

# The Theory of Consumer Choice



## PART I

# Questions being addressed:



- How to spend income on goods and services?
- Why maximizing **utility**?
- Why the **principle of diminishing marginal utility** applies to the consumption of most goods and services?
- How to use **marginal analysis** to find the **optimal consumption bundle**?

# Utility and Consumption



**Utility** – the satisfaction or well-being that a consumer receives from consuming some good or service.

Theory of consumer behavior is based on the idea of utility maximization.

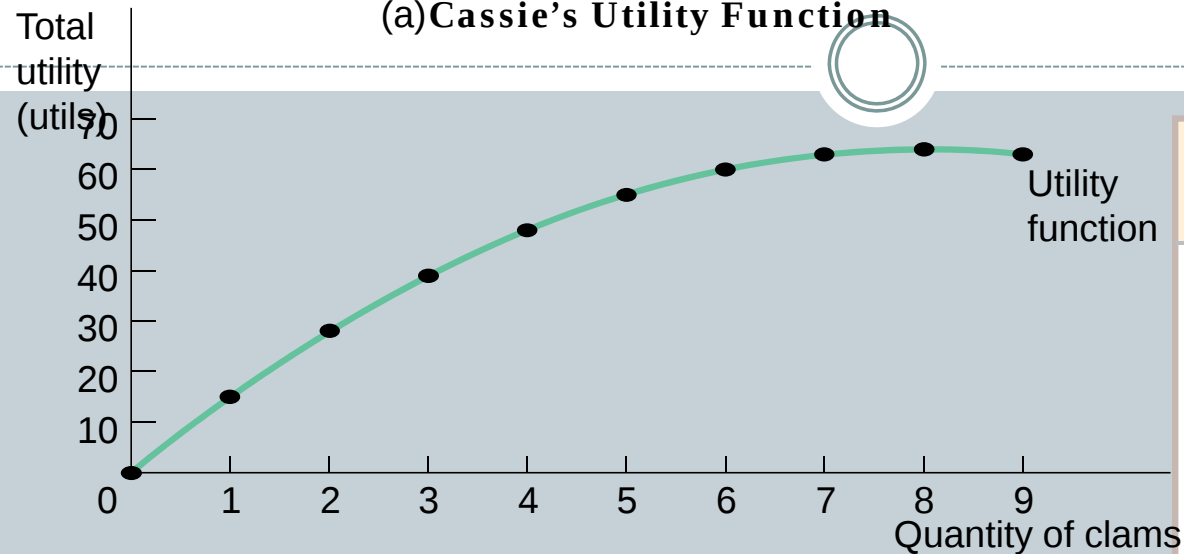
**Total utility** – the total satisfaction resulting from the consumption of a given commodity by a consumer.



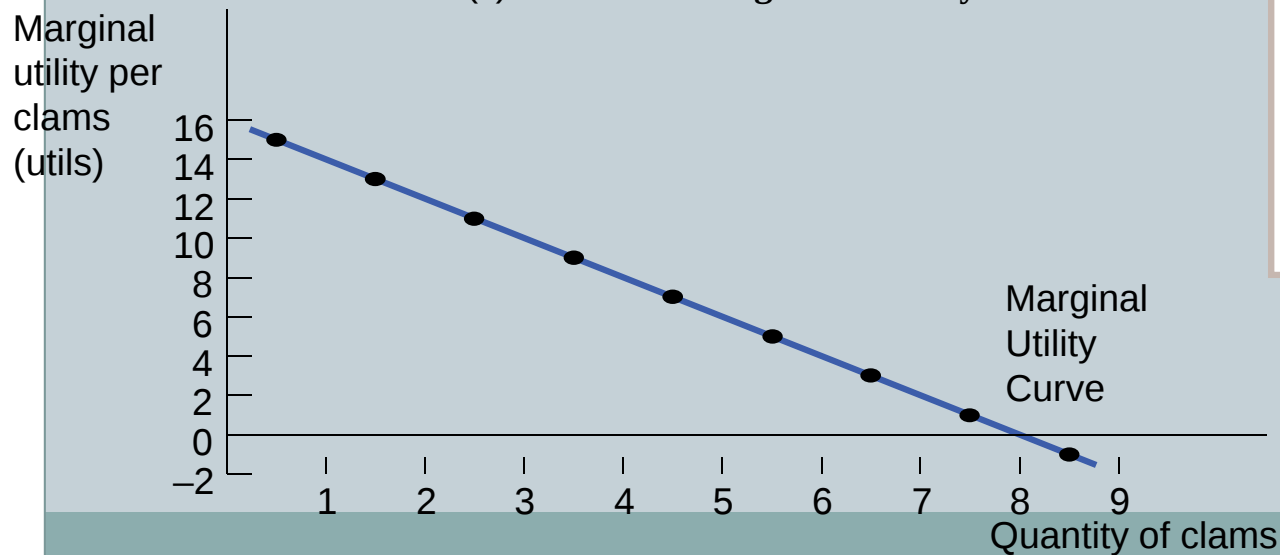
- Consumption bundle – the set of all the goods and services an individual consumes
- Utility function – the relationship between an individual's consumption bundle and the total amount of utility it generates for that individual

# Cassie's Total Utility and Marginal Utility

(a) Cassie's Utility Function



(b) Cassie's Marginal Utility Curve



| Quantity of clams | Total utility (utils) | Marginal utility per clam (utils) |
|-------------------|-----------------------|-----------------------------------|
| 0                 | 0                     |                                   |
| 1                 | 15                    | 15                                |
| 2                 | 28                    | 13                                |
| 3                 | 39                    | 11                                |
| 4                 | 48                    | 9                                 |
| 5                 | 55                    | 7                                 |
| 6                 | 60                    | 5                                 |
| 7                 | 63                    | 3                                 |
| 8                 | 64                    | 1                                 |
| 9                 | 63                    | -1                                |

# Cassie's Total Utility and Marginal Utility



- Cassie's total utility depends on her consumption of fried clams.
- It increases until it reaches its maximum utility level of 64 utils at 8 clams consumed and decreases after that.
- The marginal utility curve slopes downward due to diminishing marginal utility; each additional clam gives Cassie less utility than the previous clam.

# The Principle of Diminishing Marginal Utility



- The **marginal utility** of a good or service is the change in total utility generated by consuming one additional unit of that good or service.
- The **marginal utility curve** shows how marginal utility depends on the quantity of a good or service consumed.
- The **principle of diminishing marginal utility** says that each successive unit of a good or service consumed adds less to total utility than the previous unit.



- The more good or service you consume, the closer you are to being **satiated** – reaching a point at which an additional unit of the good adds nothing to your satisfaction

# Budgets and Optimal Consumption



- A **budget constraint** requires that the cost of a consumer's consumption bundle be no more than the consumer's total income.
- A consumer's **consumption possibilities** is the set of all consumption bundles that can be consumed given the consumer's income and prevailing prices.
- A consumer's **budget line** shows the consumption bundles available to a consumer who spends all of his or her income.

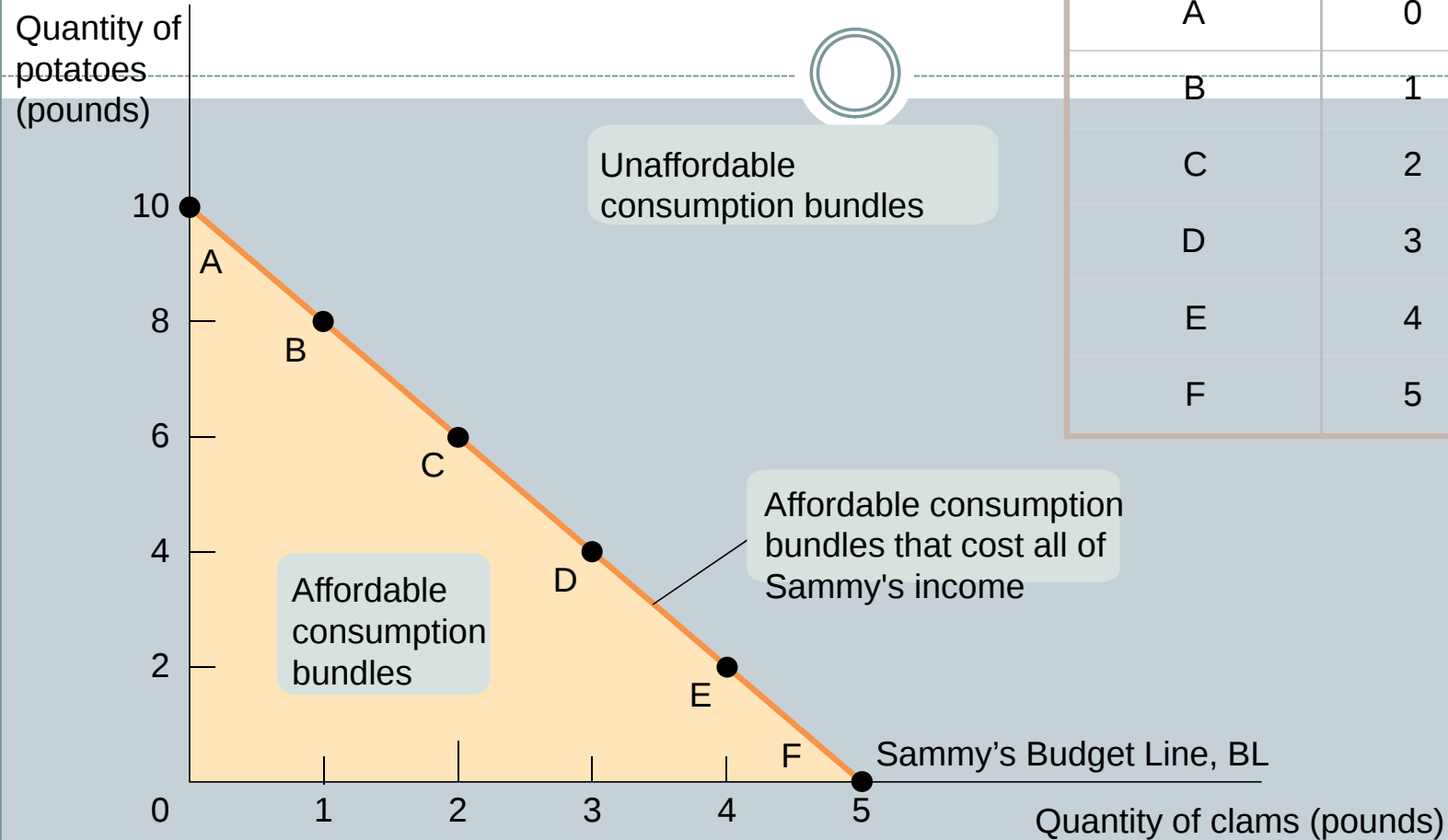
# Example



- Consider Sammy, whose appetite is exclusively for clams and potatoes
- He has a weekly income of \$20
- Given his appetite more of either good is better than less
- Assume that clams cost \$4 per pound and potatoes cost \$2 per pound

$$\text{Expenditure on clams} + \text{Expenditure on potatoes} \leq \text{Total income}$$

# The Budget Line

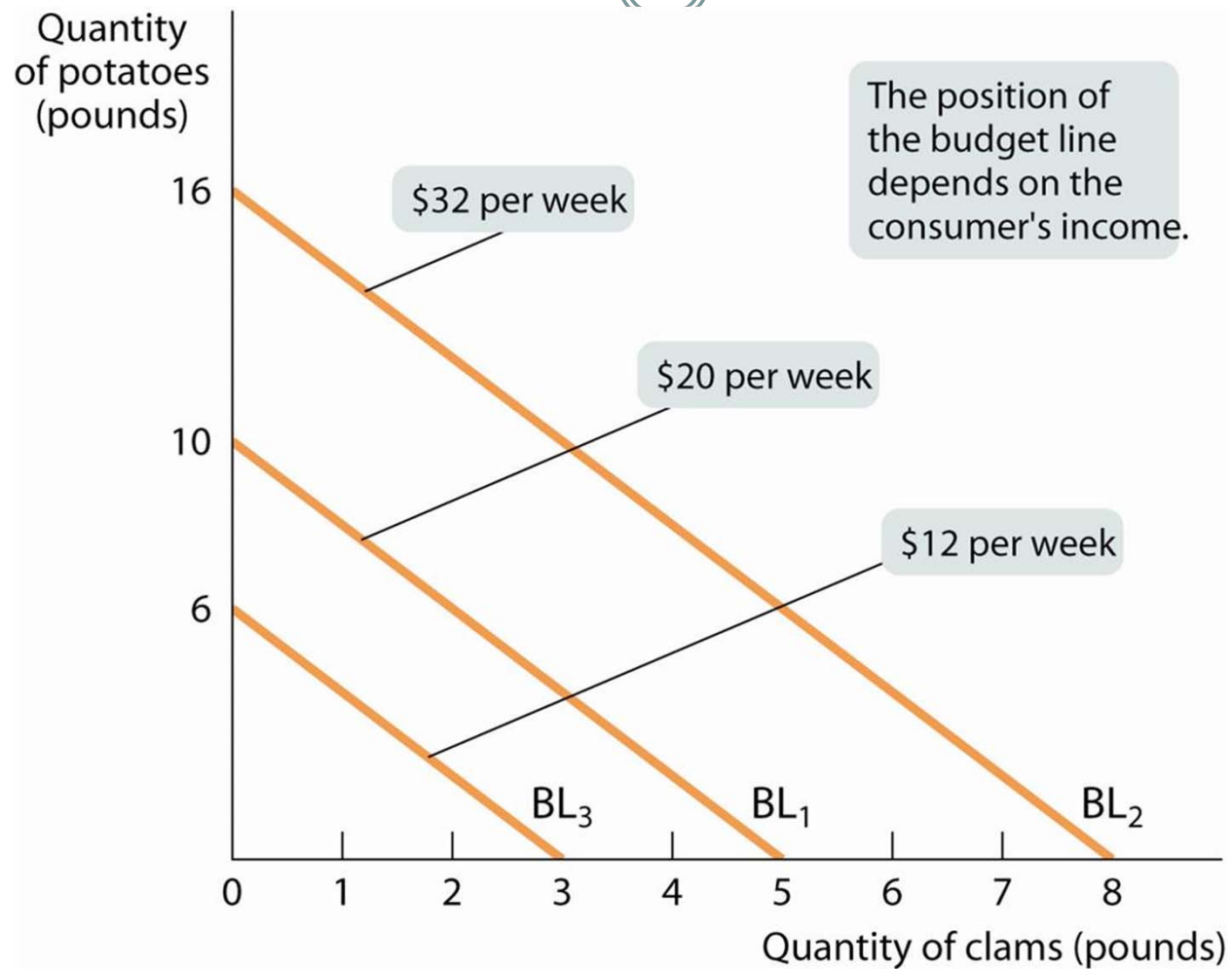


**The *budget line* represents all the possible combinations of quantities of potatoes and clams that Sammy can purchase if he spends all of his income. It is also the boundary between the set of affordable consumption bundles (the *consumption possibilities*) and unaffordable ones.**



- Do we need to consider the other bundles in Sammy's consumption possibilities, the ones that lie within the shaded region bounded by the budget line?
- No – as long as Sammy doesn't get satiated – as long as his MU from consuming either good is always positive and he doesn't get any utility from saving income rather than spending it
- He will always choose to consume a bundle that lies on his budget line

# Changes in Income Shift the Budget Line



## Sammy's Utility from Clam and Potato Consumption

| Utility from clam consumption |                               | Utility from potato consumption  |                                  |
|-------------------------------|-------------------------------|----------------------------------|----------------------------------|
| Quantity of clams<br>(pounds) | Utility from<br>clams (utils) | Quantity of<br>potatoes (pounds) | Utility from<br>potatoes (utils) |
| 0                             | 0                             | 0                                | 0                                |
| 1                             | 15                            | 1                                | 11.5                             |
| 2                             | 25                            | 2                                | 21.4                             |
| 3                             | 31                            | 3                                | 29.8                             |
| 4                             | 34                            | 4                                | 36.8                             |
| 5                             | 36                            | 5                                | 42.5                             |
|                               |                               | 6                                | 47.0                             |
|                               |                               | 7                                | 50.5                             |
|                               |                               | 8                                | 53.2                             |
|                               |                               | 9                                | 55.2                             |
|                               |                               | 10                               | 56.7                             |

# Optimal Consumption Choice



The **optimal consumption bundle** is the consumption bundle that maximizes a consumer's total utility given his or her budget constraint.

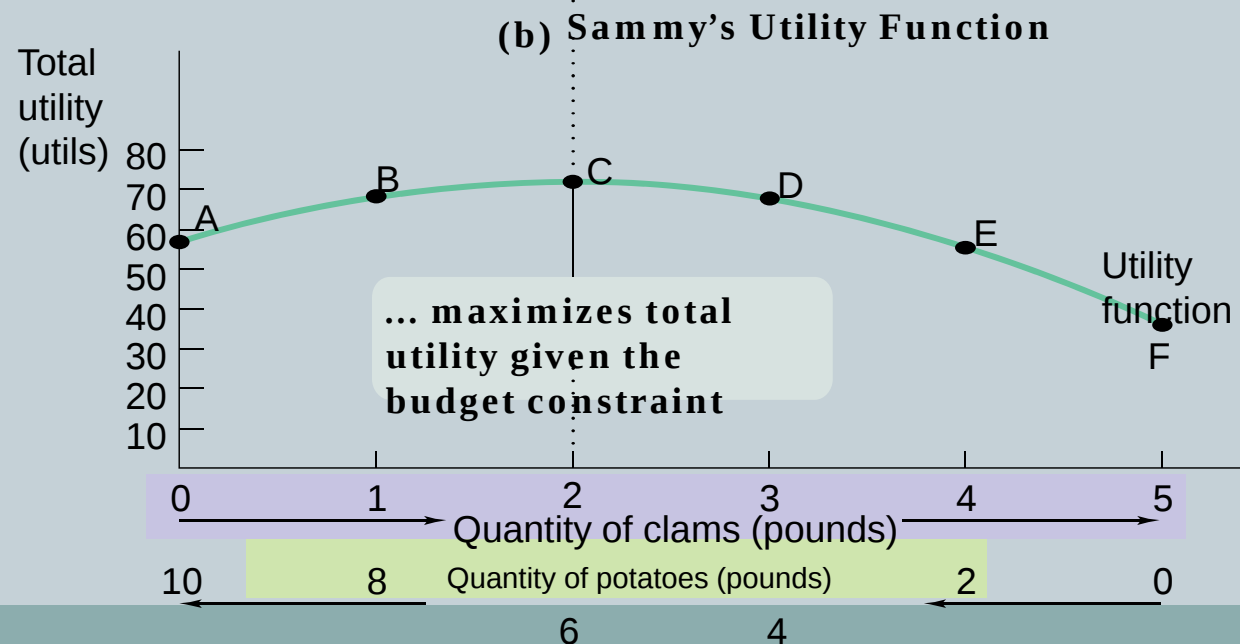
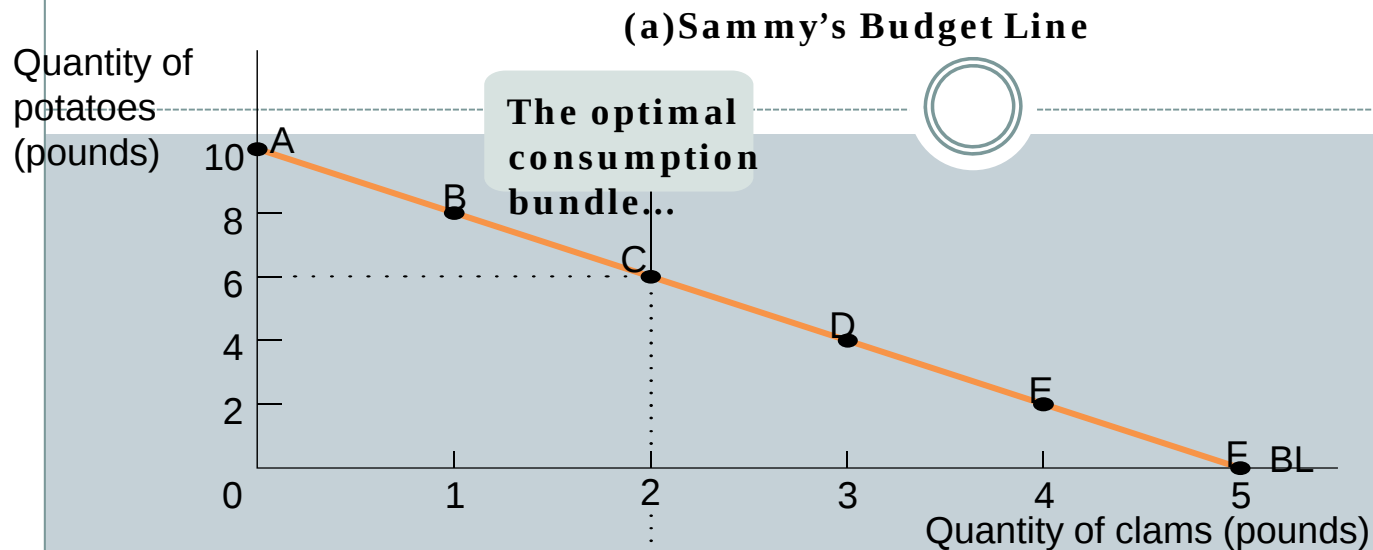
# Sammy's Budget and Total Utility



| Consumption Bundle | Quantity of clams (pounds) | Utility from clams (utils) | Quantity of potatoes (pounds) | Utility from potatoes (utils) | Total utility (utils) |
|--------------------|----------------------------|----------------------------|-------------------------------|-------------------------------|-----------------------|
| <i>A</i>           | 0                          | 0                          | 10                            | 56.7                          | 56.7                  |
| <i>B</i>           | 1                          | 15                         | 8                             | 53.2                          | 68.2                  |
| <i>C</i>           | 2                          | 25                         | 6                             | 47.0                          | 72.0                  |
| <i>D</i>           | 3                          | 31                         | 4                             | 36.8                          | 67.8                  |
| <i>E</i>           | 4                          | 34                         | 2                             | 21.4                          | 55.4                  |
| <i>F</i>           | 5                          | 36                         | 0                             | 0                             | 36.0                  |

Sammy's total utility is the sum of the utility he gets from clams and the utility he gets from potatoes.

# Optimal Consumption Bundle



Sammy's total utility is maximized at bundle C, where he consumes 2 pounds of clams and 6 pounds of potatoes. This is Sammy's *optimal consumption bundle*.

# Spending the Marginal Dollar



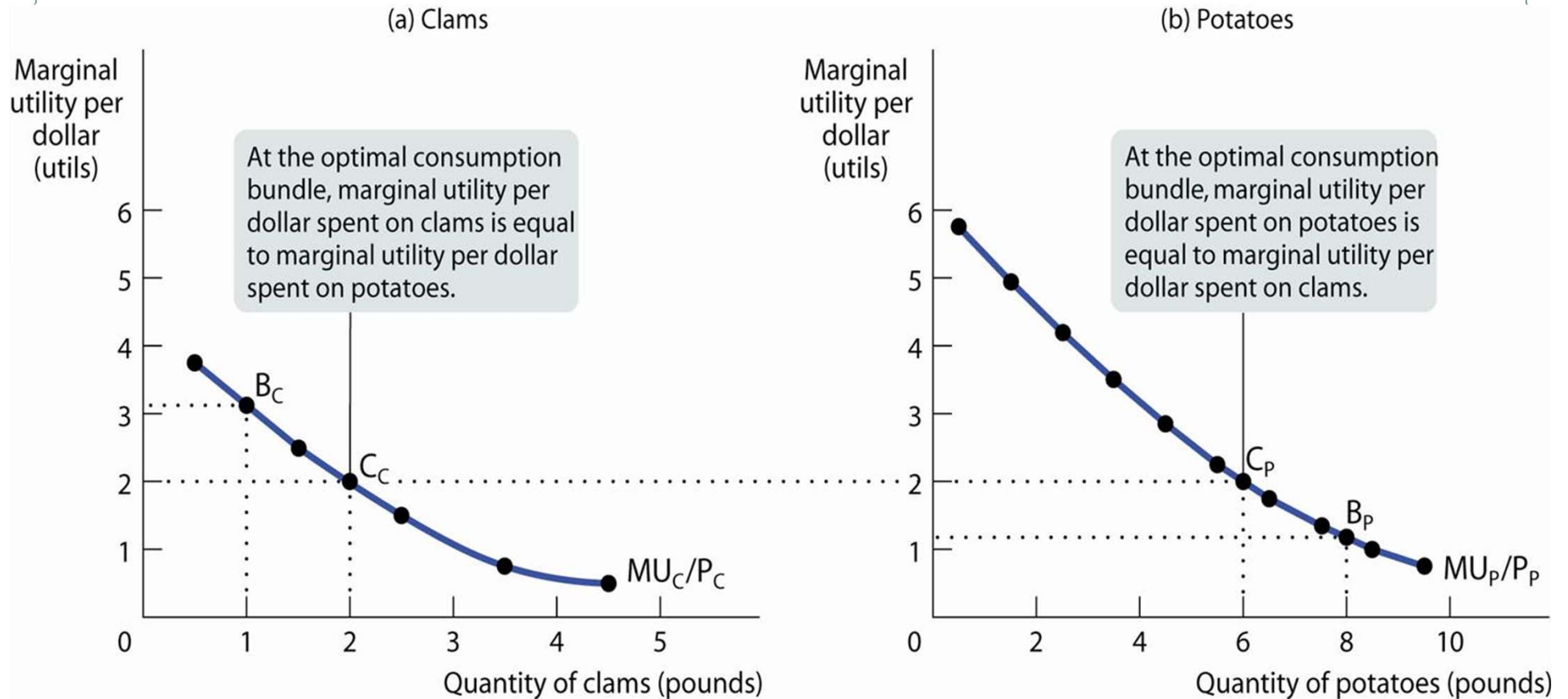
The **marginal utility per dollar** spent on a good or service is the additional utility from spending one more dollar on that good or service.

Marginal utility per dollar spent on a good  
= Marginal utility of one unit of the good / Price of one unit of the good  
=  $MU_{good} / P_{good}$

# Sammy's Marginal Utility per Dollar

| (a) Clams (price of clams = \$4 per pound) |                            |                                             |                                     | (b) Potatoes (price of potatoes = \$2 per pound) |                               |                                                |                                     |
|--------------------------------------------|----------------------------|---------------------------------------------|-------------------------------------|--------------------------------------------------|-------------------------------|------------------------------------------------|-------------------------------------|
| Quantity of clams (pounds)                 | Utility from clams (utils) | Marginal utility per pound of clams (utils) | Marginal utility per dollar (utils) | Quantity of potatoes (pounds)                    | Utility from potatoes (utils) | Marginal utility per pound of potatoes (utils) | Marginal utility per dollar (utils) |
| 0                                          | 0                          | 15                                          | 3.75                                | 0                                                | 0                             | 11.5                                           | 5.75                                |
| 1                                          | 15                         | 10                                          | 2.50                                | 1                                                | 11.5                          | 9.9                                            | 4.95                                |
| 2                                          | 25                         | 6                                           | 1.50                                | 2                                                | 21.4                          | 8.4                                            | 4.20                                |
| 3                                          | 31                         | 3                                           | 0.75                                | 3                                                | 29.8                          | 7.0                                            | 3.50                                |
| 4                                          | 34                         | 2                                           | 0.50                                | 4                                                | 36.8                          | 5.7                                            | 2.85                                |
| 5                                          | 36                         |                                             |                                     | 5                                                | 42.5                          | 4.5                                            | 2.25                                |
|                                            |                            |                                             |                                     | 6                                                | 47.0                          | 3.5                                            | 1.75                                |
|                                            |                            |                                             |                                     | 7                                                | 50.5                          | 2.7                                            | 1.35                                |
|                                            |                            |                                             |                                     | 8                                                | 53.2                          | 2.0                                            | 1.00                                |
|                                            |                            |                                             |                                     | 9                                                | 55.2                          | 1.5                                            | 0.75                                |
|                                            |                            |                                             |                                     | 10                                               | 56.7                          |                                                |                                     |

# Marginal Utility per Dollar

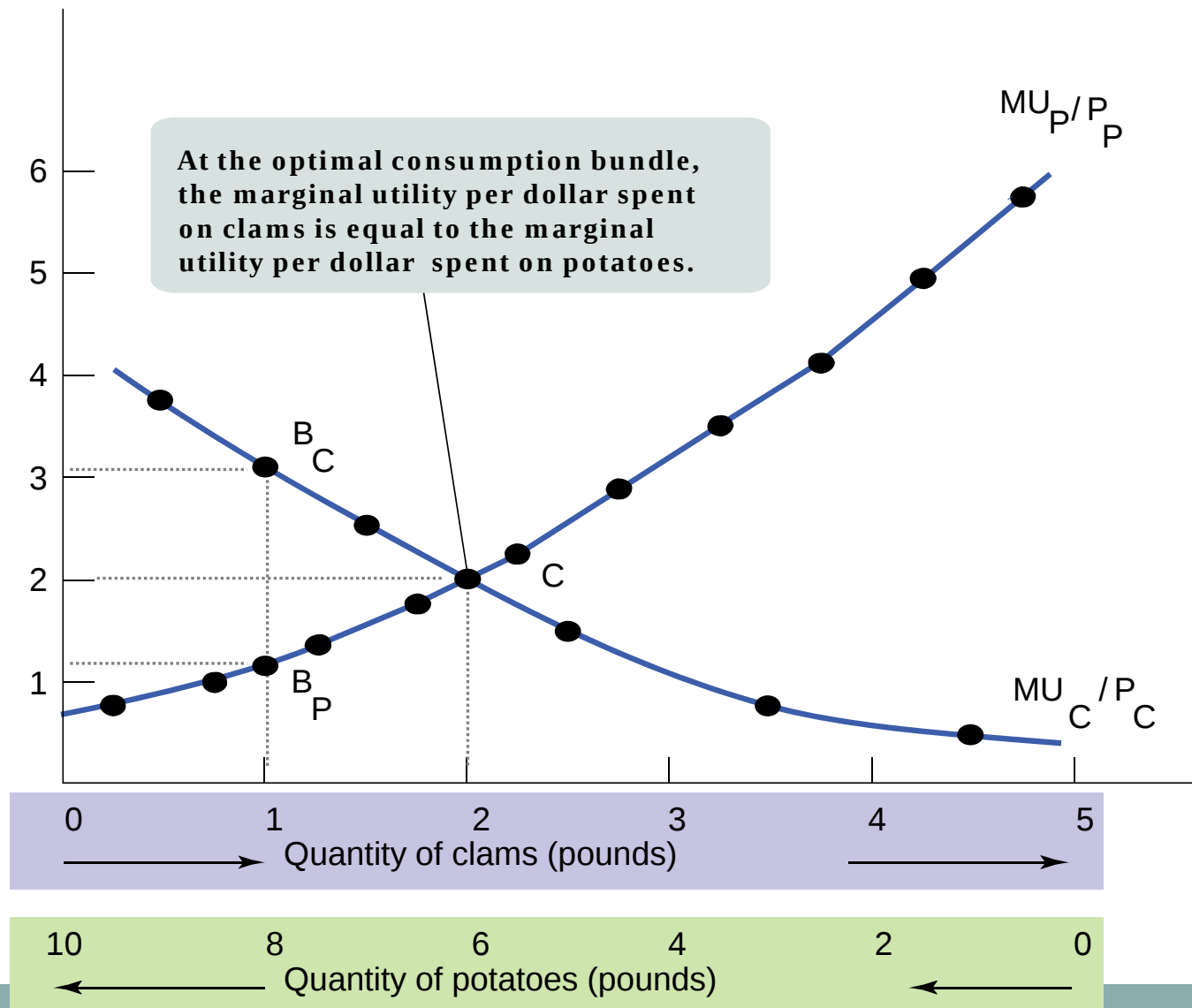


If Sammy has in fact chosen his optimal consumption bundle, his marginal utility per dollar spent on clams and potatoes must be equal.

# Marginal Utility per Dollar

If Sammy has in fact chosen his optimal consumption bundle, his marginal utility per dollar spent on clams and potatoes must be equal.

Total utility (utils)



# Optimal Consumption Rule



## The **optimal consumption rule**:

when a consumer maximizes utility, the marginal utility per dollar spent must be the same for all goods and services in the consumption bundle.

$$MU_C/P_C = MU_P/P_P$$

# DECISION MAKING PROCESS

Income = 9 baht

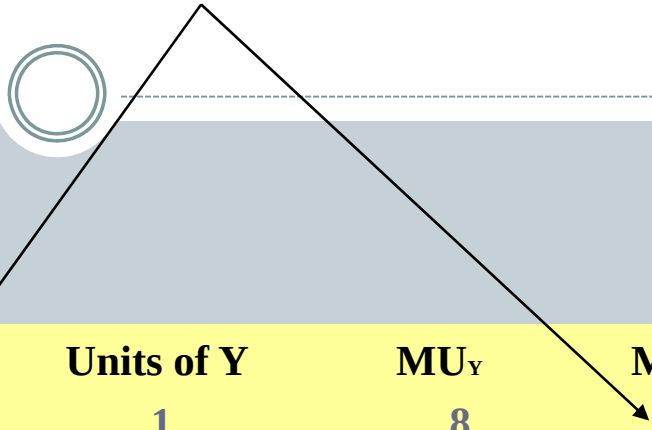
$P_X = 2$



$P_Y = 1$

| Units of X | MU <sub>X</sub> | MU <sub>X</sub> /P <sub>X</sub> | Units of Y | MU <sub>Y</sub> | MU <sub>Y</sub> /P <sub>Y</sub> |
|------------|-----------------|---------------------------------|------------|-----------------|---------------------------------|
| 1          | 10              | 5                               | 1          | 8               | 8                               |
| 2          | 8               | 4                               | 2          | 7               | 7                               |
| 3          | 6               | 3                               | 3          | 6               | 6                               |
| 4          | 4               | 2                               | 4          | 5               | 5                               |
| 5          | 3               | 1.5                             | 5          | 4               | 4                               |
| 6          | 2               | 1                               | 6          | 3               | 3                               |

### Compare The Value of MU of 1<sup>st</sup> Unit of X & 1<sup>st</sup> Unit of Y



| Units of X | MU <sub>X</sub> | $P_X = 2$<br>MU <sub>X</sub> /P <sub>X</sub> | Units of Y | MU <sub>Y</sub> | $P_Y = 1$<br>MU <sub>Y</sub> /P <sub>Y</sub> |
|------------|-----------------|----------------------------------------------|------------|-----------------|----------------------------------------------|
| 1          | 10              | 5                                            | 1          | 8               | 8                                            |
| 2          | 8               | 4                                            | 2          | 7               | 7                                            |
| 3          | 6               | 3                                            | 3          | 6               | 6                                            |
| 4          | 4               | 2                                            | 4          | 5               | 5                                            |
| 5          | 3               | 1.5                                          | 5          | 4               | 4                                            |
| 6          | 2               | 1                                            | 6          | 3               | 3                                            |

**Since 8 Utils/Baht > 5 Utils/Baht, The Consumer buys The 1<sup>st</sup>**

**Unit of Y:**

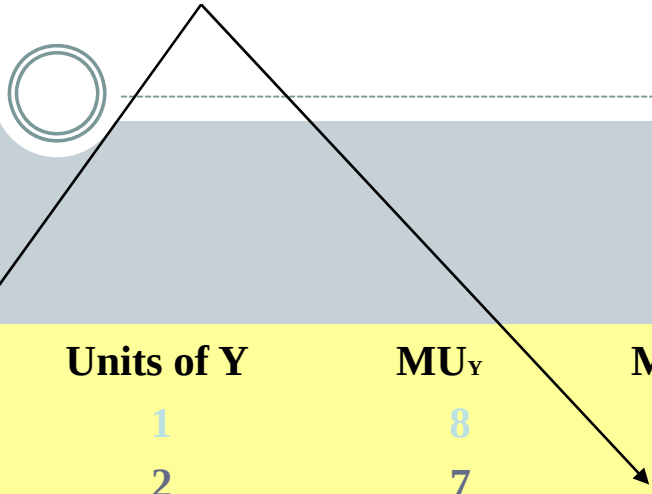
**Total Quantity: 1 Unit of Y**

**TU: 8 Utils**

**Paid: 1 Baht**

**Money Left: 9 – 1 = 8 Baht**

**Compare The Value of MU of 1<sup>st</sup> unit of X & 2<sup>nd</sup> unit of Y**



| $P_X = 2$  |                 |                                 | $P_Y = 1$  |                 |                                 |
|------------|-----------------|---------------------------------|------------|-----------------|---------------------------------|
| Units of X | MU <sub>X</sub> | MU <sub>X</sub> /P <sub>X</sub> | Units of Y | MU <sub>Y</sub> | MU <sub>Y</sub> /P <sub>Y</sub> |
| 1          | 10              | 5                               | 1          | 8               | 8                               |
| 2          | 8               | 4                               | 2          | 7               | 7                               |
| 3          | 6               | 3                               | 3          | 6               | 6                               |
| 4          | 4               | 2                               | 4          | 5               | 5                               |
| 5          | 3               | 1.5                             | 5          | 4               | 4                               |
| 6          | 2               | 1                               | 6          | 3               | 3                               |

**Since 7 Utils/Baht > 5 Utils/Baht, The Consumer buys The 2<sup>nd</sup> Unit of Y:**

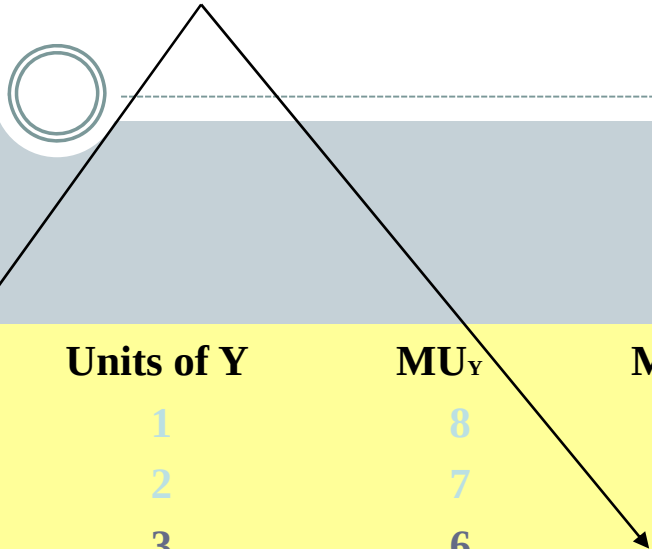
**Total Quantity: 2 Units of Y**

**TU:  $8 + 7 = 15$  Utils**

**Paid:  $1 + 1 = 2$  Baht**

**Money Left:  $9 - 2 = 7$  Baht**

**Compare The Value of MU of 1<sup>st</sup> unit of X & 3<sup>rd</sup> unit of Y**



| Units of X | MU <sub>X</sub> | MU <sub>X</sub> /P <sub>X</sub> | Units of Y | MU <sub>Y</sub> | MU <sub>Y</sub> /P <sub>Y</sub> |
|------------|-----------------|---------------------------------|------------|-----------------|---------------------------------|
| 1          | 10              | 5                               | 1          | 8               | 8                               |
| 2          | 8               | 4                               | 2          | 7               | 7                               |
| 3          | 6               | 3                               | 3          | 6               | 6                               |
| 4          | 4               | 2                               | 4          | 5               | 5                               |
| 5          | 3               | 1.5                             | 5          | 4               | 4                               |
| 6          | 2               | 1                               | 6          | 3               | 3                               |

**Since 6 Utils/Baht > 5 Utils/Baht, The Consumer buys the 3<sup>rd</sup>**

**Unit of Y:**

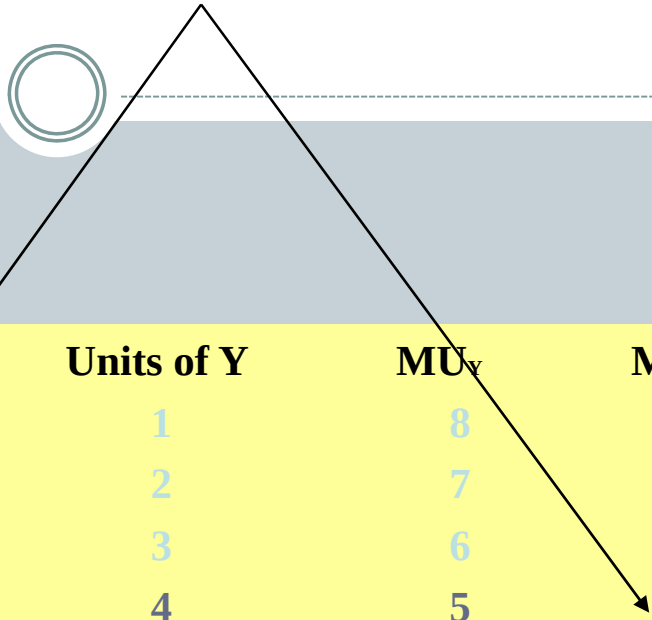
**Total Quantity: 3 Units of Y**

**TU:  $8 + 7 + 6 = 21$  Utils**

**Paid:  $1 + 1 + 1 = 3$  Baht**

**Money Left:  $9 - 3 = 6$  Baht**

## Compare The Value of MU of 1<sup>st</sup> Unit of X & 4<sup>th</sup> Unit of Y



| Units of X | MU <sub>X</sub> | $P_X = 2$<br>MU <sub>X</sub> /P <sub>X</sub> | Units of Y | MU <sub>Y</sub> | $P_Y = 1$<br>MU <sub>Y</sub> /P <sub>Y</sub> |
|------------|-----------------|----------------------------------------------|------------|-----------------|----------------------------------------------|
| 1          | 10              | 5                                            | 1          | 8               | 8                                            |
| 2          | 8               | 4                                            | 2          | 7               | 7                                            |
| 3          | 6               | 3                                            | 3          | 6               | 6                                            |
| 4          | 4               | 2                                            | 4          | 5               | 5                                            |
| 5          | 3               | 1.5                                          | 5          | 4               | 4                                            |
| 6          | 2               | 1                                            | 6          | 3               | 3                                            |

**Since 5 Utils/Baht = 5 Utils/Baht, The Consumer buys The 1<sup>st</sup> and The 4<sup>th</sup> Units of Y:**

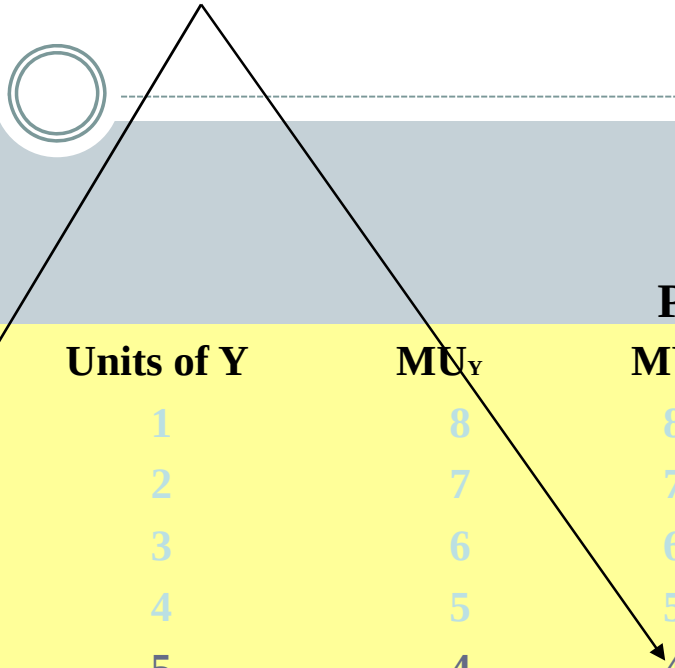
**Total Quantity: 4 Units of Y And 1 Unit of X**

**TU:  $8 + 7 + 6 + 5 + 10 = 36$  Utils**

**Paid:  $1 + 1 + 1 + 2 + 1 = 6$  Baht**

**Money Left:  $9 - 6 = 3$  Baht**

## Compare The Value of MU of 2<sup>nd</sup> Unit of X & 5<sup>th</sup> Unit of Y



| $P_X = 2$  |                 |                                 | $P_Y = 1$  |                 |                                 |
|------------|-----------------|---------------------------------|------------|-----------------|---------------------------------|
| Units of X | MU <sub>X</sub> | MU <sub>X</sub> /P <sub>X</sub> | Units of Y | MU <sub>Y</sub> | MU <sub>Y</sub> /P <sub>Y</sub> |
| 1          | 10              | 5                               | 1          | 8               | 8                               |
| 2          | 8               | 4                               | 2          | 7               | 7                               |
| 3          | 6               | 3                               | 3          | 6               | 6                               |
| 4          | 4               | 2                               | 4          | 5               | 5                               |
| 5          | 3               | 1.5                             | 5          | 4               | 4                               |
| 6          | 2               | 1                               | 6          | 3               | 3                               |

Since 4 Utils/Baht = 4 Utils/Baht, The Consumer buys The 2<sup>nd</sup> and The 5<sup>th</sup> Units of Y:

Total Quantity: 5 Units of Y And 2 Units of X

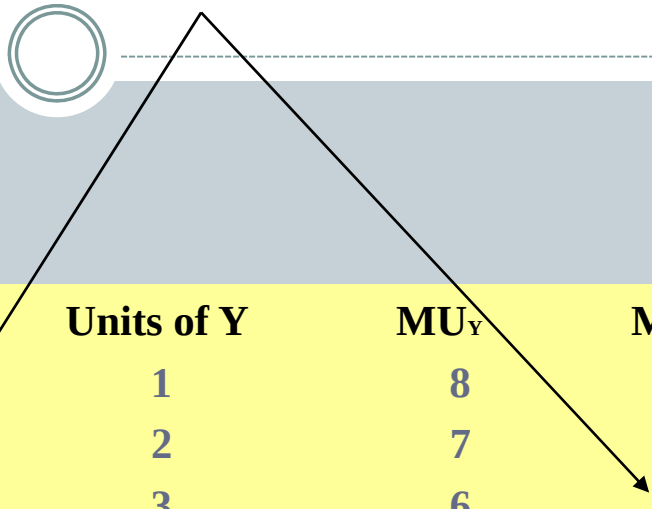
TU:  $8 + 7 + 6 + 5 + 10 + 4 + 8 = 48$  Utils

Paid:  $1 + 1 + 1 + 2 + 1 + 2 + 1 = 9$  Baht

Money Left:  $9 - 9 = 0$  Baht

## INFERIOR OPTIONS

Will The Consumer have The Maximum Utility by  
Consuming 3 Units of X (6 Baht) and 3 Units of Y (3 Baht) That Cost 9 Baht?



| $P_X = 2$  |        |            | $P_Y = 1$  |        |            |
|------------|--------|------------|------------|--------|------------|
| Units of X | $MU_X$ | $MU_X/P_X$ | Units of Y | $MU_Y$ | $MU_Y/P_Y$ |
| 1          | 10     | 5          | 1          | 8      | 8          |
| 2          | 8      | 4          | 2          | 7      | 7          |
| 3          | 6      | 3          | 3          | 6      | 6          |
| 4          | 4      | 2          | 4          | 5      | 5          |
| 5          | 3      | 1.5        | 5          | 4      | 4          |
| 6          | 2      | 1          | 6          | 3      | 3          |

**Total U Obtained by Consuming 3 Units of X:**

$$10 + 8 + 6 = 24 \text{ Utils}$$

**Total U Obtained by Consuming 3 Units of Y:**

$$8 + 7 + 6 = 21 \text{ Utils}$$

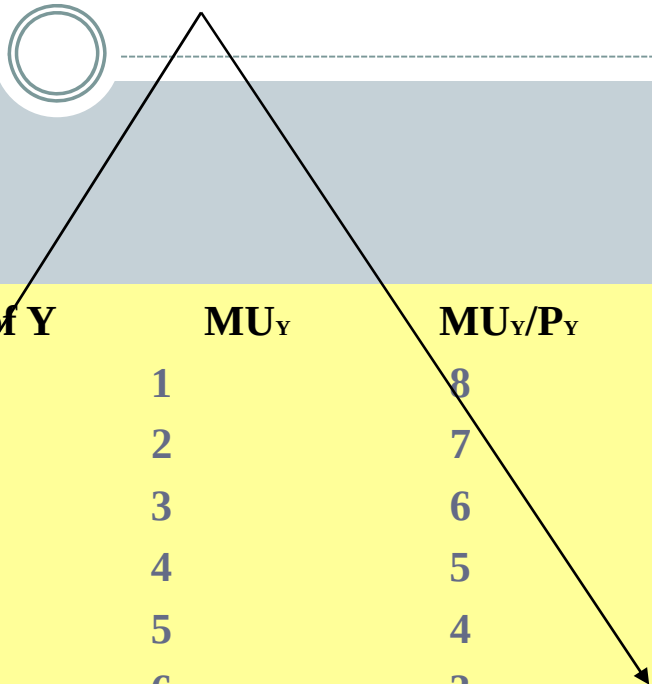
**Total U Obtained by Consuming 3 Units of X and 3 Units of Y:**

$$24 + 21 = 45 \text{ Utils}$$

$$45 \text{ Utils} < 48 \text{ Utils}$$

**The Last Baht Spent on Each Product Does Not Yield The Same Amount Of MU**

**Could the Consumer Consumes 3 Units of X & 6 Units of Y?**



| $P_X = 2$  |        |            | $P_Y = 1$  |        |            |
|------------|--------|------------|------------|--------|------------|
| Units of X | $MU_X$ | $MU_X/P_X$ | Units of Y | $MU_Y$ | $MU_Y/P_Y$ |
| 1          |        | 10         | 5          | 1      | 8          |
| 2          |        | 8          | 4          | 2      | 7          |
| 3          |        | 6          | 3          | 3      | 6          |
| 4          |        | 4          | 2          | 4      | 5          |
| 5          |        | 3          | 1.5        | 5      | 4          |
| 6          |        | 2          | 1          | 6      | 3          |

**The cost of 3 Units of X =  $2 \times 3 = 6$**

**The Cost of 6 Units of Y =  $1 \times 6 = 6$**

**Total Cost =  $6 + 6 = 12 > 9$ .**

# From Utility to the Demand Curve



The main reason for studying consumer behavior is to go behind the market demand curve—to understand how the downward slope of the market demand curve is explained by the utility-maximizing behavior of individual consumers.

# Marginal Utility, the Substitution Effect, and the Law of Demand



- When the price of a good increases, an individual will normally consume less of that good and more of other goods
- When the price of a good decreases, an individual will normally consume more of that good and less of other goods
- This explains why the individual demand curve, which relates an individual's consumption of a good to the price of that good, normally slopes downward – that is, it obeys the law of demand



- This effect of a price change on that quantity consumed is always present. It is known as **the substitution effect**
- *The change in the quantity consumed as the consumer substitutes the good that has become relatively cheaper in place of the good that has become relatively more expensive*

# The income effect



- The change in the quantity of a good consumed that results from a change in the overall purchasing power of the consumer due to a change in the price of that good
- A change in the price of a good effectively changes a consumer's income because it alters the consumer's purchasing power



- **Normal goods**
  - Goods for which demand decreases when income falls. So this effective reduction in income leads to a reduction in the quantity demanded and reinforces the substitution effect
- **Inferior goods**
  - Goods for which demand increases when income falls, the income and substitution effects work in opposite directions.

# Source:



- Krugman, P. and Robin Wells (2008)