

THE EFFICIENCY CRITERION

Public Finance, 10th Edition
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Outline: Chapter 2 THE EFFICIENCY CRITERION

1. Positive and Normative Economics
2. Normative Evaluation of Resource Use: The Efficiency Criterion
3. Markets, Prices, and Efficiency Conditions
4. Market Failure: A Preview of the Basis for Government Activity
5. Equity versus Efficiency
6. Positive Analysis Tradeoff Between Equity and Efficiency

Positive Economics

1. Positive and Normative Economics

- Scientific approach to analysis that establishes cause-and-effect relationships among economic variables
- Attempts to be objective
- Formulates “If...then” hypotheses that can be checked against facts

Normative Economics

1. Positive and Normative Economics

- Designed to formulate recommendations as to what *should* be accomplished
- Not objective
- Begins with predetermined criteria and is used to prescribe policies that best achieve those criteria
- Useful to the positive approach in that it defines relevant issues

Positive Economics is useful to the normative approach in that it cannot make recommendations to achieve certain outcomes without an underlying theory of human behavior.

The Efficiency Criterion

2. Normative Economics of Resource Use: The Efficiency Criterion

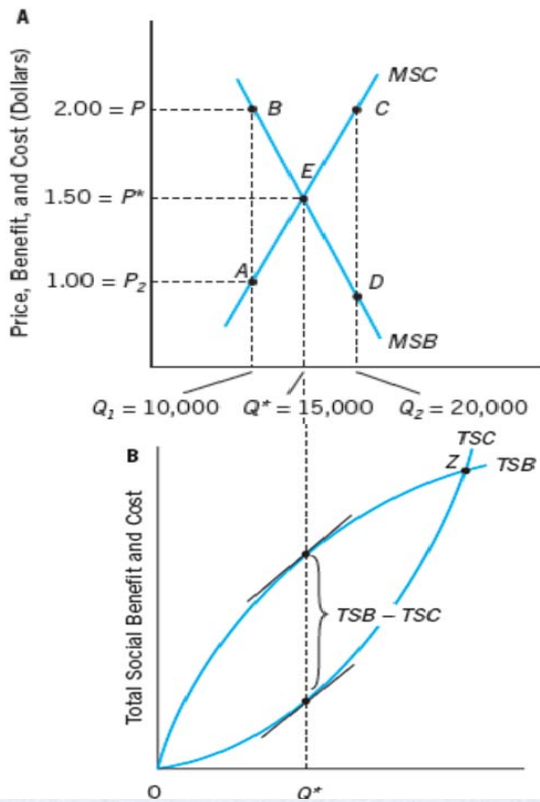
- Normative criterion for evaluating effects of resource use on individual well-being
- Satisfied when resources are used in such a way as to make it is impossible to increase the well-being of any one person without reducing the well-being of another
- Often referred to as the criterion of *Pareto optimality*

Marginal Conditions for Efficiency

2. Normative Economics of Resource Use: The Efficiency Criterion

- *Total social benefit* – any given quantity of an economic good available in a give time period will provide satisfaction to those who consume it
- *Marginal social benefit* – the extra benefit by making one more unit of that good available in a given time period
- *Total social cost* – the value of all resources necessary to make a given amount of the good available
- *Marginal social cost* – minimum sum required to compensate the owners of inputs used for making an extra unit of the good available

Efficient Output

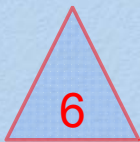


Efficient Output

The efficient level of output, Q^* , occurs at point E. At that monthly output, $MS = MSC$. The monthly output Q^* maximizes the difference between TSB and TSC, as shown in B.

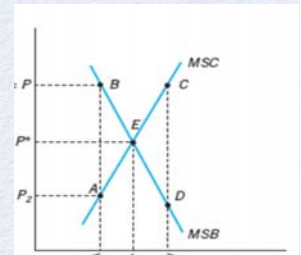
Extension of monthly output to the level corresponding to equality of TSB and TSC would involve losses in net benefits.

Similarly, output levels Q_1 and Q_2 are inefficient.



6. The following table shows how the total social benefit and total social cost of summer outdoor concerts in Central City vary with the number of performances.

NUMBER OF CONCERTS	TOTAL SOCIAL BENEFIT	TOTAL SOCIAL COST
1	\$10,000	\$5,000
2	\$15,000	\$11,000
3	\$18,000	\$18,000
4	\$20,000	\$26,000
5	\$21,000	\$36,000



What is the efficient number of concerts?

Ans.
 The marginal social benefit of the first concert is \$10,000, and its marginal social cost is \$5,000. The marginal social benefit of a second concert is \$5,000, which falls short of its marginal social cost of \$6,000.
 The efficient number of concerts is one.
 After the first concert, the marginal social cost exceeds the marginal social benefit.

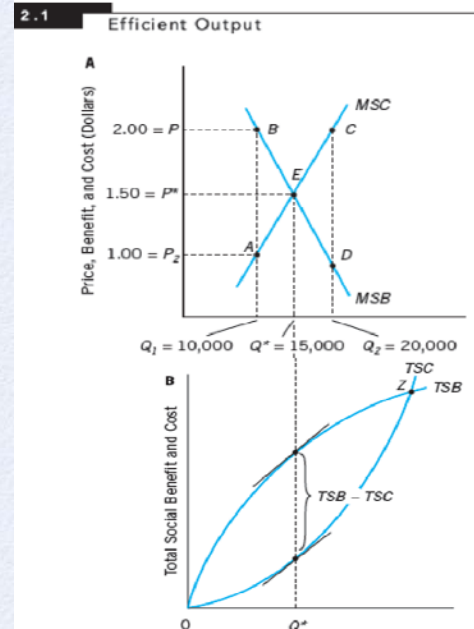
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2. A prominent senator has calculated the total social benefit of the current amount of space exploration at \$3 billion per year. The total social cost of space exploration is currently only \$2 billion. The senator argues that a **net gain** to society would result by increasing the amount of space exploration until total costs rise enough to equal total benefits. Is the senator's logic correct?

Ans.
The senator's logic is false.

Equating the marginal social benefit of a service with its marginal social cost maximizes net gains.

If output is increased to the point at which $TSB = TSC$, there will be more than the efficient amount of resources devoted to space exploration.



Markets

3. Markets, Prices, and Efficiency Conditions

In a perfectly competitive market:

1. All productive resources are privately owned.
2. All transactions take place in markets, in which competing sellers offer a standardized product to many buyers.
3. Economic power is dispersed in that no single buyer or seller can influence prices.
4. All relevant information is available to buyers and sellers.
5. Resources are mobile and may be freely employed in any enterprise.

Inefficiency in Competitive Markets

4. Market Failure: A Preview of the Basis for Government Activity

- Prices do not always fully reflect marginal social benefits/costs of output
- Means other than markets needed to make social benefits of certain goods available
- Failure of markets to make available certain goods (national defense, environmental protection) gives rise to demand for government production and regulation

Loss of Efficiency Due to Monopolistic Power

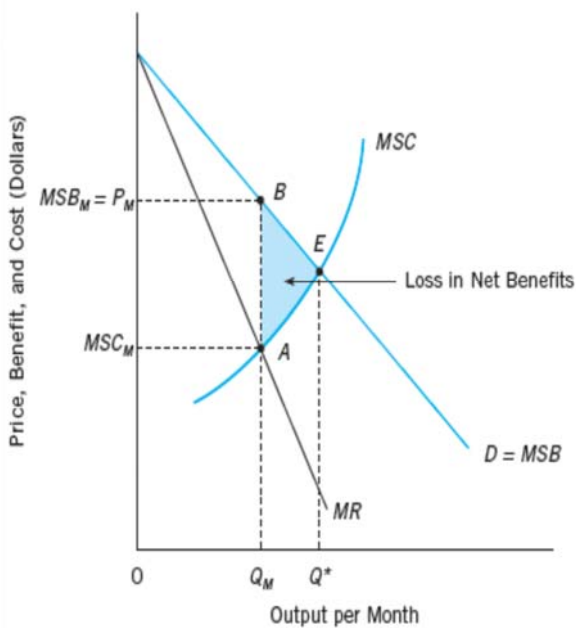
4. Market Failure: A Preview of the Basis for Government Activity

- Occurs when a firm influences the price of a product by reducing output to a level at which the price it sets exceeds marginal cost of production
- Causes failure of markets to result in inefficient levels of output
- Normative economists would prescribe government intervention to increase output in order to attain efficiency

Monopolistic Power

2.2

Loss in Net Benefits Due to Monopolistic Power

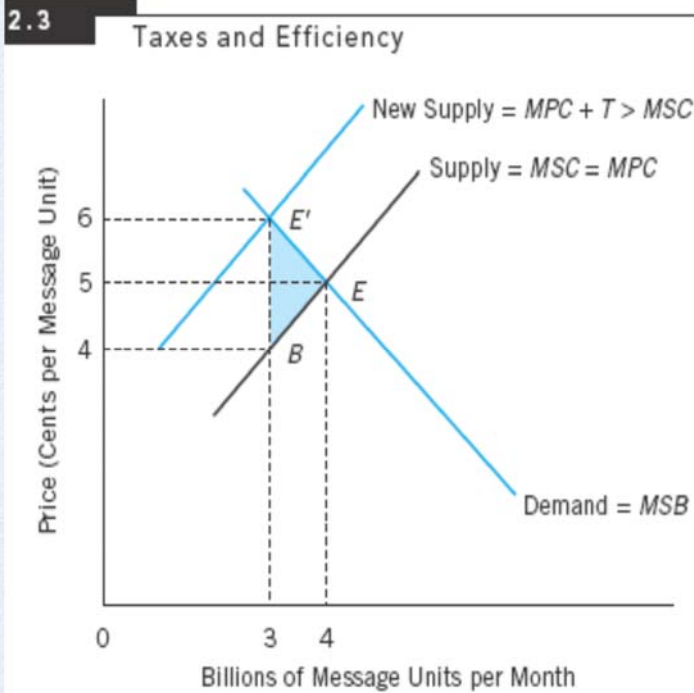


- The monopolistic firm maximizes profits by producing Q_M units per month.
- At that output level, the marginal social benefit of the good exceeds its marginal social cost.
- Additional net benefits equal to the area ABE are possible if output were increased to Q^* units per month.

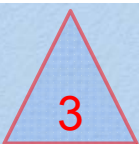
Loss of Efficiency Due to Taxes

- Tax causes the amount of a good or service that is traded to be influenced by tax paid per unit, not only marginal social benefit/cost.
- Therefore, the tax distorts decisions of market participants.
- Taxes influence decisions to work by reducing the net gain from working.

Loss of Efficiency Due to Taxes



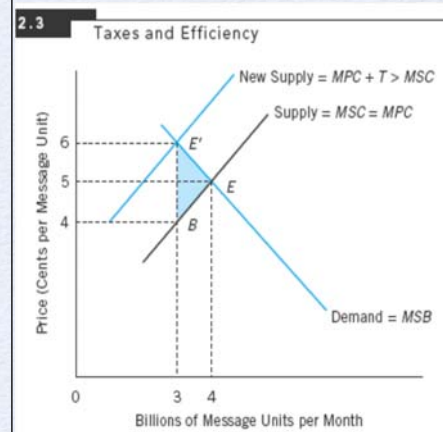
- A tax on the sale of a product affects incentives to supply that product. In the graph above, a tax on telephone service decreases the supply of the product. The price of a message unit increases from 5 to 6 cents.
- There is a loss in net benefits from telephone service because the marginal social cost of the new equilibrium output (corresponding to point E') is less than its marginal social benefit.
- The loss in net benefits is represented by the triangular area $E'EB$. The tax costs more than the \$0.06 billion in revenue collected when the loss in net benefits is added to the amount of revenue collected.



3. Suppose perfect competition prevails in the market for hotel rooms. The current market equilibrium price of a standard hotel room is \$100 per night. Show that the current market equilibrium is efficient, assuming that
- 1 both the marginal cost incurred by sellers and the marginal benefit perceived by buyers reflect all costs and benefits associated with production and use of hotel rooms. Suppose a \$10 per night tax is levied
 - 2 on hotel occupancy. Show how this tax will prevent the market from achieving efficient output. Show the loss in net benefits from hotel use
 - 3 resulting from the tax.

Ans.

- 1 At the current market equilibrium under perfect competition, $MSB = MSC = \$100$, implying efficiency. The \$10 per night tax results in an increase in the market equilibrium price of hotel rooms.
- 2 At the higher prices, MSB exceeds MSC .
- 3 The graph used to answer this question should be similar to Figure 2.3 in the text. The loss in net benefits would be an area like $E'EB$ in Figure 2.3.



4a

4. a. Suppose the marginal social cost of television sets is \$100. This is constant and equal to the average cost of television sets. The annual demand for television sets is given by the following equation: $Q=200,000-500P$, where Q is the quantity sold per year and P is the price of television sets.

- If television sets are sold in a perfectly competitive market, calculate the annual number sold. Under what circumstances will the market equilibrium be efficient?
- Show the losses in well-being each year that would result from a law limiting sales of television sets to 100,000 per year. Show the effect on the price, marginal social benefit, and marginal social cost of television sets. Show the net loss in well-being that will result from a complete ban on the sales of television sets.

Ans a) .

The efficient output is the one for which $P = MC$.

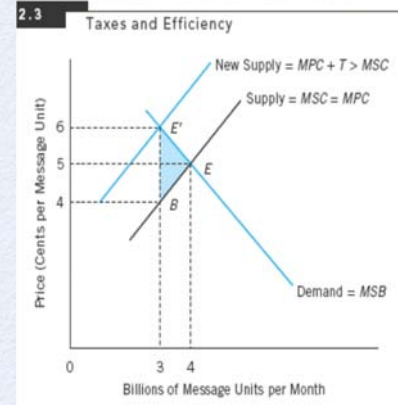
If sold in a competitive market, the price of a television would be \$100 and the quantity sold would be $200,000 - 500(100) = 150,000$.

Ans b)

If sales were limited to 100,000 per year, the marginal social benefit of TVs would exceed the marginal social cost.

Students should draw a graph showing the resulting loss of net benefits as a triangle above the marginal cost line and under the demand curve between the outputs of 100,000 and 150,000.

If there is a complete ban on TV sales, the loss in net benefits will be the entire area under the demand curve and above the marginal cost curve corresponding to the consumer surplus from TV sales.



5

5. Define *Pareto optimality*. Use the definition of Pareto optimality to demonstrate that the market for buying and selling owner-occupied housing follows the requirements for Pareto optimality. Apply a supply and demand diagram to your answer. Let equilibrium market prices paid equal \$250,000

- per house and quantity sold equal 1,000 houses per month. Why is this type of exchange Pareto optimal? On the other hand, the government's use of eminent domain is thought to violate Pareto optimality. The government still
- pays the homeowner fair market value (\$250,000). Nevertheless, use the definition of Pareto optimality to show that the use of eminent domain violates
- Pareto's guidelines for efficient exchange. Use the supply curve to identify which homeowners are made worse off by eminent domain, violating the Pareto guidelines.

Ans

- Pareto Optimality is when resources are allocated in such a manner in which it is impossible to increase the well-being of any one person without reducing the well-being of any other person. The corresponding supply and demand curve (Supply = MSC and Demand = MSB) should look similar to Figure 2.1A. At the intersection of MSC and MSB, quantity = 1,000 and price = \$250,000. The exchange is optimal because $MSC = MSB$.

Eminent domain. The power of the government to take private property and convert it into public use. The Fifth Amendment provides that the government may only exercise this power if they provide just compensation to the property owners.

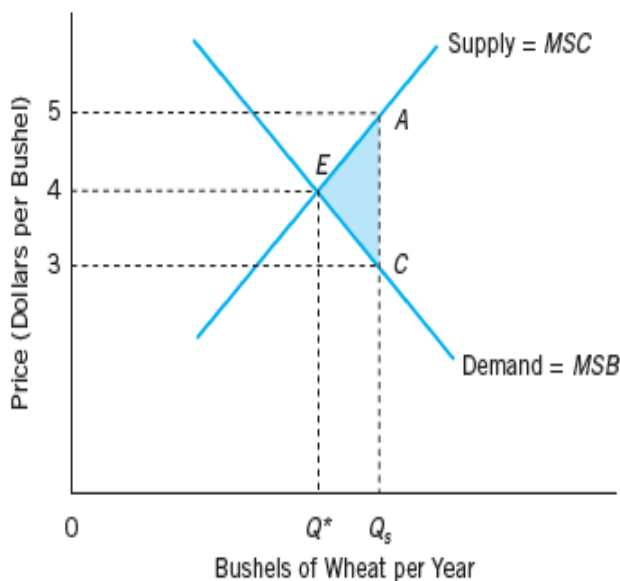
- The use of eminent domain forces homeowners out of houses which is not to the homeowners' benefit, thus violating Pareto Optimality.
- Further, there becomes a need for more houses to be available which can only exist by increasing home prices to offset the necessary increase in MSC (diagram similar to Figure 2.4). Homeowners who receive \$250,000 for their homes from the government will need to pay a higher price to buy a new home due to the need for the increased supply in homes. In this case MSC will exceed MSB and not be optimal.

Loss of Efficiency Due to Government Subsidies

4. Market Failure: A Preview of the Basis for Government Activity

2.4

Subsidies and Efficiency



- A target price of \$5 per bushel is set by the government.
- Because this price exceeds the market price of \$4 per bushel, the wheat farmers produce Q_s bushels per year instead of Q^* .
- Q_s is more than the efficient amount of wheat because its marginal social cost is greater than its marginal social benefit.
- The loss in net benefits from resource use is represented by the area EAC . The subsidy the government pays is \$2 per bushel multiplied by the Q_s bushels produced annually.
- After the subsidy, the market price of wheat falls to \$3, which is less than the marginal social cost of producing it.

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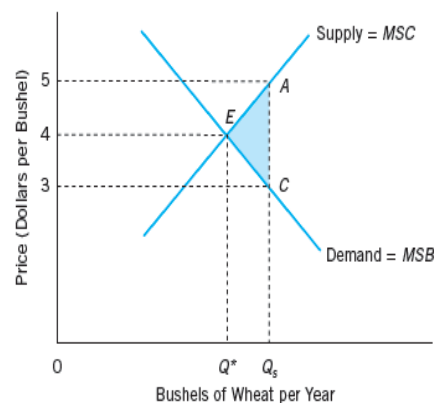
7. The market equilibrium price for rice in Japan would be \$3 per pound in the absence of government subsidies to rice production. However, the government sets the price of rice at \$5 per pound and agrees to buy all the rice produced by farmers at that price. Assume that points on the demand curve for rice equal the marginal social benefit of alternative quantities, while points on an upward-sloping supply curve equal the marginal social cost of various quantities. Show how the subsidy program will result in losses in efficiency.

Ans.
The price support for rice will increase annual production beyond the efficient level.

At the price support, the marginal social cost of rice will exceed its marginal social benefit.

2.4

Subsidies and Efficiency



Basis for Government Intervention in Markets

4. Market Failure: A Preview of the Basis for Government Activity

1. Exercise of monopoly power in markets
2. Effects of market transactions on third parties
3. Lack of a market for a good with a marginal social benefit that exceeds its marginal social cost
4. Incomplete information
5. Economic stabilization

Equity Versus Efficiency

5. Equity versus Efficiency

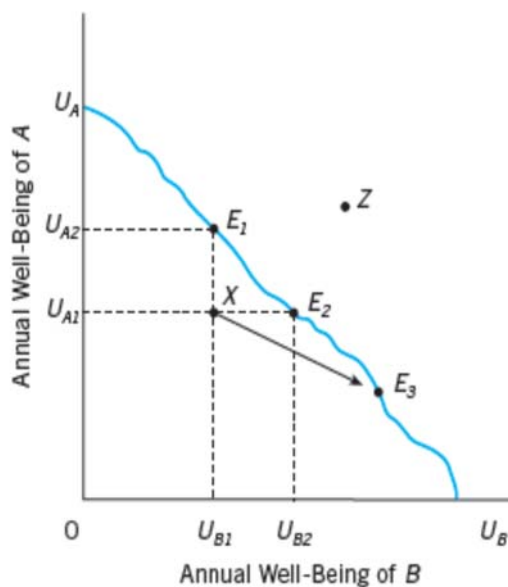
- Many argue that resource allocation should also be evaluated in terms of *equity*, or perceived fairness of the outcome.
- People differ in their ideas about fairness.
- Analysts usually try to determine the effects of government actions on both resource allocation and the distribution of well-being.
- The *utility-possibility curve* presents the maximum attainable level of well-being (utility) for one individual, given the utility level of others in the economy, their tastes, resource availability, and technology.

Utility-Possibility Curve

6. Positive Economics: Tradeoff Between Equity and Efficiency

2.5

A Utility-Possibility Curve



- Points on the utility possibility curve indicate the maximum level of well-being for any one person, A, given the level of well-being of any other person, B.
- Points E_1 , E_2 , and E_3 are efficient.
- Point Z is unattainable.
- Point X is inefficient.
- However, a movement from X to E_3 will be opposed by A because it would make him or her worse off.

Equity Versus Efficiency in Competitive Markets

6. Positive Economics: Tradeoff Between Equity and Efficiency

- Critics of the market system argue that many participants cannot satisfy basic needs because they cannot pay for goods and services.
- Critics of the market system argue that the poor should receive transfers financed by taxes on the more fortunate.
- However, taxes used to alter the distribution of income distort incentives to produce, preventing achievement of efficiency.
- Thus, equity versus efficiency causes conflict for policy makers.

Equity Versus Efficiency: Positive Analysis

6. Positive Economics: Tradeoff Between Equity and Efficiency

- Positive approach attempts to explain why efficient outcomes are, or are not, achieved
- Can also predict how government intervention in private affairs affects likelihood of achieving efficiency
- Attempts to predict whether changes in government policy will be agreed upon through political institutions, regardless of an efficient outcome
- Improvements in efficiency are often opposed by special-interest groups that would suffer losses by the improvements

RECAP: Chapter 2 THE EFFICIENCY CRITERION

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