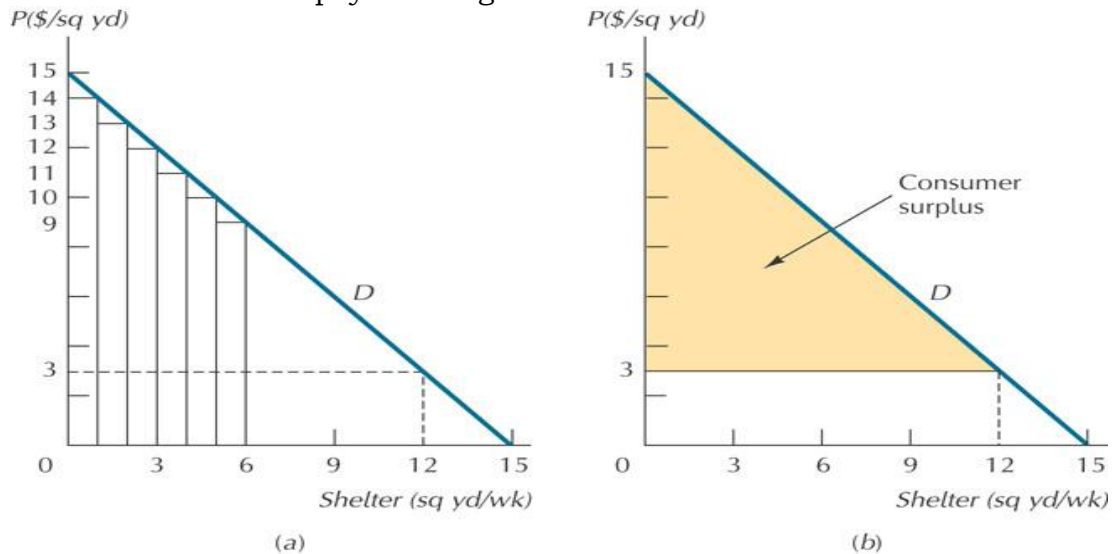


## INTERMEDIATE MICROECONOMICS LECTURE 5 PART B - APPLICATIONS OF RATIONAL CHOICE AND ANALYSIS OF MARKETS

**Consumer Surplus** - The difference between the total amount consumers are willing to pay for a good and they actual amount they pay. Alternatively, the difference between the total benefit (TB) consumers receive less total consumer expenditures (CE or Price times quantity) on the good.

$$CS = TB - CE \text{ (Consume expenditures)}$$

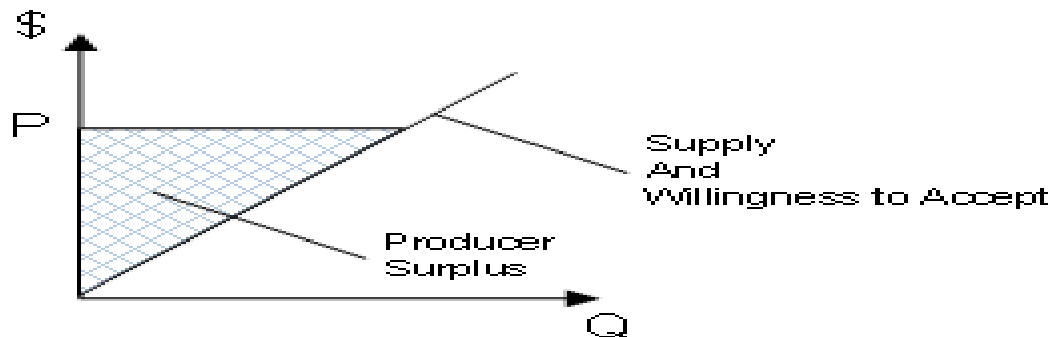
It is given by the area below the demand curve and above the market price which all consumers pay for the good.



**Producer Surplus** -The difference between the total revenue (TR) and the total economic cost (TC) of production.

$$PS = TR - TC$$

(Note: Total economic cost = Explicit Cost + Implicit Cost)



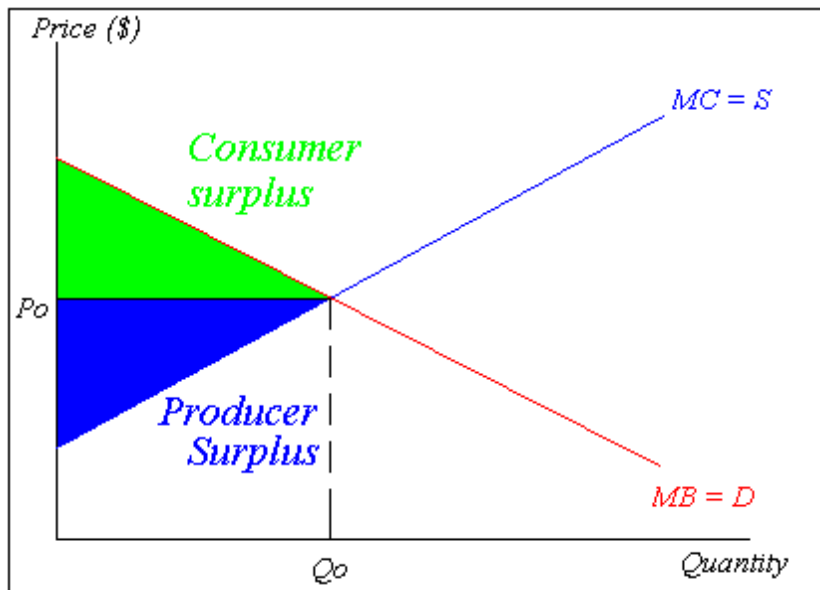
PS is the area below the market price and above the market supply curve.

### Total Surplus

$$\begin{aligned}
 \text{Total Surplus} &= \text{Consumer Surplus} &+& \text{Producer Surplus} \\
 &= (TB - CE) &+& (TR - TC) \\
 &= TB &-& TC
 \end{aligned}$$

(Note:  $CE = TR$ , Why?)

Geometrically it is the area between the demand and supply curves up to the market equilibrium quantity.



### Conclusions

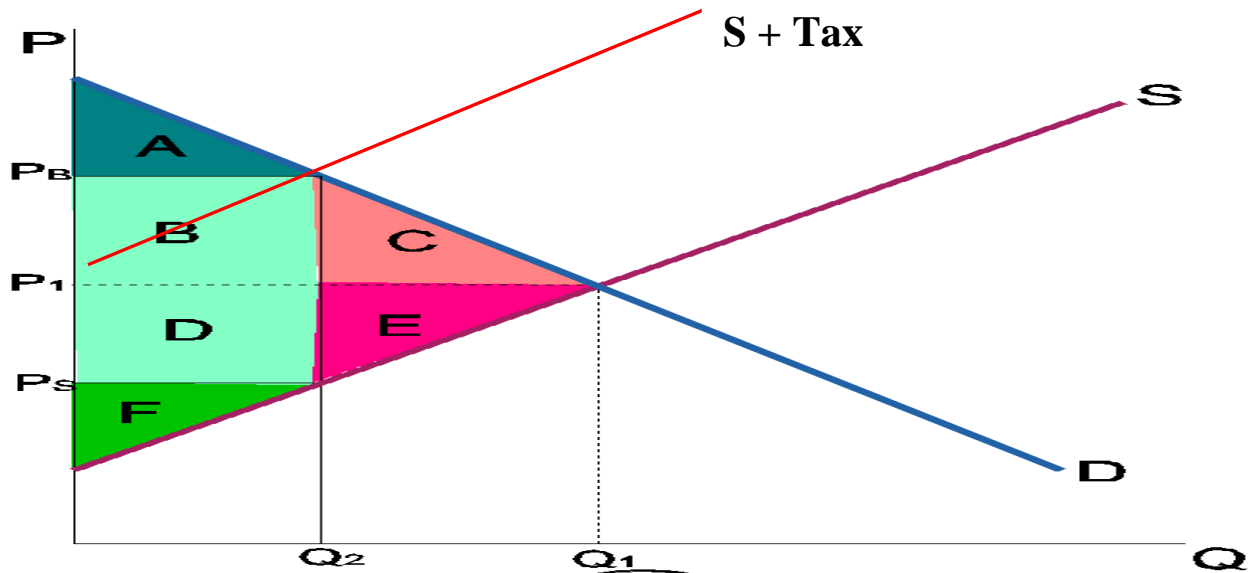
1. Free markets allocate goods to consumers who value them most highly, as measured by their willingness to pay.
2. Free markets allocate production to those producers who are minimum cost producers.
3. Free markets result in a market equilibrium quantity that maximizes the sum of consumer surplus and producer surplus.

In short, unfettered markets maximize economic welfare, they are efficient from both the private and social viewpoint.

Note: These conclusions are valid if there are no negative externalities, i.e., adverse third party effects.

### Taxes, Total Surplus, and Deadweight Loss

**The Effect of a Tax** - A tax would drive a wedge between the price paid by consumers and the amount received by producers. In general, it reduces both consumer and producer surplus and results in a deadweight loss in total surplus.



Before tax: Market price is  $P_e$  and quantity  $Q_e$ .

After tax: Market quantity is  $Q_T$  and consumers pay  $P_c$ , but producers receive  $P_s$ .

#### Results of the Tax

1. Reduction in consumer surplus: Areas B + C.
2. Reduction in producer surplus: Areas D + E.
3. Tax revenues to government: Areas B + D.
4. Deadweight loss: Areas: C + E.

#### Analysis of the Change in Total Surplus

1. Part of the loss in total surplus suffered by consumers (B) and producers (D) represent gains for the government, i.e., tax revenues.
2. Part of the loss in total surplus suffered by consumers (C) and producers (E) represent an entire loss (C + E), i.e., no one else receives this part of the total surplus. This is called a deadweight loss.

Deadweight loss – the decline in total surplus caused by a market distortion, e.g. a tax.

1. The larger the distortion (e.g. tax) the greater the deadweight loss.
2. The more inelastic supply and demand are the greater the deadweight loss of a distortion.

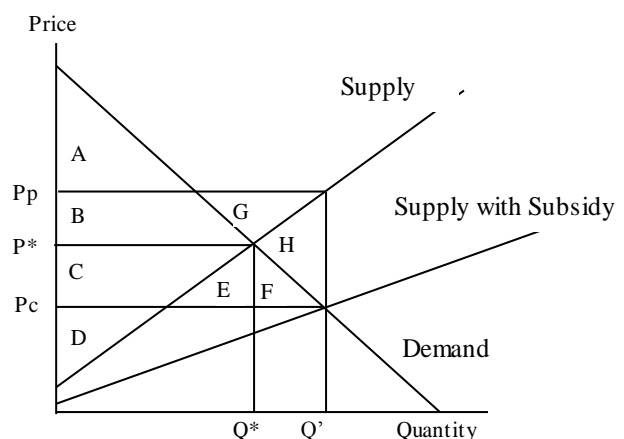
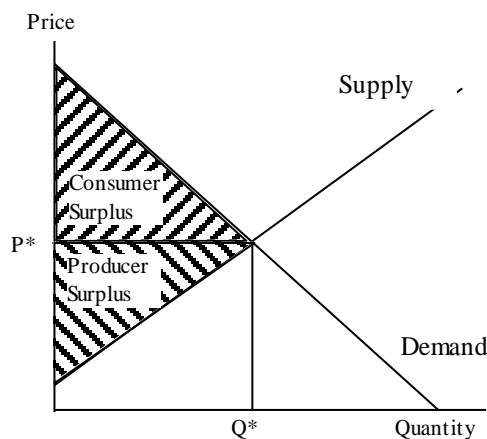
**Subsidies and Price Ceilings**

We can use the idea of consumer and producer surplus to examine the welfare impacts of subsidies and price ceilings to lower prices and encourage consumption. As shown below, a subsidy will increase the supply curve, or shift the supply curve to the right (alternatively, the same analysis could be conducted shifting the demand curve to the right). This will increase the price producers receive ( $P_p$ ) and encourage them to expand output ( $Q'$ ). At the same time, the subsidy reduces the price consumers pay ( $P_c$ ) and encourages them to consume more ( $Q'$ ). As a result, consumption and production both increase, increasing equilibrium output ( $Q'$ ).

As illustrated in the table and figures below, the subsidy increases both consumer and producer surplus. Both consumers and producers would tend to support this measure. However, tax payers are the losers. The tax revenue required to finance the subsidy exceeds the total gain to consumers and producers. This represents the cost associated with producing units of output for which the cost to producers exceeds the value to consumers. This cost is the area between the demand and supply curves for the extra units encouraged by the subsidy (area H), as indicated in the table and illustrated in the figure below.

**Effect of a Subsidy on Consumer and Producer Surplus**

	Before Subsidy	After Subsidy	
Consumer Surplus	A + B	A + B + C + E + F	
Producer Surplus	C + D	C + D + B + G	
	Consumer	Producer	Total
Net Surplus Gain	C + E + F	B + G	B + C + E + F + G
Tax Expenditure			B + C + E + F + G + H
Net Gain (Loss)			-H

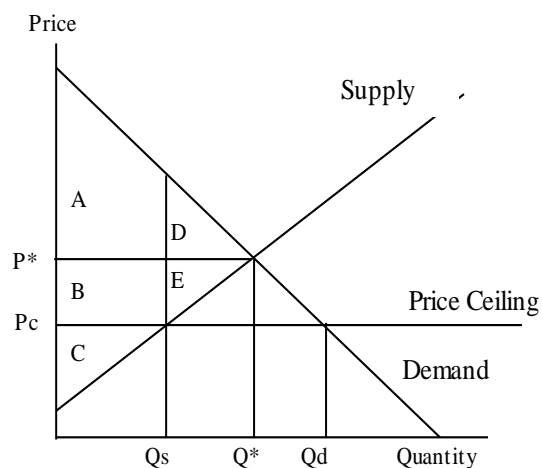
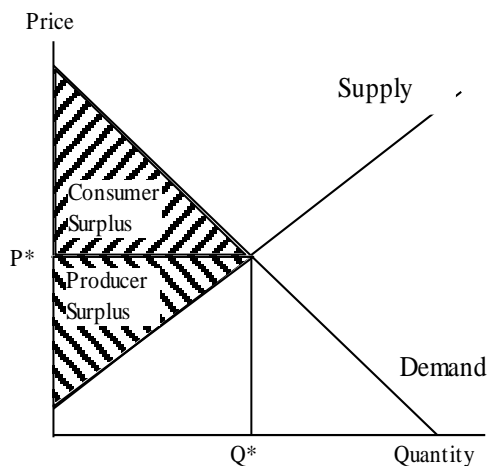


Price ceilings can be analyzed in a similar fashion. A price ceiling reduces market price by administrative order. This increases the quantity demanded but reduces the quantity supplied, as illustrated below. The price ceiling's welfare implications can be analyzed by examining consumer and producer surplus. This is described in the table below and illustrated in the corresponding figure.

As illustrated in the table and figure, the price ceiling increases consumer surplus at the expense of producer surplus. In particular, area B represents an income transfer from producers to consumers. This represents the impact of reducing price from its equilibrium value to the ceiling price on the items exchanged under the price ceiling. In addition, there is a net welfare loss. Areas D and E represent consumer and producer surplus lost as a result of the price ceiling. This is the surplus value associated with the units that are no longer exchanged after imposing the price ceiling. This area is frequently referred to as the dead weight loss associated with a price ceiling (you should be able to identify a similar dead weight loss associated with taxes). Consumers that receive the item after the price ceiling would support this measure; consumers not receiving the item and producers would oppose it.

### Effect of a Price Ceiling on Consumer and Producer Surplus

	Before Ceiling		After Ceiling
Consumer Surplus	A + D		A + B
Producer Surplus	B + C + E		C
	Consumer	Producer	Total
Net Surplus Gain	B - D	- B - E	- D - E



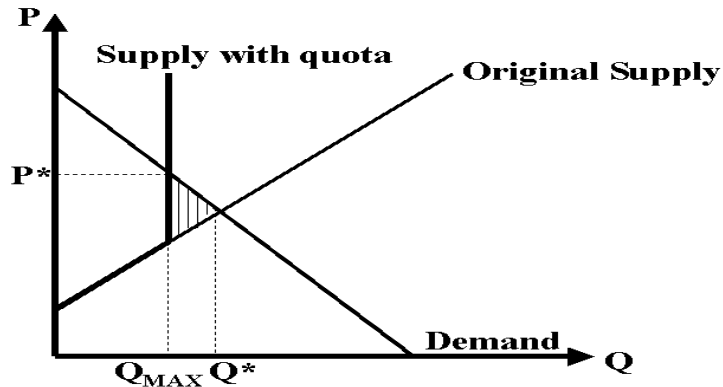
**Definition: Economic Efficiency** means that the total surplus is maximized.

*"Every consumer who is willing to pay more than the opportunity cost of the resources needed to produce extra output is able to buy; every consumer who is not willing to pay the opportunity cost of the extra output does not buy."*

The perfectly competitive equilibrium attains economic efficiency.

### Policy: Production Quotas

Definition: A **production quota** is a limit on either the number of producers in the market or on the amount that each producer can sell. The quota usually has a goal of placing a limit on the total quantity that producers can supply to the market.



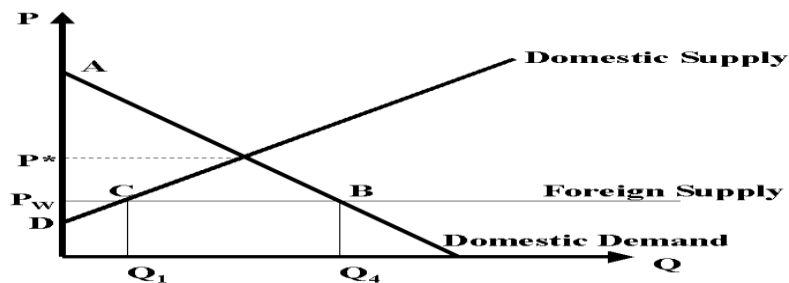
Example: Consider a quota program those results in the same market price as a price support program. How does the output levels and surpluses (CS,PS,TS) generated by the programs compare?

### Policy: Import Tariffs and Quotas

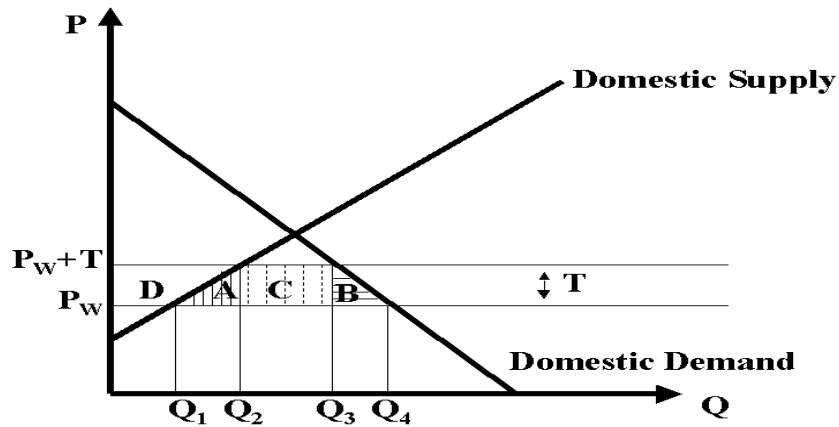
Definition: **Tariffs** are taxes levied by a government on goods imported into the government's own country. Tariffs sometimes are called **duties**.

Definition: An **import quota** is a limit on the total number of units of a good that can be imported into the country.

*When will importation occur of a good?*



**Now, add an import tariff.**



Comparing a tariff to a quota...

Let quota limit imports to  $Q_3 - Q_2$ ...the equilibrium price would be the same as for the tariff...and the (world) deadweight loss would be the same as well.

Is there a difference? The quota generates no government revenue. Hence, while the total supply and total price for the domestic market remains the same under the two policies, *domestic* deadweight loss is larger under the quota.

**Government Intervention: Who Wins and Who Loses?**

<b>Intervention Type</b>	<b>Effect on (domestic) Quantity Trade</b>	<b>Effect on (domestic) Consumer Surplus</b>	<b>Effect on (domestic) Producer Surplus</b>	<b>Effect on (domestic) Government Budget</b>	<b>Is a (domestic) Deadweight loss created?</b>
<b>Excise Tax</b>	<b>Falls</b>	<b>Falls</b>	<b>Falls</b>	<b>Positive</b>	<b>Yes</b>
<b>Subsidies to Producers</b>	<b>Rises</b>	<b>Rises</b>	<b>Rises</b>	<b>Negative</b>	<b>Yes</b>
<b>Maximum Price Ceilings for Producers</b>	<b>Falls; Excess Demand</b>	<b>Rise or Fall</b>	<b>Falls</b>	<b>Zero</b>	<b>Yes</b>
<b>Minimum Price Floors for Producers</b>	<b>Falls; Excess Supply</b>	<b>Falls</b>	<b>Rise or Fall</b>	<b>Zero</b>	<b>Yes</b>
<b>Production Quotas</b>	<b>Falls; Excess Supply</b>	<b>Falls</b>	<b>Rise or Fall</b>	<b>Zero</b>	<b>Yes</b>
<b>Import Tariffs</b>	<b>Falls</b>	<b>Falls</b>	<b>Rises</b>	<b>Positive</b>	<b>Yes</b>
<b>Import Quotas</b>	<b>Falls</b>	<b>Falls</b>	<b>Rises</b>	<b>Zero</b>	<b>Yes</b>