Microeconomics

- Ordinal Utility

Indifference Curve, Budget Line And Consumer Equilibrium

Indifference Curve

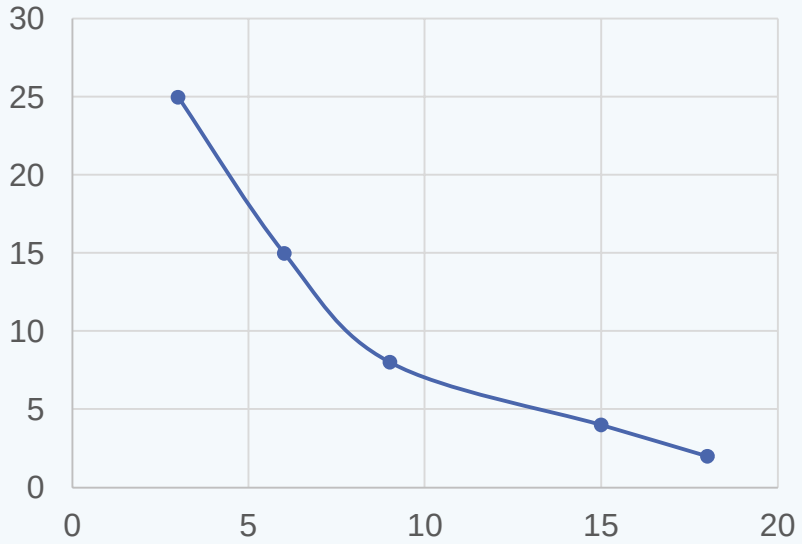
Based on Ordinal Approach

Explains behaviour of consumer in terms of his preferences.

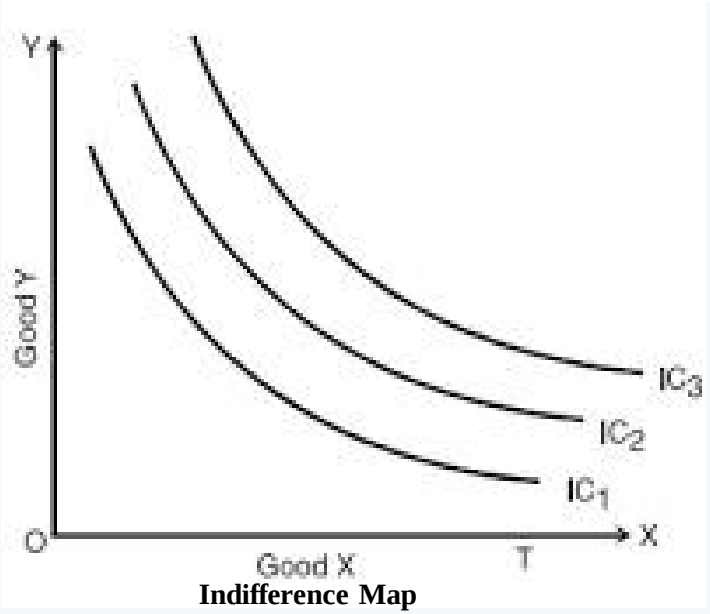
- **Indifference curve may be defined as locus of points, each representing a different combination of two substitute goods, which yield the same utility or level of satisfaction to the consumer.**

Indifference curve is derived from indifference schedule.

Combination	Units of Y	Units of X	Total Utility
A	25	3	U
B	15	6	U
C	8	9	U
D	4	12	U
E	2	15	U



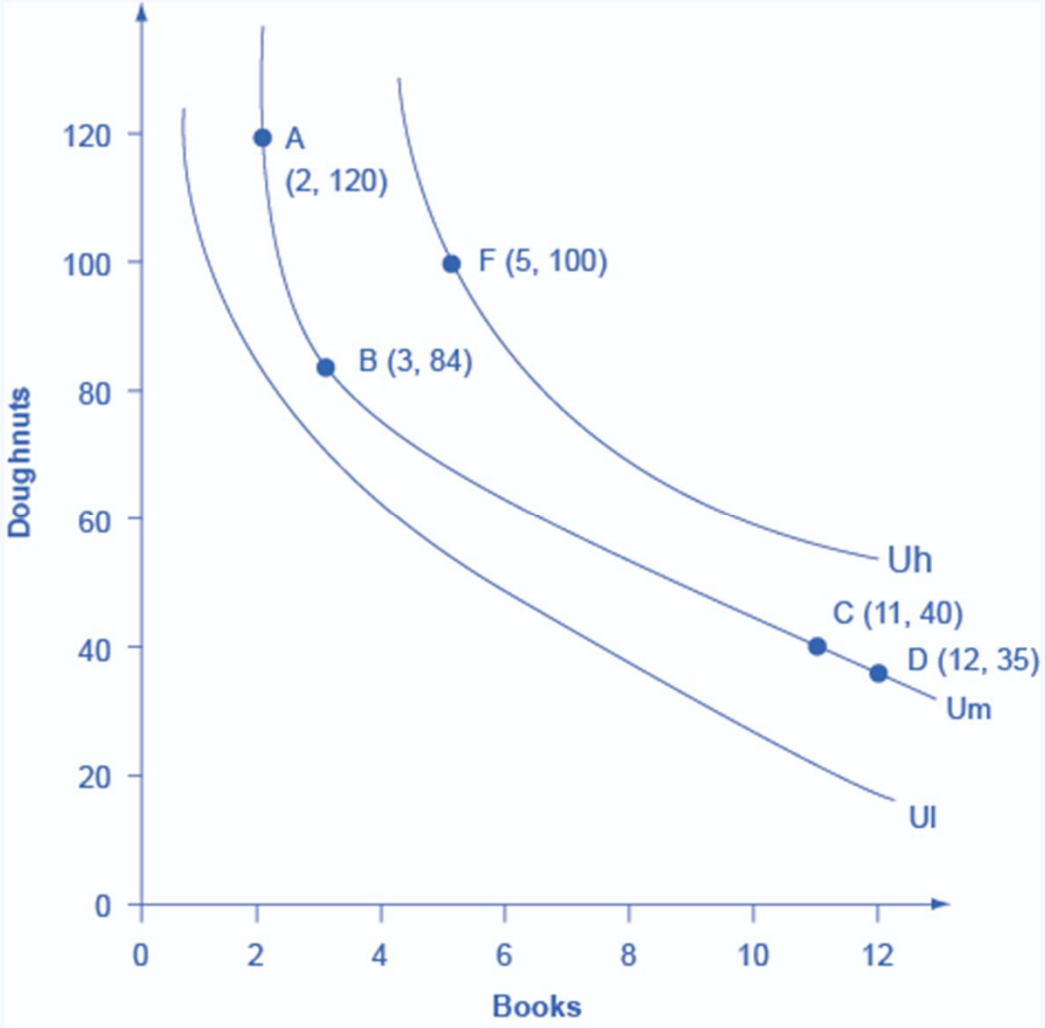
Indifference Curve



Indifference Map

Indifference Curves

- An indifference curve shows all combinations of goods that provide an equal level of utility or satisfaction
- Each indifference curve (Ul, Um, and Uh) represents one level of utility
- The indifference curve Um has four points labeled on it: A, B, C, and D
- Consider Lilia's preferences for the tradeoffs that she faces in her two main relaxation activities: eating doughnuts and reading paperback books



The Shape of an Indifference Curve

- Since an indifference curve represents a set of choices that have the same level of utility, Lilia must receive an equal amount of utility
- She would also receive the same utility from any of the unlabeled intermediate points along this indifference curve
- Indifference curves have a roughly similar shape in two ways:
  1. They are downward sloping from left to right
  2. They are convex with respect to the origin. In other words, they are steeper on the left and flatter on the right
- The downward slope of the indifference curve means that Lilia must trade off less of one good to get more of the other, while holding utility constant

The Field of Indifference Curves

- Each indifference curve represents the choices that provide a single level of utility
- Every level of utility will have its own indifference curve
- Lilia's preferences will include an infinite number of indifference curves lying nestled together on the diagram
- These arguments about the shapes of indifference curves and about higher or lower levels of utility do not require any numerical estimates of utility

The Individuality of Indifference Curves

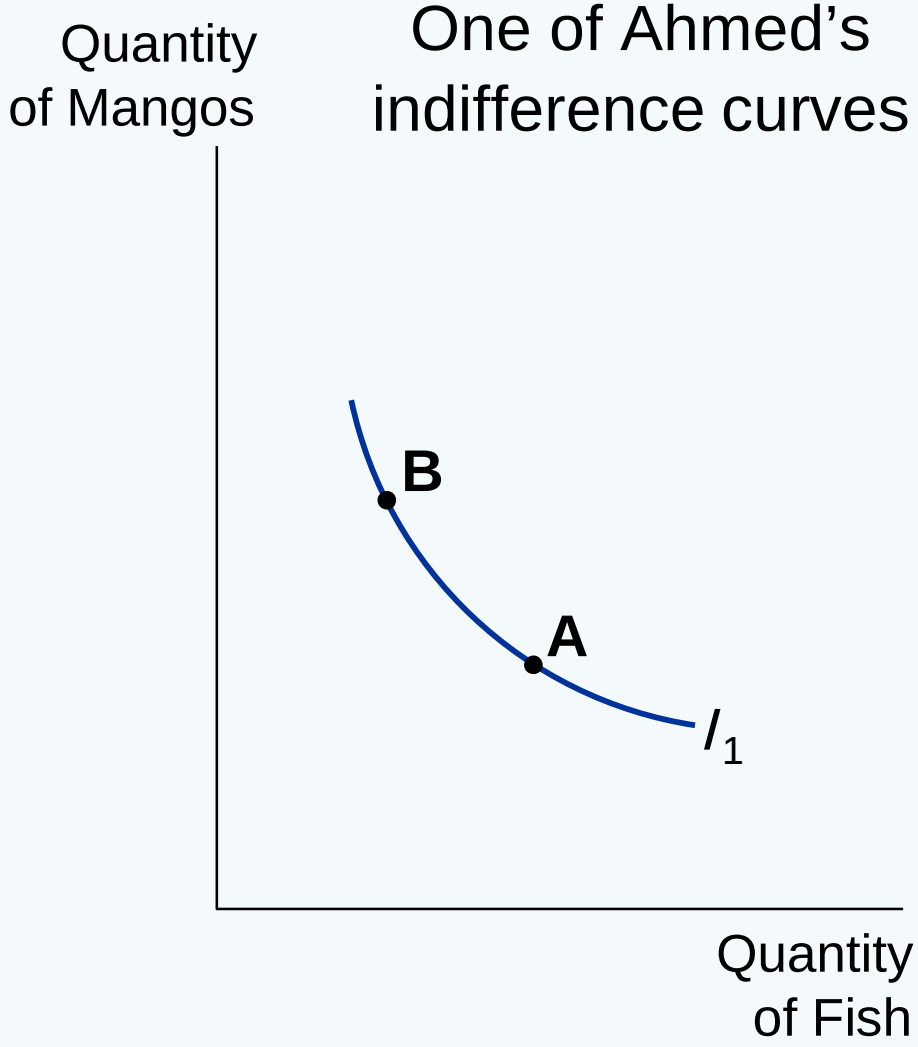
- Each person determines his or her own preferences and utility
- While indifference curves have the same general shape—they slope down, and the slope is steeper on the left and flatter on the right—the specific shape of indifference curves can be different for every person
- People seek the highest level of utility, which means that they wish to be on the highest possible indifference curve, but people are limited by their budget constraints

Preferences: What the Consumer Wants

Indifference curve: shows consumption bundles that give the consumer the same level of satisfaction

A, **B**, and all other bundles on I_1 make Ahmed equally happy – he is *indifferent* between them.

One of Ahmed's indifference curves



Properties Of Indifference Curve

- Negatively sloping
- Neither intersect nor be tangent with one another
- Higher the indifference curve represent a higher level of satisfaction.
- Convex to origin

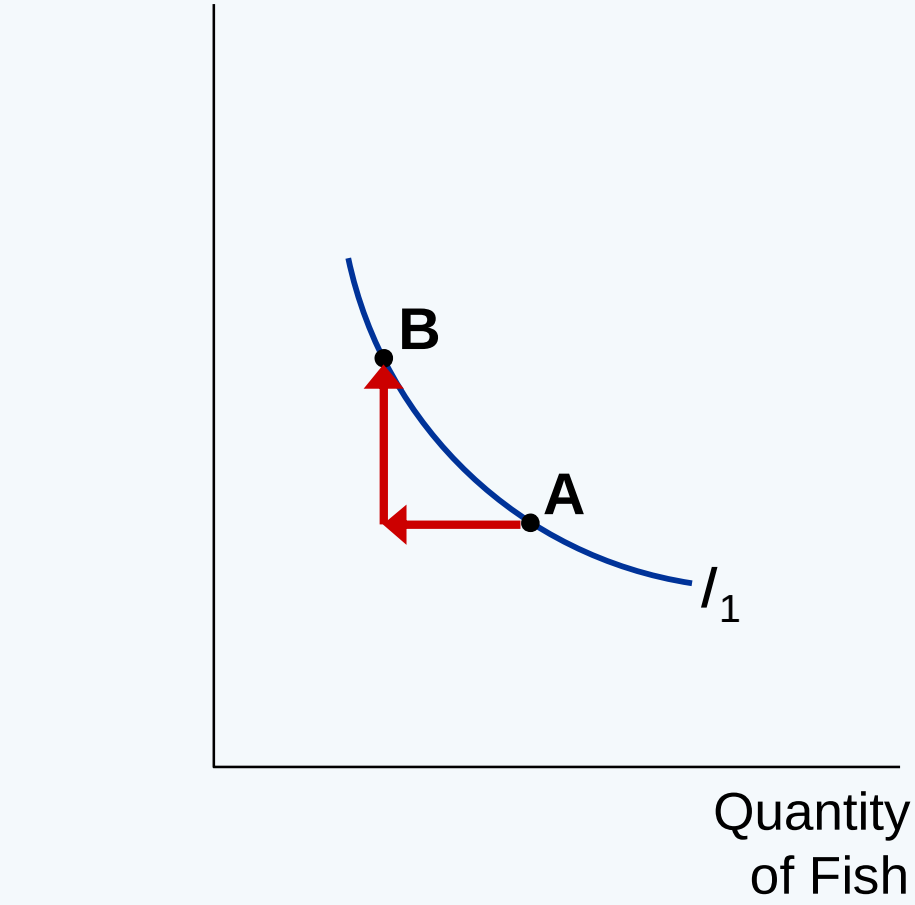
Four Properties of Indifference Curves

1. Indifference curves are downward-sloping.

If the quantity of fish is reduced,

the quantity of mangos must be increased to keep Ahmed equally happy.

One of Ahmed's indifference curves



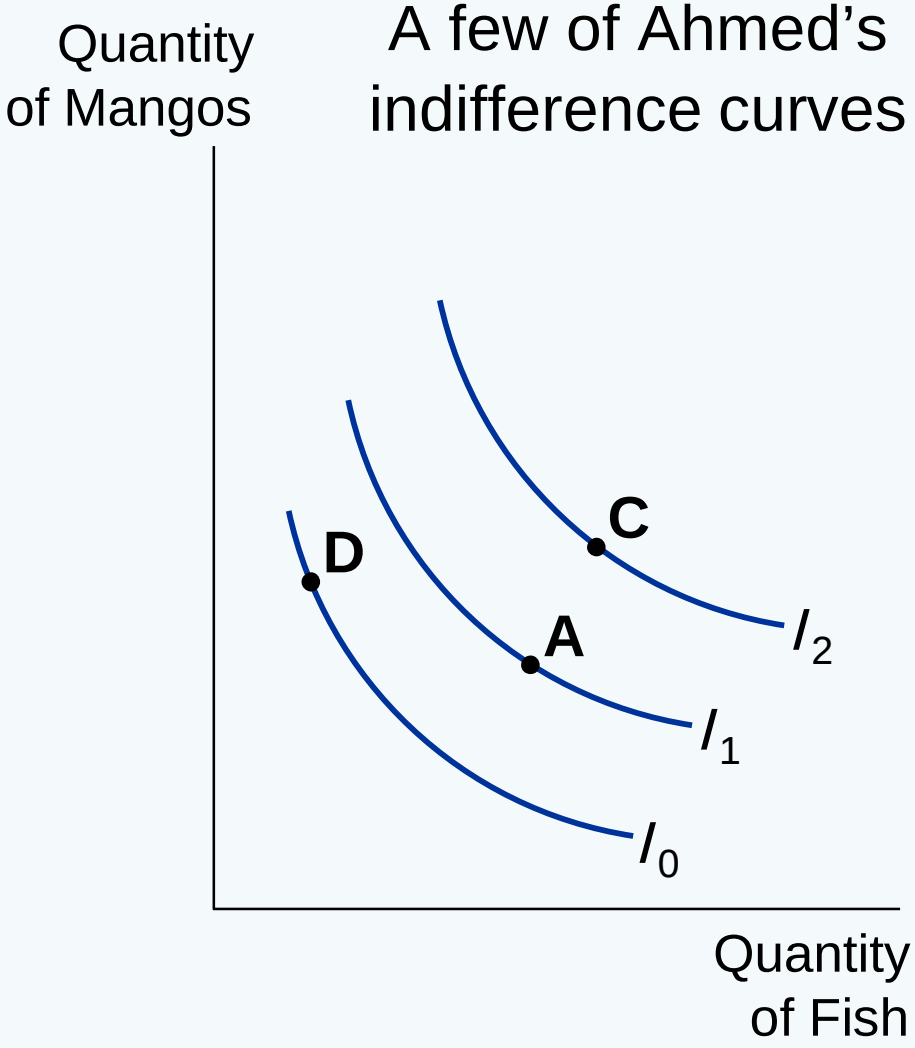
Four Properties of Indifference Curves

2. Higher indifference curves are preferred to lower ones.

Ahmed prefers every bundle on I_2 (like **C**) to every bundle on I_1 (like **A**).

He prefers every bundle on I_1 (like **A**) to every bundle on I_0 (like **D**).

A few of Ahmed's indifference curves



Four Properties of Indifference Curves

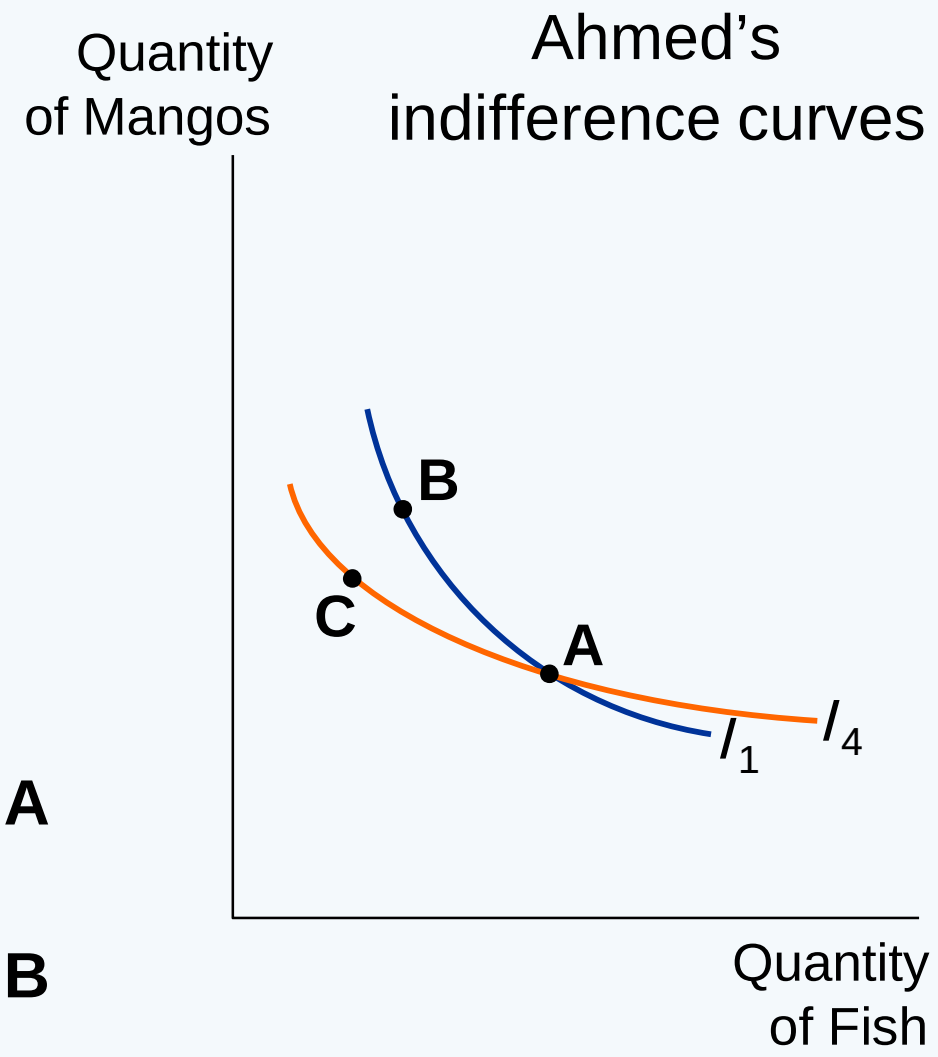
3. Indifference curves cannot cross.

Suppose they did.

Ahmed should prefer **B** to **C**, since **B** has more of both goods.

Yet, Ahmed is indifferent between **B** and **C**:

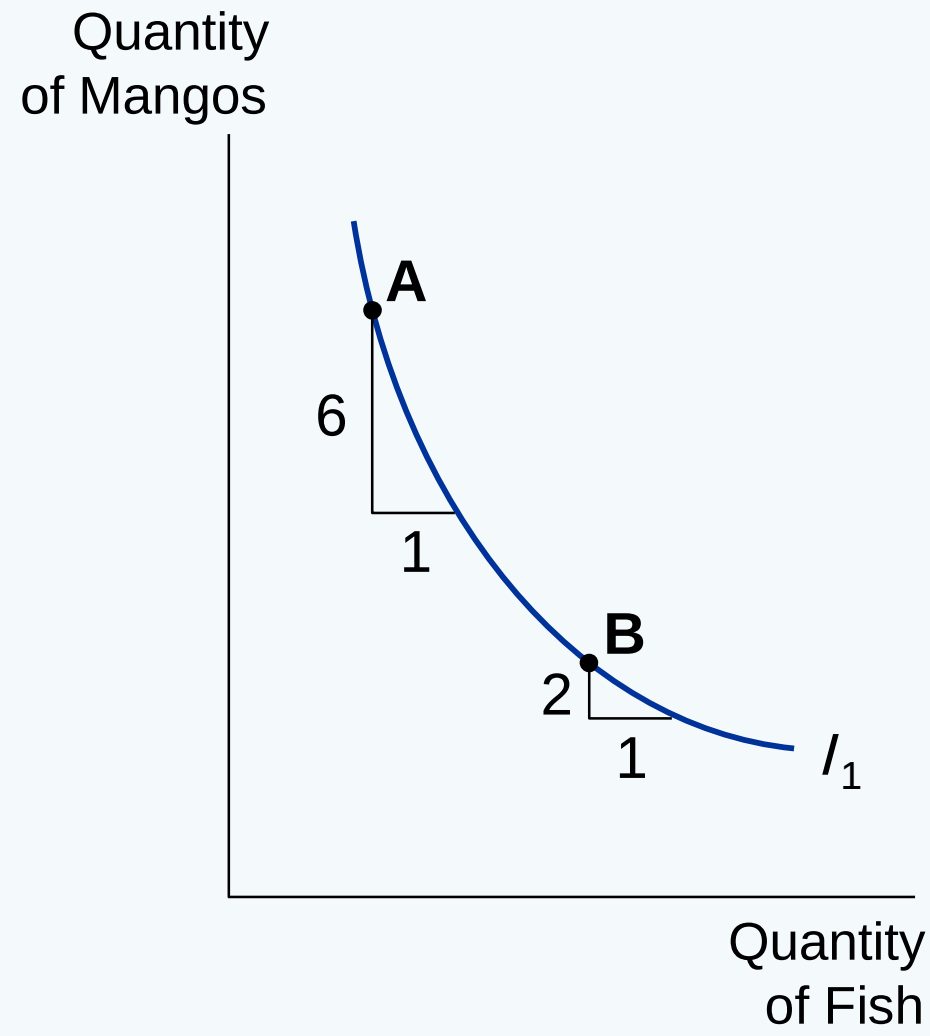
- He likes **C** as much as **A** (both are on I_4).
- He likes **A** as much as **B** (both are on I_1).



Four Properties of Indifference Curves

4. Indifference curves are bowed inward.

Ahmed is willing to give up more mangos for a fish if he has few fish (**A**) than if he has many (**B**).



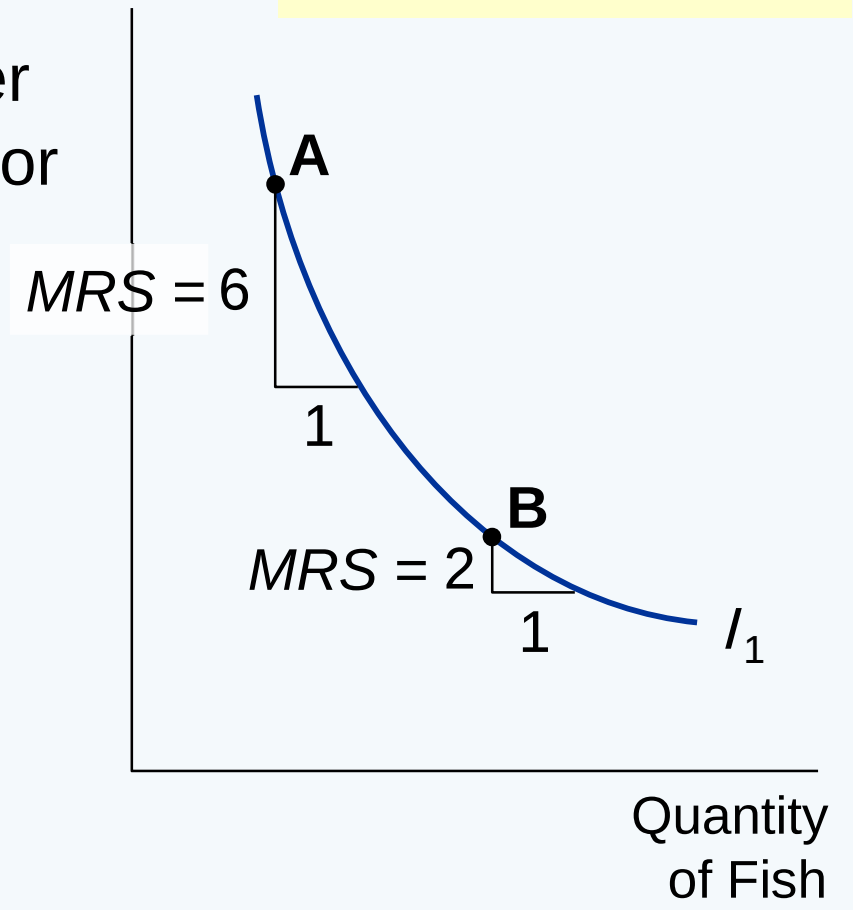
The Marginal Rate of Substitution

Marginal rate of substitution (MRS): the rate at which a consumer is willing to trade one good for another.

Ahmed's MRS is the amount of mangos he would substitute for another fish.

MRS falls as you move down along an indifference curve.

MRS = slope of indifference curve

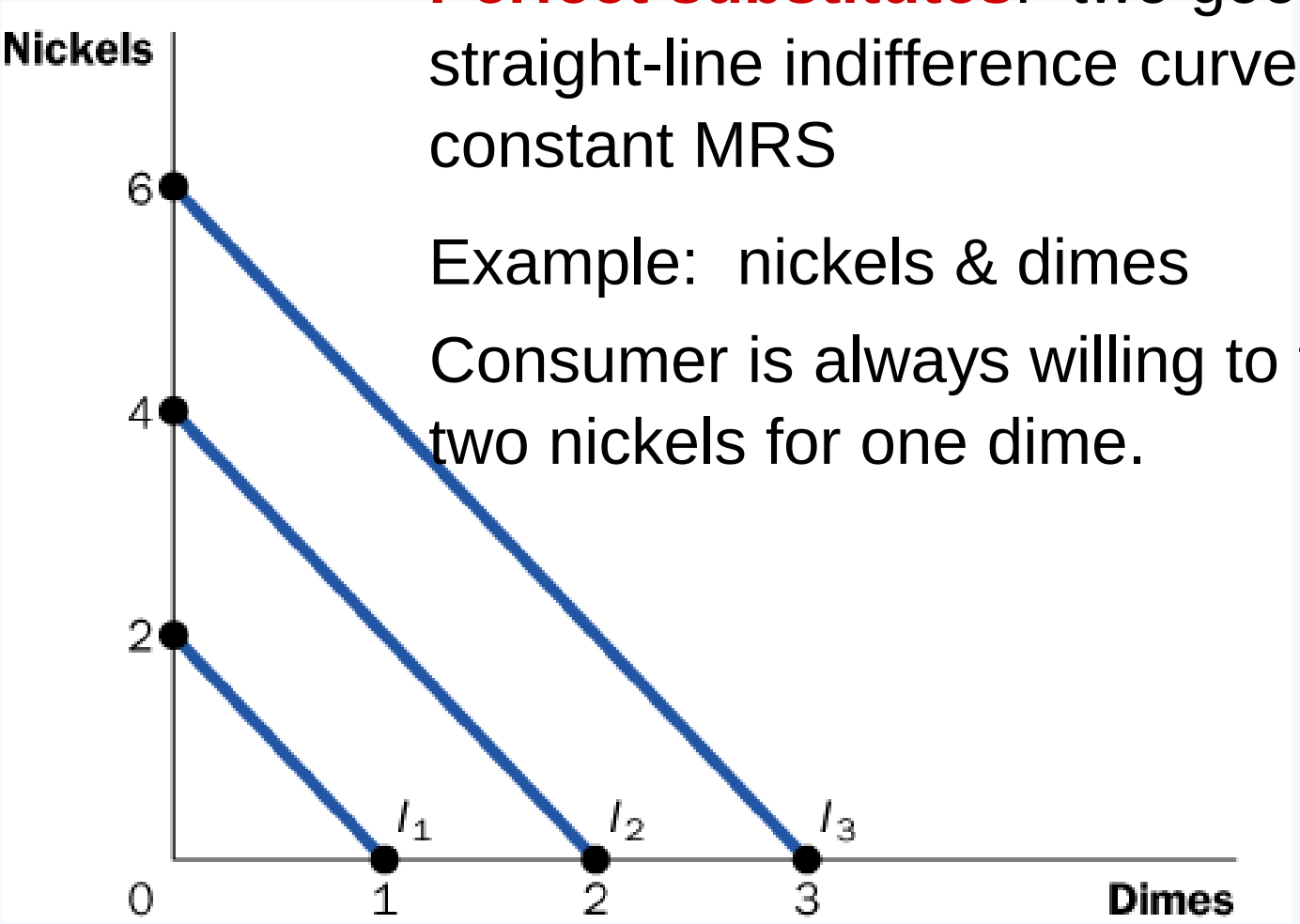


One Extreme Case: Perfect Substitutes

Perfect substitutes: two goods with straight-line indifference curves, constant MRS

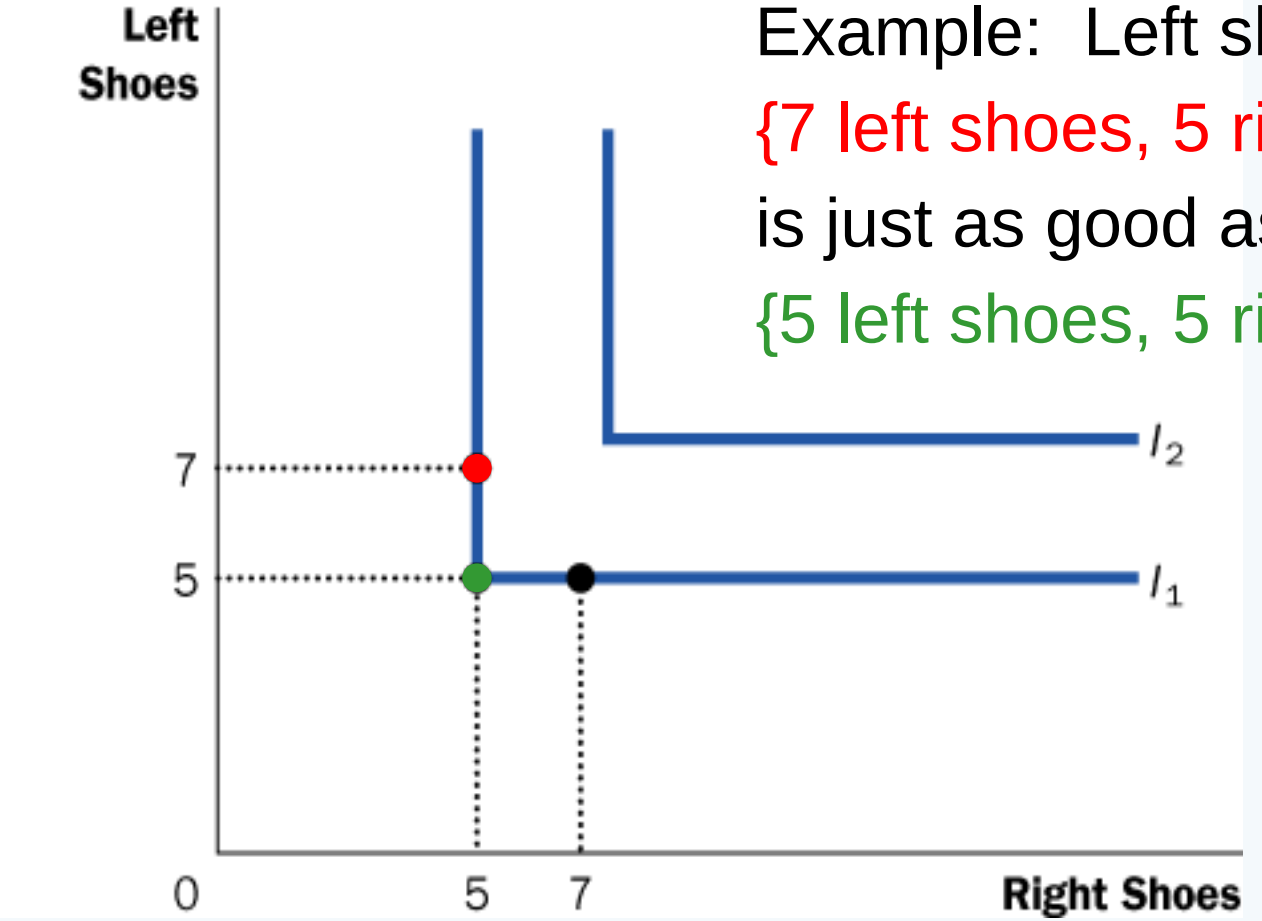
Example: nickels & dimes

Consumer is always willing to trade two nickels for one dime.



Another Extreme Case: Perfect Complements

Perfect complements: two goods with right-angle indifference curves



Example: Left shoes, right shoes

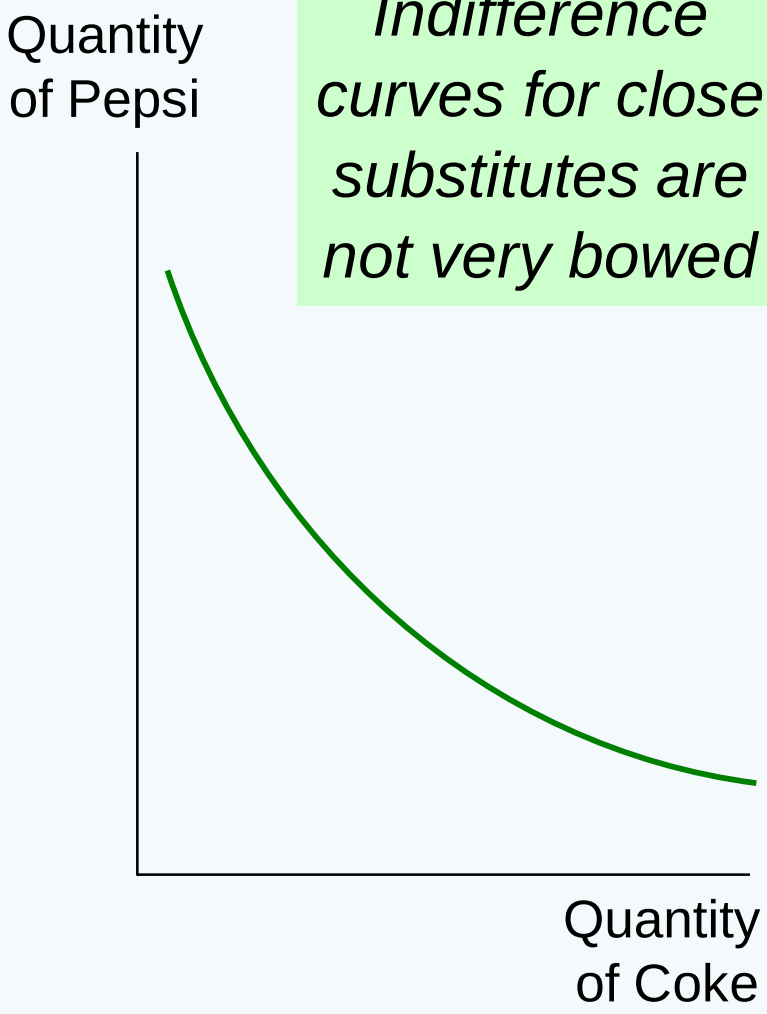
{7 left shoes, 5 right shoes}

is just as good as

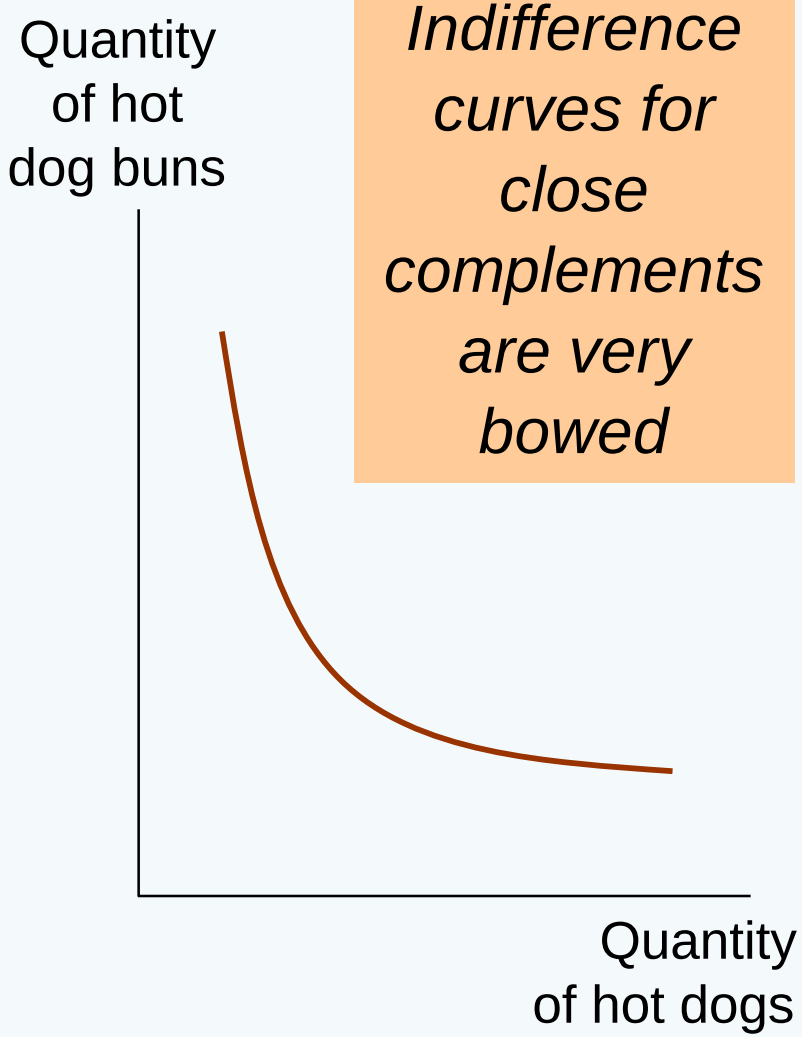
{5 left shoes, 5 right shoes}

Less Extreme Cases: Close Substitutes and Close Complements

Indifference curves for close substitutes are not very bowed



Indifference curves for close complements are very bowed



Budget Line

- A budget line shows all possible combination of two commodities that could be pursued with a given amount of income.
- straight line that slope downwards
- The budget line, also known as the budget constrain
- The equation of the budget line equation can be represented as follows:

$$M = Px \times Qx + Py \times Qy$$

- Where,

  Px = price of product X.

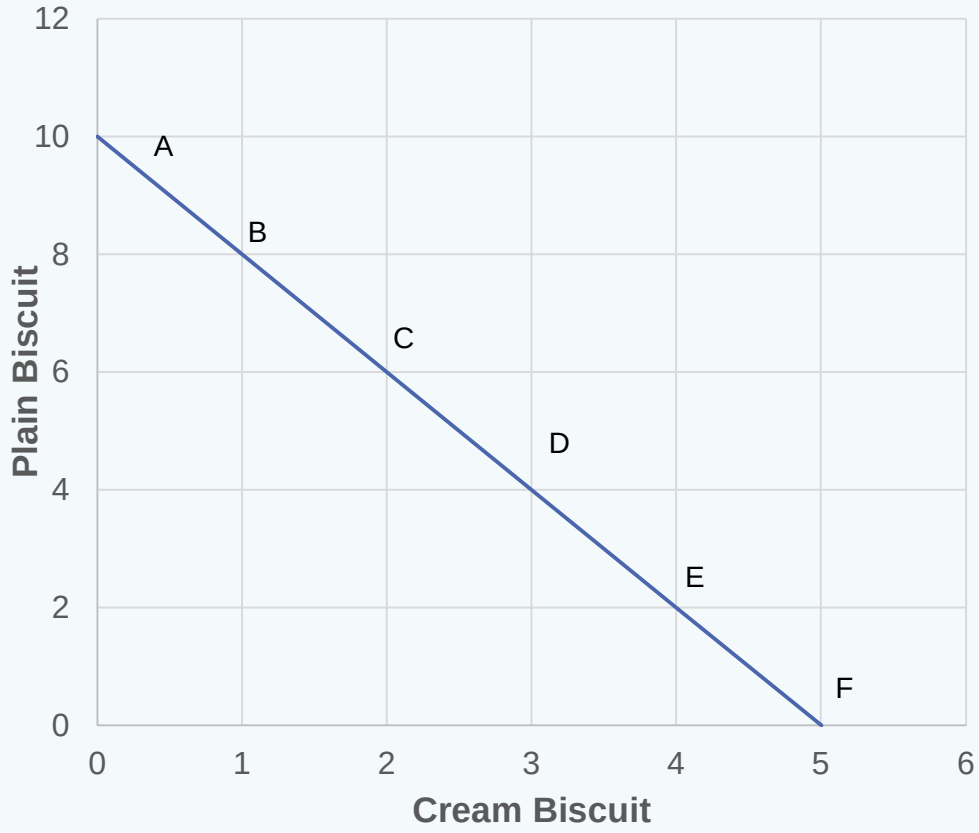
  Qx = the quantity of product X.

  Py = Price of product Y.

  Qy = quantity of product Y.

  M = consumer's income.

	Budget schedule		
Combination	Cream biscuit (@ ₹10 per packet)	Plain biscuit (@ ₹5 per packet)	Budget allocation
A	0	10	10 × 0 + 5 × 10 = 50
B	1	8	10 × 1 + 5 × 8 = 50
C	2	6	10 × 2 + 5 × 6 = 50
D	3	4	10 × 3 + 5 × 4 = 50
E	4	2	10 × 4 + 5 × 2 = 50
F	5	0	10 × 5 + 5 × 0 = 50

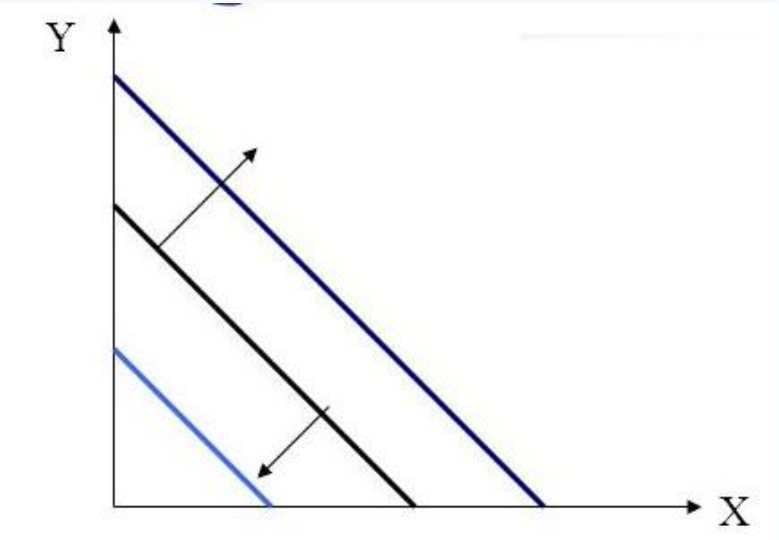


Change in budget line

- 1. Change in income

Increase lead to parallel outward shift

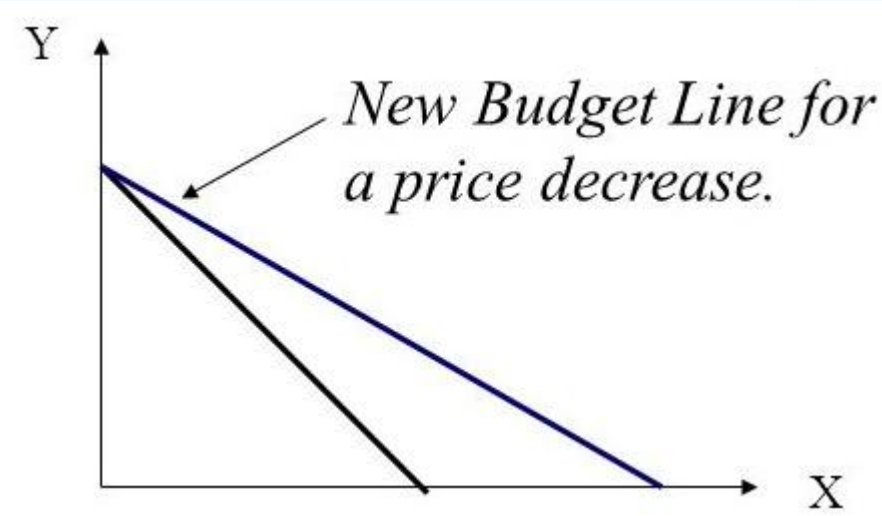
Decrease lead to parallel inward shift



- 2. Change in price-

A decrease in price of goods X rotate the line counter clockwise.

Increase in price of goods X rotate the line clockwise.

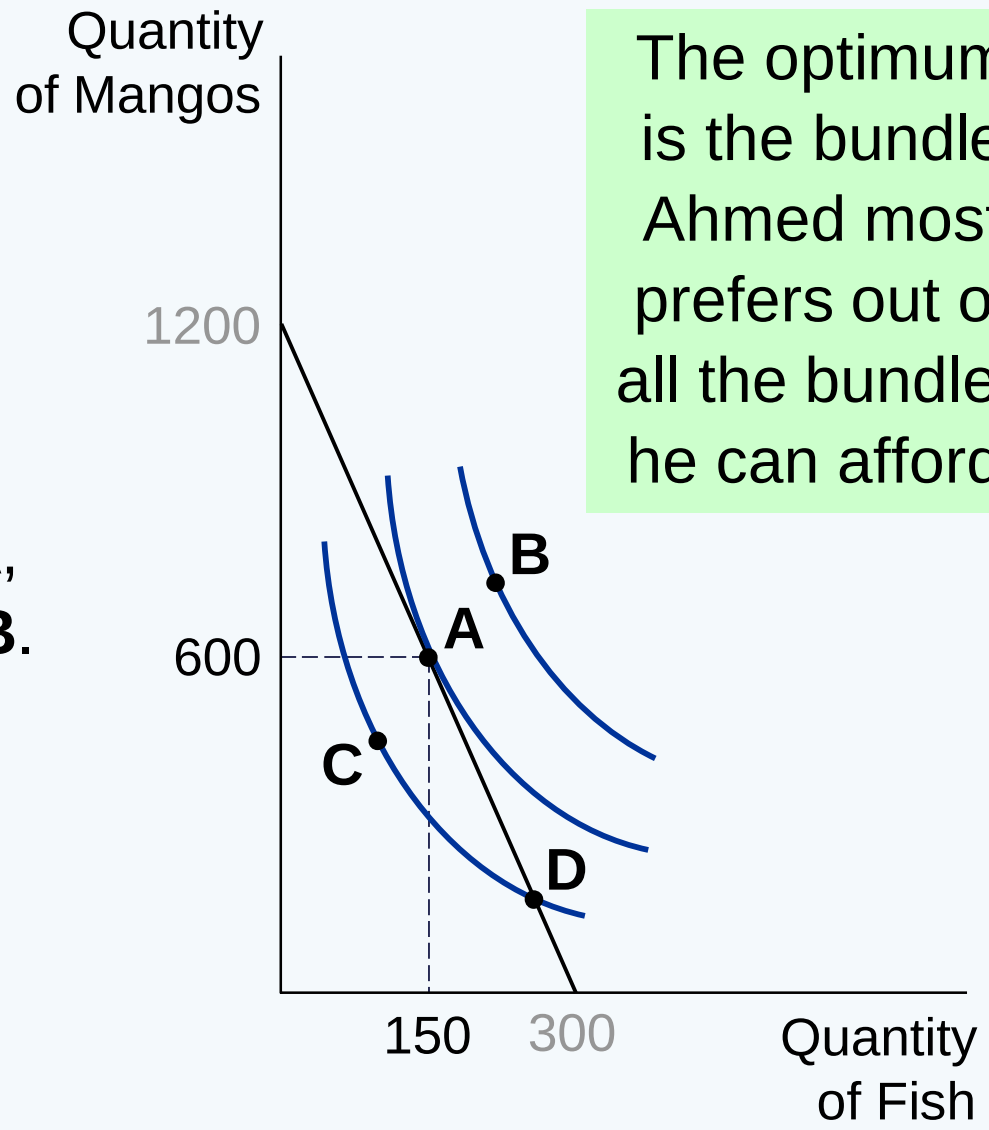


Optimization: What the Consumer Chooses

A is the *optimum*: the point on the budget constraint that touches the highest possible indifference curve.

Ahmed prefers **B** to **A**, but he cannot afford **B**.

Ahmed can afford **C** and **D**, but **A** is on a higher indifference curve.



The optimum is the bundle Ahmed most prefers out of all the bundles he can afford.

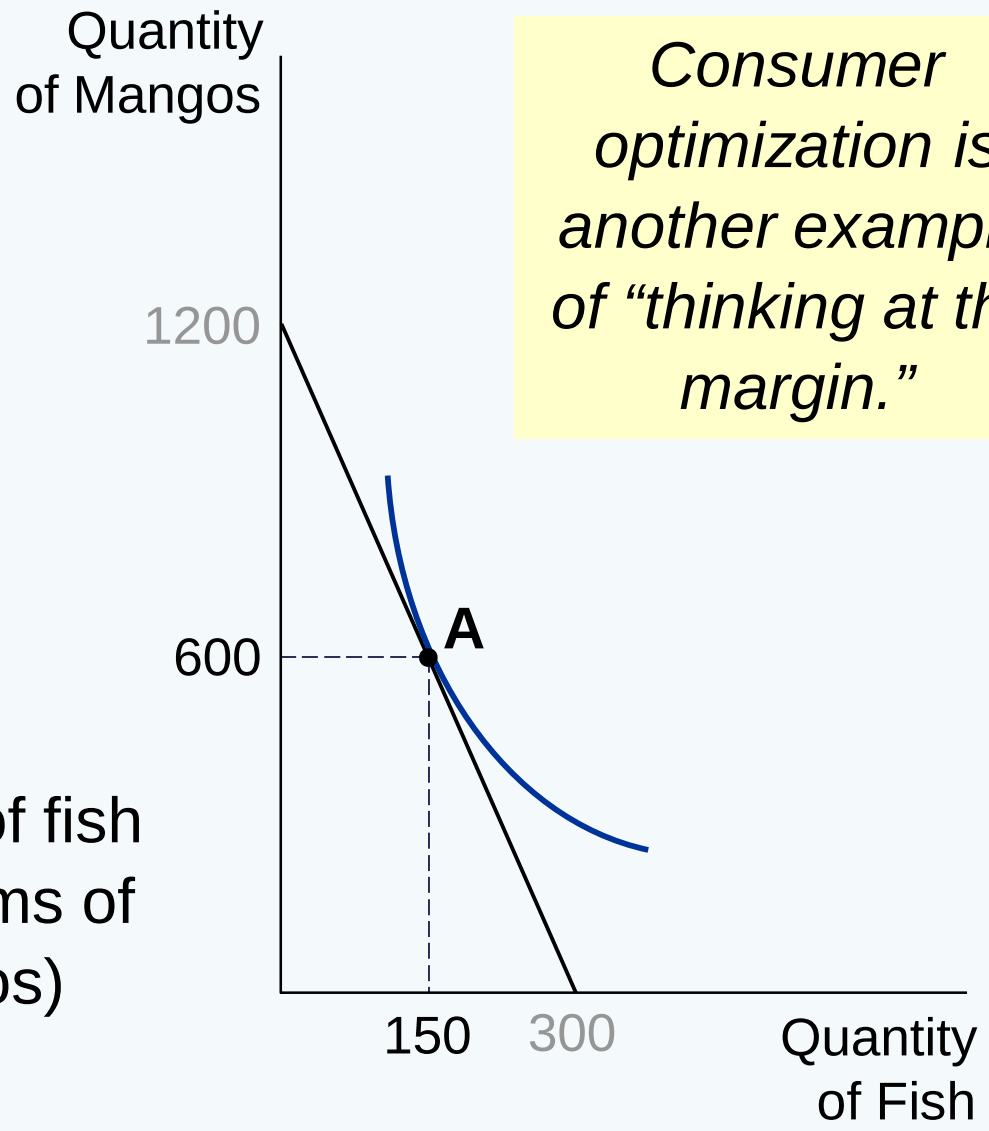
Optimization: What the Consumer Chooses

At the optimum, slope of the indifference curve equals slope of the budget constraint:

$$MRS = P_F/P_M$$

marginal value of fish (in terms of mangos)

price of fish (in terms of mangos)

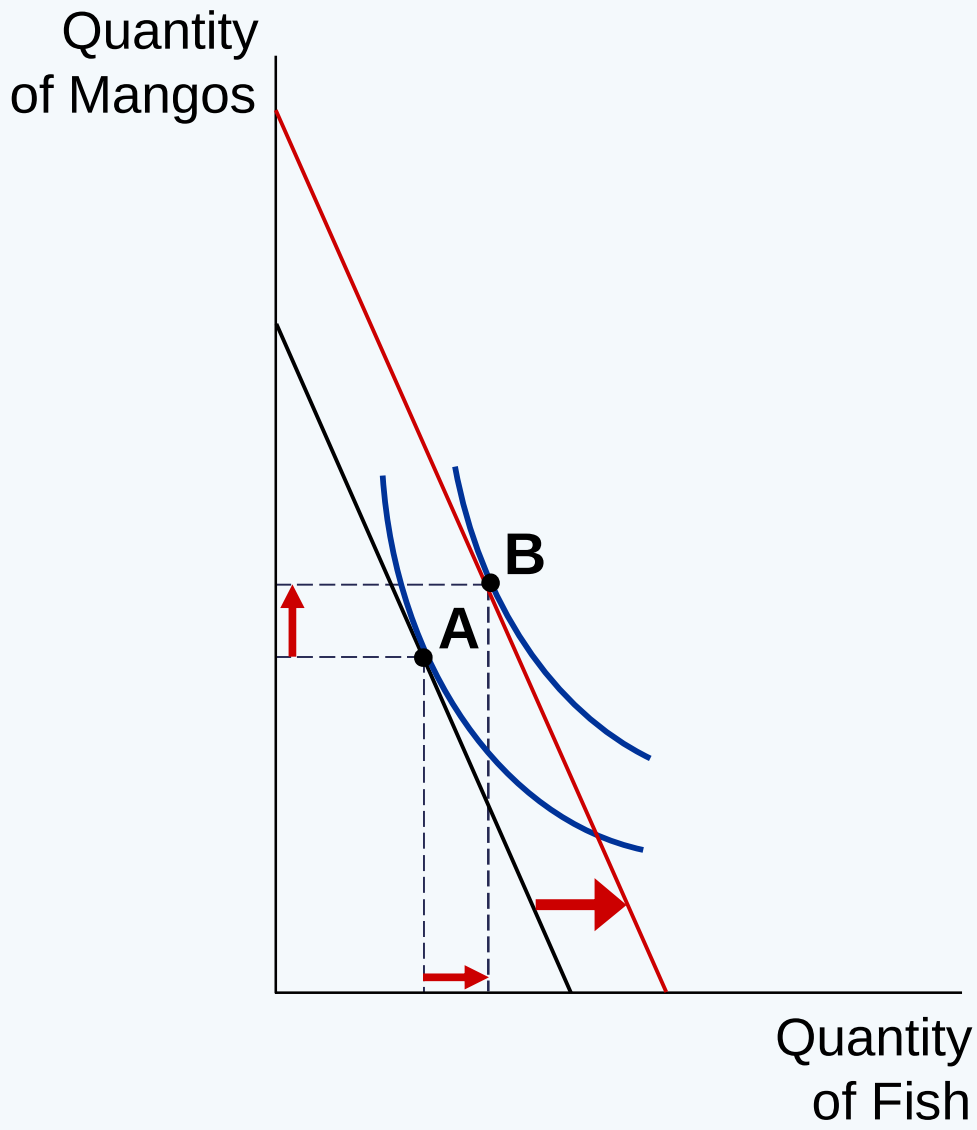


Consumer optimization is another example of "thinking at the margin."

The Effects of an Increase in Income

An increase in income shifts the budget constraint outward.

If both goods are "normal," Ahmed buys more of each.



ACTIVE LEARNING *3*

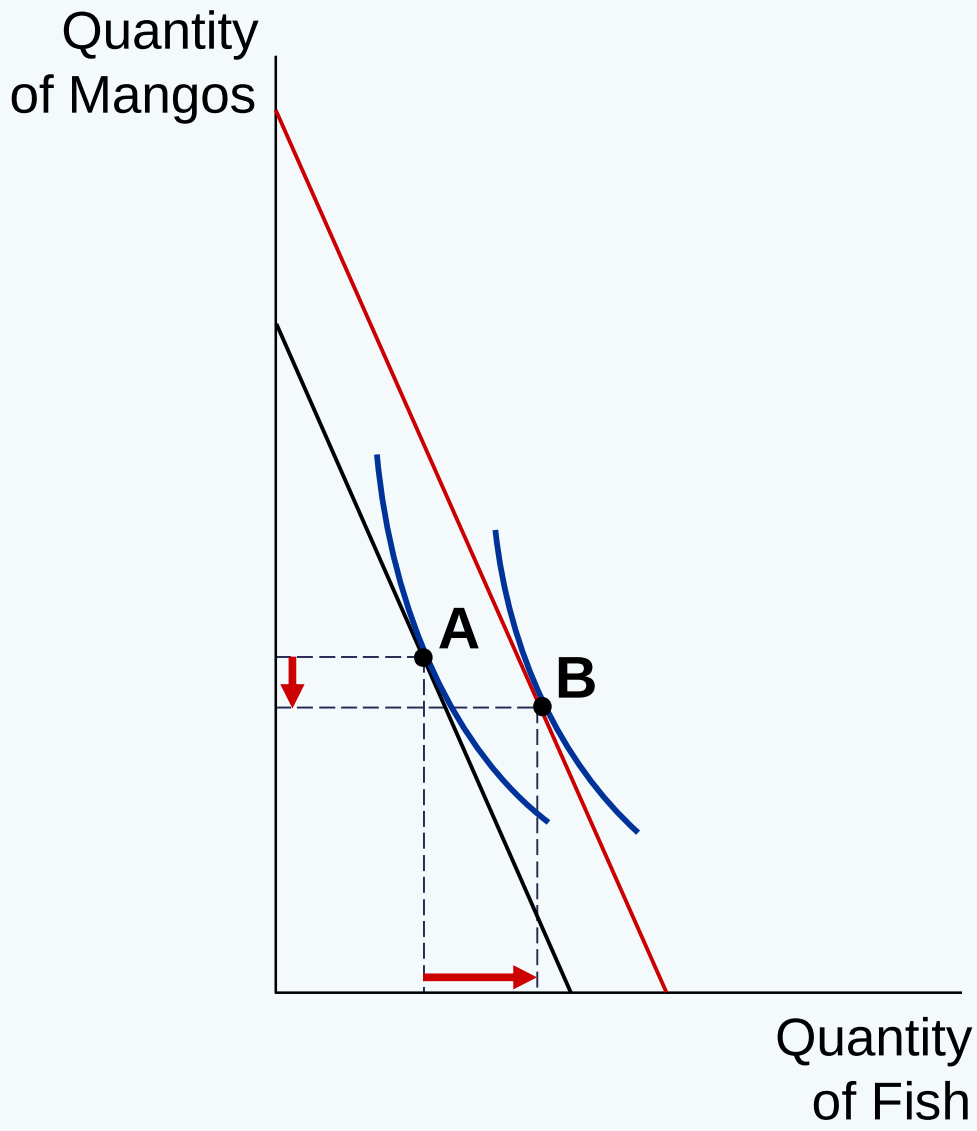
Inferior vs. normal goods

- An increase in income increases the quantity demanded of normal goods and reduces the quantity demanded of inferior goods.
- Suppose fish is a normal good but mangos are an inferior good.
- Use a diagram to show the effects of an increase in income on Ahmed's optimal bundle of fish and mangos.

ACTIVE LEARNING *3*

Answers

If mangos are inferior, the new optimum will contain fewer mangos.



The Effects of a Price Change

Initially,

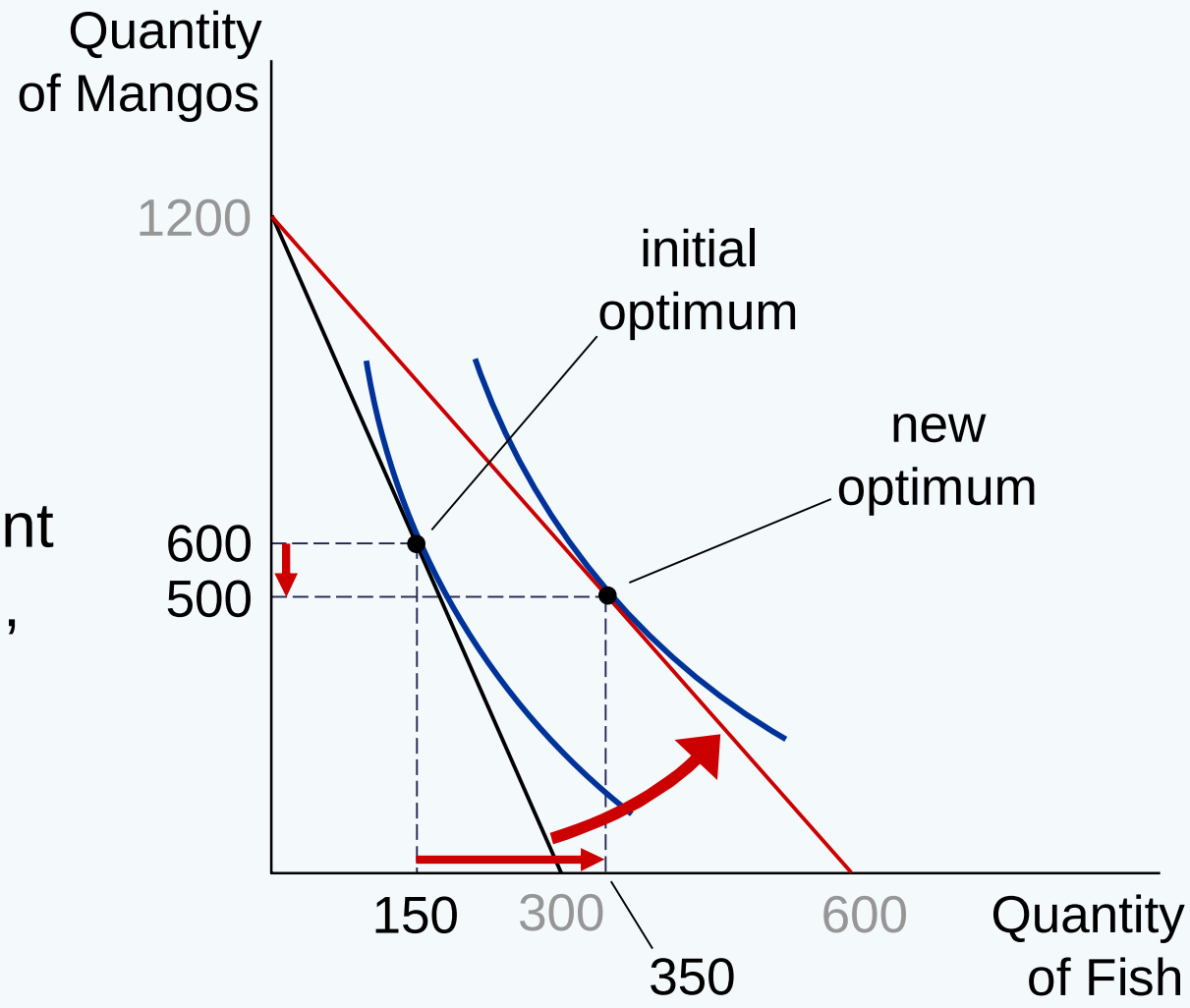
P_F = \$4

P_M = \$1

P_F falls to \$2

budget constraint rotates outward,

Ahmed buys more fish and fewer mangos.



The Income and Substitution Effects

A fall in the price of fish has two effects on Ahmed's optimal consumption of both goods.

- Income effect

  A fall in P_F boosts the purchasing power of Ahmed's income, allows him to buy more mangos and more fish.

- Substitution effect

  A fall in P_F makes mangos more expensive relative to fish, causes Ahmed to buy fewer mangos & more fish.

Notice: *The net effect on mangos is ambiguous.*

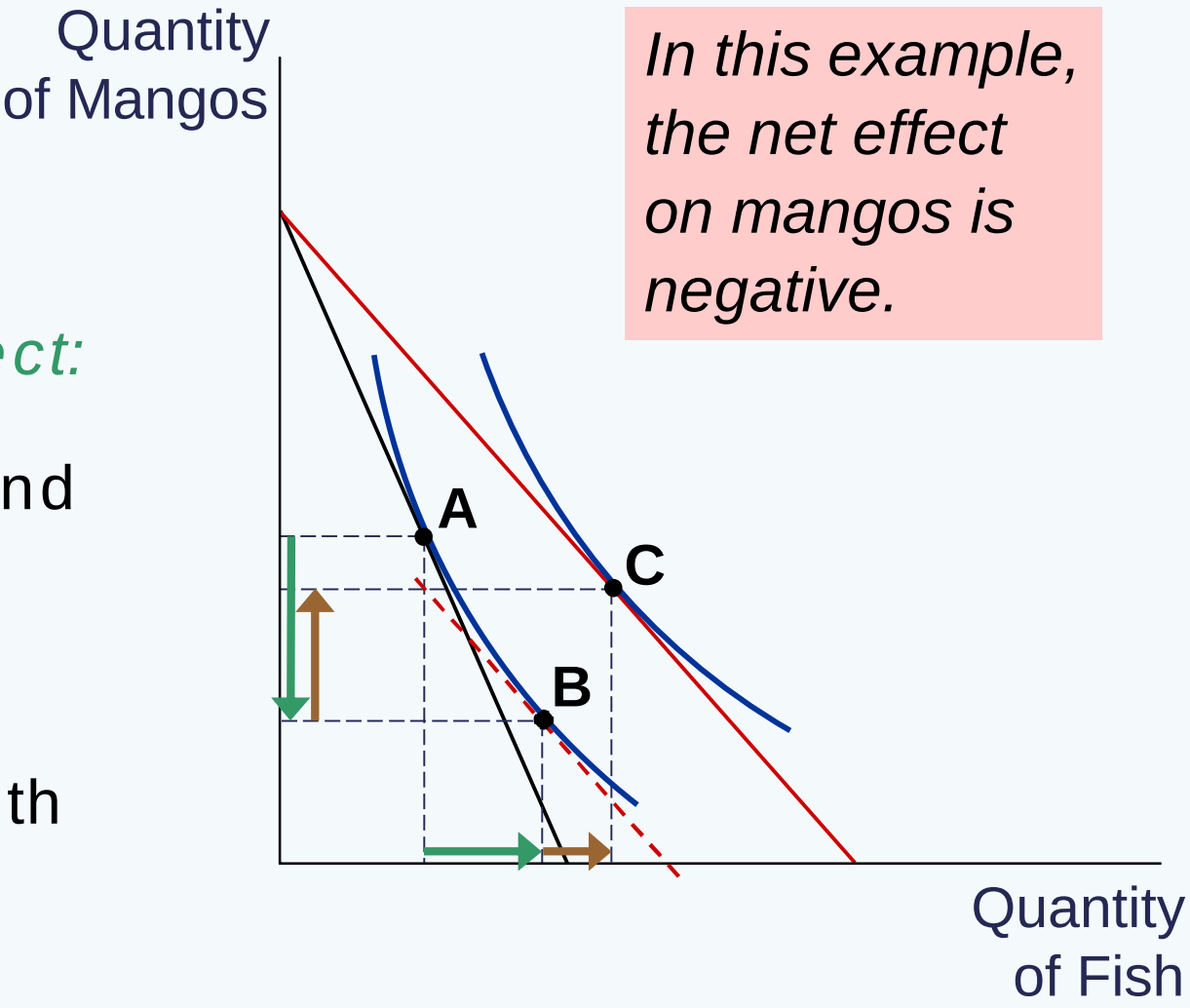
The Income and Substitution Effects

Initial optimum at A.

P_F falls.

Substitution effect:
from A to B,
buy more fish and
fewer mangos.

Income effect:
from B to C,
buy more of both
goods.



In this example, the net effect on mangos is negative.

ACTIVE LEARNING *4*

The substitution effect in two cases

Do you think the substitution effect would be bigger for substitutes or complements?

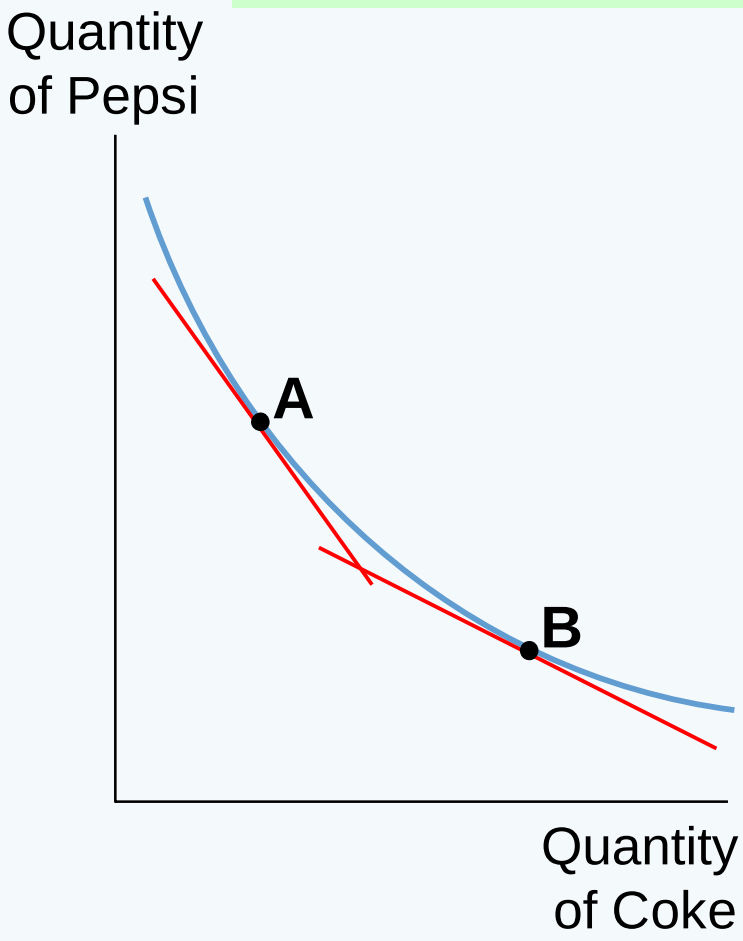
- Draw an indifference curve for Coke and Pepsi, and, on a separate graph, one for hot dogs and hot dog buns.
- On each graph, show the effects of a relative price change (keeping the consumer on the initial indifference curve).

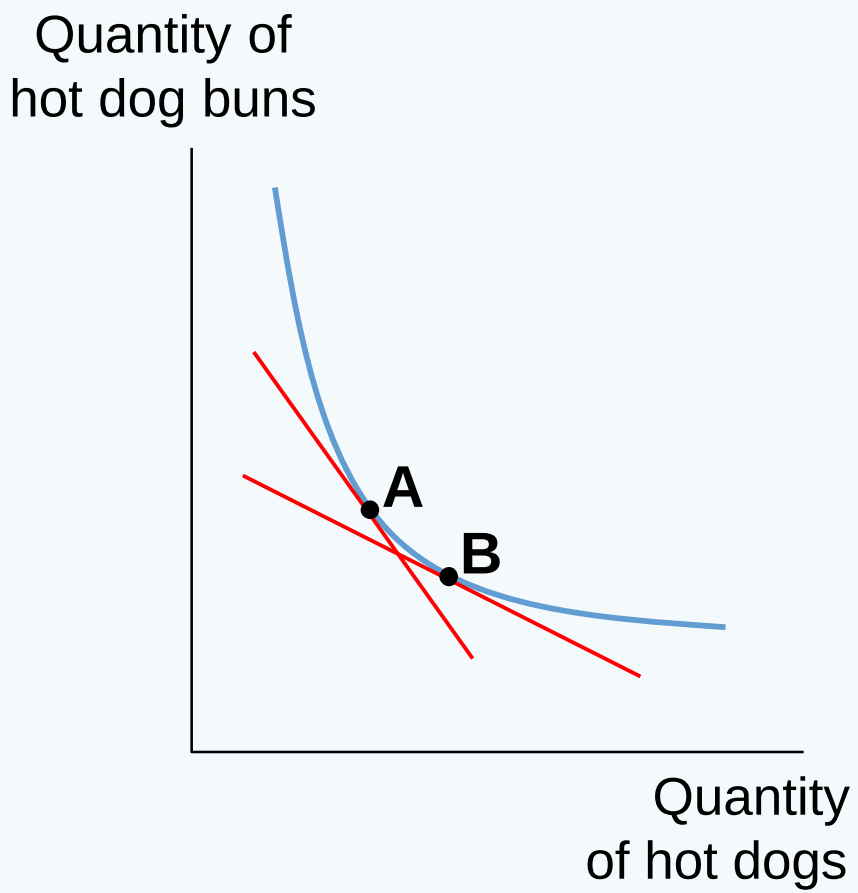
ACTIVE LEARNING 4

Answers

In both graphs, the relative price changes by the same amount.

But the substitution effect is bigger for substitutes than complements.





Deriving Ahmed's Demand Curve for Fish

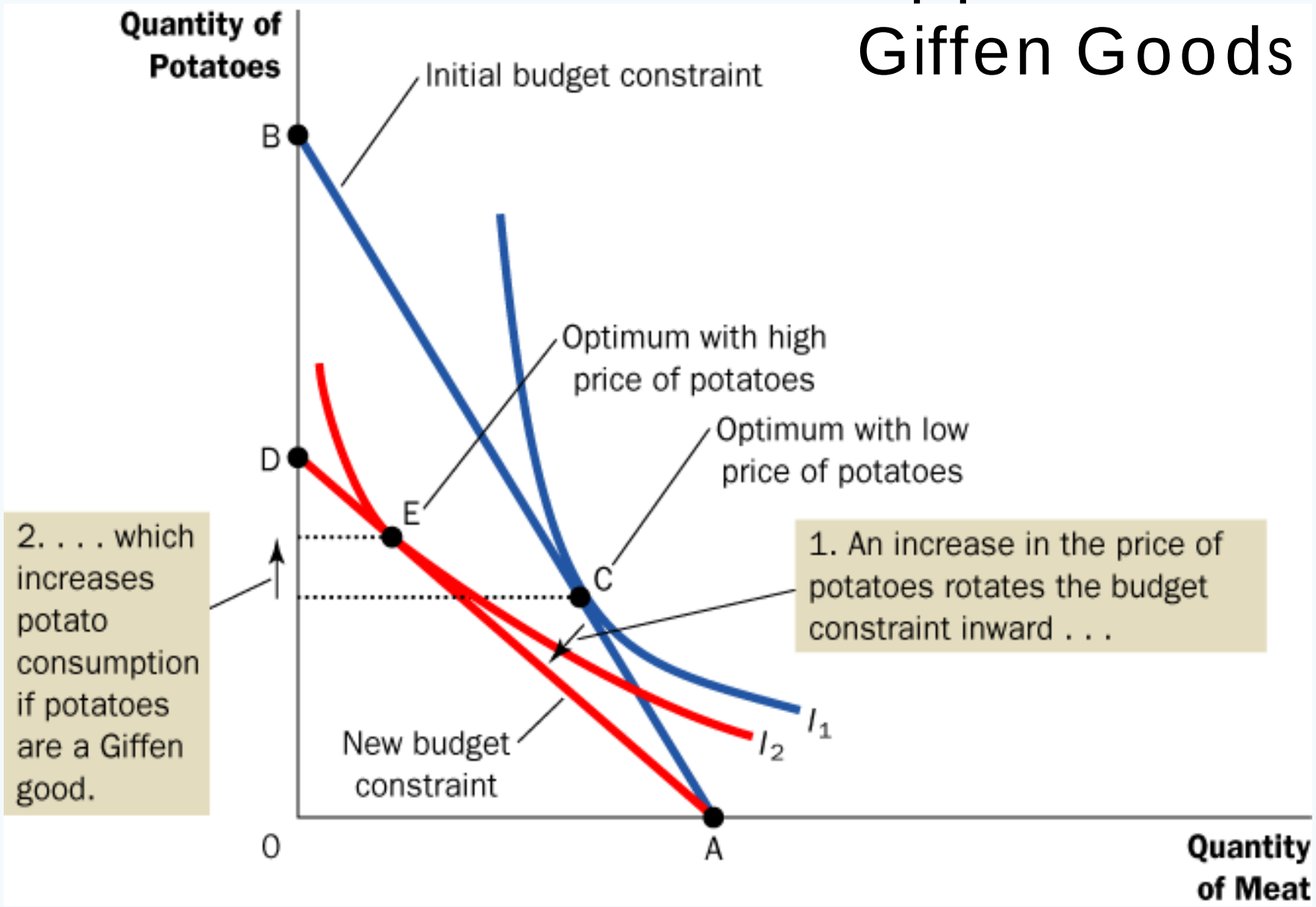
A: When P_F = \$4, Ahmed demands 150 fish.

B: When P_F = \$2, Ahmed demands 350 fish.

Application 1: Giffen Goods

- Do all goods obey the *Law of Demand*?
- Suppose the goods are potatoes and meat, and potatoes are an inferior good.
- If price of potatoes rises,
  - substitution effect: buy less potatoes
  - income effect: buy more potatoes
- If income effect > substitution effect, then potatoes are a Giffen good, a good for which an increase in price raises the quantity demanded.

Application 1: Giffen Goods



CONCLUSION:
Do People Really Think This Way?

- People do not make spending decisions by writing down their budget constraints and indifference curves.
- Yet, they try to make the choices that maximize their satisfaction given their limited resources.
- The theory in this chapter is only intended as a metaphor for how consumers make decisions.
- It explains consumer behavior fairly well in many situations and provides the basis for more advanced economic analysis.

CHAPTER SUMMARY

- A consumer's budget constraint shows the possible combinations of different goods she can buy given her income and the prices of the goods. The slope of the budget constraint equals the relative price of the goods.
- An increase in income shifts the budget constraint outward. A change in the price of one of the goods pivots the budget constraint.
- A consumer's indifference curves represent her preferences. An indifference curve shows all the bundles that give the consumer a certain level of happiness. The consumer prefers points on higher indifference curves to points on lower ones.
- The slope of an indifference curve at any point is the marginal rate of substitution – the rate at which the consumer is willing to trade one good for the other.

CHAPTER SUMMARY

- The consumer optimizes by choosing the point on her budget constraint that lies on the highest indifference curve. At this point, the marginal rate of substitution equals the relative price of the two goods.
- When the price of a good falls, the impact on the consumer's choices can be broken down into two effects, an income effect and a substitution effect.

CHAPTER SUMMARY

- The income effect is the change in consumption that arises because a lower price makes the consumer better off. It is represented by a movement from a lower indifference curve to a higher one.
- The substitution effect is the change that arises because a price change encourages greater consumption of the good that has become relatively cheaper. It is represented by a movement along an indifference curve.
- THE THEORY OF Ordinal Utility can be applied in many situations. It can explain why demand curves can potentially slope upward, why higher wages could either increase or decrease labor supply, and why higher interest rates could either increase or decrease saving.

More Quick Review

- What is the purpose, use, and shape of indifference curves?
- How does one indifference curve differ from another?
- How do you find the consumer equilibrium using indifference curves and a budget constraint?