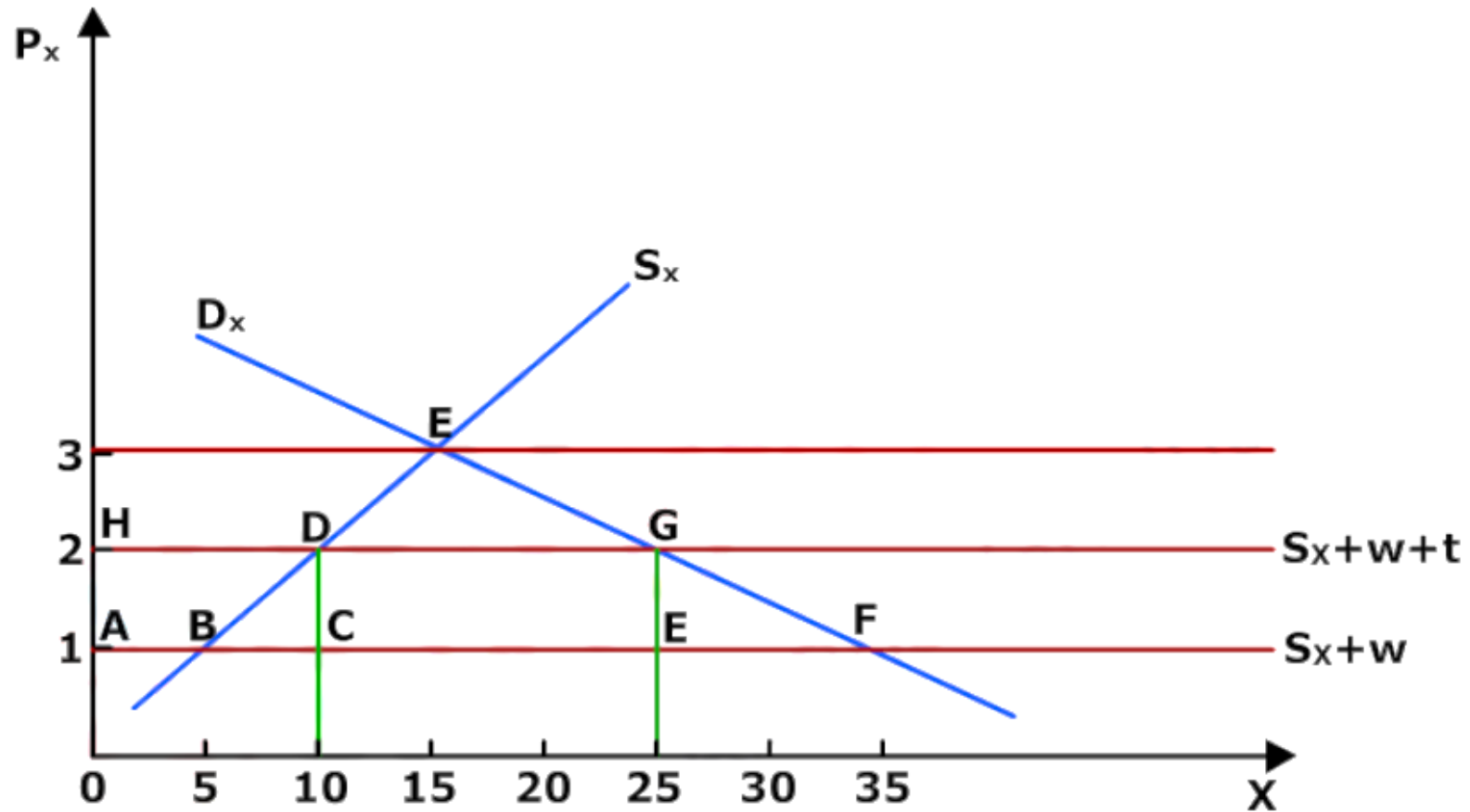# Effect of Tariff

Unit-II

Effect of Tariff

- Tariff is the duties or taxes imposed on internationally traded products when they pass the national borders.

- Thus, the tariff imposed on the imported commodity is known as import tariff and similarly the tariff imposed on exported commodity is termed as export tariff.

- Import tariffs are more important than the export tariff and their effects are symmetrical to those for the imports.

- The features of the tariff are-
  - It affects the domestic consumption of that good.
  - It affects the home production of goods that compete with the imported good.
  - It affects the foreign production of the imported good.
  - It also changes the structure of the economy.

Types of tariff

1. **Specific tariff** – This is one of the simplest forms of a tariff. A specific tariff is shown in terms of a given amount of money per physical unit of the imported product.

- For example, a US importer of a German Computer may be required to pay a duty to the US government of $50 per computer, regardless of the computers price. A specific tariff is quite easy for a government to administer.

2. **Ad valorem tariff** – It is measured as a % of the value of the imported good say, 10 %. This constant percentage tariff evades the regressive nature of a specific tariff.

- This tariff maintains a constant degree of protection for domestic producers during the period of variation in prices.

- For example, if the tariff rate is 10% ad valorem and the imported product price is $ 5000, then the duty will be $ 500. If the product price increases, then the ad valorem tariff will also increase.

- This tariff is similar to proportional tax where the real proportional tax burden doesn't change as the tax base changes.

3. **Compound tariff** – It is comprised of both a specific tariff & an ad valorem tariff. For example, $10 per imported product plus 5% of the value of the imported good such compound tariffs are common on agricultural products whose prices tend to fluctuate.

Effects of Tariff

- The partial equilibrium effects of tariff is analysed with the help of figure.
- In this figure, Dx is the demand curve and Sx is the supply curve of commodity X in Nation 1.
- Here Nation 1 is assumed to be small. In the absence of trade, intersection of Dx & Sx defines equilibrium at point E where 15 X is demanded & supplied at Px = $ 3 in Nation 1.
- Now suppose that the economy is opened to foreign trade and the world price is $1.
- As the world market will supply an unlimited units of commodity X at price $1, the world supply schedule will appear as horizontal (perfectly elastic) line.
- Line Sx+w shows the supply of commodity X available to the small nation consumers from domestic and foreign sources combined. At world price of Px = $1 and with free trade Nation 1 consumes 35 X(AF), of which 5X is produced domestically and the remainder 30 X (BF) is imported.
- Now if Nation 1 imposes 100% ad valorem tariff on the imports of commodity X, the overall supply curve shifts upward by an amount of the tariff from Sx+w to Sx+w+t.
- So now Px will rise to 2. At Px = 2, Nation 1 will consume 25X(GH) of which 10X(HD) is produced domestically and the remainder of 15X(DG) is imported.

The effects of tariff from the figure

- The **consumption effect** of the tariff as seen from the fig 1 is the reduction in the domestic consumption which is equal to 10X(EF).

- The **production effect** i.e, the expansion of domestic production resulting from the tariff equals to 5X(BC).

- The **trade effect** i.e, decline in imports equals 15X(EF+BC).

- The **revenue effect** i.e, the revenue collected by the government equals DCGE equals $15($1 each of 15X imported).

- The more elastic Dx and Sx are in Nation 1, greater is the trade effect of the tariff and smaller is the revenue effect of the tariff.

Effect of Tariff on Consumer and Producer Surplus

- A tariff raises the price of a good in the importing country and lowers it in the exporting country.

- Due to the changes in prices, consumers lose in the importing country and gain in the exporting country. The producers gain in the importing country and lose in the exporting country.

- In addition, the government imposing the tariff gains revenue.

- To compare the cost and benefits resulting from the tariff, hereby the two concepts of microeconomics analysis – consumer and producer surplus are discussed.

Consumer Surplus

- The figure illustrates the domestic demand of commodity X for the consumers in nation 1.

- The vertical axis represents the maximum price that consumers are willing and able to pay for a given quantity of commodity X, which is represented on the horizontal axis.

- The demand for Commodity X slopes downward to right. All else being equal, it indicates that as the price if commodity X falls, consumers are willing and able to buy more of X.
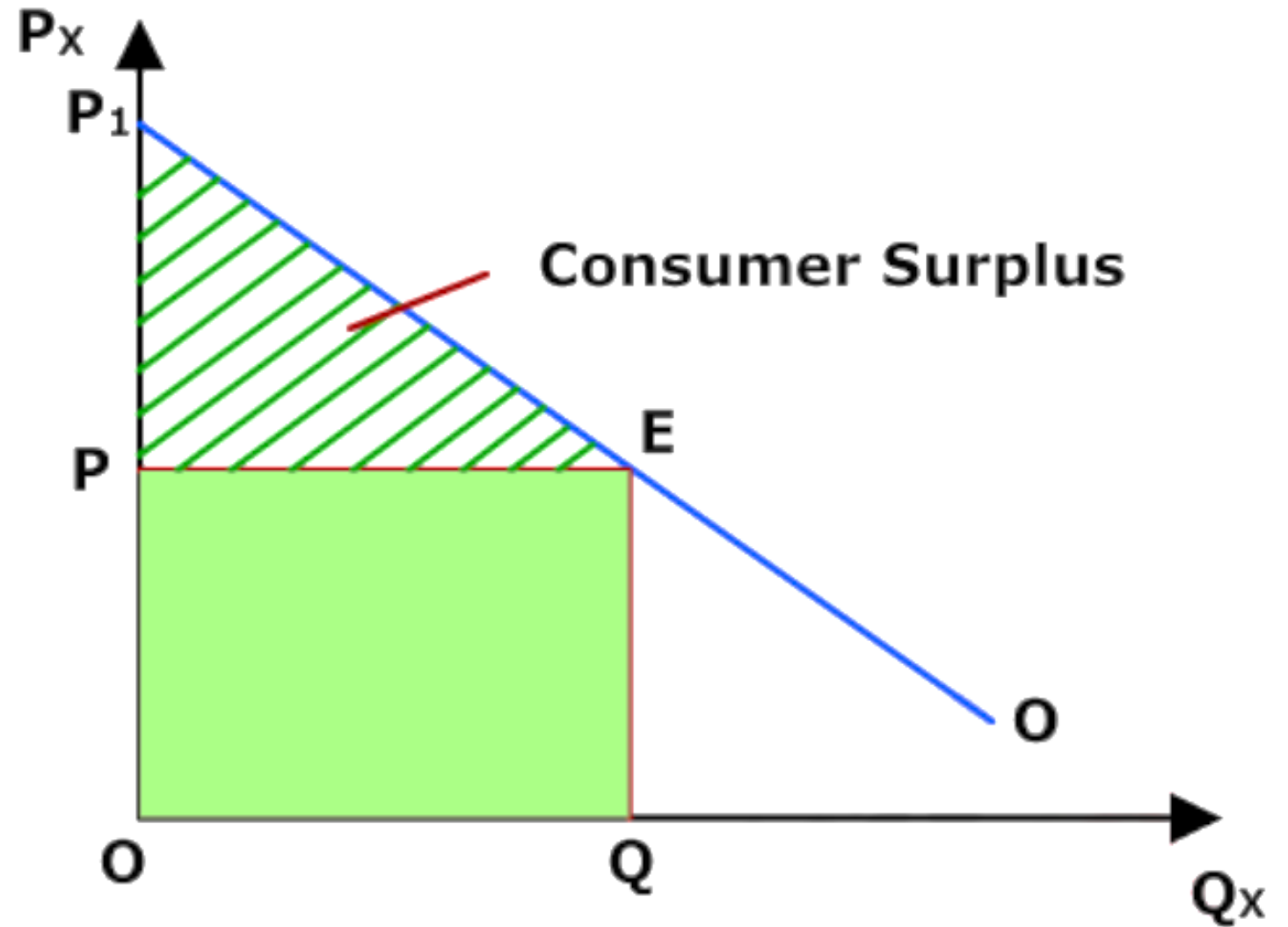
- Suppose the market price of X in Nation 1 is P as shown in figure.
- The quantity that consumers purchase at that price would be Q units of commodity X. Total expenditure will be price times quantity and is shown by the area of rectangle OPEQ.
- In this market all the consumers are paying price P. But there are some consumers who are willing to pay the higher price. At price P_1, where the demand curve intersects vertical axis, the quantity demanded is zero. Below P_1 there is some quantity demanded by consumers.
- These consumers are paying the lower price P than the maximum price they would be willing to pay.
- **The difference between the price that the consumers are willing to pay and the price they actually pay is known as consumer surplus.**
- Consumer surplus is represented by the triangular area P_1EP. The size of consumer surplus varies inversely with the price of commodity. A decrease in the market price would increase consumer surplus, while a higher market price would decrease the consumer surplus.
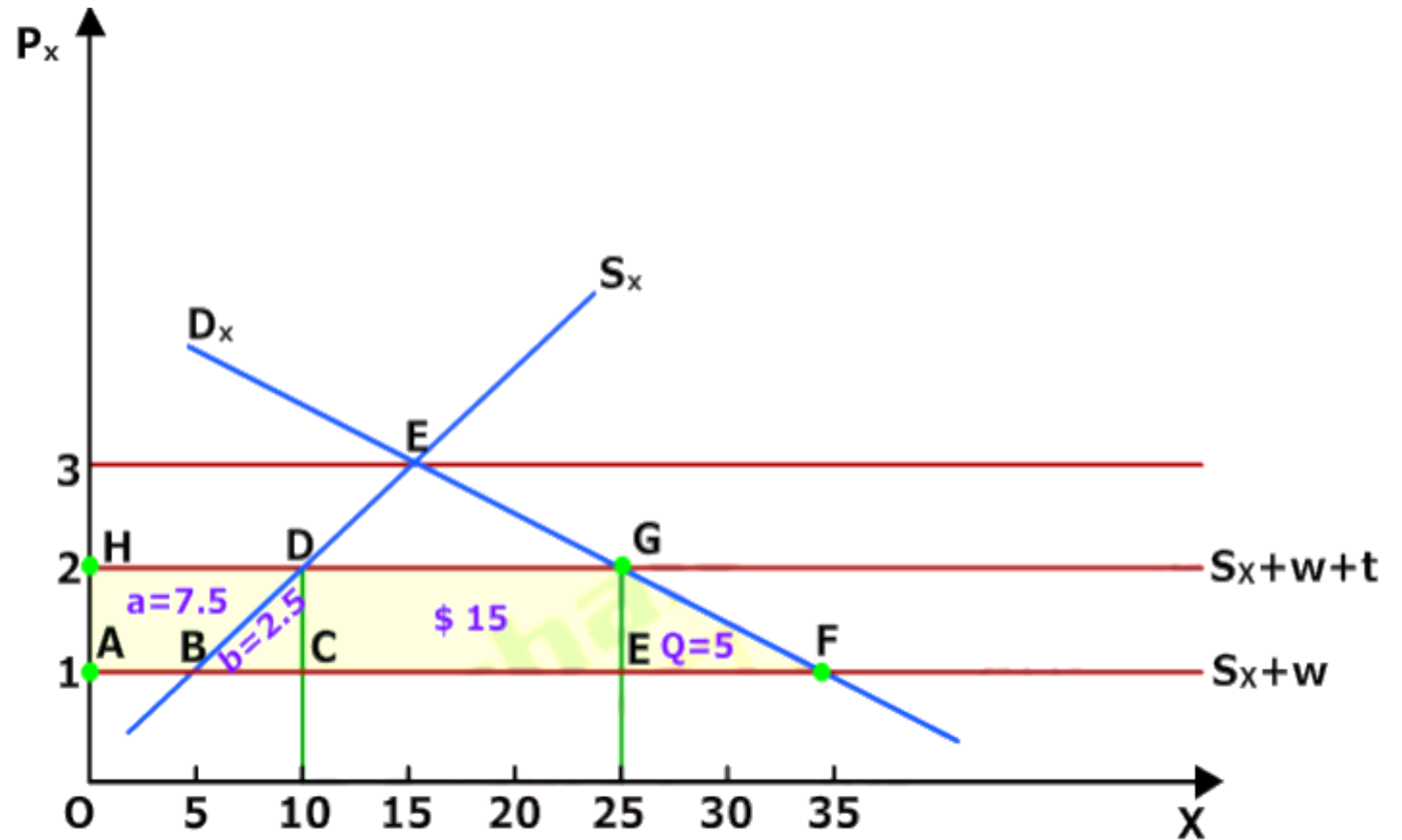
Producer Surplus

- Now consider the nation1's producers of commodity X.

- In figure the market supply of commodity X is illustrated.

- The vertical axis represents the minimum price that the producers would be willing to accept for a given quantity of commodity X, which is represented on the horizontal axis.

- This supply curve slopes upward to the right. All things being equal, as the price of X rises, producers are willing and able to produce more X.
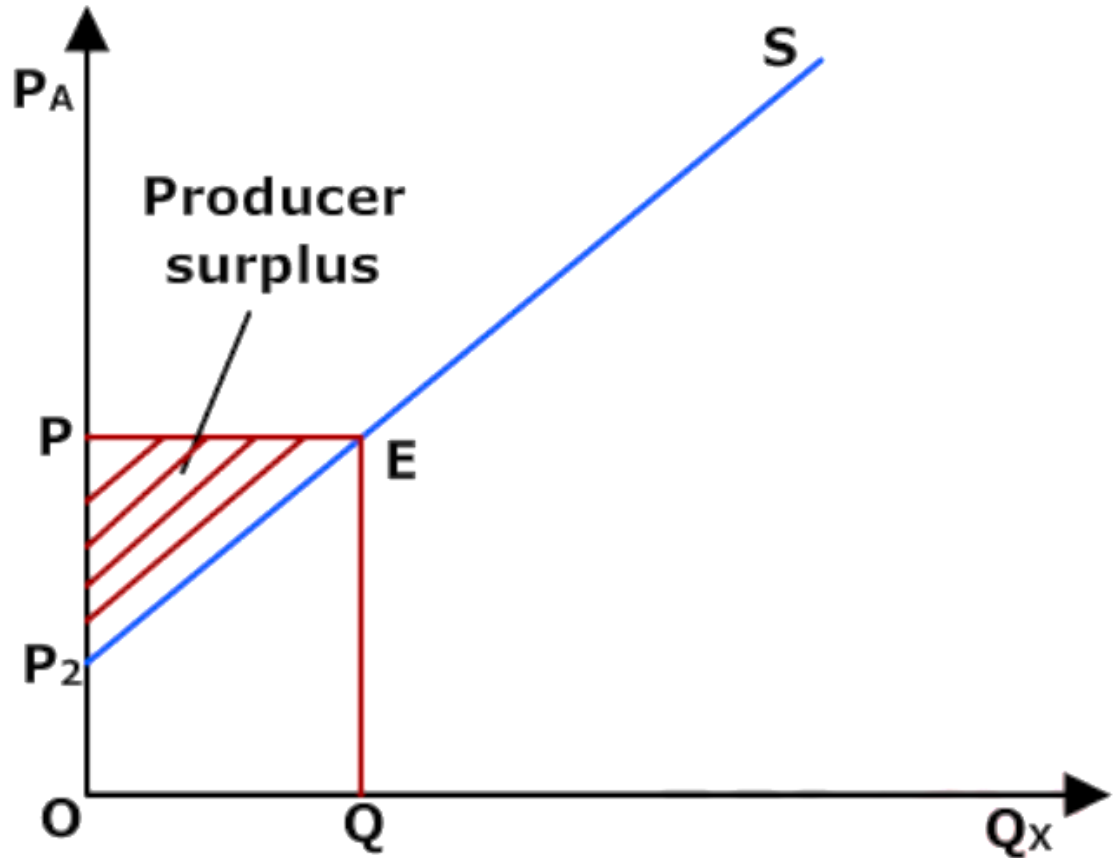
- In the figure the market price of Commodity X is P.

- The quantity supplied by all the producers would be Q units of commodity X.

- The total revenue that all the producers receive is price × quantity which is represented by the area OPEQ. In this market all the producers receive the same price, P.

- The supply curve indicates that there are some producers willing to sell at a lower price. At price P_2 where the supply curve intersects the vertical axis, the quantity supplied is zero. Above P_2, there is some quantity supplied by the producers.

- These producers are receiving the higher price, P, than the minimum price they would be willing to accept.

- **The difference between the price that producers are willing to accept & the price they receive is called as producer surplus.**

- The triangular area P_2EP represents the producer surplus. It shows the difference between the total amount of money that producers are keen to accept for commodity X & what producers actually receive for selling X.

- The size of producer surplus moves directly with the price of commodity X. A decrease in the Px would decrease producer surplus, while a higher market price for X will increase the producer surplus.

Cost and Benefits of Tariff

- The concept and measure of consumer and producer surplus as discussed above is used to measure the cost and benefits of tariff.

- As shown in Figure, with 100% import tariff in Commodity X, Px rises from $1 to $2 in Nation1.

- With increase in P the consumption falls from AF(35X) to HG(25X) and production increases from AB(5X) to HD(10X).

- The import of commodity X also declines from BF(30X) to DG(15X). The government of nation 1 collects the revenue of the area DCGE = $15.

- The increase in price reduces the consumer surplus by

- AHGF = AHDB + BDC + DCGE + GEF = 7.5 + 2.5 +15 + 5 = 30$.

- Out of the area AHGF, DCGE = $15 is collected by the government as a tariff revenue, AHDB = $7.5 is redistributed to the domestic producers of commodity X in the form of producer surplus while the remaining area BDC and GEF represents the protection cost or the deadweight loss to the economy.

- The triangle BDC is the production distortion loss which arises from the fact that tariff leads domestic producers too much of this good.

- The second triangle area GEF is a domestic consumption distortion loss, which arises from the fact that a tariff leads consumers to consume less amount of commodity X.

Welfare Effect of Tariff

Small country case

To analyze the effects of tariff, consider a market in a small importing country that faces an international world price of Pf in free trade.

In figure the free trade equilibrium is shown at pf where the domestic demand is given by Df, domestic supply by Sf and the imports by the difference of demand and supply Df-Sf.
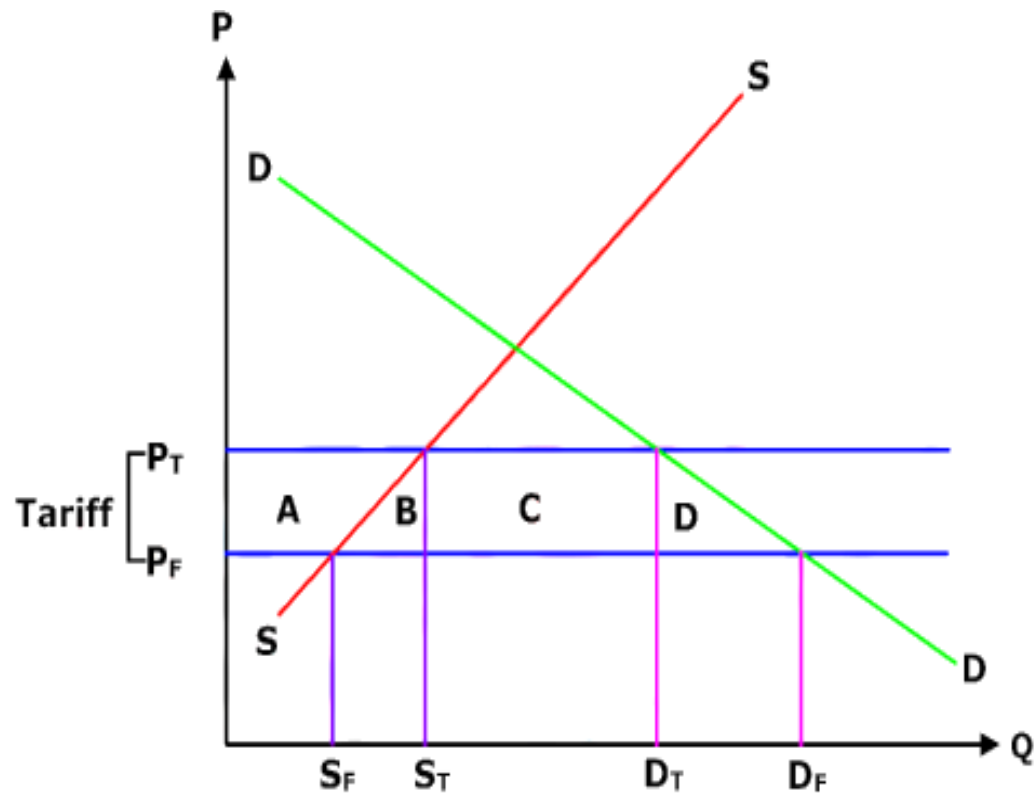
When a specific tariff is implemented by a small country it will raise the domestic price by the full value of tariff.

So, with tariff the price now rises to Pt and the tariff rate will be t = Pt – Pf.

Small Size Country

Welfare effects of an Import tariff	
	Importing country
Consumer surplus	$-(A+B+C+D)$
Producer surplus	$+A$
Government revenue	$+C$
National welfare	$-B-D$

The tariff effects on small country

Importing country consumers – consumers of the product in the importing country are worse off as a result of the tariff.

The increase in the domestic price of both imported goods and the domestic substitutes reduces consumer surplus in the market.

The magnitude of the change in consumer surplus is shown as – (A+B+C+D).

Importing country producers – producers in the importing country are better off as a result of the tariff. The increase in the price of their product increases producer surplus in the industry.

The price increase also induces an increase in the output of existing firms, an increase in employment and an increase in profit.

The tariff effects on small country

- **Importing country government** – The government receives tariff revenue as a result of the tariff.

- Who will benefit from the tariff revenue will depend on how the government spends it? These funds help in supporting the government programs.

- **Importing country** – The aggregate welfare effect is calculated by summing the gains and losses to consumers, producers and the government.

- The net effect consist of two components i.e, a negative production efficiency loss (area B in figure) and negative consumption efficiency loss (area D). These two losses are referred to a "deadweight losses".

- As there are the negative elements in the national welfare change, the net national welfare effect of a tariff must be negative. This implies that a tariff implemented by the small importing country must reduce the national welfare.

Large Country Case

- We here take that there are only two trading nations – one importing and one exporting.

- The supply and the demand curves for the two countries are shown in the figure. Pf is the free trade equilibrium price.

- At this price, the excess demand by the importing country equals excess supply by the exporting country.
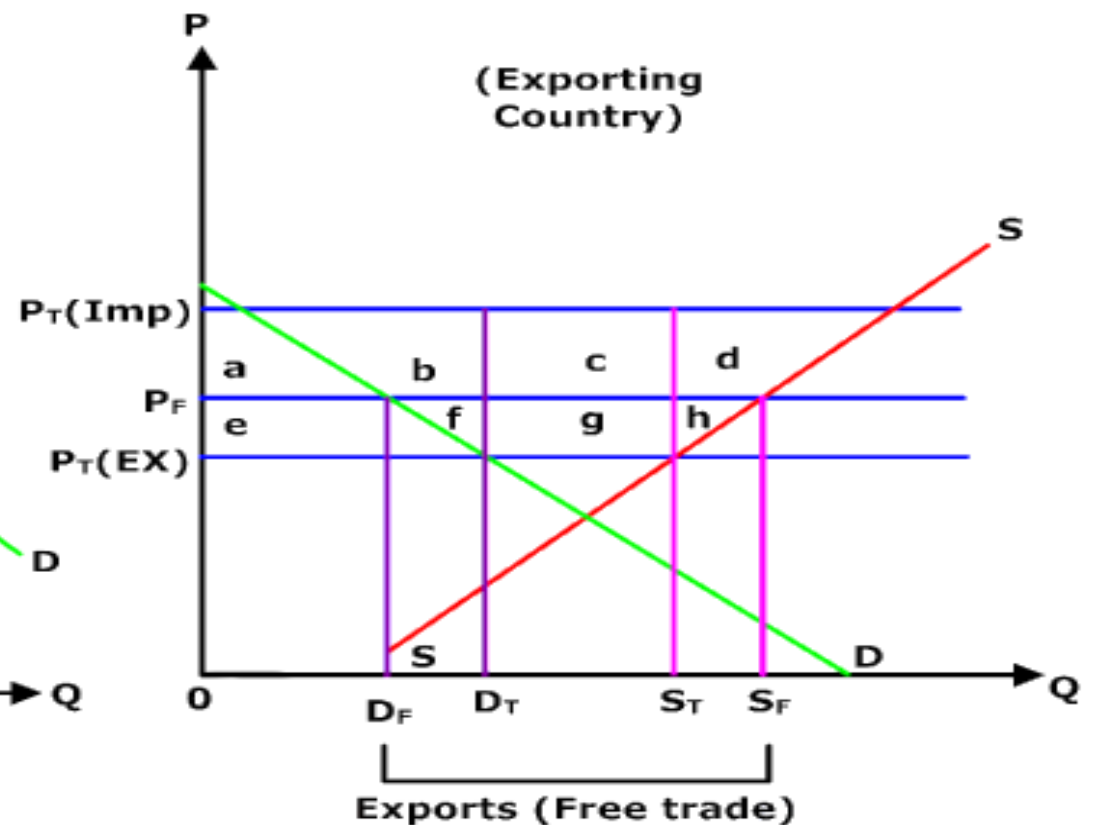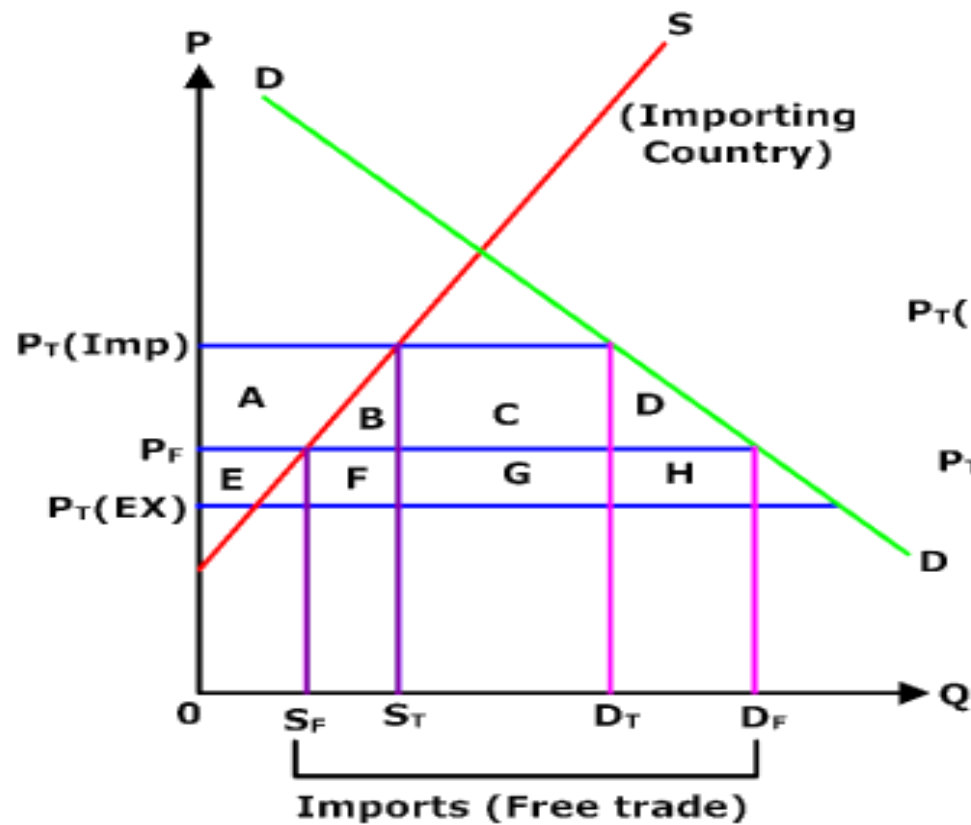
	Importing Country	Exporting Country
Consumer Surplus	-(A+B+C+D)	+e
Producer Surplus	+A	-(e+f+g+h)
Government Revenue	+C	0
National Welfare	-B-D	-(f+g+h)

- When a large country implements a tariff on its imports, the tariff will inhibit the flow of commodity across the border.

- It will now cost more to move the product from exporting country to the importing country.

- As a result, supply of the commodity to the importing country will fall due to increase in price. Due to reduced supply of product to the large importer the price of the exporting nation will fall.

- So, this lower price will reduce the supply of the exporting country.

- Suppose after the tariff the price in the importing country rises to Pt(imp) and the price in the exporting country falls to Pt(exp).

- So, the tariff would be T = Pt(imp) – Pt(exp)

- **Importing country consumers** – Consumers of the product in the importing country suffer a reduction in well being as a result of tariff. The increase in the domestic price of both imported goods and the domestic substitutes reduces the amount of consumer surplus in the market.

- **Importing country producers** – As a result of tariff there is increase in the well being of the producers as shown by the area +A. The increase in the price of the product in the domestic market increases the producer surplus in the industry.

- The price increases also induces an increase in output of the existing firms, an increase in employment and an increase in profit.

- **Importing country government** – The government receives tariff revenue as a result of the tariff. who benefits from the revenue depends on how the government spends it.

- **Importing country** – The aggregate welfare effects for the country is found by summing the gains and losses to consumers, producers and the government the net effect of the three components are – a positive terms of trade effect(G), a negative production distortion effect (B) and a negative consumption distortion(D).

- As there are both positive and negative elements, the net national welfare effect can be either positive or negative.

- But generally, the tariff implemented by a large importing country may raise the national welfare.

- **Exporting country consumers** – consumers of the products in the exporting country experience an increase in wellbeing as a result of the tariff.

- The decrease in their domestic prices raises the amount of consumer surplus (area e).

- **Exporting country producers** – they suffer decrease in the wellbeing as a result of tariff.

- The decrease in the price of their product in their own country decrease the producer surplus.

- It also results in decrease in output, decrease in employment and decrease in profits.

- **Exporting country government** – there is no effect on the exporting country government as a result of the importer tariff.

- **Exporting country** – It is calculated by summing up the gains and losses to consumers and the producers. Since all the three components are negative, so the importers tariff must result in a reduction in national welfare for the exporting country.

Quotas

One of the most restrictive forms of protectionism is the quota. Quotas involve restriction of imports of a good to a definite quantitative level.

In practice, this means that a country imposing a quota imports only a certain number of units of the good on an annual basis.
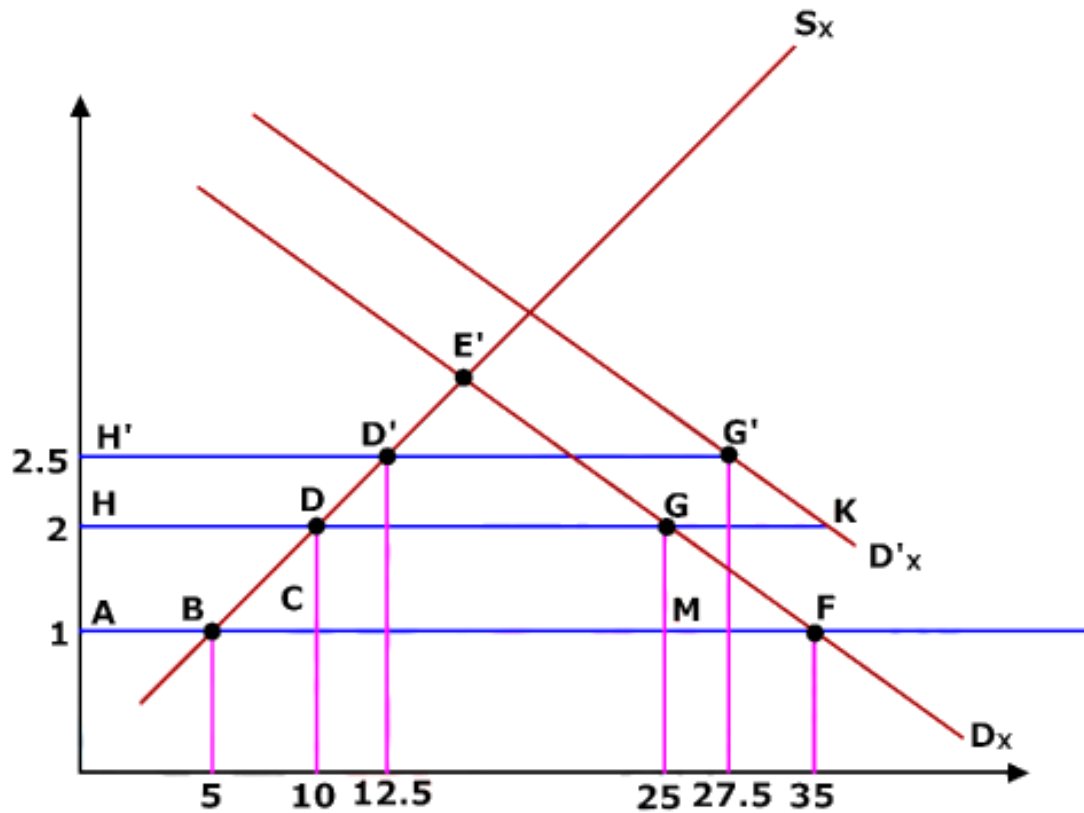
Effect of Quota

- Dx is the demand curve and Sx is the supply curve of commodity X for nation 1.

- With free trade at the world price of Px = 1, the nation consumes 35 (X) AF, of which 5X (AB) is produced domestically and the remainder of 30X (BF) is imported.

Effect of Quota

- An import quota of 15X(DG) will raise the domestic price of X to Px = 2 which is the same as if 100 percent ad valorem import tariff on commodity X is charged. At Px = 2, the quantity demanded of 25 X (HG) equals 10X (HD) produced domestically plus the 15X (DG) allowed by import quota.

- hand, consumption is reduced by FM and domestic production is increased by 5X (BC) with an import quota of 15X (DG).

- With an upward shift of Dx to D'x , the given import quota of 15X(D'G') would result in domestic price of X rising to Px = 2.50, and domestic production rising to H'D' (12.5X) and domestic consumption to H'G'.

- On the other changed, if demand is increased from Dx to D'x and with given 100% import tariff, price of X would not have been changed, and domestic production would also be the same i.e, 10X (HD) but domestic consumption would have increased to HK and imports to DK.

Import Quota Vs. Import tariff

- Import quotas and tariffs have the same objectives that is to reduce the level of imports so as to protect the domestic industries, correct balance of payment deficit, expand domestic employment and economic activities. Still, they are distinguished on the basis of following points:

- **The revenue effect –** The tariff brings revenue to the government whereas quotas do not. When quota instead of tariff is used to restrict imports, the sum of money that would have appeared as government revenue with a tariff is collected by the one who receives import license. License holders are able to buy imports and resell them at a higher price in the domestic market.

- **Corruption and bribery –** Distribution of import licenses may give rise to corruption and bribery on the part of government officials. Import tariffs do not create such evils of government corruption, political favoritism etc.

- **Monopoly profit –** Quotas creates a monopoly profit for those who have import licenses. This means that consumer surplus is converted into monopoly profits.

- Thus, quotas are likely to lead to a greater loss of consumer welfare. Where as, if a tariff is imposed domestic price will be equal to import price plus tariff.

- **Nature of protectionism –** In its protective effect, tariff shelters the domestic market from competition by foreign firms, while import quota offers protection to old inefficient firms as import licenses are generally offered to them.

- **Price Differential –** Tariffs and Quota also differ in price differentials between domestic price and the world price, in the case of a tariff, the domestic price differs from the world price by the amount of a tariff duty. But under quota domestic price would exceed the tariffs, because when the quantity imported is fixed, instability in demand and supply conditions in the domestic and world markets have to be adjusted not through changing import quantities but through altered prices.

- **Stability -** An import quota is unstable because it can be changed at the discretion of the bureaucracy, while a tariff is stable because any change in tariff policy requires legislative approval.

- **Preventing Recession –** Quotas may also be used as a device to prevent the international transmission of severe recession. Recession generally causes a fall in prices and this may encourage exports. A country may make use of quotas to safeguard their interest against such recession.

Figure (a) Tariff restriction
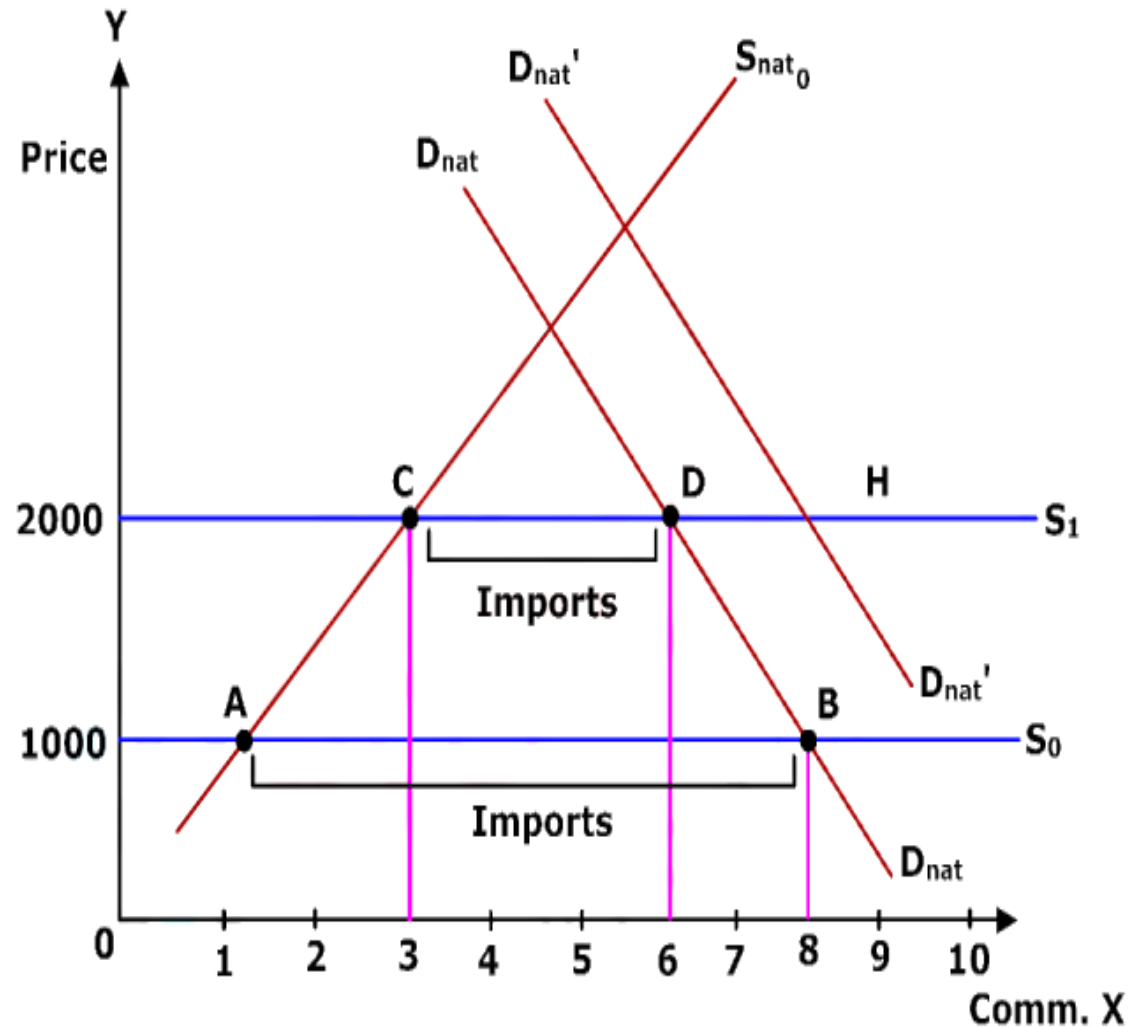
- The figure (a) represents the hypothetical trade situation of the Nation 1 in commodity X.
- The nation 1 supply and demand schedule is given by S_{nat0} and D_{nat}, respectively.
- Suppose the Nation 1 has the option of levying a tariff or quota on commodity X imports to protect Nation 1 companies from foreign competition.

Figure (b) Quota Restriction
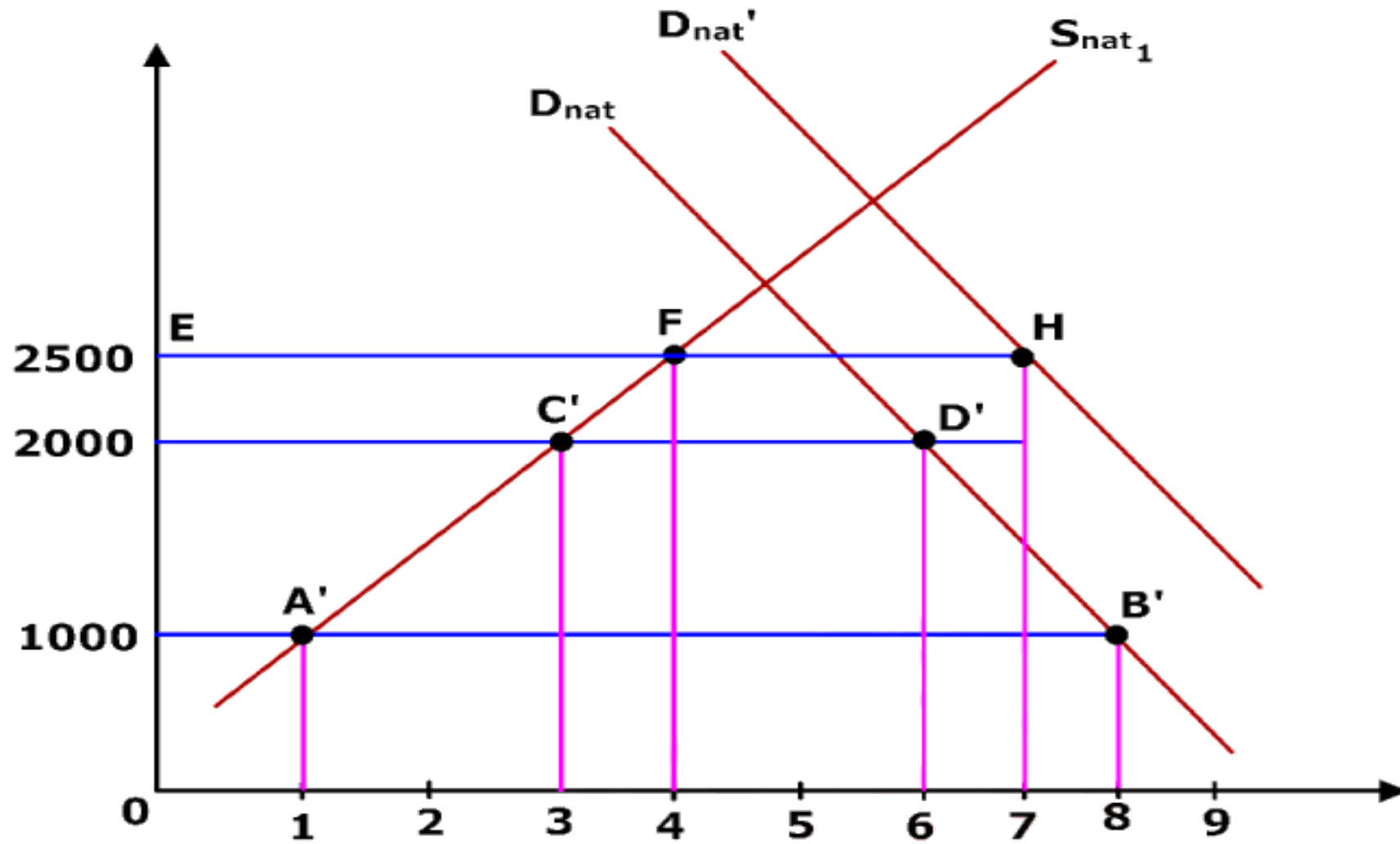
- In figure (a) a tariff of $ 1000 would raise the commodity X from $1000 to $2000. And so, commodity X imports will fall from 7 lakh units (AB) to 3 lakh units (CD).

- In figure (b) an import quota of 3 lakh units would put nation 1 in a trade position identical to that which occurs under tariff and the rise in price is the same ie from $1000 to $2000. So far it appears that the tariff and the quota are equivalent with respect to their restrictive impact on the volume of trade. Now suppose the Nation 1 demand for Commodity X rises from Dnat to Dnat'.

- In figure (a), despite the increased demand, the price of commodity X remains at $2000. This is because the Nation 1 price cannot differ from the international price by an amount exceeding the tariff duty. Commodity X imports rises from 3 lakh units (CD) to 5 (CH) lakh units. So, under an import tariff prices were not increased further.

- In figure (b) an identical increase in demand induces a rise in domestic auto prices. With increase in the demand from Dnat to Dnat' forces commodity x prices up from $2000 to $2500. At this new price the domestic production equals 4 lakh units (EF) and domestic consumption equals 7 lakh units (EH). So, the adjustment is occurred in the prices rather than the quantity of commodity X imported.

- So, during the period of growing demand, an import quota is more restrictive trade barrier than an equivalent import tariff.

Optimum tariff formula

- The exact level of optimum tariff can be calculated with the help of following formula:

$$T = \frac{1}{E - 1}$$

- Where, E stands for the elasticity of the foreign country's offer curve and T stands for optimum tariff rate for the tariff imposing country.

- The magnitude of the optimum tariff depends upon the elasticity of the foreign offer curve.

- As long as the foreign country's offer curve elasticity is less than unity or equal to unity, the home country can impose or increase tariffs and thus can improve its terms of trade and increase its level of economic welfare.

- On the other hand, as the foreign country's offer curve has elasticity greater than unity, it would be better for the home country to reduce tariffs.

Optimum Tariff Rate

$$t = \frac{1}{e - 1} = \frac{1}{1 - 1} = \infty$$

$$= \frac{1}{2 - 1} = 1 \quad (100\%)$$

$$= \frac{1}{3 - 1} = 0.5 \quad (50\%)$$

$$= \frac{1}{4 - 1} = 0.33 \quad (33\%)$$

$$= \frac{1}{5 - 1} = 0.25 \quad (25\%)$$
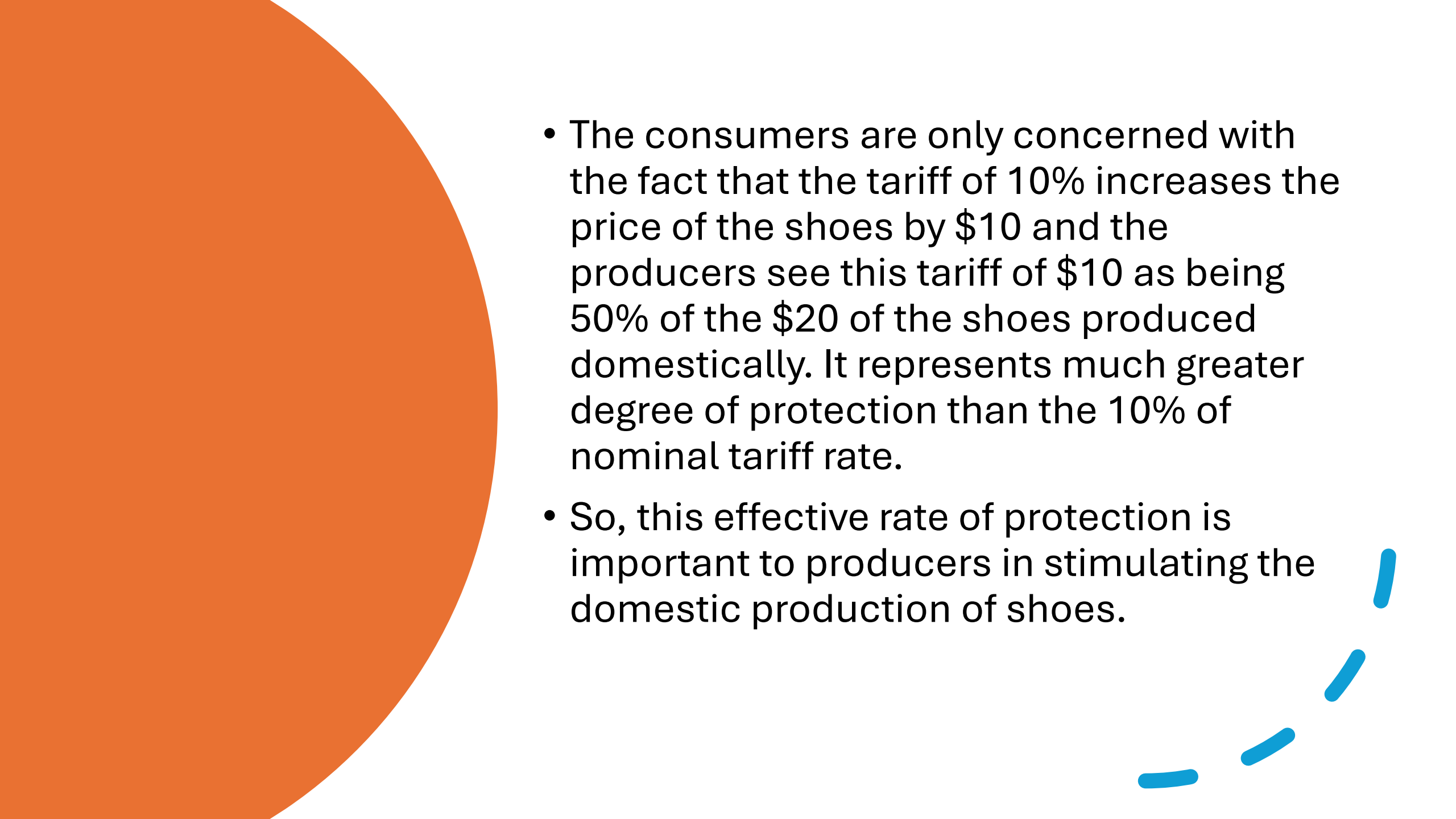
$$= \frac{1}{6 - 1} = 0.20 \quad (20\%)$$

- The following calculation proves that as the foreign offer curve elasticity coefficient becomes greater and greater than unity, the optimum tariff rate that maximizes economic welfare would become lower and lower.

- As the coefficient of elasticity of the foreign curve becomes less and less, the optimum tariff rate will go on increasing.

Effective rate of protection

- The domestic producers with high import tariffs receive high degree of protection and domestic producers with low import tariffs receive a low degree of protection.

- This relationship between the tariff rates and the degree of protection may not necessarily hold. To determine the actual degree of protection, we must consider not only the tariff on the final goods but also the tariff on the intermediate inputs that the industry uses to produce the final good.

❑ **Example**

- Suppose $80 of imported leather goes into the domestic production of shoes. The free trade price of the shoes is $100 but the nation imposes a 10% nominal tariff on each imported shoes.

- The price of the shoes to the domestic consumers after the tariff will be $110. Out of which, $80 represents imported leather, $ 20 is domestic value added and $10 is the tariff.

- So, the tariff collected on each pair of shoes is the nominal tariff which is calculated on the price of final commodity($10/$100 = 10%) and the effective tariff which is calculated on the value added domestically to the leather is 50%($10/$20 = 50%).

- The consumers are only concerned with the fact that the tariff of 10% increases the price of the shoes by $10 and the producers see this tariff of $10 as being 50% of the $20 of the shoes produced domestically. It represents much greater degree of protection than the 10% of nominal tariff rate.

- So, this effective rate of protection is important to producers in stimulating the domestic production of shoes.

- The rate of effective protection is usually calculated by the following formula

$$G = \frac{T - aT_i}{(1 - a)}$$

- Where G = the rate of effective protection to the producers of the final commodity

- T = the nominal rate of tariff on the consumers of the final commodity

- a = the ratio of the cost of the imported input to the price of the final commodity in the absence of tariffs

- Ti = the nominal tariff rate on the imported input

- So, with our previous example we have

- T = 10% (the nominal tariff on shoes)

- Ti = 5% (the nominal tariff on leather)

- a = $80/$100 = 0.8 (share of leather to the value of shoes at free trade prices)

- **The effective tariff rate for shoes is**

- $G = \frac{10\% - 0.8(5\%)}{1 - 0.8} = 30\%$

PROTECTION AND UNDERDEVELOPED COUNTRIES

1. Industrialization Argument
2. Infant Economy Argument
3. Capital Formation Argument
4. Underemployment Argument
5. Correction in Balance of Payment
6. Self-sufficiency Argument