

## Surplus and Price Setting

This handout will:

- Explain the concepts of surplus, price setting, and deadweight
- Provide examples of the surplus, price setting, and deadweight
- Provide practice problems relating to surplus, price setting, and deadweight

### Surplus

Surplus, in this context, is NOT excess production of an item. In this context, surplus is equal to the extra marginal benefit that a consumer or producer gains from market efficiency. To understand what this means, we must understand what marginal benefit is.

**Marginal benefit** is a benefit that an entity gains when they would have completed a transaction regardless of the additional benefit.

- *Example:* If you are willing to pay 10 dollars to see a movie, but the theatre is only charging 8 dollars, your marginal benefit is 2 dollars.

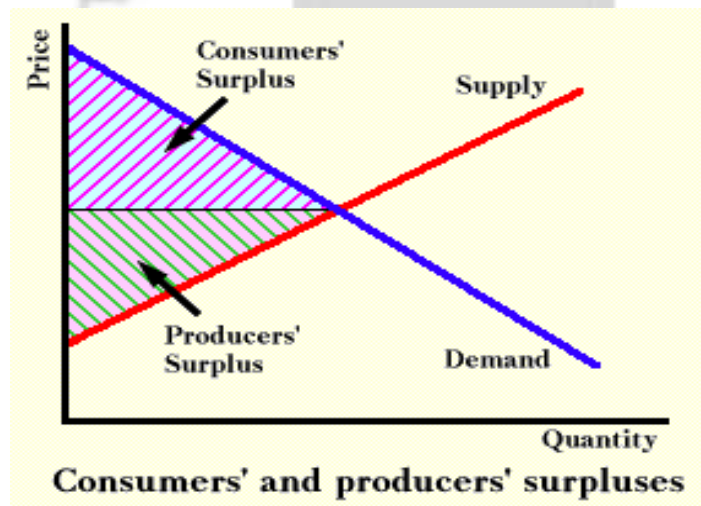
This is a gain that you have realized that you would be willing to forgo and still complete the transaction. This is an added benefit to you, and is therefore a surplus.

A surplus can apply to a consumer, a producer, or, as in most cases, both. The total market surplus is equal to the surplus of the consumer plus the surplus of the producer. In formula format:

$$\text{Total Market Surplus} = \text{Consumer Surplus} + \text{Producer's Surplus}$$

The following graph is a graph of a market in equilibrium. This graph will be referenced in the following definitions and examples.

Figure 1



<http://ingrimayne.com/econ/government/excisetax2.htm>

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### Consumer Surplus

Consumer surplus exists any time that the price of a product is lower than a consumer is willing to pay.

**Consumer Surplus-** the marginal benefit a consumer gains from a transaction

- *Example:* If a person is willing to pay 100 dollars for a pair of jeans, but the market price is only 50 dollars, then that consumer is getting a marginal benefit, or surplus, of 50 dollars.

All of the consumers that are willing to pay more than the market price of an item gain a surplus, and the total consumer surplus is equal to the sum of all these surpluses.

In Figure 1, the top shaded triangle marked as “Consumer’s Surplus” is the surplus experienced by the customer.

### Producer Surplus

Producer surplus exists at any time that the price of a product is higher than the price at which the producer is willing to sell it.

**Producer Surplus-** the marginal benefit a producer gains from a transaction

- *Example:* If a producer is willing to sell a pair of jeans for only 25 dollars but the market price is 50 dollars, that producer experiences a surplus of 25 dollars.

For each item that a producer sells above their minimum required price the producer gains a surplus that is equal to the total sum of all of these surpluses. This is represented by the triangle marked “Producers’ Surplus” in Figure 1.

### Price Setting

In order to understand price setting, it is important to understand a few terms first:

**Efficiency-** the maximum amount of surplus that a market can generate

**Inefficiency-** any lost surplus due to a market that is not efficient

**Equality-** the widespread and equal spread of any generated surpluses

When a market is allowed to operate with perfect efficiency the price of a product will be the price at which the demand curve crosses the supply curve. This price that will result in a maximum **total surplus**, as both consumer and producer surpluses will be at their maximum value.

**Efficiency vs Equality-** an efficient market is a market that generates the greatest possible surplus while an equal market provides the most good for the most people.

Even though equilibrium is the point of the greatest possible market *efficiency*, a society may determine that the most *efficient* market is not ideal— that a more *equal* market is more desirable. In this case, a government will employ price setting, which takes the form of either a price floor or a price ceiling.

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**Price Setting-** a government mandated maximum or minimum price for a good or service

In a price ceiling, a producer may not charge more than the price ceiling amount. The intent of such price setting is to make the economy more *equal*, even if it is less efficient.

#### **Price Floors**

A price floor or ceiling will set a government-mandated minimum or maximum price for an item or service, and it is illegal to violate this mandate. In the case of a price floor a producer must charge at least the price floor amount for this product.

**Price Floor-** a legally mandated *minimum* price at which a transaction for a given good or service can occur

A price floor is a price that is set by the government, and it establishes the very minimum price that a good can cost. A common example of a price floor is the minimum wage. The minimum wage is the lowest wage price that a supplier, or laborer, can have. The worker, or supplier, cannot ask for less, and the employer, or demander, cannot pay less. While this does result in higher pay for all laborers, and therefore a more equal economy, it also results in market inefficiency.

Think of a staircase. Every step on the stairs represents a price. A supplier or consumer may wish to move to the very bottom stair to take advantage of that price. The government decides that it is in the best interest of everyone to stay above the second stair, so it builds a physical floor on the staircase. Since there is now a floor there, the supplier or consumer simply cannot reach the bottom stair— they can only go as low as the second stair. It is impossible to reach the desired stair and price.

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Here is the stair metaphor for a price floor visualized:

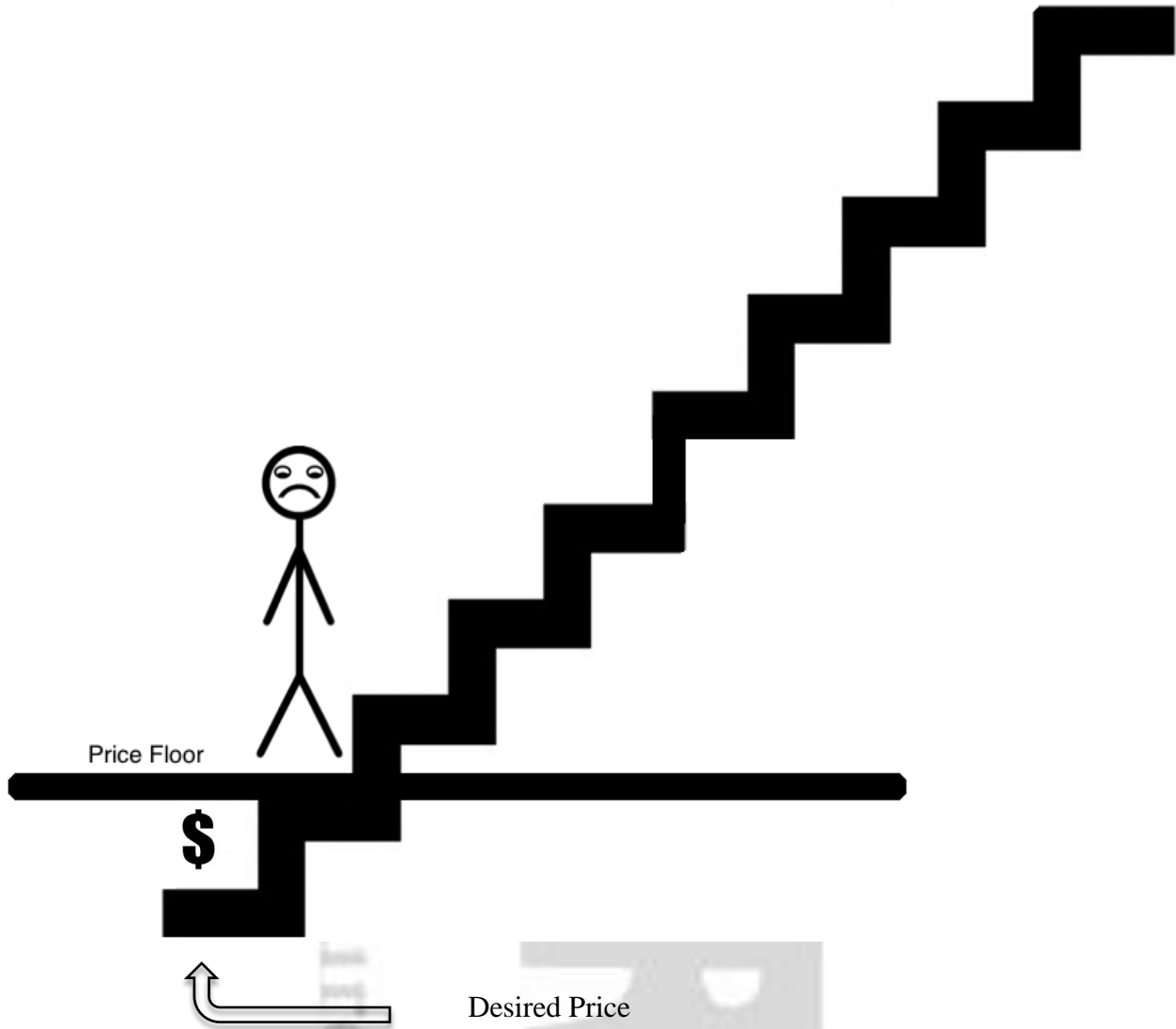
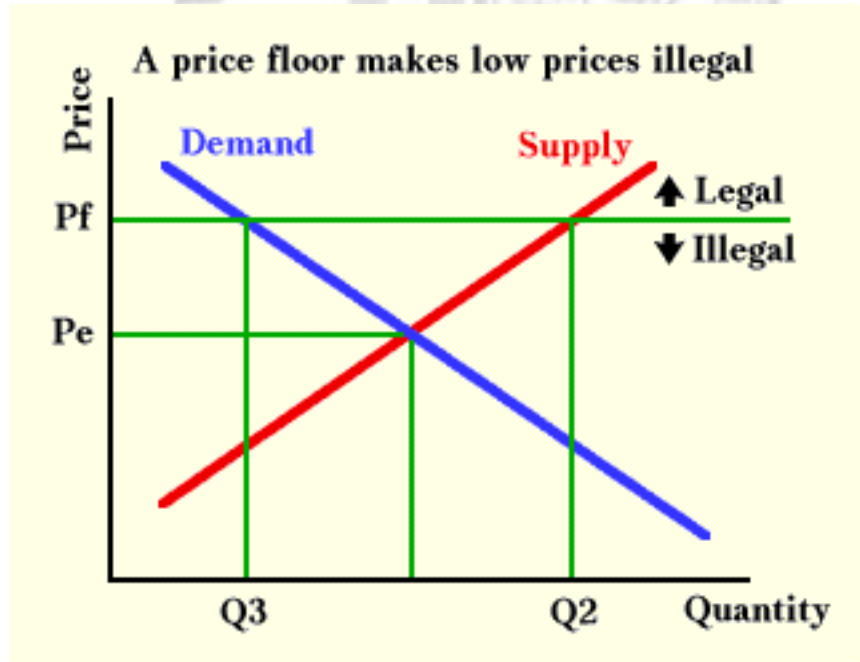


Figure 2



<http://ingrimayne.com/econ/AllocatingRationing/PriceAsRationer.html>

In Figure 2 we see that the market equilibrium price is at  $P_e$ . This is the point of optimum market efficiency. However, the government has intervened and set a price floor at  $P_f$ . As shown in the graph, it is illegal to perform a transaction below price  $P_f$ .

### Price Ceilings

A price ceiling is the same as the price floor, except that it restricts the *maximum* price for a product or service. Neither the producer nor the consumer can perform a transaction at a price that exceeds the price ceiling.

**Price Ceiling-** a legally mandated maximum price at which a transaction for a given good or service can occur

- *Example:* A real life example of a price ceiling is the existence of rent-controlled apartments. These are apartments that are rented to tenants at a maximum set price, and this price is usually far below market equilibrium. The government has decided that it is more important for some apartments to have equal pricing instead of efficient pricing.

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Once again, consider the price staircase. Both the producer and consumer decide that the best price is on stair 10 and want to set this as their “desired” price, but the government feels that this will lead to societal problems. The government then builds a physical ceiling on stair eight. This means that neither the producer nor the consumer can get to stair ten; there is a physical ceiling blocking the way. The lost surplus in this scenario is equal to six stairs: three stairs of consumer surplus plus three stairs of supplier surplus.

Here is the stair metaphor for a price floor visualized

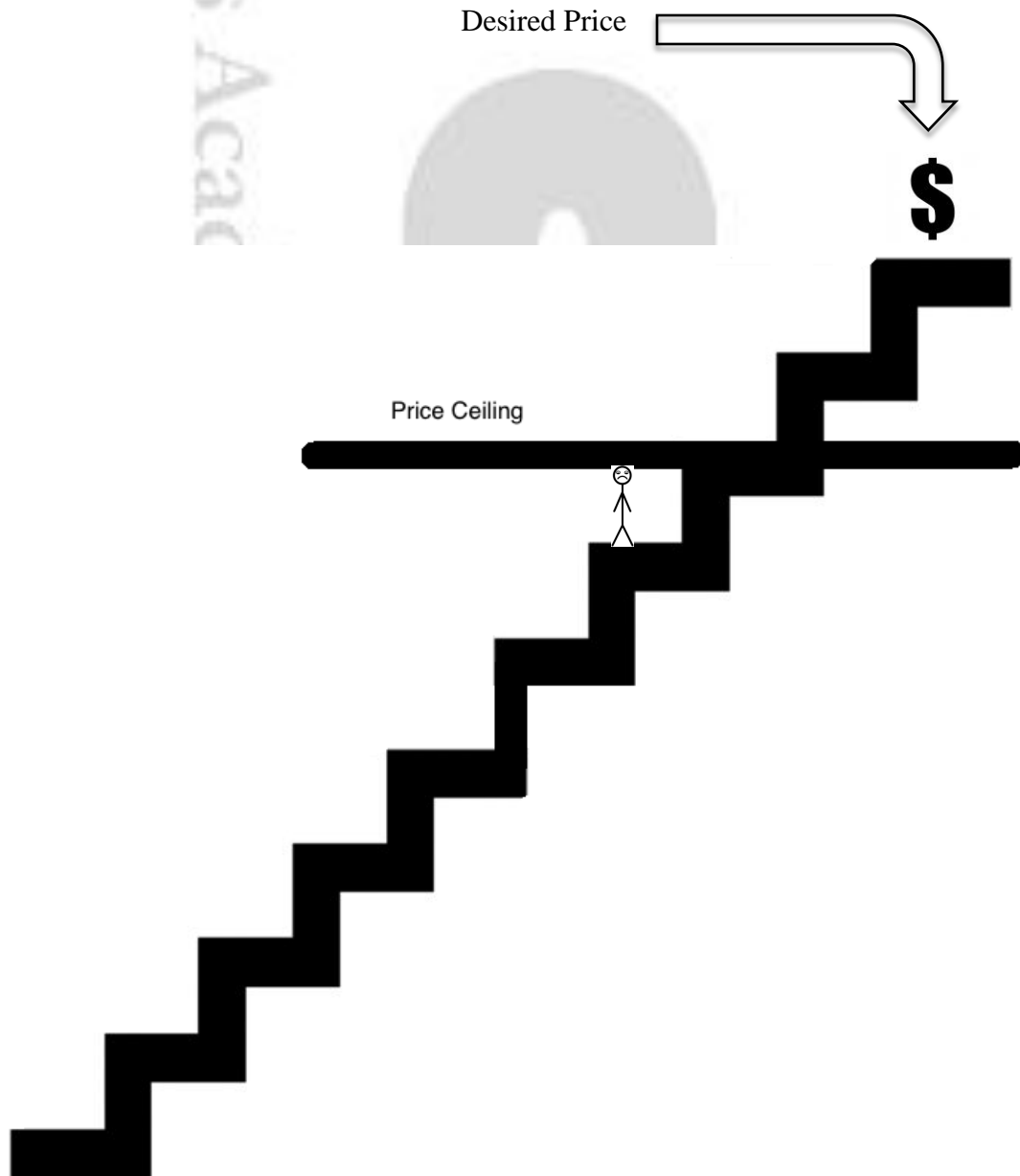


Figure 3



<http://ingrimayne.com/econ/AllocatingRationing/PriceAsRationer.html>

As we can see, Figure 3 is just the opposite of Example 2. Instead of placing a floor above the equilibrium price, a ceiling,  $P_c$ , is placed below the equilibrium price of  $P_e$ . The illegal prices for the transaction fall above  $P_c$  instead of below  $P_f$ .

### Deadweight

Although it is true that price setting causes market inefficiencies, these inefficiencies are not necessarily bad. What is bad and unavoidable is the deadweight loss caused by these market inefficiencies.

**Deadweight-** the lost surplus in a market due to price setting

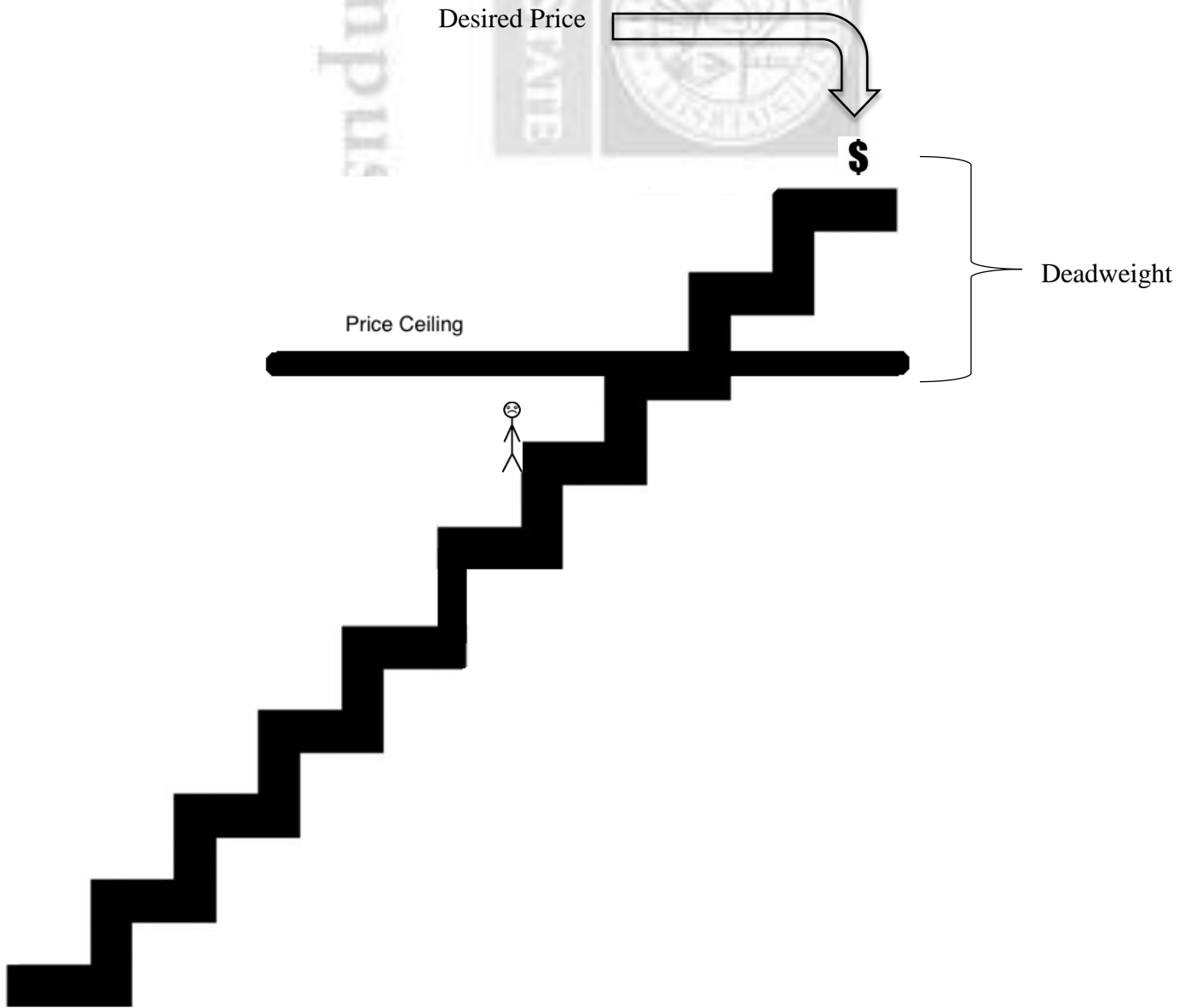
Deadweight is surplus that could have been realized if there were no market interventions. The loss is incurred both by consumers and suppliers. What a government must consider is if it is worth the deadweight loss that will occur for a market or economy to become more equal.

Again, think of a marketplace as a staircase. If both the consumer and the producer decide that stair ten is the optimal stair to be on but the government builds a ceiling blocking everything above stair 7, then the inaccessible stairs will be equal to the deadweight loss. Remember that the total surplus is equal to the consumer's surplus plus the supplier's surplus, and so in this case, the total lost surplus, or deadweight, is equal to 6 stairs.

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Here is the stair metaphor for deadweight visualized:

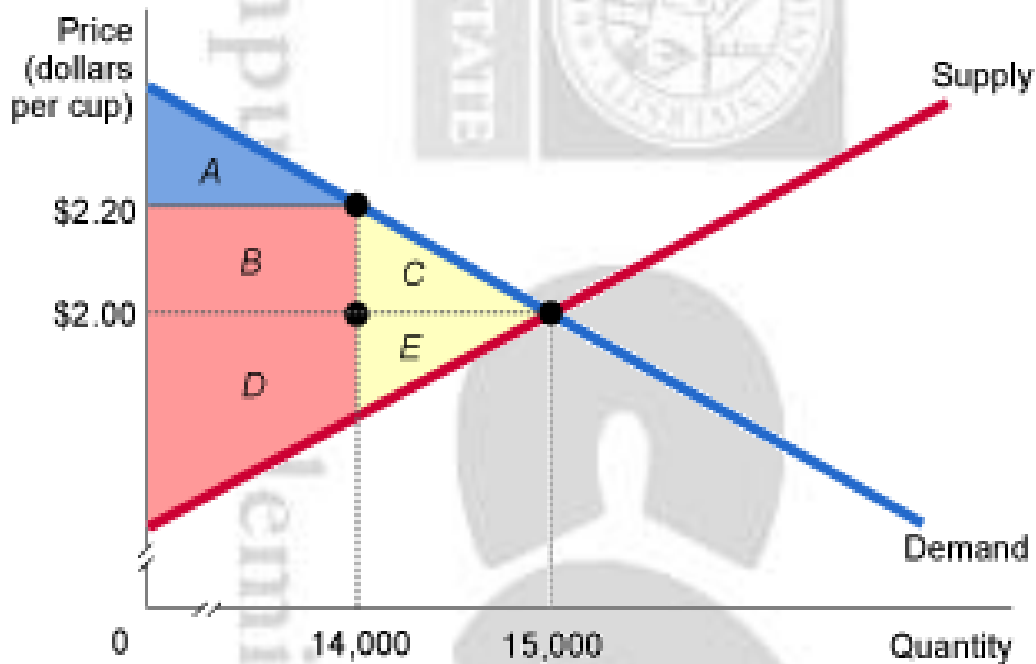




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Figure 4



[http://wps.prenhall.com/wps/media/objects/5399/5528631/OSG\\_fig4\\_6\\_graph.gif](http://wps.prenhall.com/wps/media/objects/5399/5528631/OSG_fig4_6_graph.gif)

In Figure 4 the price is set at \$2.20 instead of being allowed to reach its equilibrium of \$2.00. What this means is that the total economic surplus is reduced. Instead of the areas **A**, **B**, and **C** the consumer's surplus is reduced to only area **A**. However, the supplier's surplus increases from areas **D** and **E** to areas **D** and **B**. Since the price is higher than 1,000 consumers are willing to pay that entire area, the surpluses of area **C** and **E**, are eliminated. This is referred to as dead-weight. In this case, because of the price floor, total economic gain is reduced. The loss, or deadweight, is equal to the sum of the areas **C** and **E**.

Consider the following questions that relate to Figure 4. Answers are provided at the bottom of the next page.

1. What is the area of consumer deadweight?
2. What is the area of total deadweight?
3. What is the amount of area B in dollars?
4. What is the equilibrium price?
5. Is \$2.20 a price floor or a price ceiling?

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### Conclusion

A market that is in equilibrium is operating efficiently. When a government decides that it is more desirable to have equality rather than efficiency, it will employ price setting tactics. It will put either price floors or price ceilings in place. These price floors or price ceilings will create deadweight loss. The deadweight loss is equal to the total surplus that is forgone because of the price setting.

(1) Area C (2) Areas C + E (3) \$2,800 (4) \$2.00 (5) Price floor

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Works Cited

Hubbard, R., & Brien, A. (2006). Economic Efficiency, Government Price Setting, and Taxes. In *Microeconomics*. Upper Saddle River, N.J.: Pearson Prentice Hall.