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PUBLIC FINANCE AND PUBLIC POLICY

FIFTH EDITION



Theoretical Tools of Public Finance 2

2.1 Constrained Utility Maximization

2.2 Putting the Tools to Work: TANF and Labor Supply among Single Mothers

2.3 Equilibrium and Social Welfare

2.4 Welfare Implications of Benefit Reductions: The TANF Example Continued

2.5 Conclusion

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Theoretical Tools of Public Finance.

This chapter covers the theoretical tools of public finance.

- **Theoretical tools:** The set of tools designed to understand the mechanics behind economic decision making.
- **Empirical tools:** The set of tools designed to analyze data and answer questions raised by theoretical analysis.

Ada yang masih ingat? 2

Utilitas Maksimal? Kurva Idiferen? Budget constrain?
Marginal utility? Diminishing marginal utility?
Marginal cost? Marginal revenue? Marginal rate of
substitution?

Theoretical Tools of Public Finance.

Do you still remember government policy to cut off Subsidi BBM?

- Do you **agree** or **disagree** with the policy?
- Explain why?

Jika anda menjadi government, anggaran itu akan anda gunakan untuk subsidi atau dialihkan ke sektor lain?

Yang mana yang bisa menimbulkan utilitas maksimal?

Constrained Utility Maximization

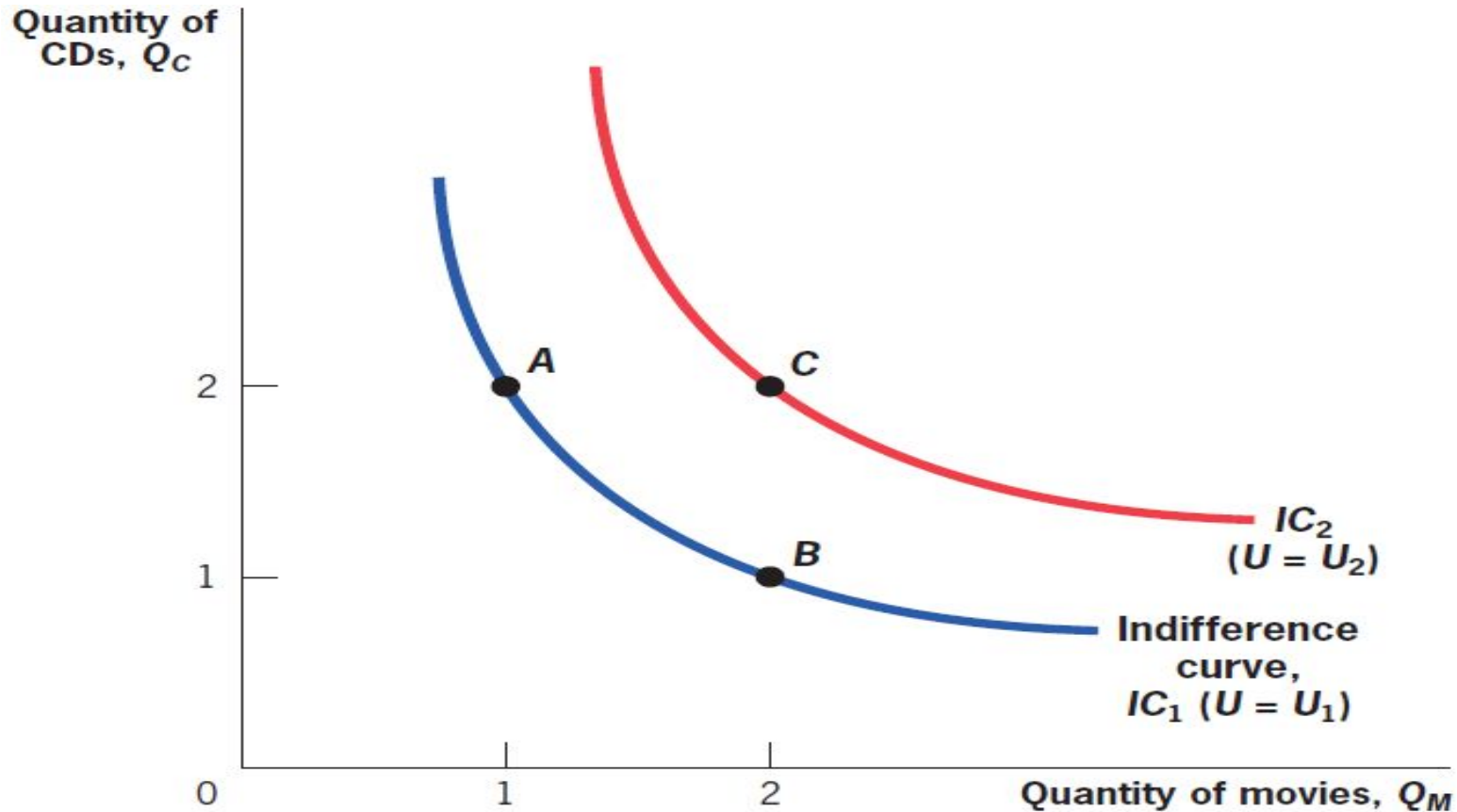
- **Utility function:** A mathematical function representing an individual's set of preferences, which translates her well-being from different consumption bundles into units that can be compared in order to determine choice.
- **Constrained utility maximization:** The process of maximizing the well-being (utility) of an individual, subject to her resources (budget constraint).
- **Models:** Mathematical or graphical representations of reality.

Preferences and Indifference Curves

- **Indifference curve:** A graphical representation of all bundles of goods that make an individual equally well off.
- Because these bundles have equal utility, an individual is indifferent as to which bundle he consumes.
- Indifference curves have two key properties:
 1. Consumers prefer higher indifference curves.
 2. Indifference curves are always downward sloping.

2.1

Preferences and Indifference Curves



2.1

Utility Mapping of Preferences

- Underlying the indifference curves is an individual's utility function.
- A utility function is some mathematical representation, $U = f(X_1, X_2, X_3, \dots)$
- X_1, X_2, X_3 , and so on are the quantities of the goods consumed.
- f is some mathematical function that describes how consumption of each good translates to utility.

Utility Mapping of Preferences: Example

- Example utility function: Your utility for Baju (Q_C) and Nonton Film (Q_M):

$$U(Q_C, Q_M) = \sqrt{Q_C \times Q_M}$$

- You are indifferent between 4 Clothings and 1 Movie, or 1 Clothing and 4 Movies.
- Andrea prefers 3 Clothings and 3 Movies to either bundle.

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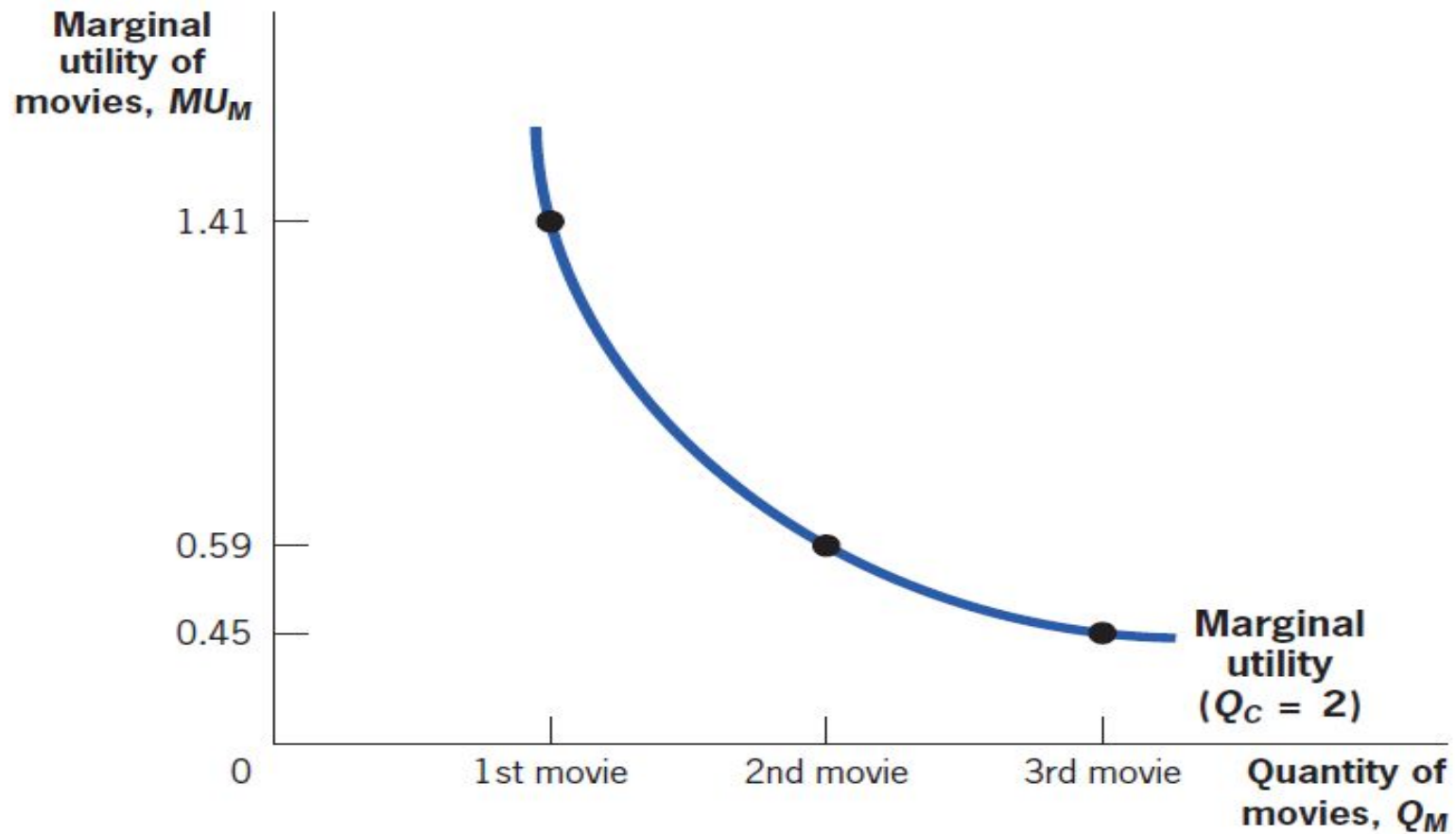
Marginal Utility

How much do consumers like a good?

- **Marginal utility:** The additional increment to utility obtained by consuming an additional unit of a good.
- **Diminishing marginal utility:** The consumption of each additional unit of a good makes the individual less happy than the consumption of the previous one.
- Many utility functions exhibit diminish marginal utility, including $U(Q_C, Q_M) = \sqrt{Q_C \times Q_M}$.
 - The first bite of pizza is often the tastiest.

2.1

Marginal Utility: Graphical Representation



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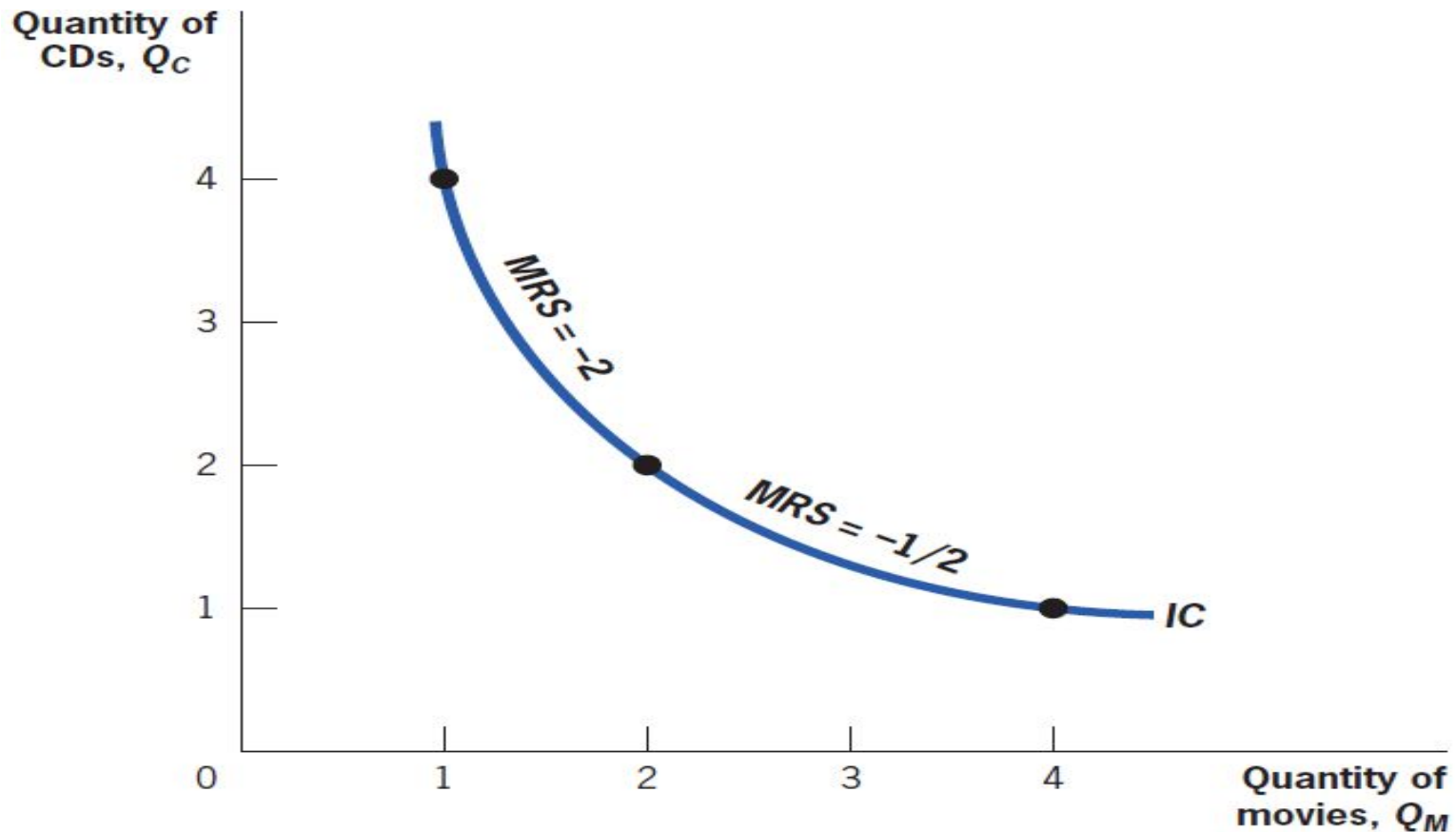
Marginal Rate of Substitution

- **Marginal rate of substitution (MRS):** The rate at which a consumer is willing to trade one good for another.
- Moving along an indifference curve keeps a consumer equally well off, so
- The MRS is equal to the slope of the indifference curve, the rate at which the consumer will trade the good on the vertical axis for the good on the horizontal axis.

$$MRS = -MU_m/MU_c$$

2.1

Marginal Rate of Substitution



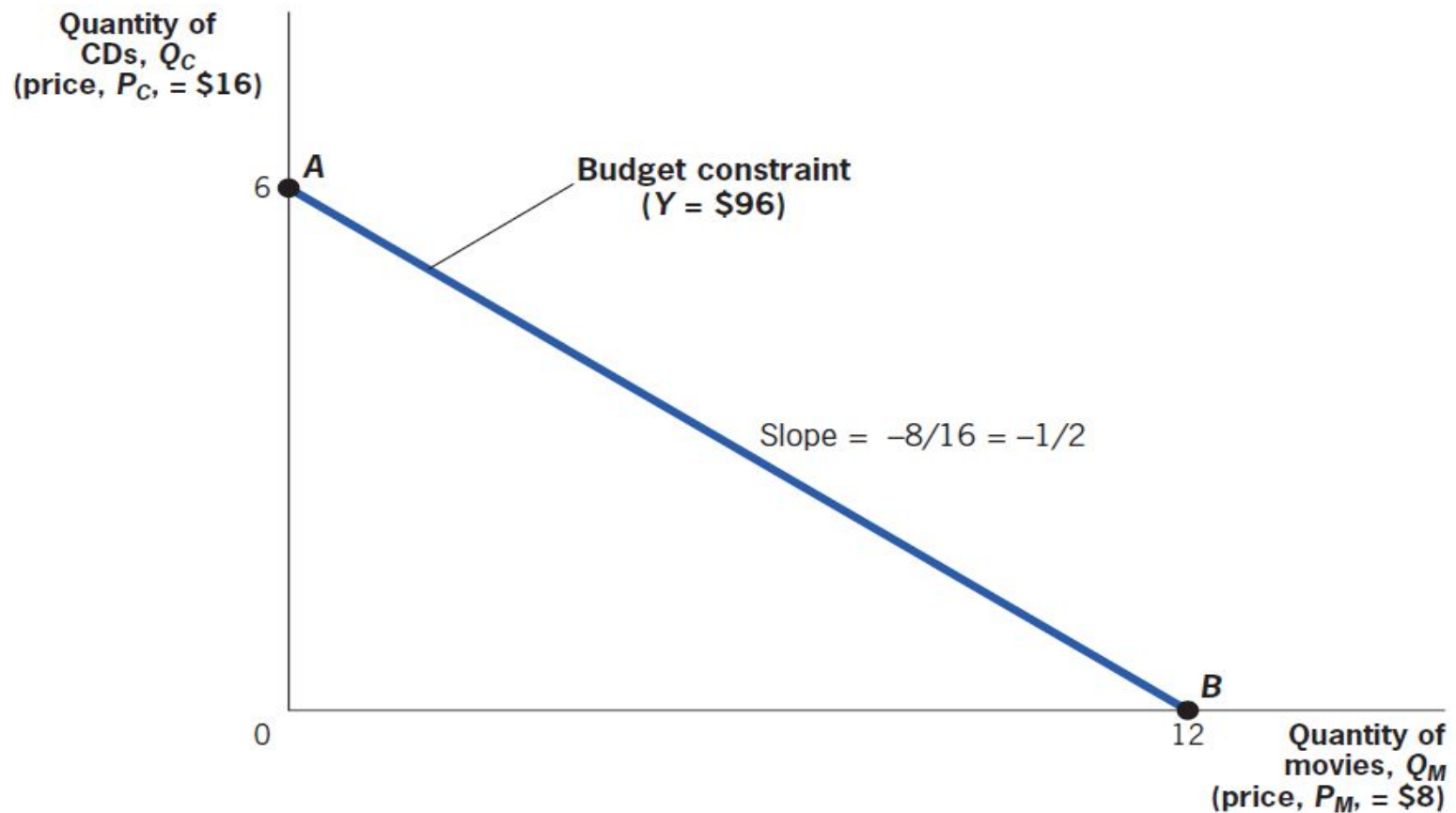
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Budget Constraints

- **Budget constraint:** A mathematical representation of all the combinations of goods an individual can afford to buy if she spends her entire income.
- **Opportunity cost:** The cost of any purchase is the next best alternative use of that money, or the forgone opportunity.
- *Quick hint:* When a person's budget is fixed, if he buys one thing he is, by definition, reducing the money he has to spend on other things. Indirectly, this purchase has the same effect as a direct good-for-good trade.

2.1

Budget Constraints



2.1

Putting It All Together: Constrained Choice

- The slope of the budget constraint says how much of one good you can buy if you give up one unit of the other, P_M/P_C .
- The marginal rate of substitution says how much you like trading one good for another.
- If $\frac{P_M}{P_C} > MRS$, get more utility buying fewer CDs and more movies.
- If $\frac{P_M}{P_C} < MRS$, get more utility buying more CDs and fewer movies.

2.1

Putting It All Together: Constrained Choice

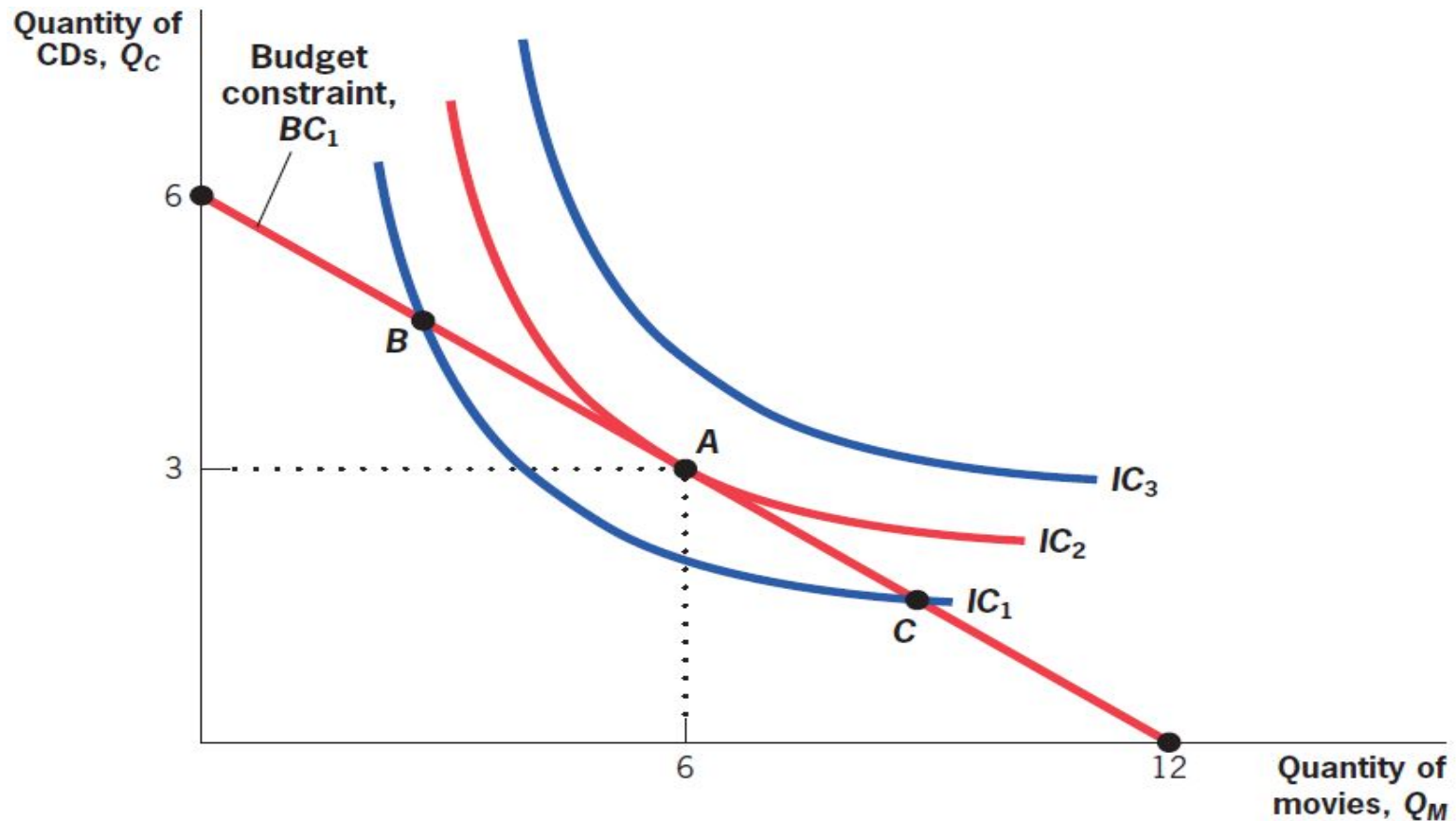
- To maximize utility, therefore:

$$\frac{P_M}{P_C} = MRS$$

- Or, find tangency between indifference curves and budget constraint.

2.1

Putting It All Together: Constrained Choice



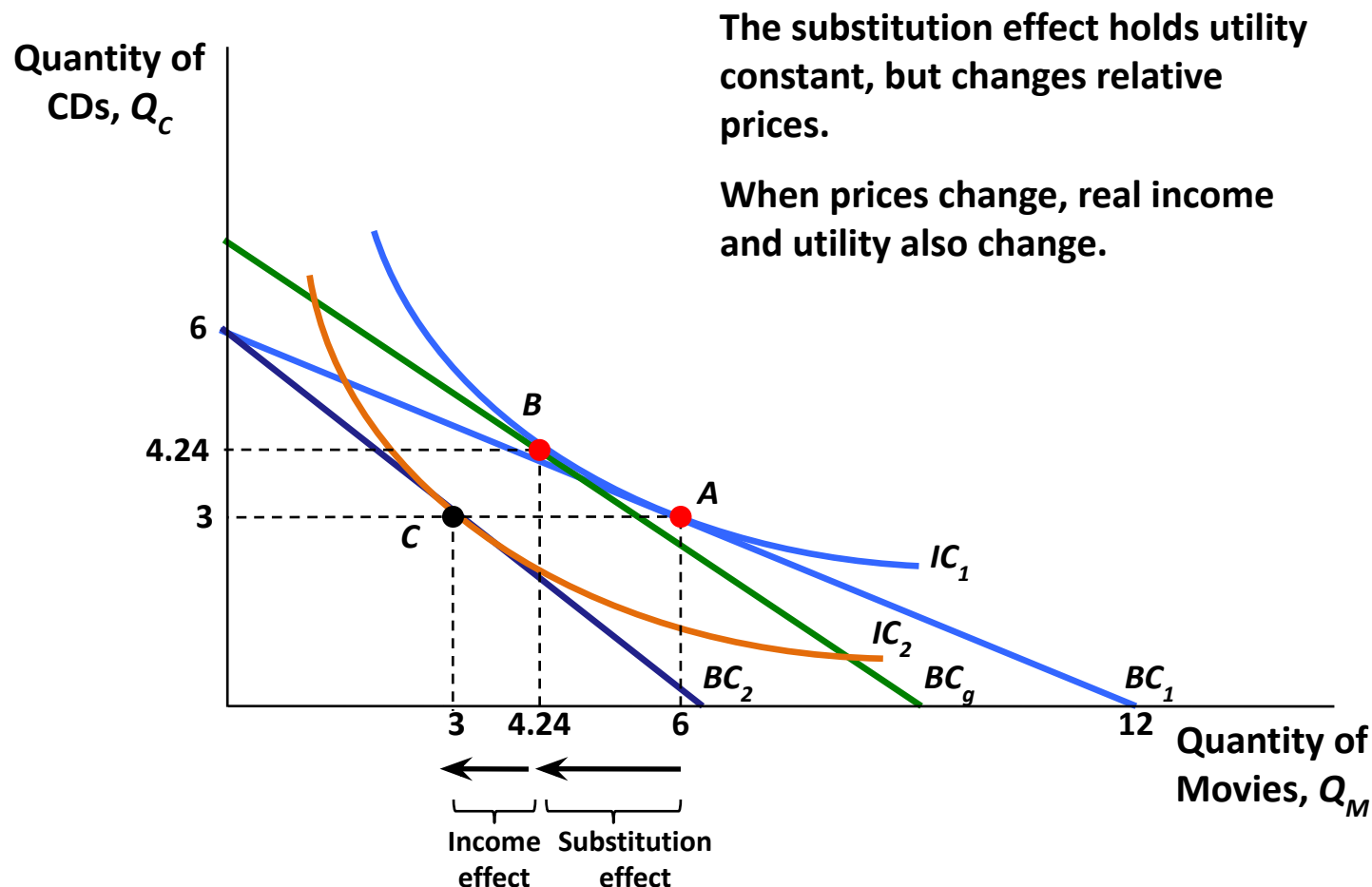
2.1

The Effects of Price Changes: Substitution and Income Effects

- Maximizing utility tells us how many goods and CDs a person buys at a given price.
- What happens when we change the prices?
- **Substitution effect:** Holding utility constant, a relative rise in the price of a good will always cause an individual to choose less of that good.
- **Income effect:** A rise in the price of a good will typically cause an individual to choose less of all goods because her income can purchase less than before.

2.1

The Effects of Price Changes: Substitution and Income Effects



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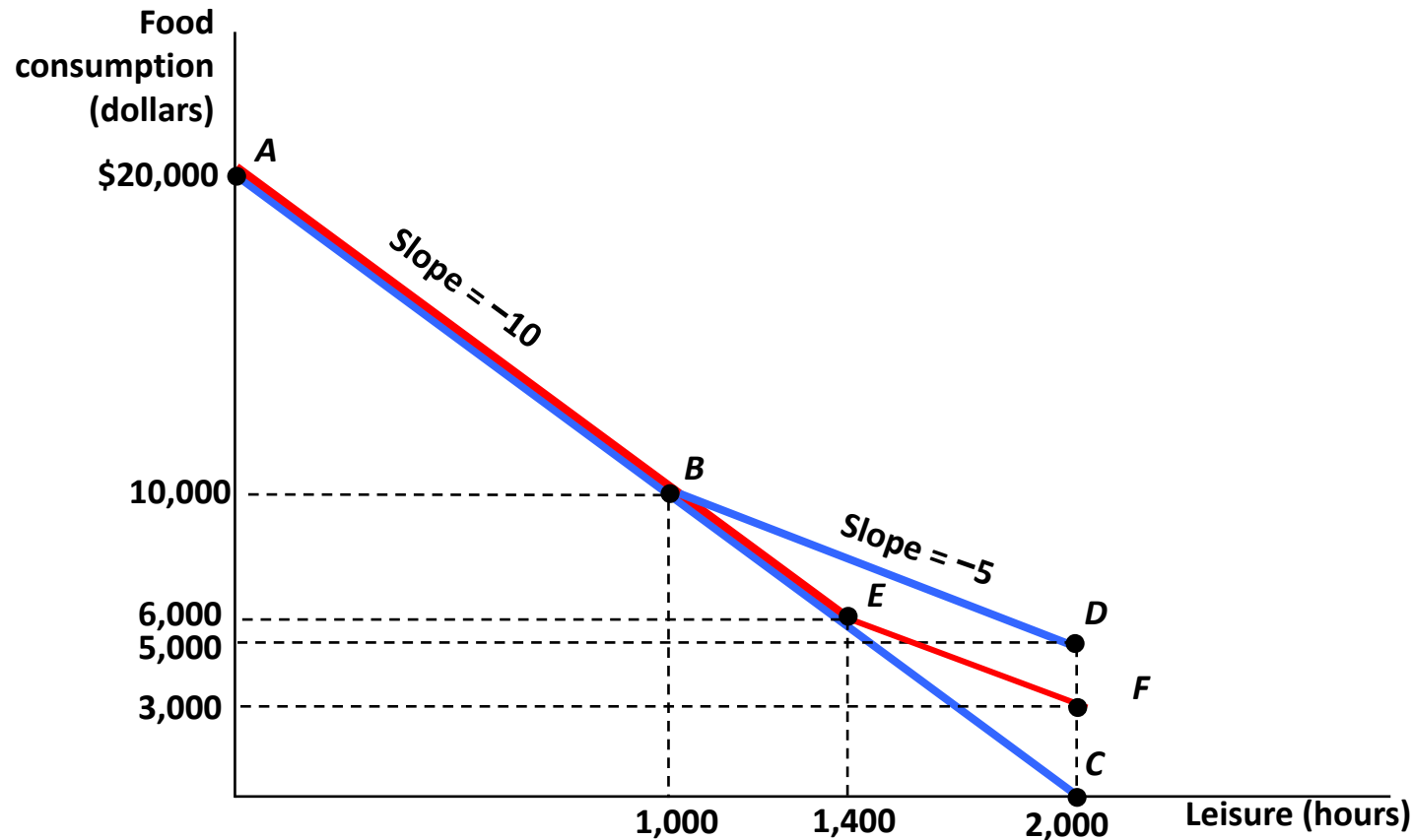
The Effects of Price Changes: Substitution and Income Effects

How do changes in income affect demand?

- **Normal goods:** Goods for which demand increases as income rises.
- **Inferior goods:** Goods for which demand falls as income rises.

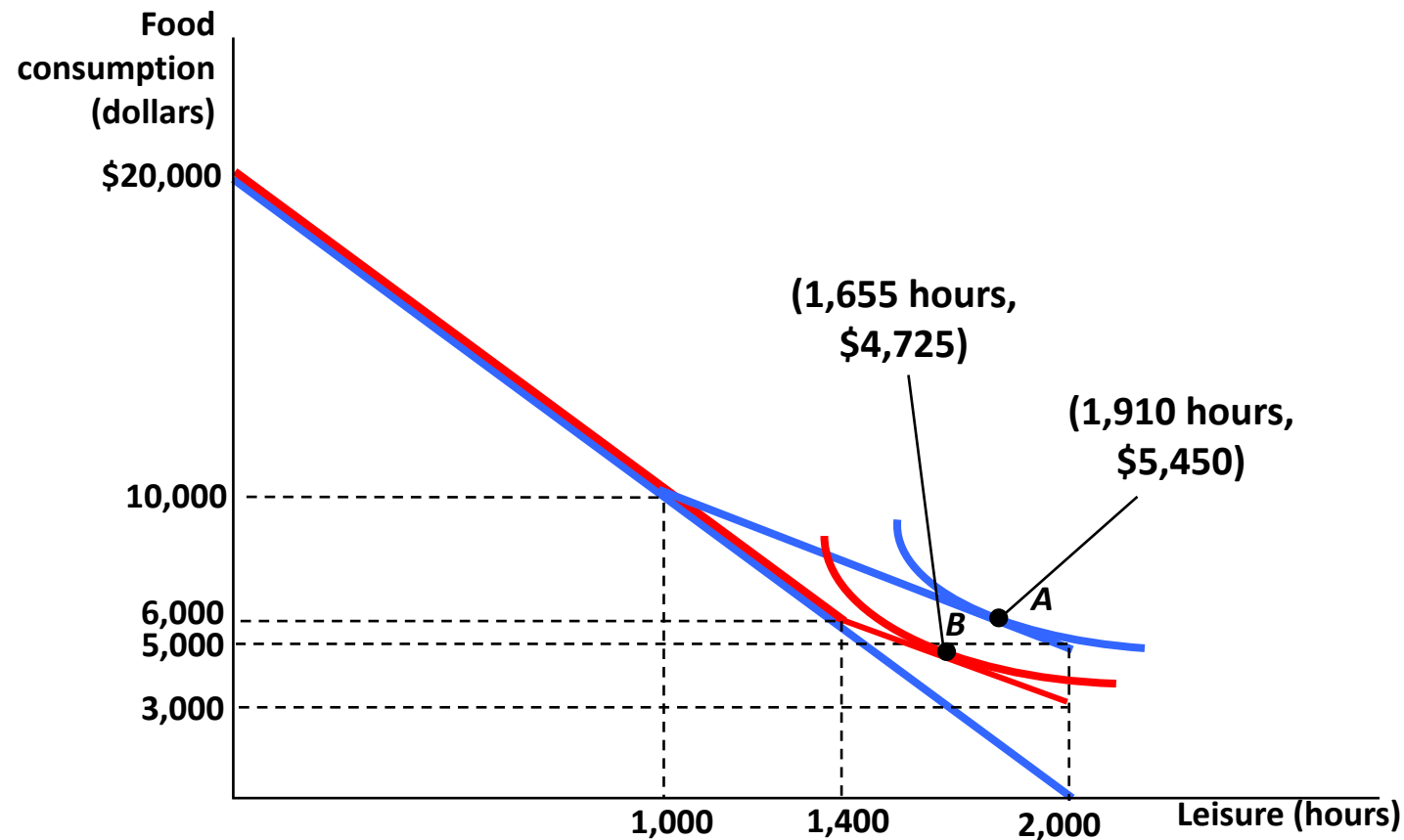
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Putting the Tools to Work: TANF and Labor Supply Among Single Mothers



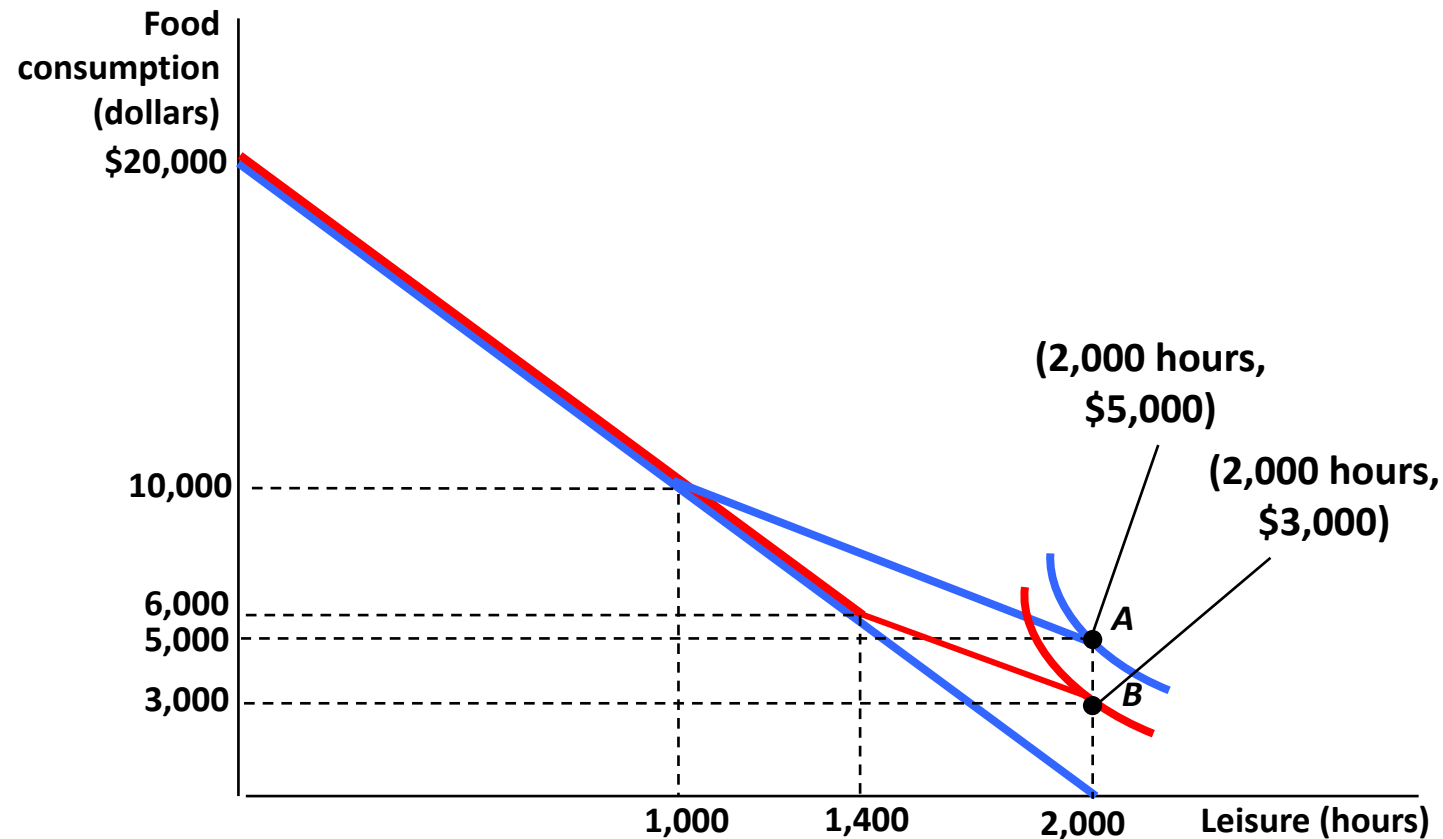
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How Large Will the Labor Supply Response Be?



2.2

How Large Will the Labor Supply Response Be?



2.3

Equilibrium and Social Welfare

How do markets determine what gets produced? Do they produce the right amount?

- **Market:** The arena in which demanders and suppliers interact.
- **Market equilibrium:** The combination of price and quantity that satisfies both demand and supply, determined by the interaction of the supply and demand curves.
- **Welfare economics:** The study of the determinants of well-being, or welfare, in society.

2.3

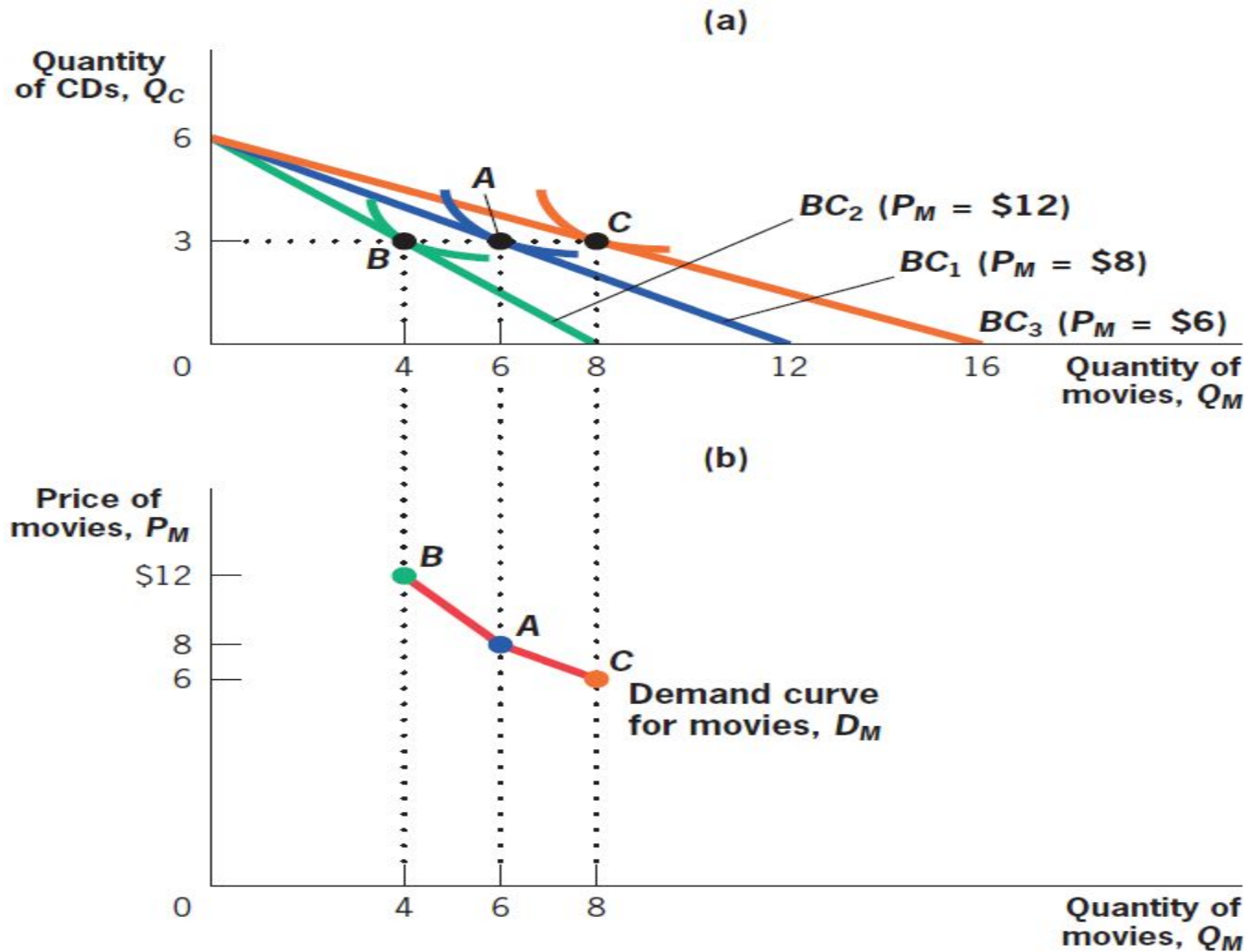
Demand Curves

How much of a good do people want to buy at the market price?

- **Demand curve:** A curve showing the quantity of a good demanded by individuals at each price.
- Obtained by finding the utility-maximizing bundle at each price.

2.3

Demand Curves



2.3

Elasticity of Demand

- **Elasticity of demand:** The percentage change in the quantity demanded of a good caused by 1% change in the price of that good.

- Mathematically:

$$\varepsilon = \frac{\text{percentage change in quantity demanded}}{\text{percentage change in price}} = \frac{\Delta Q/Q}{\Delta P/P}$$

2.3

Elasticity of Demand

Elasticities of demand:

- Elasticities of demand are often negative: Quantity demanded falls as price rises.
- Elasticities of demand are typically not constant along a demand curve.
- Typically, a change in the price of one good will affect demand for other goods as well.
- The effect of one good's prices on the demand for another good is the *cross-price elasticity*.

2.3

Elasticity of Demand

Perfectly inelastic and perfectly elastic demand:

- When the elasticity of demand is zero, the demand curve is *perfectly inelastic*, in which case
 - the demand curve is vertical, and quantity demanded does not change when price rises.
- When the elasticity of demand is infinite, the demand curve is *perfectly elastic*, in which case
 - the demand curve is horizontal, and quantity demanded changes infinitely for even a very small change in price

2.3

Supply Curves

How much do firms want to sell or produce at each price?

- **Supply curve:** A curve showing the quantity of a good that firms are willing to produce (supply) at each price.
- Supply curves are the outcome of profit maximization by firms.
- Firms produce output using a production, such as $q = \sqrt{K \times L}$.

2.3

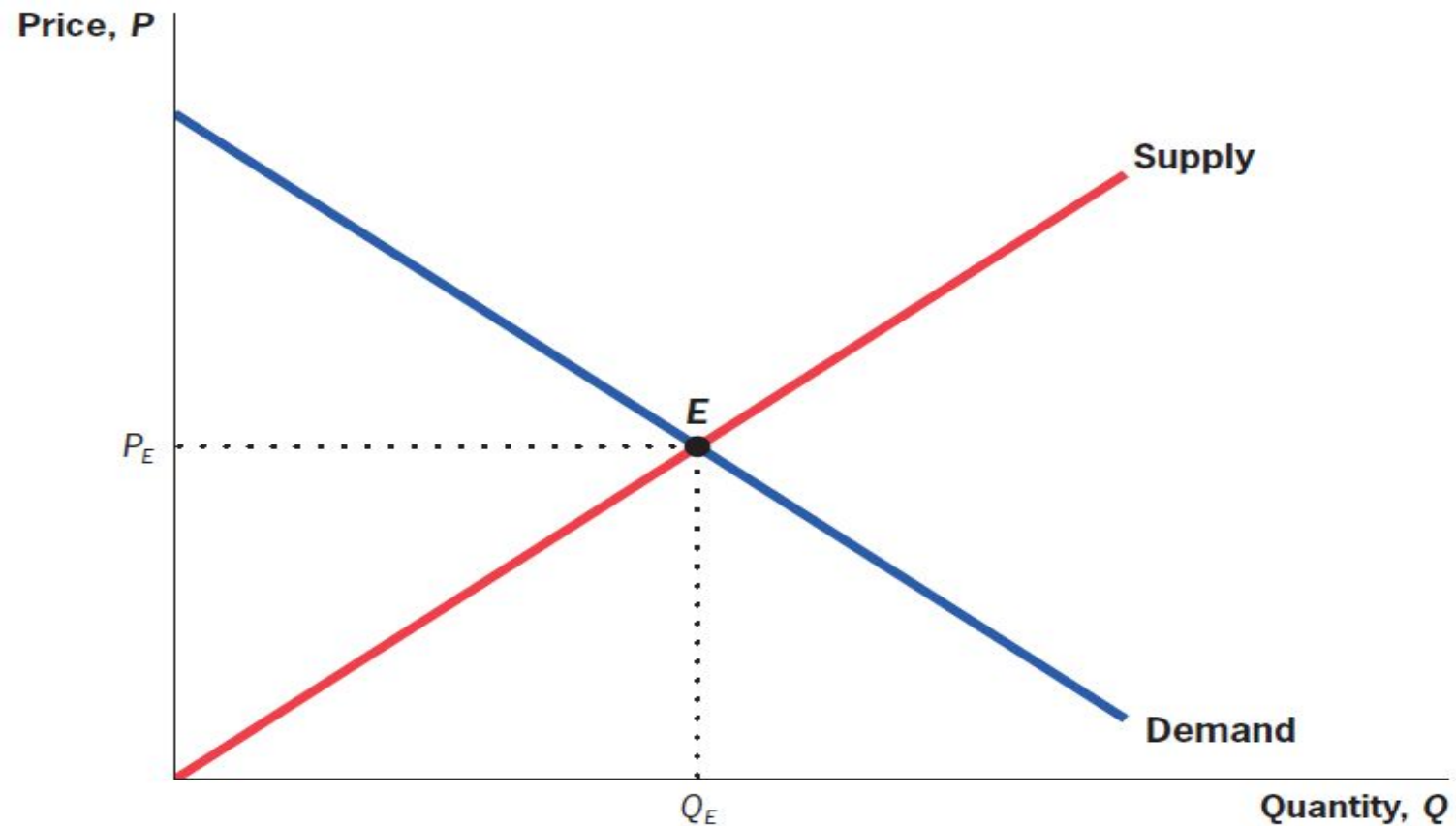
Profit maximization

How do firms decide how much to produce?

- **Marginal productivity:** The impact of a unit change in any input, holding other inputs constant, on the firm's output.
- **Marginal cost:** The incremental cost to a firm of producing one more unit of output.
- Firms choose quantities to maximize **profits**, the difference between revenues and costs.
- Profit is maximized when marginal cost equals marginal revenue (i.e. $p \times \text{marginal product}$).

2.3

Equilibrium: Graphical Representation



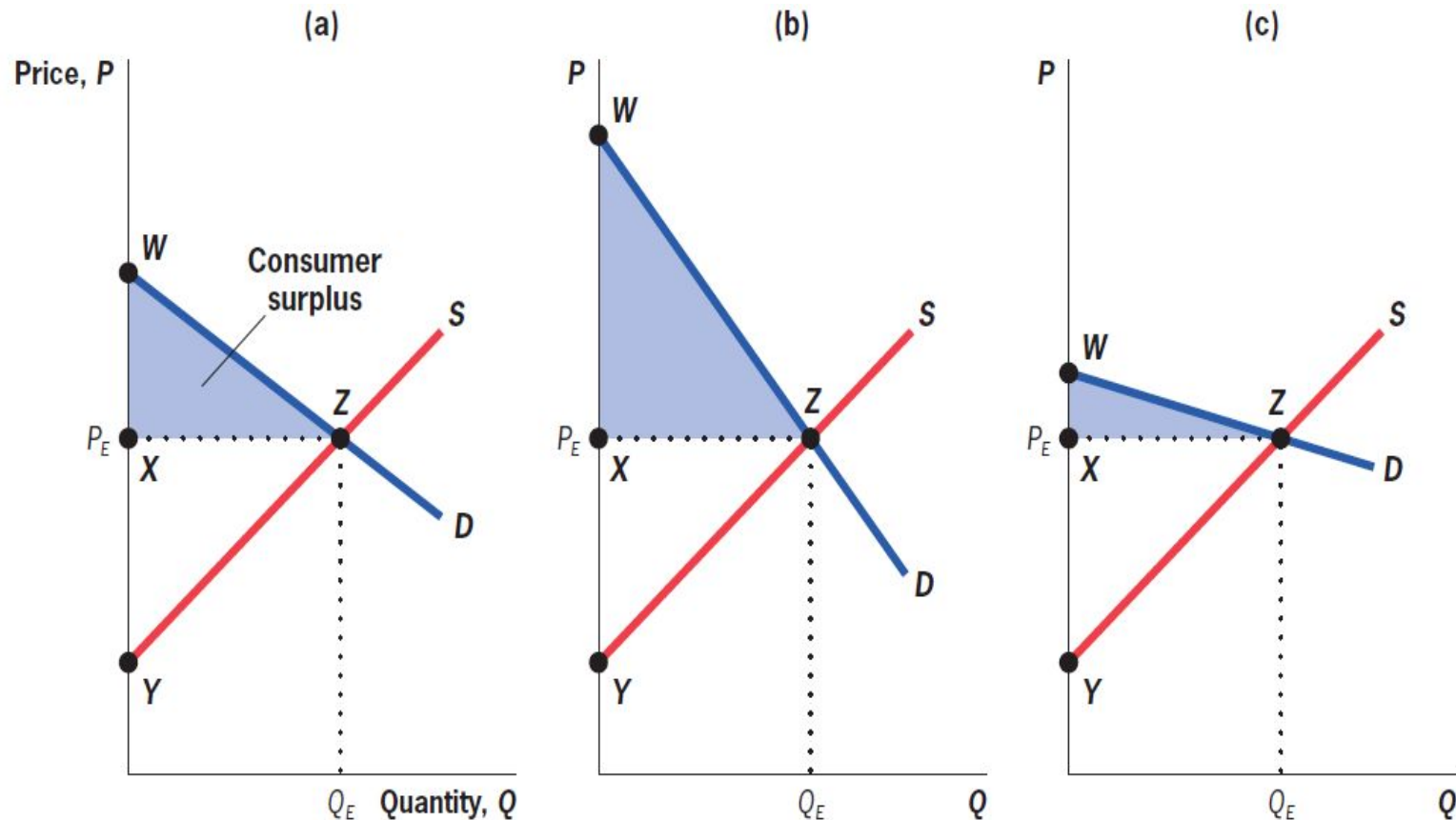
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Social Efficiency

- **Social efficiency** represents the net gains to society from all trades that are made in a market, and it consists of the sum of two components: *consumer* and *producer surplus*. Also called **total social surplus**.
- **Consumer surplus**: The benefit that consumers derive from consuming a good, above and beyond the price they paid for the good.
- **Producer surplus**: The benefit that producers derive from selling a good, above and beyond the cost of producing that good.

2.3

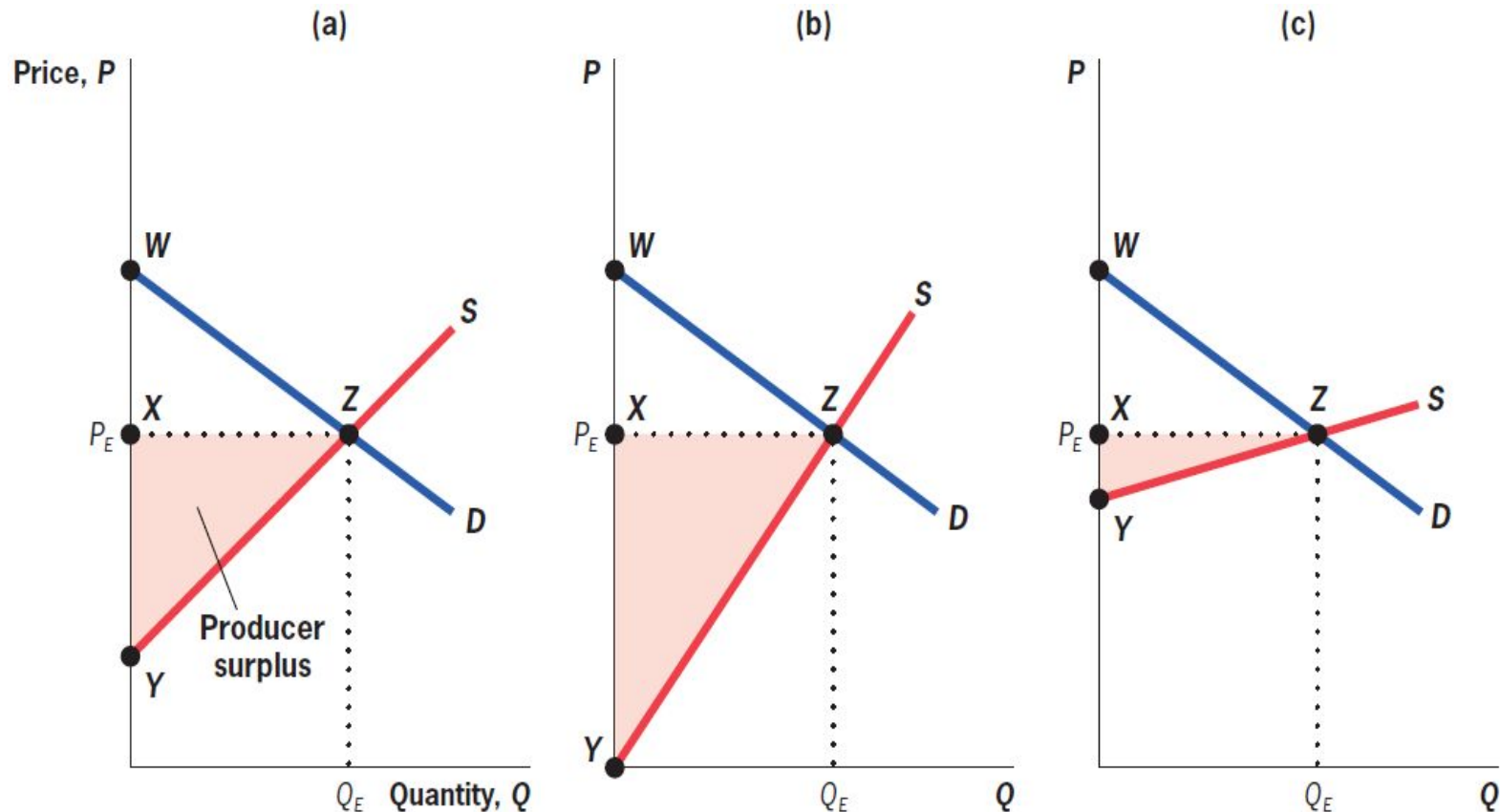
Consumer Surplus: Graphical Representation



- Consumer surplus is the area under the demand curve since demand = willingness to pay.

2.3

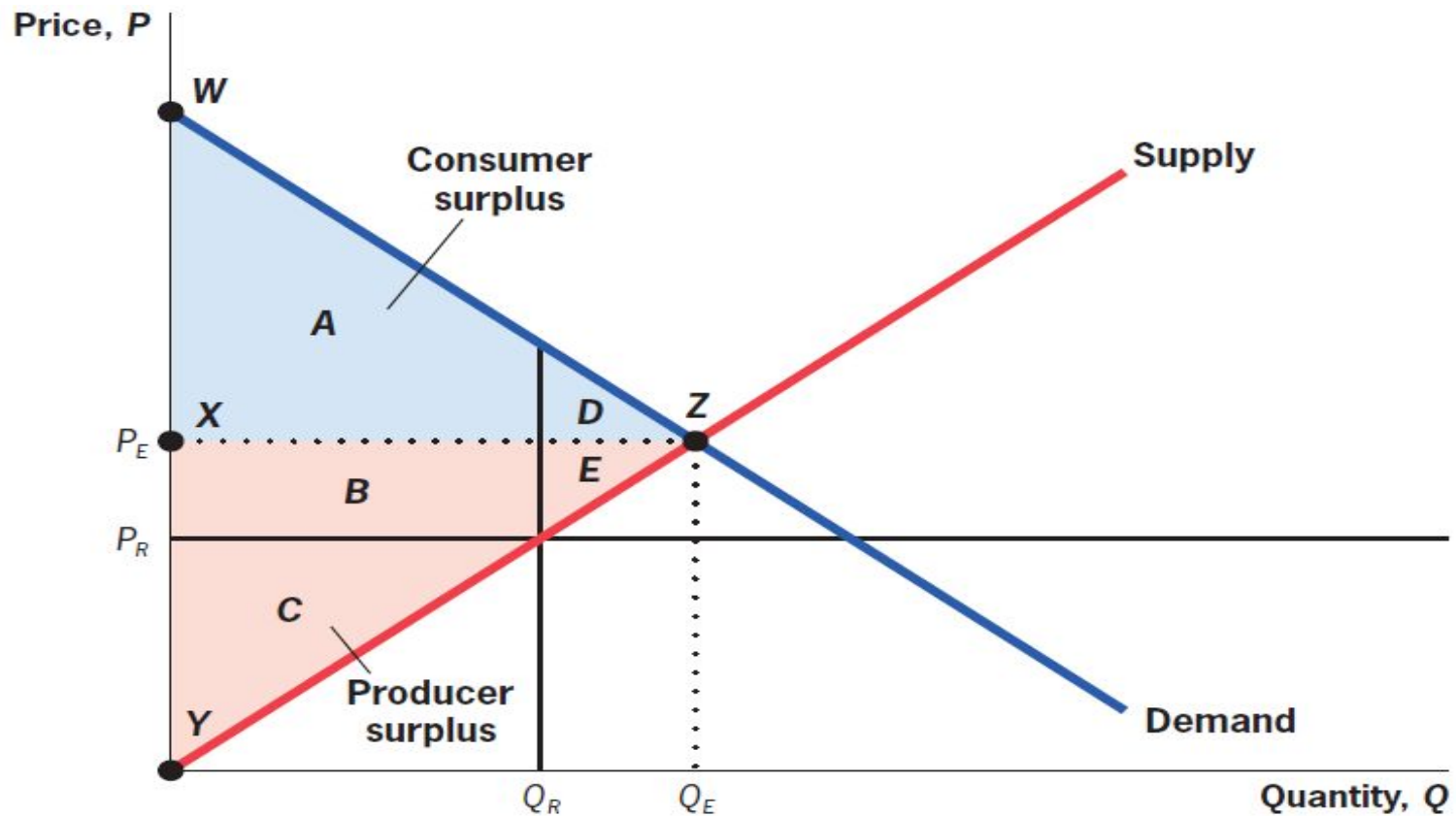
Producer Surplus: Graphical Representation



- Producer surplus is the area above the supply curve since supply = marginal cost.

2.3

Social Surplus: Graphical Representation



Competitive Equilibrium Maximizes Social Efficiency

- **First fundamental theorem of welfare economics:** The competitive equilibrium, where supply equals demand, maximizes social efficiency.
- **Deadweight loss:** The reduction in social efficiency from preventing trades for which benefits exceed costs.
- *Quick hint:* Deadweight loss is a triangle that points toward the equilibrium price and grows away from it.

2.3

From Social Efficiency to Social Welfare: The Role of Equity

- **Social welfare:** The level of well-being in society.
 - Determined by both how much gets produced, and how it is distributed.
- **Second fundamental theorem of welfare economics:** Society can attain any efficient outcome by suitably redistributing resources among individuals and then allowing them to freely trade.
 - Difficult in practice to redistribute like this.
- **Equity–efficiency trade-off:** The choice society must make between the total size of the economic pie and its distribution among individuals.

Social Welfare Functions

- **Social Welfare Function (SWF):** A function that combines the utility functions of all individuals into an overall social utility function.
- The *utilitarian* social welfare function maximizes the sum of individual utility:

$$SWF^U = U_1 + U_2 + \cdots + U_N$$

- The Rawlsian social welfare function maximizes the utility of the worst-off member of society:

$$SWF^R = \min(U_1, U_2, \dots, U_N)$$

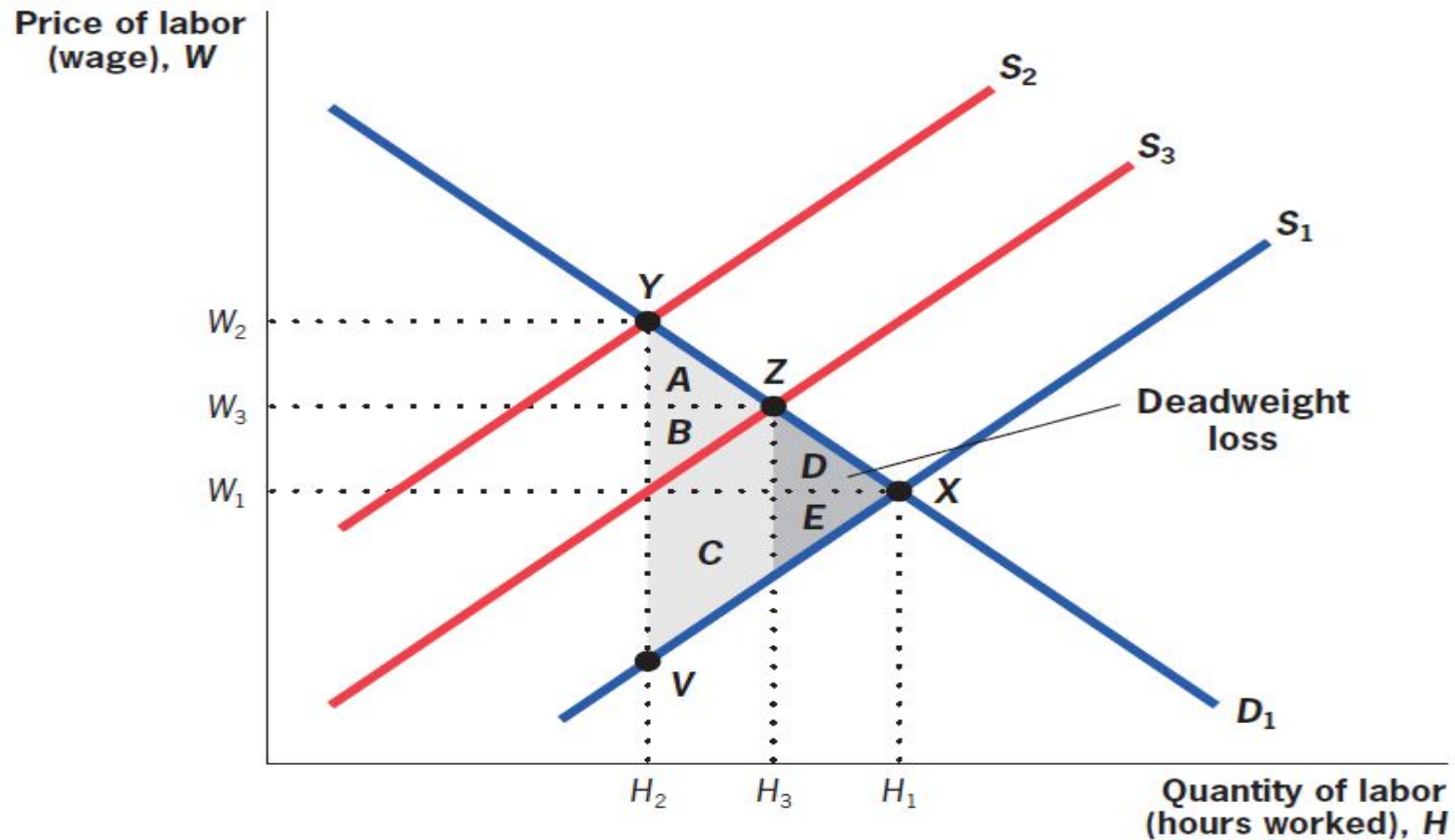
Choosing an Equity Criterion

Social welfare functions reflect different possible equity criteria, including:

- **Commodity egalitarianism:** The principle that society should ensure that individuals meet a set of basic needs, but that beyond that point income distribution is irrelevant.
- **Equality of opportunity:** The principle that society should ensure that all individuals have equal opportunities for success but not focus on the outcomes of choices made.

2.4

Welfare Implications of Benefit Reductions: The TANF Example Continued: Efficiency



Welfare Implications of Benefit Reductions: The TANF Example Continued: Equity

Increasing TANF benefits reduces efficiency. Is this a good thing?

- Governments have programs such as TANF because their citizens care not only about efficiency, but also about *equity*.
- While reducing TANF benefits may increase social *efficiency*, it need not increase social *welfare*.
- Overall conclusion depends on social welfare function.

Conclusions

- This chapter has shown both the power and the limitations of the theoretical tools of economics.
- Using theoretical tools, we are able to address complicated questions such as how TANF benefits affect the labor supply of single mothers, and the implications of that response for social welfare.
- On the other hand, we have been very imprecise about the potential size of the changes that occur in response to changes in TANF benefits.