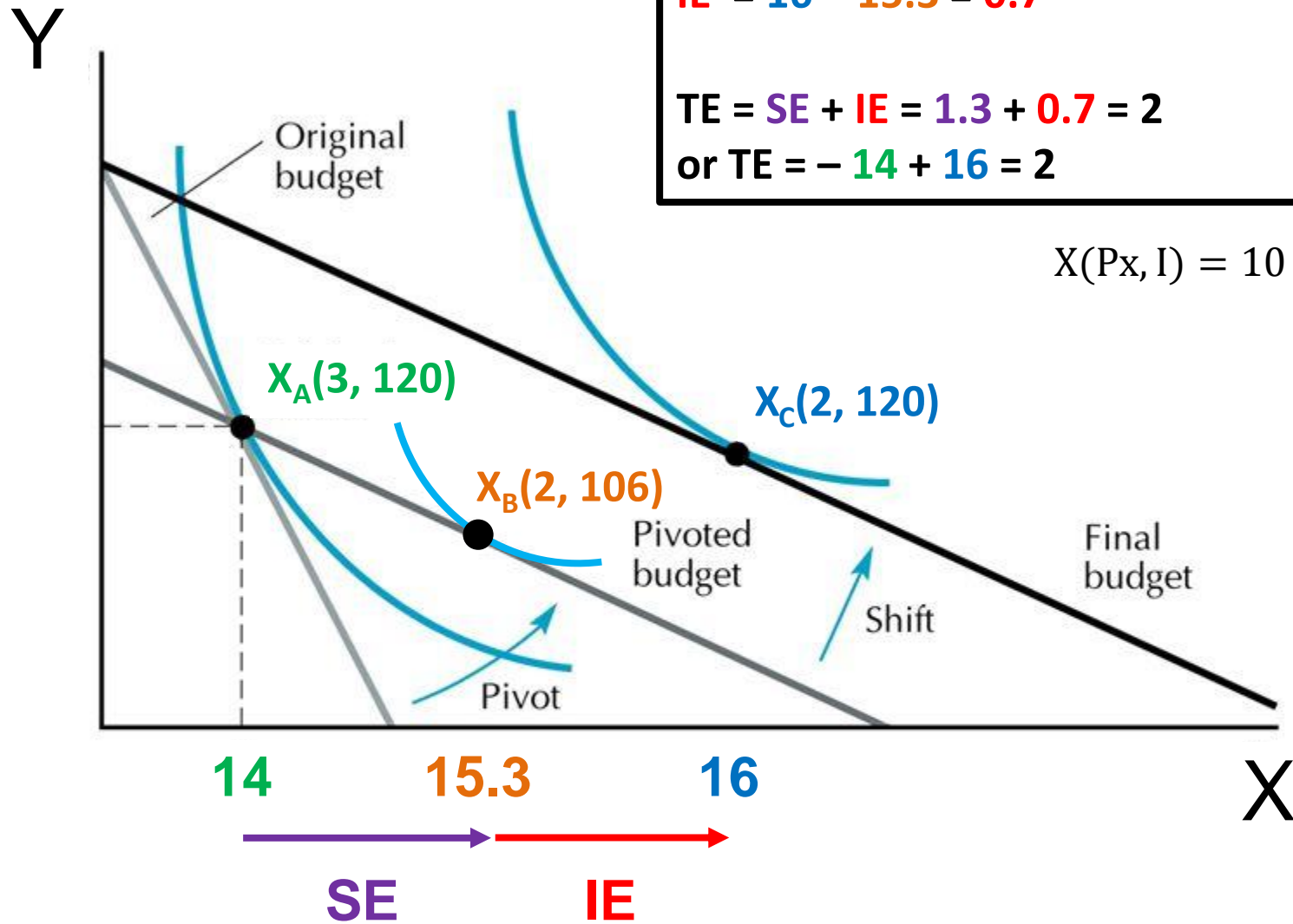


Topic 3 Part 4

The Theory of Demand (Chapter 5)



Pivot and shift

Income Compensation in Slutskian Method

- In the diagram before, Bundle B is on the BL with a lower income of \$106 although the consumer has the income of \$120. WHY?
- As previously mentioned in Topic 3 Part 2 Page 23, Slutskian and Hicksian Methods “**compensate**” income of the consumer when identifying the substitution effect.

Income Compensation in Slutskian Method

- **“Compensate”** refers to the approach that
 - Slutskian Method gives the consumer just enough money to get back to his original bundle A , so that his purchasing power is constant.
 - Hicksian Method gives the consumer just enough money to get back to his original utility, so that his utility is constant.

Income Compensation in Slutskian Method

- However, when P_x falls, it is obvious that the consumer can still get back to his original Bundle A, and he should have excess money to buy something else. Thus, his purchasing power is greater after P_x falls.
- Since Slutskian Method holds the purchasing power constant, money has to be taken from the consumer to reduce his purchasing power.
- This is why at Pivoted BL, Income falls to \$106.

Income Compensation in Slutskian Method

- Thus, according to Hicks and Slutsky, to “**compensate**” the consumer,
 - the income at the Pivoted BL will be reduced when P_x falls.
 - the income at the Pivoted BL will be raised when P_x rises.

LEARNING-BY-DOING EXERCISE 5.6



Income and Substitution Effects with a Quasilinear Utility Function

A college student who loves chocolate has a budget of \$10 per day, and out of that income she purchases chocolate x and a composite good y . The price of the composite good is \$1.

The quasilinear utility function $U(x, y) = 2\sqrt{x} + y$ represents the student's preferences. (See Chapter 3 for discussion of this kind of utility function.) For this utility function, $MU_x = 1/\sqrt{x}$ and $MU_y = 1$.

Problem

- Suppose the price of chocolate is initially \$0.50 per ounce. How many ounces of chocolate and how many units of the composite good are in the student's optimal consumption basket?
- Suppose the price of chocolate drops to \$0.20 per ounce. How many ounces of chocolate and how many units of the composite good are in the optimal consumption basket?
- What are the substitution and income effects that result from the decline in the price of chocolate? Illustrate these effects on a graph.

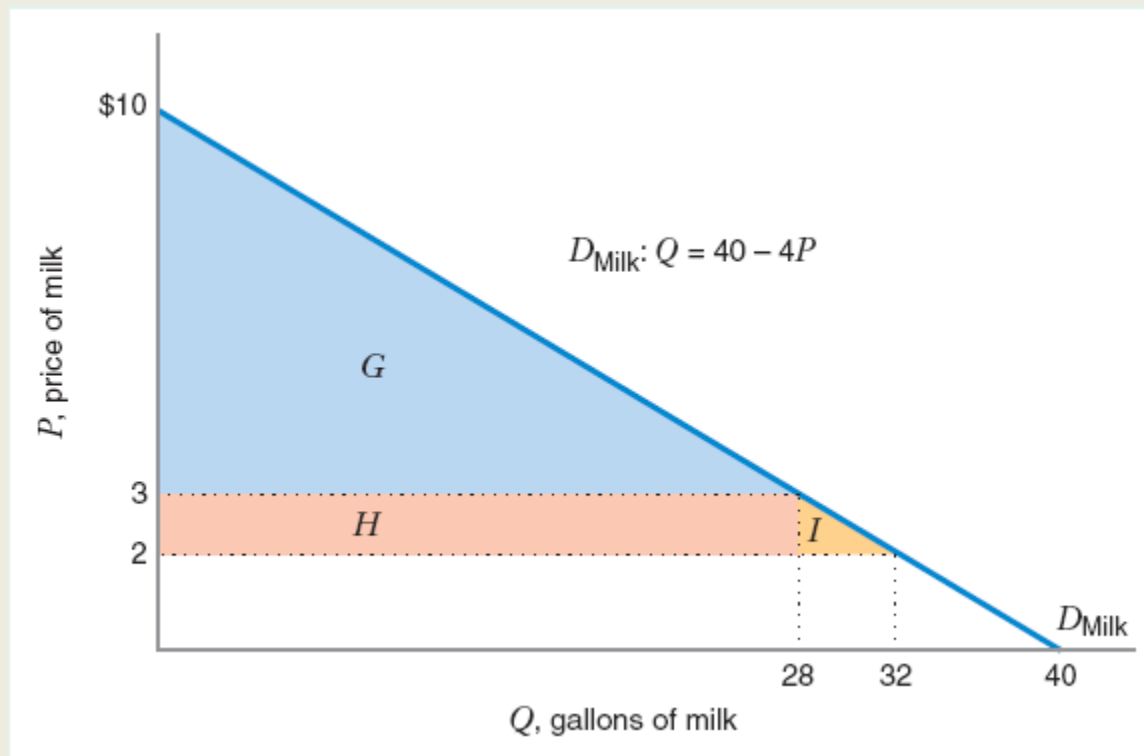
Ans(c): SE = 21, IE = 0

Consumer Surplus

- The individual's demand curve can be seen as the individual's *willingness to pay* curve.
- On the other hand, the individual *actually* pay the market price for (all) the units consumed.
- Consumer Surplus is the difference between what the consumer is willing to pay and what the consumer actually pays.

Consumer Surplus

The area *under* an ordinary demand curve and *above* the market price provides a measure of consumer surplus.



Consumer Welfare (Hicksian Approach)

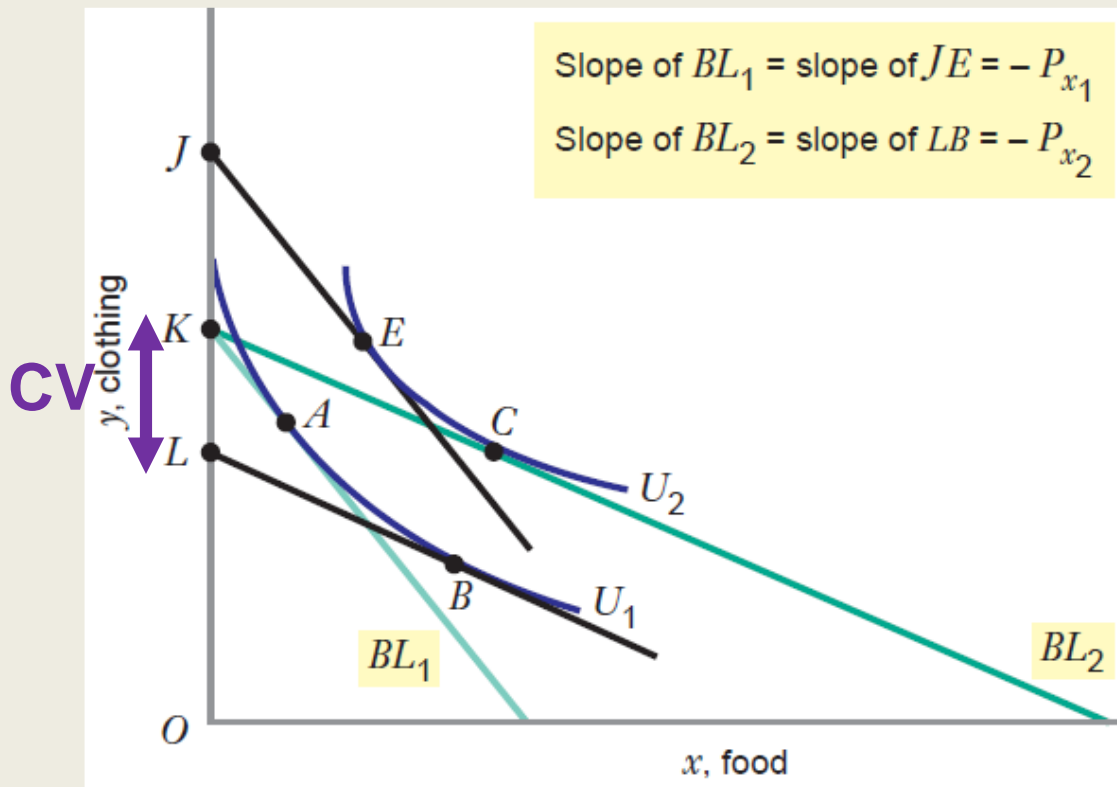
- Economists often measure the impact of price changes on a consumer's well-being in monetary terms.
- This is why we learn about consumer surplus.
- Other measures include
 - Compensating Variation (CV)
 - Equivalent Variation (EV)

Compensating Variation (CV) is calculated by $K - L$.

The amount of additional money a consumer would need to reach his initial utility after a change in prices.

CV: Difference b/w the income required to buy A at initial price and the income required to buy B (SE bundle) at final price.

Y is a composite good with $P_y = 1$.

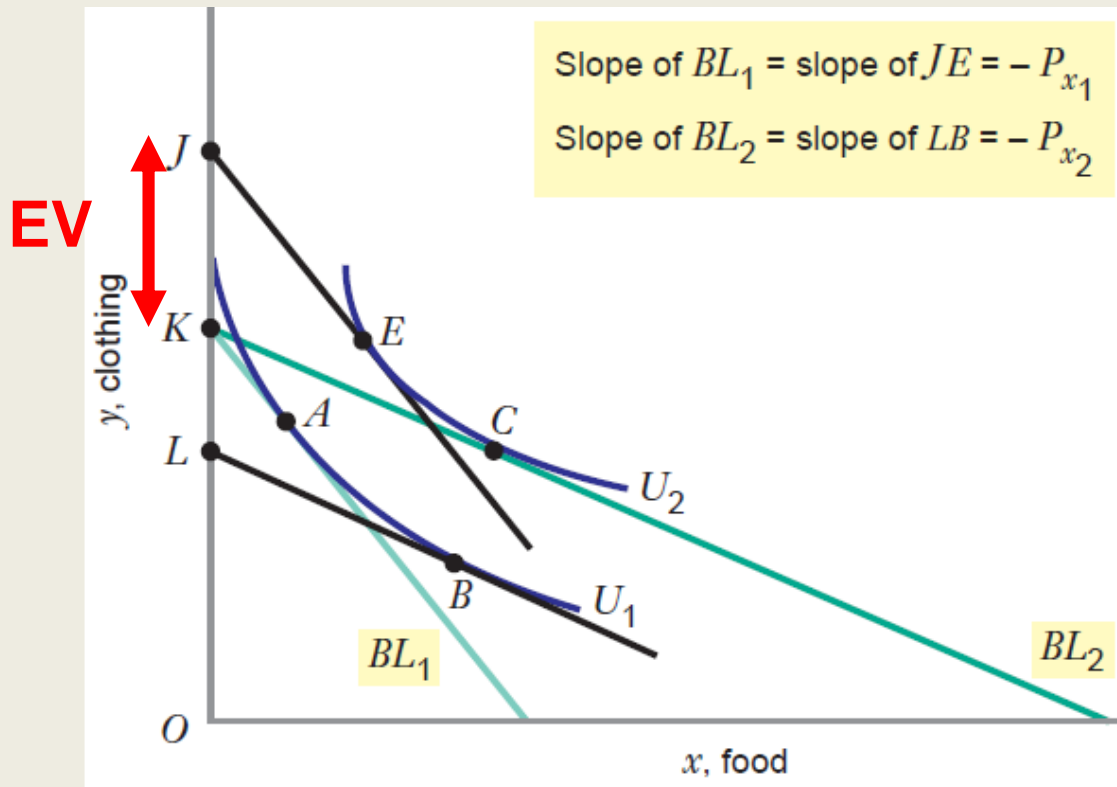


Equivalent Variation (EV) is calculated by $J - K$.

The change in income, at current prices, that would have the same effect on consumer welfare as would the change in prices, at current income.

EV: Difference b/w the income required to buy A at initial price and the income required to buy E at initial price.

Note: E gives the same utility as C does.



Y is a composite good with $P_y = 1$.

Applications of the Theory of Demand

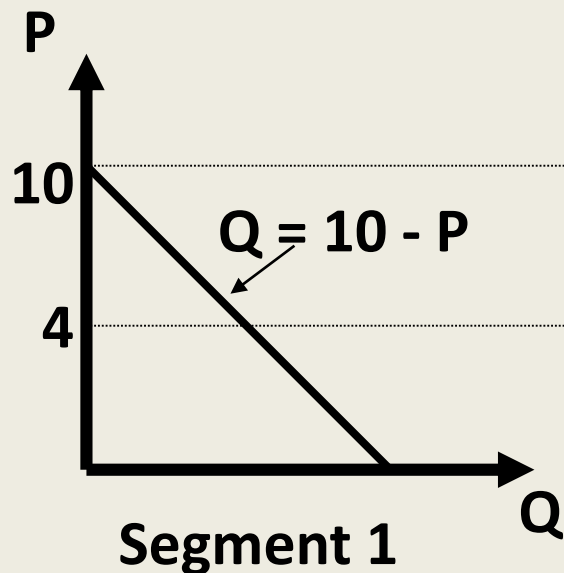
- Market Demand and Network Externalities
- Demand for Leisure and Supply for Labor
- Consumer Price Index

Market Demand

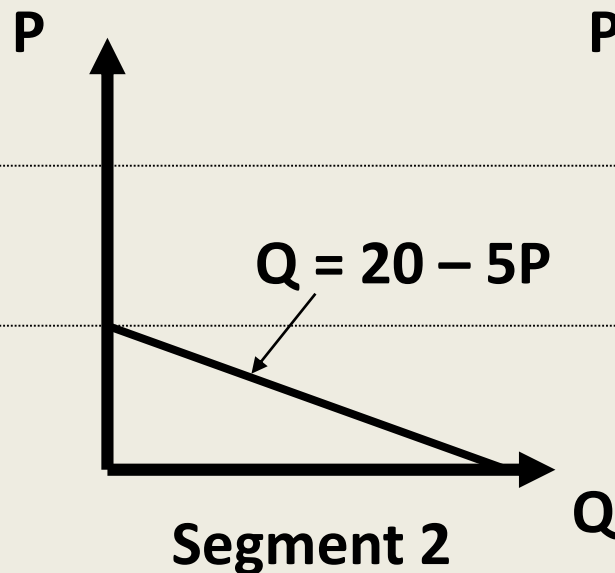
The **market demand function** is the horizontal sum of the individual demands.

In other words, market demand is obtained **by adding the quantities demanded by the individuals (or segments) at each price** and plotting this total quantity for all possible prices.

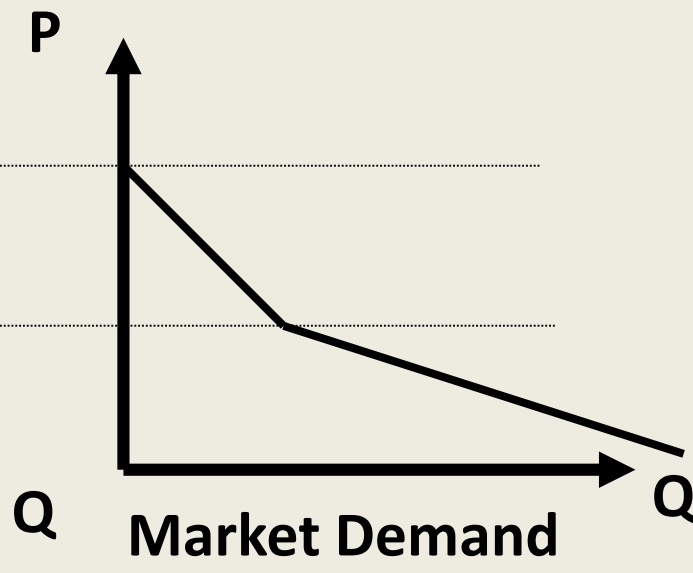
Market Demand



$$Q_1 = 10 - P, \text{ for } P < 10$$
$$Q_1 = 0, \text{ for } P \geq 10$$



$$Q_2 = 20 - 5P, \text{ for } P < 4$$
$$Q_2 = 0, \text{ for } P \geq 4$$



$$Q_M = 30 - 6P, \text{ for } P < 4$$
$$Q_M = 10 - P, \text{ for } 4 \leq P < 10$$
$$Q_M = 0, \text{ for } P \geq 10$$

Exercise

Suppose there are 10 identical consumers whose individual inverse demand is given by $P = 20 - 2Q$. Derive the market demand function.

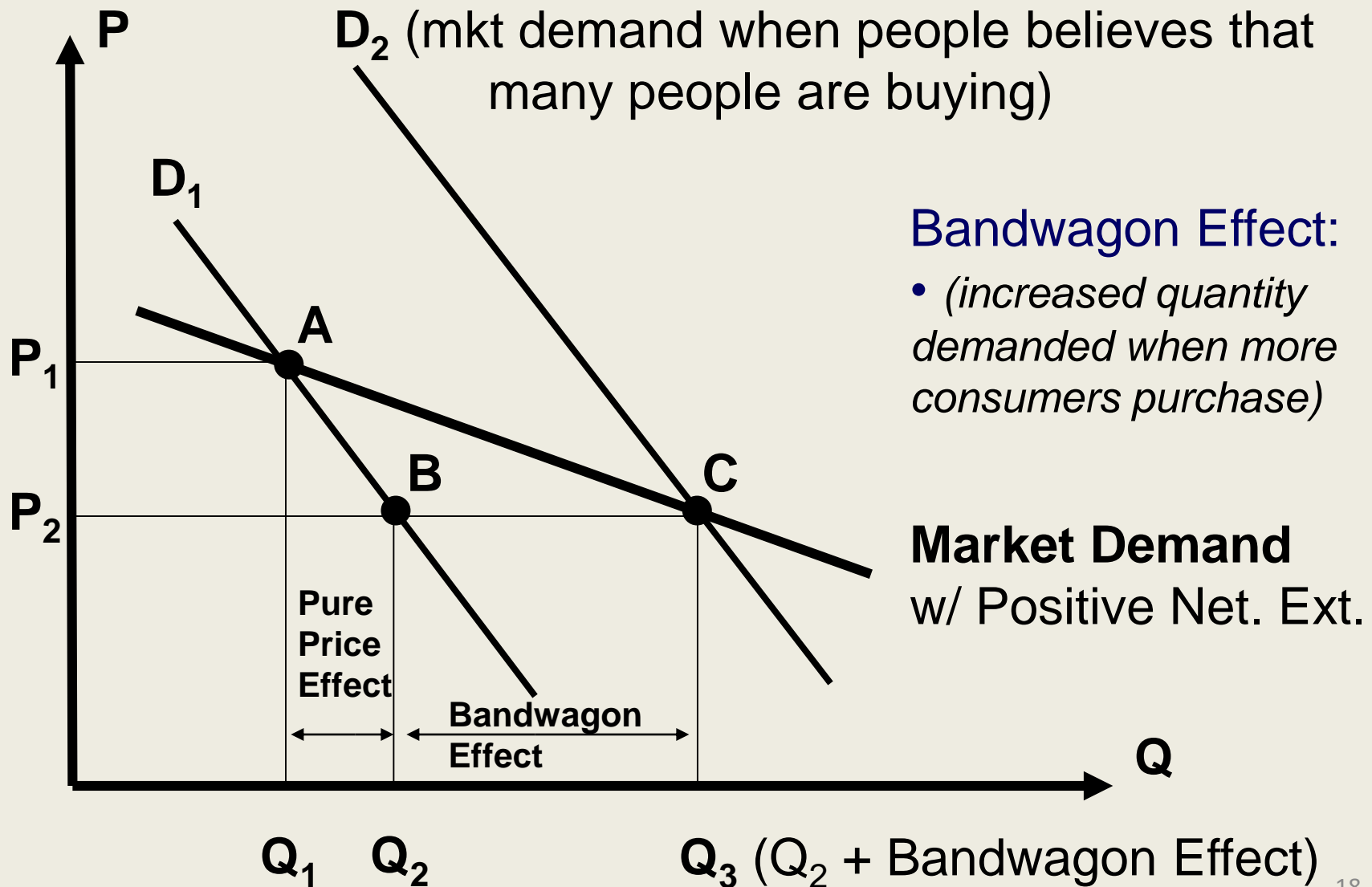
Network Externalities

- If one consumer's demand for a good changes with the number of other consumers who buy the good, there are **network externalities**.
- For example, think about a food review on YouTube. Your demand for the food may increase when there are many people buying the same food.

Network Externalities

- **Bandwagon effect:** A positive network externality that refers to the increase in each consumer's demand for a good as more consumers buy the good.
- For example, Facebook likely confers positive network externalities since it is more useful to a user if more people are using it as well.

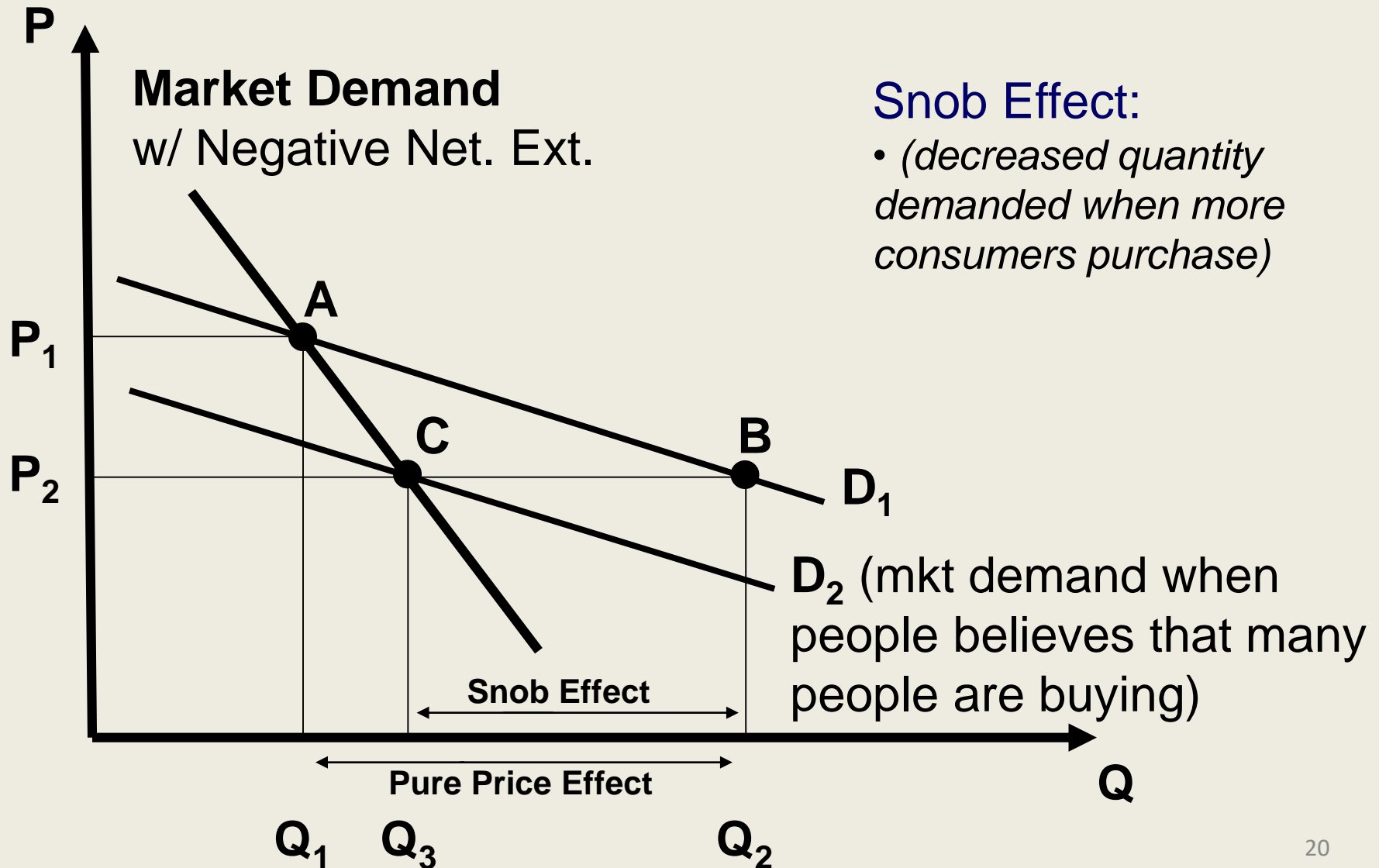
Network Externalities



Network Externalities

- **Snob effect:** A negative network externality that refers to the decrease in each consumer's demand as more consumers buy the good.
- For example, a road can confer negative network externalities since a driver on the road creates traffic for other drivers.

Network Externalities



Labor-Leisure Trade-off

- All workers face labor-leisure trade-off.
- They have 24 hours a day, which are allocated between working and resting.
- Workers value both income from working and their leisure time.
- MU for both are positive but diminishing.

Key Ideas

- **One can think of “wage” as “price of leisure”** since when we rest, we forego wage income.
- Leisure is a normal good: as income rise, people want to consume more leisure.

Key Ideas

- Now, if wage rises, leisure becomes more expensive.
- SE implies that workers will work more.
- IE implies that, with more money from higher wage, workers can work less and rest more.
- Two effects work in the opposite directions.

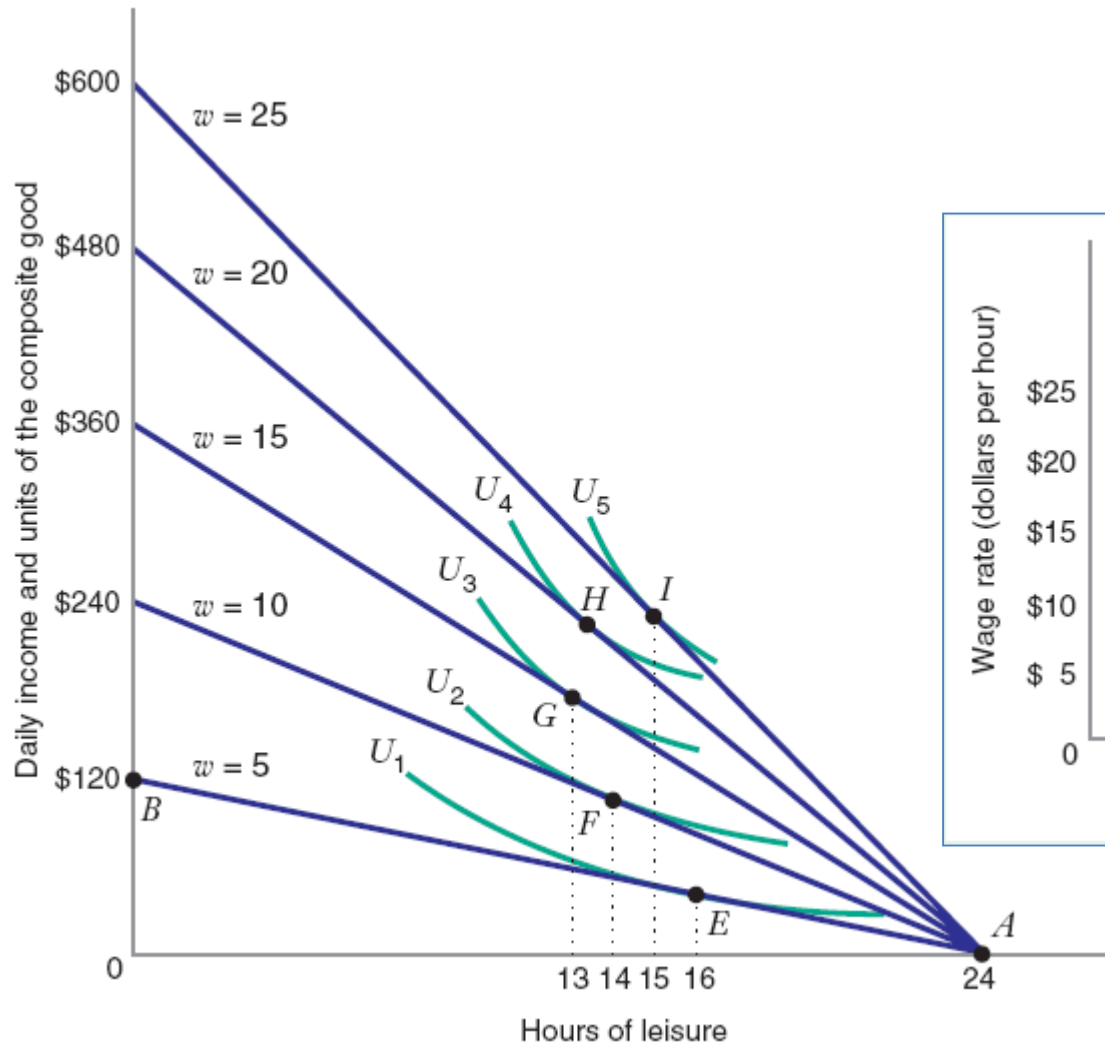
Labor Supply Curve

- The labor supply curve slopes upward over the region where the SE associated with the wage increase outweighs the IE.
- Because leisure is more expensive, workers substitute away from leisure and work more.

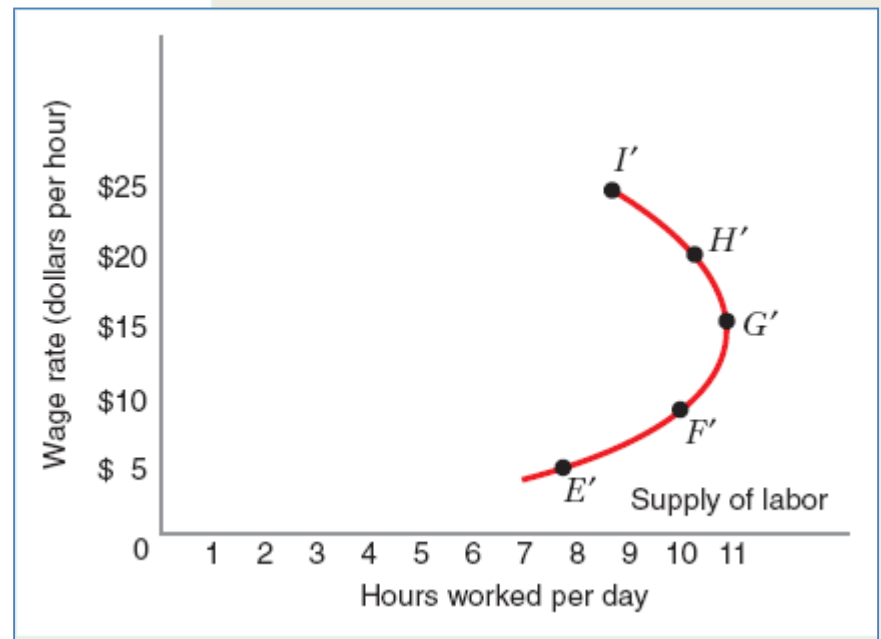
Labor Supply Curve

- The labor supply curve bends backward over the region where the IE outweighs the SE.
- Given a higher wage, workers now become richer. Since leisure is a normal good, more leisure is consumed, and workers work less.

Labor Supply Curve



Backward-Bending Labor Supply



Hrs of Leisure
Hrs of Work

Consumer Price Index (CPI)

- CPI is an index (a number) that tells us about the cost of living of typical consumers.
- It measures changes in the price level and can be used to calculate the inflation rate.
- CPI is a fixed-weight index, calculated from a fixed basket of goods.

Consumer Price Index (CPI)

- Since CPI is calculated from a fixed basket of goods, it ignores the fact that people would “substitute” expensive goods with cheaper goods.
- **This is called the “substitution bias” and causes CPI to overestimate the cost of living when the price level rises.**

Consumer Price Index (CPI)

Example

- Assume a consumer buys two goods: food with $P_{F,1} = \$3$ and clothing with $P_{C,1} = \$8$.
- At these prices, the consumer buy 80 units of food and 30 units of clothing, $(F, C) = (80, 30)$.
- Thus, the cost of living before the price change is \$480.

Consumer Price Index (CPI)

Example (cont)

- Suppose the prices of food and clothing rises; the new prices are $P_{F,2} = \$6$ and $P_{C,2} = \$9$.
- CPI assumes that the consumer would still buy the original bundle, $(F, C) = (80, 30)$. With this approach, the cost of living after the price change would be \$750.
- $CPI = 750/480 = 1.56$. Inflation = 56%.

Consumer Price Index (CPI)

Example (cont)

- In reality, there exists a bundle that could give the consumer the same happiness as $(F, C) = (80, 30)$.
- From the diagram, such bundle is $(40, 60)$ and costs \$720 after the price change.
- If CPI were to account for the substitution, CPI would be $720/480 = 1.5$. Inflation = 50%.

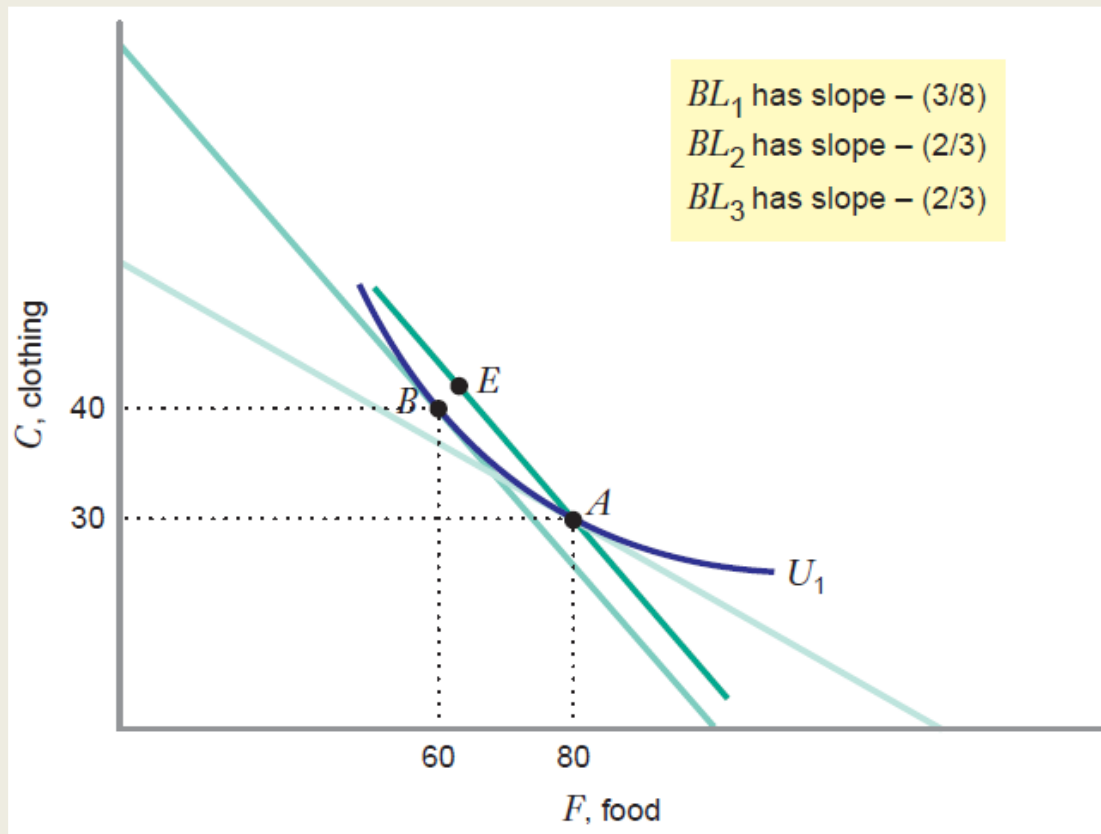


FIGURE 5.27 Substitution Bias in the Consumer Price Index

In year 1 the consumer has an income of \$480, the price of food is \$3, and the price of clothing is \$8. The consumer chooses basket A. In year 2 the price of food rises to \$6, and the price of clothing rises to \$9. The consumer could maintain his initial level of utility U_1 at the new prices by purchasing basket B, costing \$720. An ideal cost of living index would be 1.5 ($=\$720/\480), telling us that the cost of living has increased by 50 percent. However, the actual CPI assumes the consumer does not substitute clothing for food as relative prices change, but continues to buy basket A at the new prices, for which he would need an income of \$750. The CPI ($\$750/\$480 = 1.56$) suggests that the consumer's cost of living has increased by about 56 percent, which overstates the actual increase in the cost of living. In fact, if the consumer's income in year 2 were \$750, he could choose a basket such as E on BL_3 and achieve a higher level of utility than U_1 .