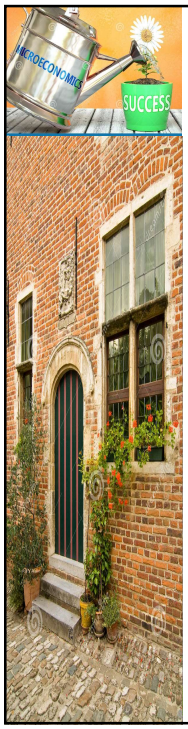

Unit 5: The Theory of Consumer Choice

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Objectives

In this unit, look for the answers to these questions:

- How does the *budget constraint* represent the choices a consumer can afford?
- How do *indifference curves* represent the *consumer's preferences*?
- What determines how a consumer divides her resources between two goods?
- How does the theory of consumer choice explain decisions such as how much a consumer saves, or how much labor she supplies?

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5.1 The Budget Constraint: What the Consumer Can Afford

- Example:
  Nam divides his income between two goods:
  fish and mangos.
- A "consumption bundle" is a particular combination of the goods, *e.g.*, 40 fish & 300 mangos.
- **Budget constraint**:
  - the limit on the consumption bundles that a consumer can afford

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ACTIVE LEARNING 1 Budget Constraint

Nam's income: $1200

Prices: P_F = $4 per fish, P_M = $1 per mango

A. If Nam spends all his income on fish, how many fish does he buy?

B. If Nam spends all his income on mangos, how many mangos does he buy?

C. If Nam buys 100 fish, how many mangos can he buy?

D. Plot each of the bundles from parts **A** – **C** on a graph that measures fish on the horizontal axis and mangos on the vertical, connect the dots.

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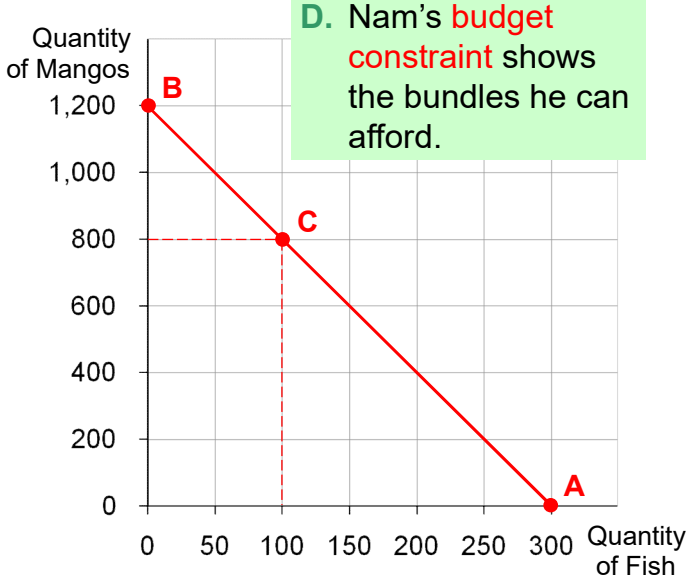
ACTIVE LEARNING 1 Budget Constraint

A. $1200/$4 = 300 fish

B. $1200/$1 = 1200 mangos

C. 100 fish cost $400, $800 left buys 800 mangos

D. Nam's budget constraint shows the bundles he can afford.



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The Slope of the Budget Constraint

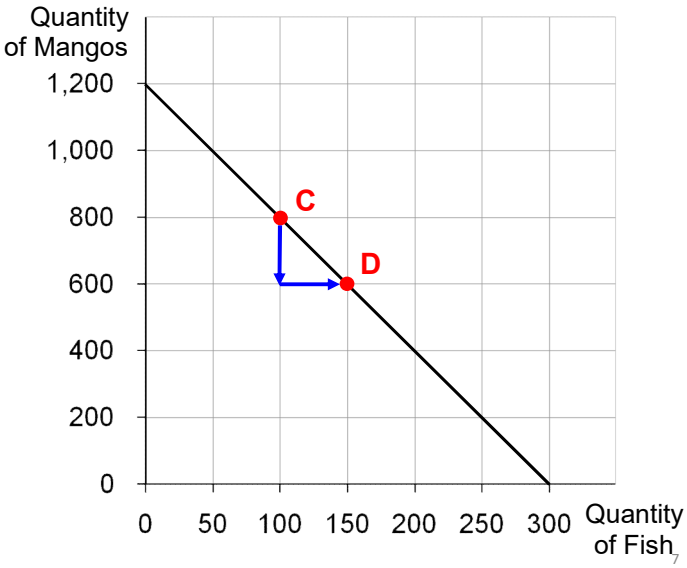
From **C** to **D**,

"rise" =
–200 mangos

"run" =
+50 fish

Slope = – 4

Nam must
give up
4 mangos
to get one fish.



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The Slope of the Budget Constraint

The slope of the budget constraint equals

- the rate at which Nam can trade mangos for fish
- the opportunity cost of fish in terms of mangos
- the relative price of fish:

$$\frac{\text{price of fish}}{\text{price of mangos}} = \frac{\$4}{\$1} = 4 \text{ mangos per fish}$$

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ACTIVE LEARNING *2*
Budget constraint, *continued.*

Show what happens to Nam's budget constraint if:

A. His income falls to \$800.

B. The price of mangos rises to P_M = \$2 per mango

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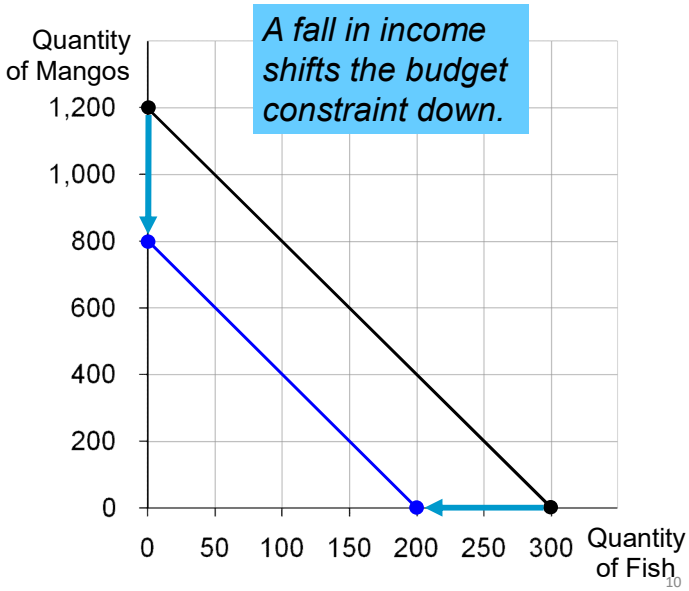
A. Nam's income falls to \$800.

Now, Nam can buy

\$800/\$4
= 200 fish

or
\$800/\$1
= 800 mangos

or any combination in between.



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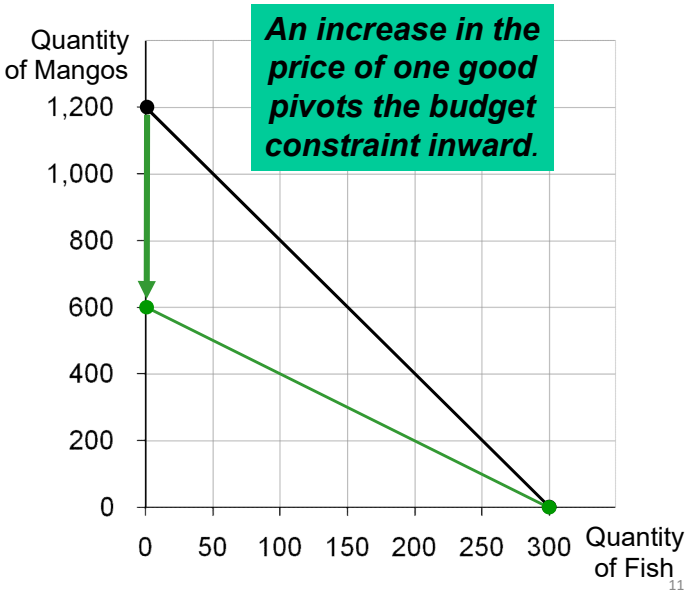
B. The price of mangos rises to P_M = $2 per mango

Nam can still buy 300 fish.

But now he can only buy $1200/$2 = 600 mangos.

Notice:
slope is smaller, relative price of fish is now only 2 mangos.



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Budget Constrain Function

- Given buyer's income: I per time period
- Price of good X: Px (per unit of X)
- Price of good Y: Py (per unit of Y)

➢Budget constrain function:

$$I = P_x X + P_Y Y$$

$$\rightarrow Y = \frac{I}{P_Y} - \frac{P_X}{P_Y} X$$

slope of the Budget line = *-Px/Py*

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5.2 Preferences: What the Consumer Wants

- A consumer's taste and preference among consumption bundles may be illustrated with indifference curves.
- **Deriving indifference curves:**
- Three assumptions of consumer's taste:
  - First assumption: the consumer can rank alternative bundles of goods according to the satisfaction or utility they provide.
  - Second assumption: the consumer prefers more to less
  - Third assumption: Diminishing marginal rate of substitution

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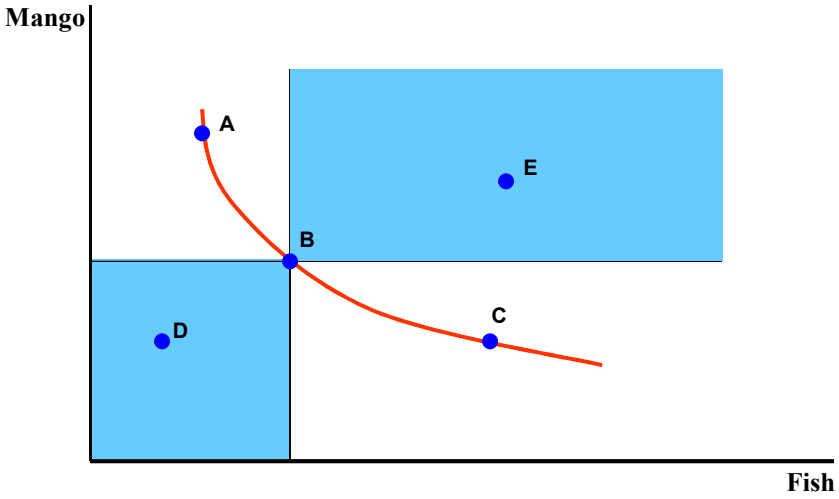
Preference map: deriving indifference curves



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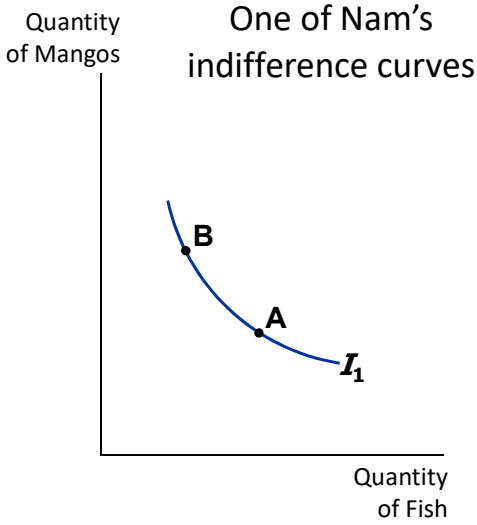
5.2 Preferences: What the Consumer Wants

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

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

One of Nam's indifference curves



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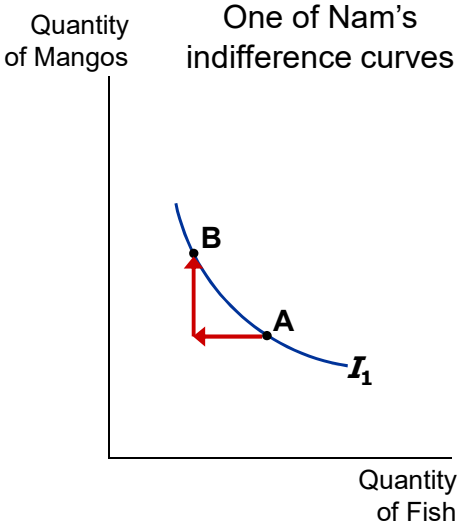
Four Properties of Indifference Curves

1. Indifference curves are downward-sloping.

If the quantity of fish is reduced, the quantity of mangos must be increased to keep Nam equally happy.

One of Nam's indifference curves



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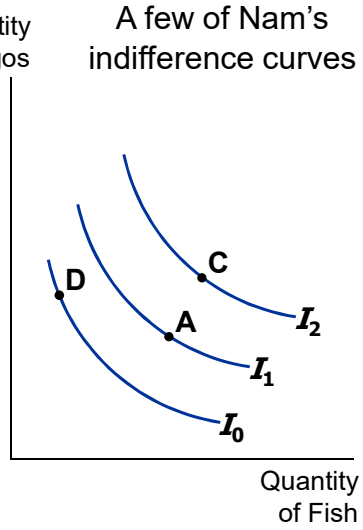
Four Properties of Indifference Curves

2. Higher indifference curves are preferred to lower ones.

Nam 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 Nam's indifference curves



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Four Properties of Indifference Curves

3. Indifference curves cannot cross.

Suppose they did.

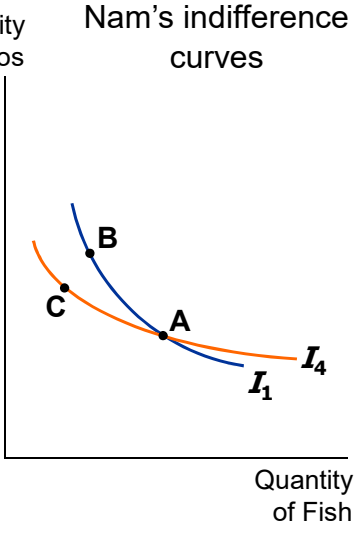
Nam should prefer B to C, since B has more of both goods.

Yet, Nam is indifferent between B and C:

He likes C as much as A (both are on I4).

He likes A as much as B (both are on I1).

Nam's indifference curves



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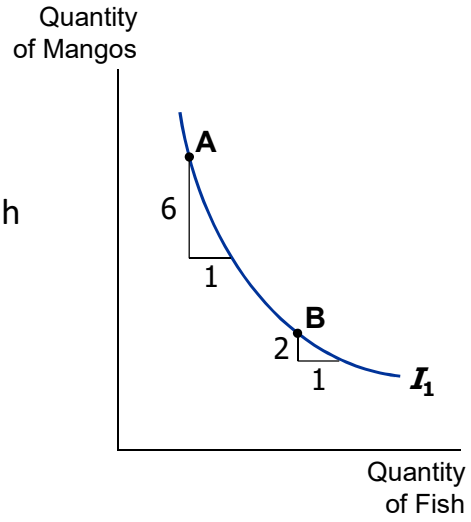
Four Properties of Indifference Curves

4. Indifference curves are bowed inward.

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



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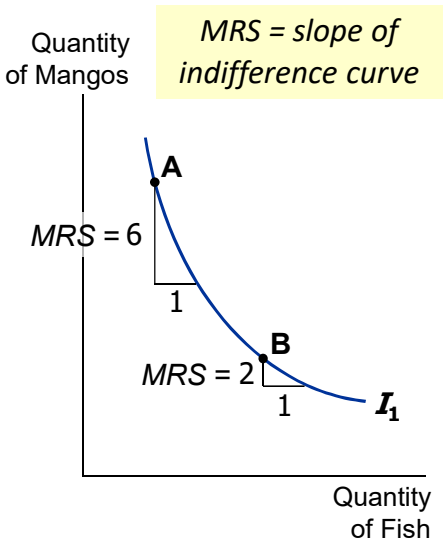
The Marginal Rate of Substitution

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

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

MRS falls as you move down along an indifference curve.



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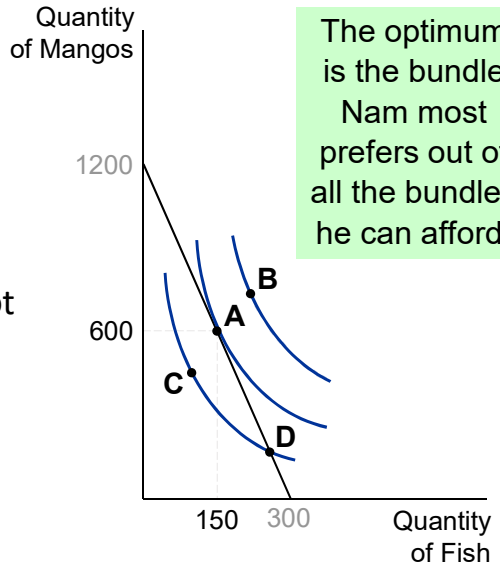
5.3 Optimization: What the Consumer Chooses

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

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

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



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

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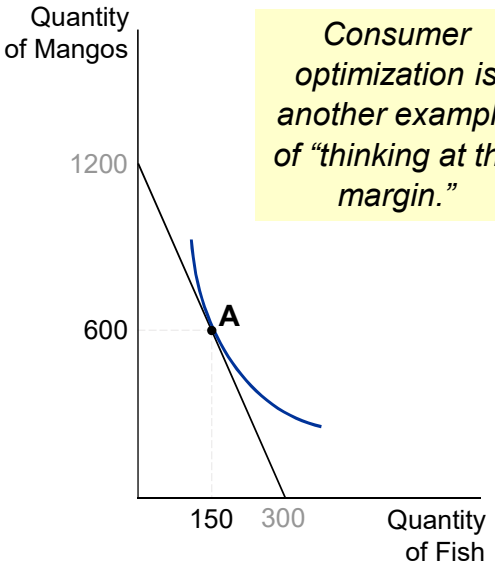
Optimization: What the Consumer Chooses

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."

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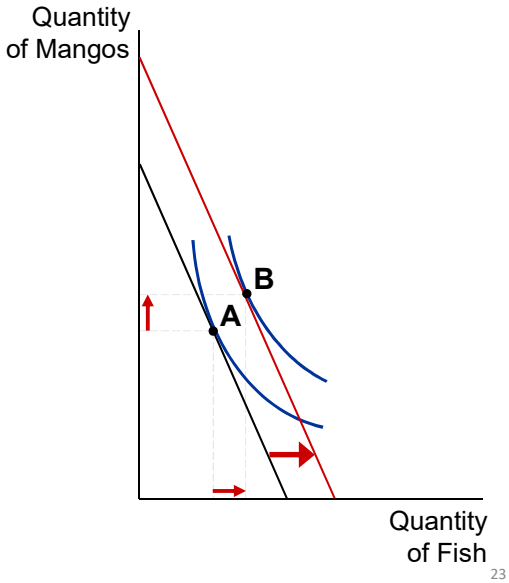
The Effects of an Increase in Income

An increase in income shifts the budget constraint outward.

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



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The Effects of a Price Change

Initially,

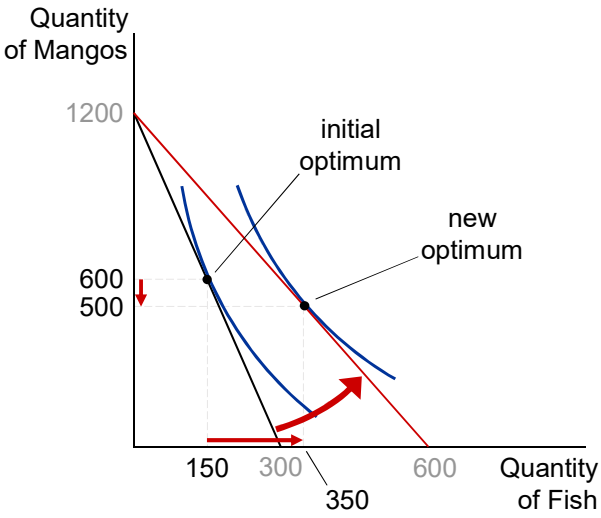
P_F = \$4

P_M = \$1

P_F falls to \$2

budget constraint rotates outward,

Nam buys more fish and fewer mangos.



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The Income and Substitution Effects

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

- **Income effect**
  A fall in P_F boosts the purchasing power of Nam'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 Nam to buy fewer mangos & more fish.

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

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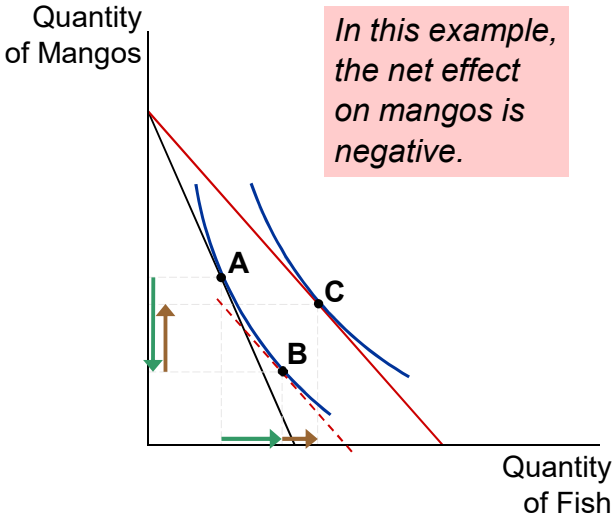
The Income and Substitution Effects

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.

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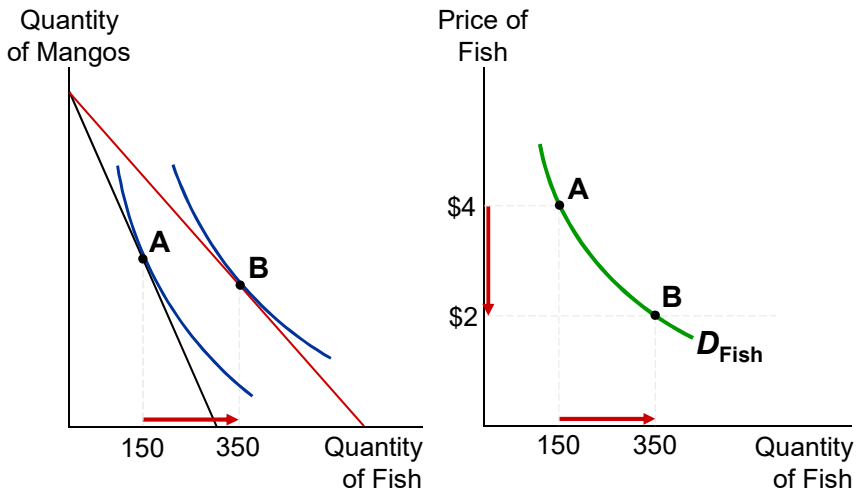
Deriving Nam's Demand Curve for Fish

BA: When P_F = $2, Nam demands 350 fish.



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5.4 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.

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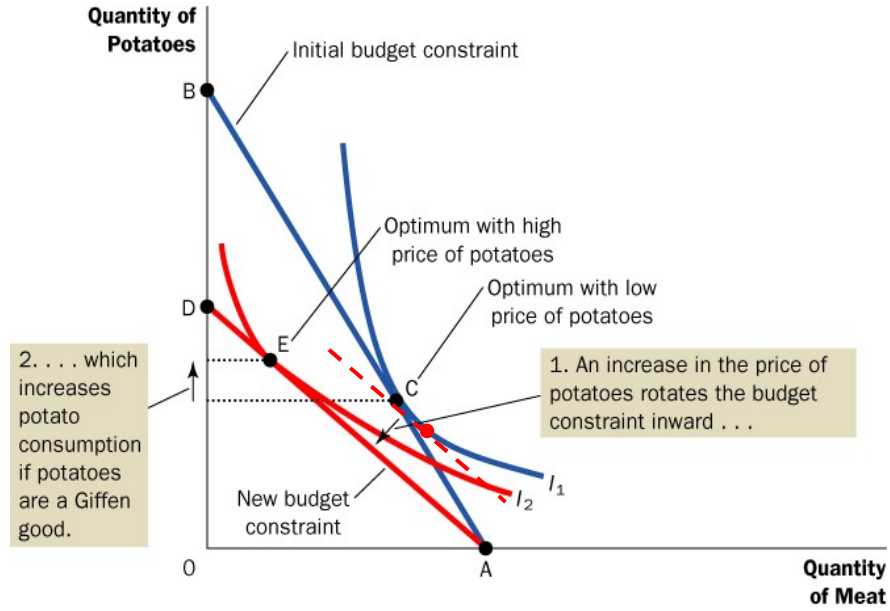
Application 1: Giffen Goods



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Application 2: Wages and Labor Supply

Budget constraint

- Shows a person's tradeoff between consumption and leisure.
- Depends on how much time she has to divide between leisure and working.
- The relative price of an hour of leisure is the amount of consumption she could buy with an hour's wages.

Indifference curve

- Shows "bundles" of consumption and leisure that give her the same level of satisfaction.

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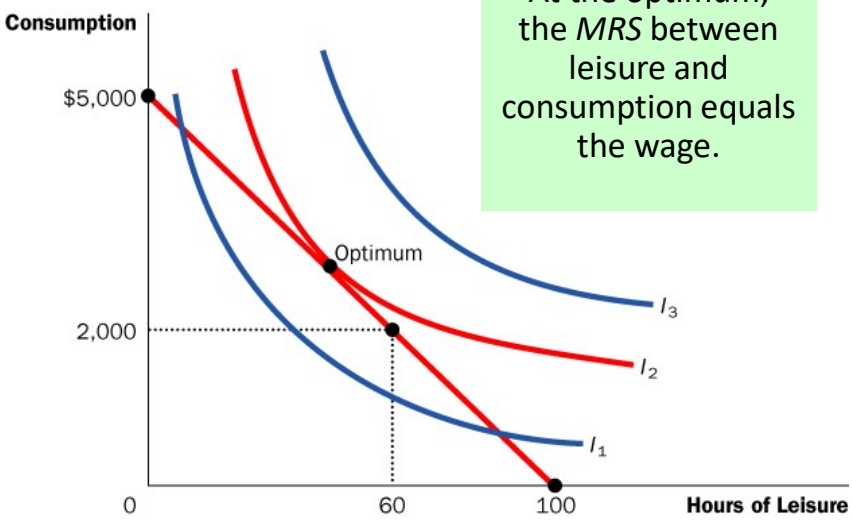
Application 2: Wages and Labor Supply



At the optimum, the *MRS* between leisure and consumption equals the wage.

Application 2: Wages and Labor Supply

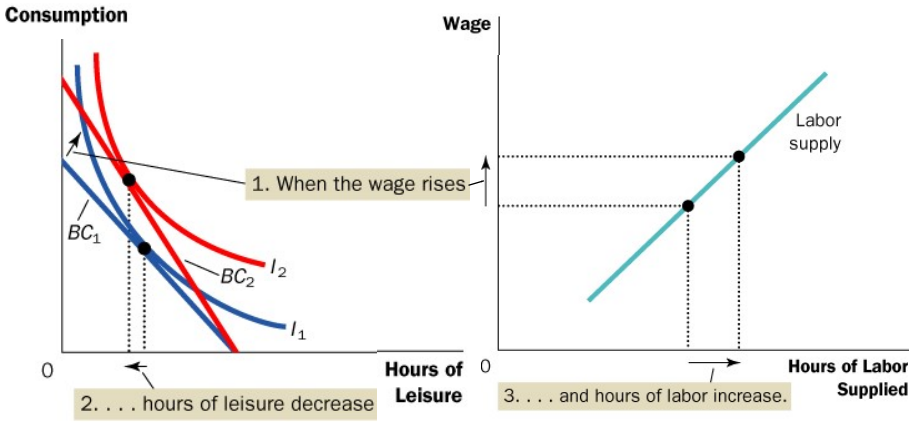
An increase in the wage has two effects on the optimal quantity of labor supplied.

- *Substitution effect (SE)*: A higher wage makes leisure more expensive relative to consumption.
  The person chooses less leisure,
  i.e., increases quantity of labor supplied.
- *Income effect (IE)*: With a higher wage, she can afford more of both "goods."
  She chooses more leisure,
  i.e., reduces quantity of labor supplied.

Application 2: Wages and Labor Supply

For this person, *SE* > *IE*

So her labor supply increases with the wage



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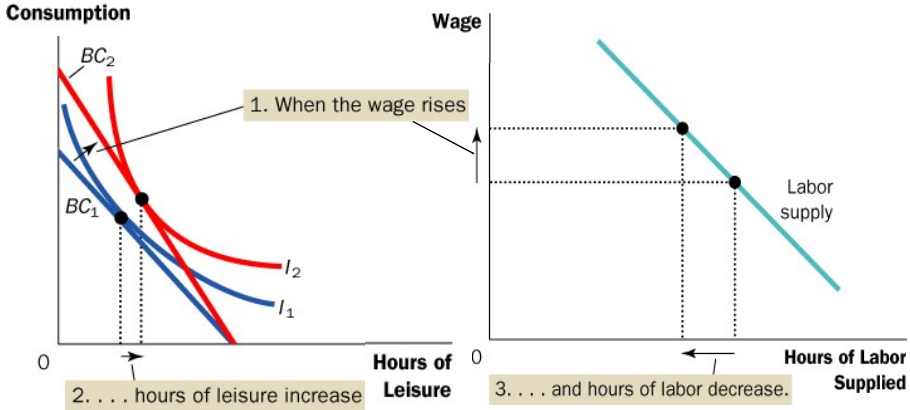
Application 2: Wages and Labor Supply

For this person, *SE* < *IE*

So his labor supply falls when the wage rises



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Application 3: Interest Rates and Saving

- A person lives for two periods.
  - Period 1: young, works, earns $100,000
    consumption = $100,000 minus amount saved
  - Period 2: old, retired
    consumption = saving from Period 1
    plus interest earned on saving
- The interest rate determines the relative price of consumption when young in terms of consumption when old.

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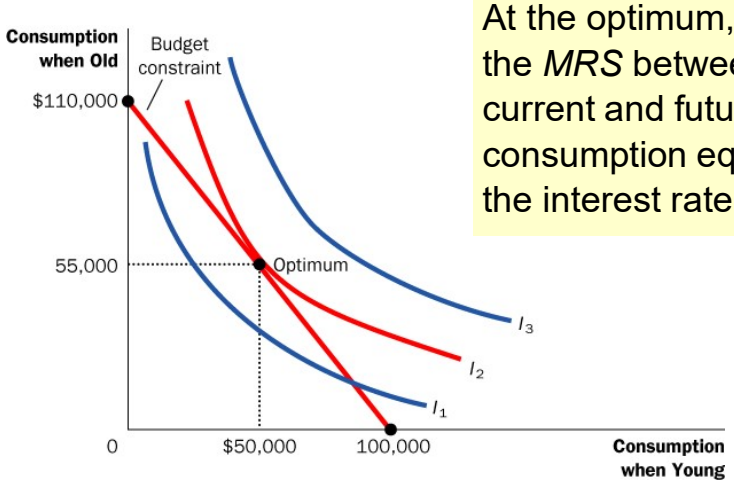
Application 3: Interest Rates and Saving

Budget constraint shown is for 10% interest rate.



At the optimum, the *MRS* between current and future consumption equals the interest rate.

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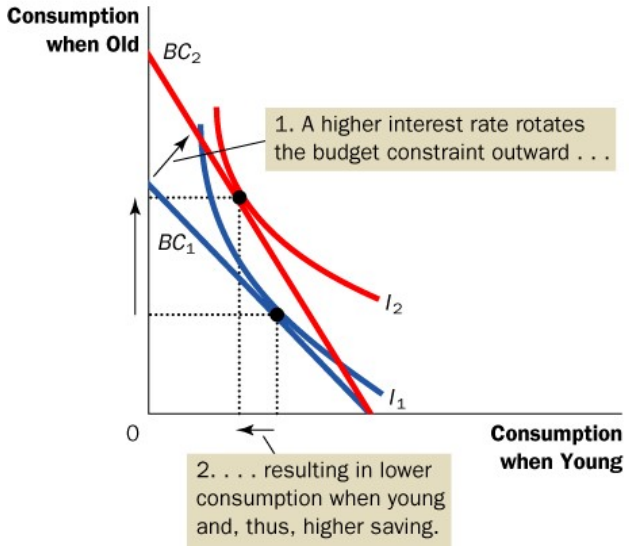
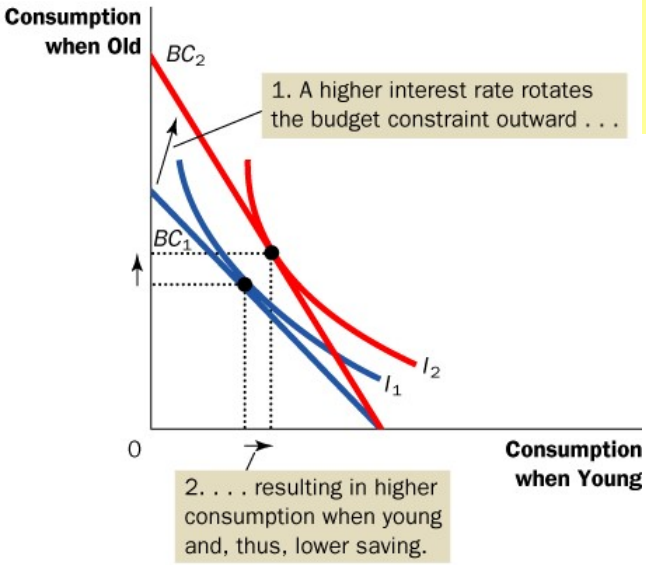
Application 3: Interest Rates and Saving



In this case, *SE* > *IE* and saving rises

Application 3: Interest Rates and Saving



In this case, *SE* < *IE* and saving falls

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 unit 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.

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