Intermediate Microeconomics - Budget Constraint (Ch2)

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Consumption Theory

Components Market Equilibrium

- Demand side: **Consumer Theory**
- Supply side: Producer Theory
- Equilibrium

Consumer Theory

- Simple intuition: assumes that consumers choose the best (Ch3, preference) bundle of goods they can afford (Ch2).
- Budget Constraint: describes what a consumer can afford

Examples

Consuming books spending time

- Say it takes Emily 2 hours to read one chapter of the math book,
  2 hour to read one chapter of *Microeconomics*,
  and 4 hours to read one chapter of *The Three-Body Problem*.
- For a day, she can only spend 12 hours reading books.

- Possible bundle of books Emily can read a day?
- What is her budget constraint for one day?

Examples

Consuming books spending time

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  2 hour to read one chapter of *Microeconomics*,
  and 4 hours to read one chapter of *The Three-Body Problem*.
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- budget constraint:
  2 (hours) * math (chapter) + 3 * MicroEcon + 4 * Novel $\leq$ 12 (hours)

Consuming goods spending money

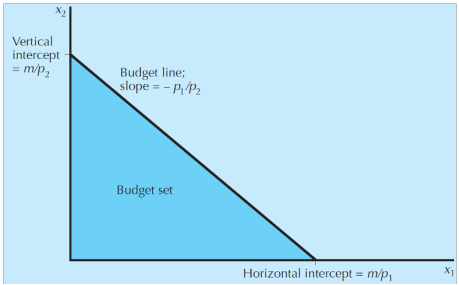
Basic Setting

- A consumption bundle $\mathcal{X}$: $(x_1, x_2, ..., x_n)$
- Commodity prices $\mathcal{P}$: $p_1, p_2, ..., p_n$ (RMB)
- Suppose the consumer has an income of I (RMB)

- Budget constraint $\mathcal{PX} \leq I$: $p_1x_1 + p_2x_2 + ... + p_nx_n \leq I$
  The consumer can spend no more than her income
- Budget Set: bundles that satisfy budget constraint
- Budget Line: $\mathcal{PX} = I$

To Illustrate the Budge Constraint

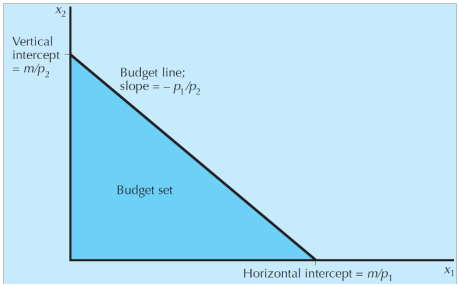
Consider two goods only



- Two goods: x_1 with price p_1, and x_2 with p_2
- x_1: what we focus on
- x_2: composite good that represents anything else other than x_1 income is m (RMB)
- Budget Constraint: $p_1 * x_1 + p_2 * x_2 \leq m$
  Budget Line: $p_1 * x_1 + p_2 * x_2 = m$

Slope of the Budge Constraint

Trade-off between x_1 and x_2

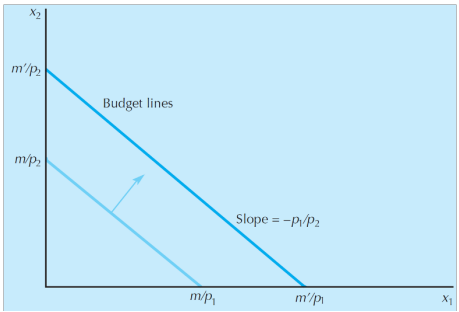


- x_1 increase $\Delta_1 > 0$ units, $p_1 * \Delta_1$ of money are needed
- x_2 should decreases, $\Delta_2 < 0$
- $\Delta_2 = -\frac{p_1 * \Delta_1}{p_2}$

- **The slope**: $= \frac{\Delta_2}{\Delta_1} = -\frac{p_1}{p_2}$
- **Opportunity cost of** $x_1 = \frac{p_1}{p_2}$: increasing one unit of x_1 requires decreasing x_2 by $\frac{p_1}{p_2}$ units
- **Relative price of** x_1: $\frac{p_1}{p_2}$

How the budget line changes

If income changes



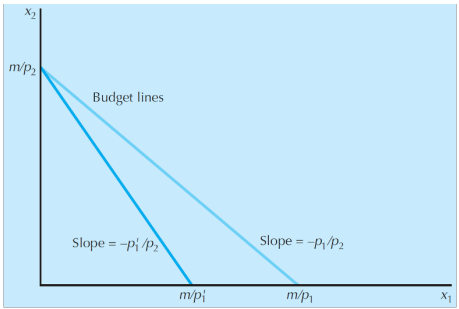
- An increase (a) in income will result in a parallel shift outward of the budget line

  $\Rightarrow$ Budget Constraint:
  $p_1 * x_1 + p_2 * x_2 \leq m' = m + a$
- Similarly, a decrease (d) in income will cause a parallel shift inward

  $\Rightarrow$ Budget Constraint:
  $p_1 * x_1 + p_2 * x_2 \leq m - d$

How the budget line changes

If price changes



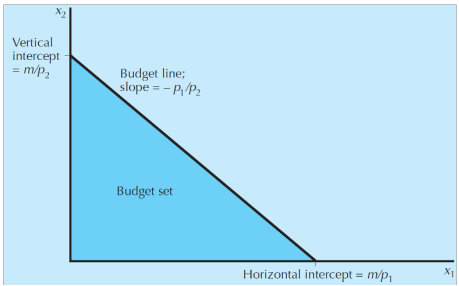
- An increase (a) in p_1, the budget line becomes steeper.

  $\Rightarrow$ Budget Constraint:
  $(p_1 + a) * x_1 + p_2 * x_2 \leq= m$
- Similarly, a decrease (d) in income will cause a parallel shift inward

  $\Rightarrow$ Budget Constraint:
  $(p_1 - d) * x_1 + p_2 * x_2 \leq m$

The numeraire

If $p_2 = 1$



- x_2 is called as "**numeraire good**",
- p_2 is called as "**numeraire price**"

- **The slope**: $= \frac{\Delta_2}{\Delta_1} = -\frac{p_1}{p_2} = -p_1$
- **Opportunity cost of** $x_1 = \frac{p_1}{p_2}$: increasing one unit of x_1 requires decreasing x_2 by p_1 units
- **Relative price of** x_1: $\frac{p_1}{p_2} = p_1$

How to encourage food (x_1) consumption?

US Food Stamp program

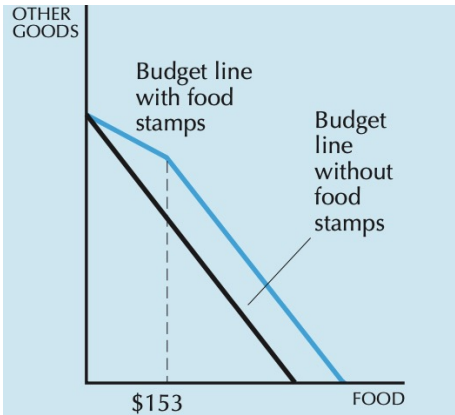
- The US government was trying to find a way to promote the expenditure on food for poor families in 1964.

To use Tax or Subside?

- **A quantity tax**: a per-unit tax
- **A value tax**: a percentage tax on the value (or expenditure) of a good, such as a sales tax, also known as "ad valorem tax"
- **A lump sum tax**: a unit tax on income
- **Subsidies** can be thought of as negative taxes

Subsidies: Food coupons

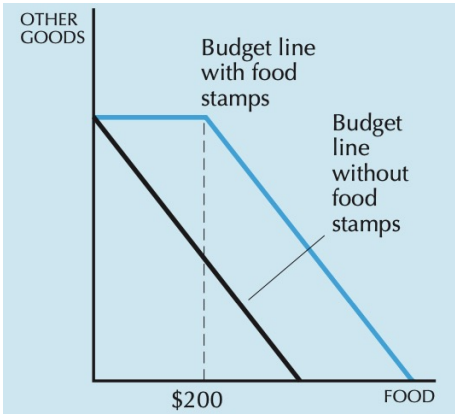
ad valorem subside: buy \$153 of food stamps for \$25



- x_1: dollar spent on food $\Rightarrow p_1 = 1$
- Relative price of x_1 when the consumption of food ≤ 153: $\frac{25}{153}$
- Relative price of x_1 when the consumption of food > 153: p_1
- Write the new budget constraint?

Subsidies: Food coupons

$200 of food stamps for $0



- Relative price of x_1 when the consumption of food ≤ 200: $\frac{0}{200}$
- Relative price of x_1 when the consumption of food > 200: p_1

- Write the new budget constraint?
- Will people buy more food for sure? Why? (Quiz or PS)

Summary

What we should know know

- Write the budget line equation, draw the budget line
- Know the budget set, the meaning of the slope (relative price, opportunity cost)
- Know how budget line moves with changing income, price, tax, or subside.

What next

- Consumer Theory (**Ch3, Ch4**, Ch5, Ch6)


Thank You!