

The price of one good changing has two effects:

1. The rate at which you can exchange one good for another changes

两个物品的相对价格发生变化

2. The total purchasing power of your income is altered 购买力发生变化

- If the price went down, consuming the same bundle as before leaves extra income
价格下降，手里剩钱
- If the price went up, you cannot consume the same bundle as before
价格上升，不能再买原来的数量

if 物品 1 价格 falls, you:

1. Must give up less of good 2 to purchase good 1

Change in the rate at which you must substitute good 2 for good 1

2. Can now buy more of good 1

The purchasing power of your income has gone up

if 物品 1 价格 increases, you:

1. Must give up more of good 2 to purchase good 1

Change in the rate at which you must substitute good 2 for good 1

2. Can now buy less of good 1

The purchasing power of your income has gone down

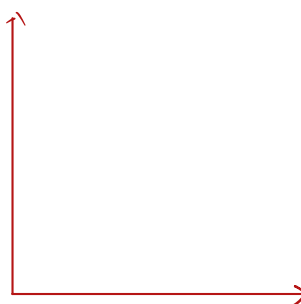
中心思想：

Substitution Effect 替代效应

- The change in demand due to the change in the rate of exchange (p_1/p_2) between the two goods
相对价格的变化对需求的影响

Income Effect 收入效应

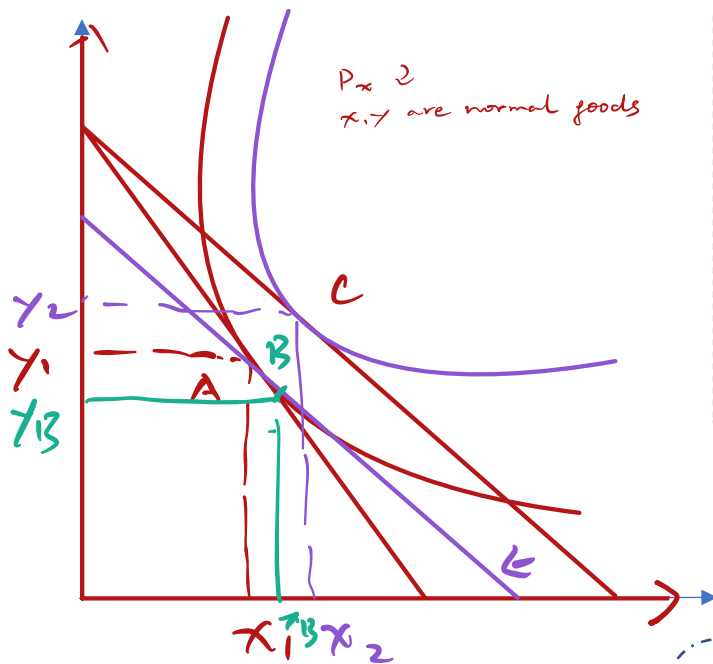
- The change in demand due to having more or less purchasing power
购买力的变化对需求的影响



● SUBSTITUTION EFFECT

Let relative prices change and adjust income so as to hold purchasing power constant

改变相对价格，购买力一样（买原来的 bundle）



画图步骤：

If price of good 1 decrease

1. pivot the budget line outward
2. shift the pivoted budget line to the original bundle

当物品 1 价格下降

1. 将预算线转到新的价格
2. 将新价格的预算线平移回一开始的商品组合

$A \Rightarrow C$: total effect

- 1) income
- 2) substitution.

将 C 点在 income curve 平移，与 original welfare curve 相切。

income effect: $|x_C - x_{13}|$

substitution effect: $|x_A - x_{13}|$

两条 budget line 公式：

$$m' = \overset{\text{新的 } p_1}{p_1'} x_1 + p_2 x_2$$

$$m = p_1 x_1 + p_2 x_2$$

相减找出变化

$$m' - m = x_1 (p_1' - p_1)$$

$$\Delta m = x_1 \Delta p_1$$

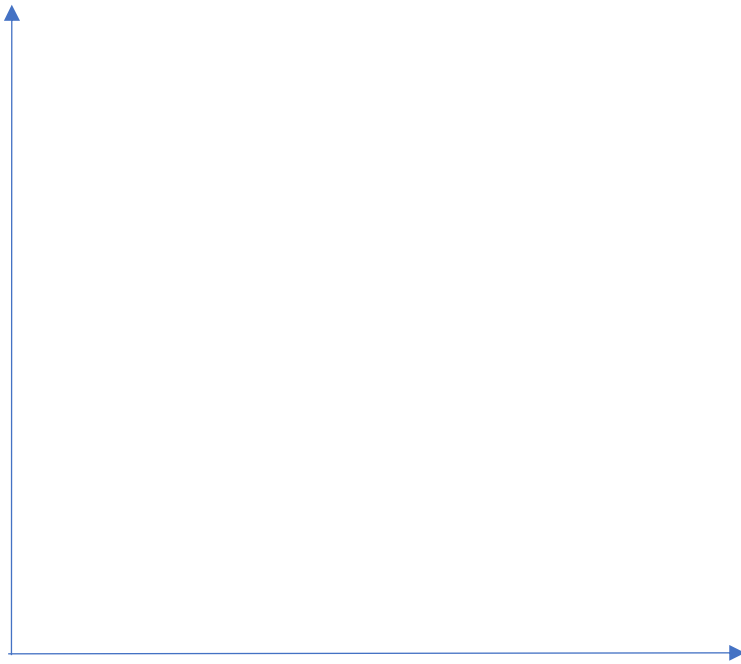
Substitution effect 公式：

$$\Delta x_1^S = (x_2 - x_1) = x_1 (p_1', p_2, m') - x_1 (p_1, p_2, m)$$

- **INCOME EFFECT**

Let purchasing power adjust while holding relative prices constant

改变购买力，相对价格一样

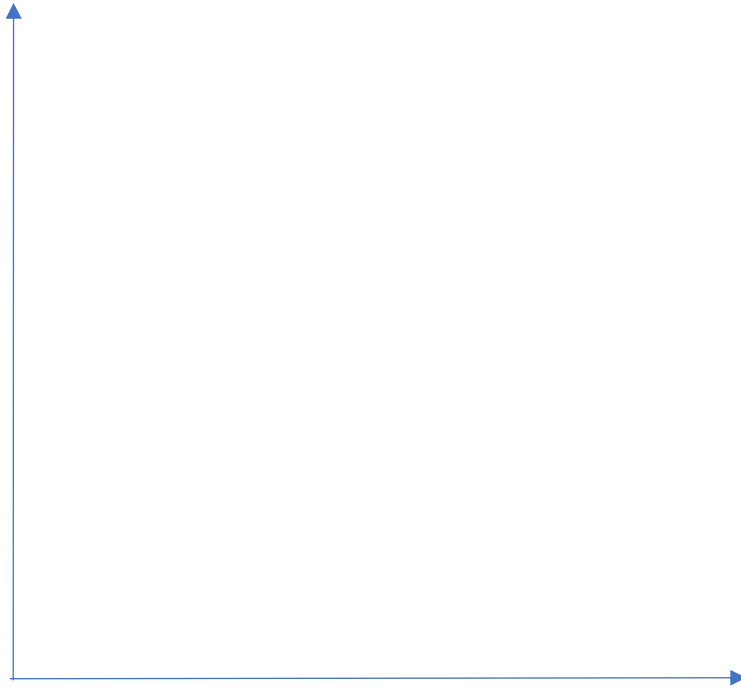


Income effect 公式：

$$x_2 - x_3 = x_2(p_1', p_2, m) - x_3(p_1', p_2, m)$$

- 组合在一起

- Case 1 : Good 1 Normal good



画图步骤：

If price of good 1 decrease

1. pivot the budget line outward
2. shift the pivoted budget line to the original bundle

当物品 1 价格下降

1. 将预算线转到新的价格
2. 将新价格的预算线平移回一开始的商品组合

A → B Total effect (T.E.)

A → C Substitution effect (S.E.)

C → B Income effect (I.E.)

总结：(后面的点减前面的点 才是变化)

Total effects = Substitution effect + income effects

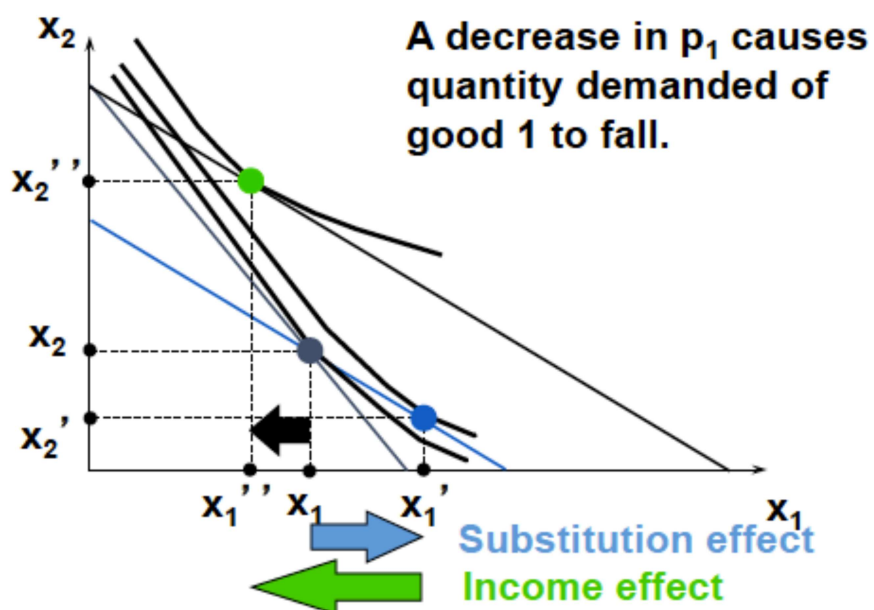
$$\text{Total effects} = x_1^{final} - x_1^{initial}$$

$$\text{Substitution effects} = x_1^{SE} - x_1^{initial}$$

$$\text{Income effects} = x_1^{final} - x_1^{SE}$$

- Case 2 : Good 1 Inferior good

- Case 3: Good1 Giffen good



总结：

Normal Good: 普通商品

a) Substitute effect 替代影响

$p_1 \downarrow, x_1 \uparrow,$

$p_1 \uparrow, x_1 \downarrow$

b) Income effect 收入影响

$X_1 [\quad] \quad X_2 [\quad]$

the IE reinforces the SE

Inferior Good: 残次品

1. Substitute effect 替代影响

$p_1 \downarrow, x_1 \uparrow,$

$p_1 \uparrow, x_1 \downarrow$

2. Income effect 收入影响X

$X_1 [\quad] \quad X_2 [\quad]$

The substitution and income effects oppose each other when an inferior good' s own price changes

● SLUTSKY EQUATION

The total change in demand from a price change can be written using the Slutsky Equation:

Normal good:

SE and IE work in same direction (直接可以判断出总变化的方向)

- A price increase causes a reduction in overall demand, through both SE and IE:

Inferior Good:

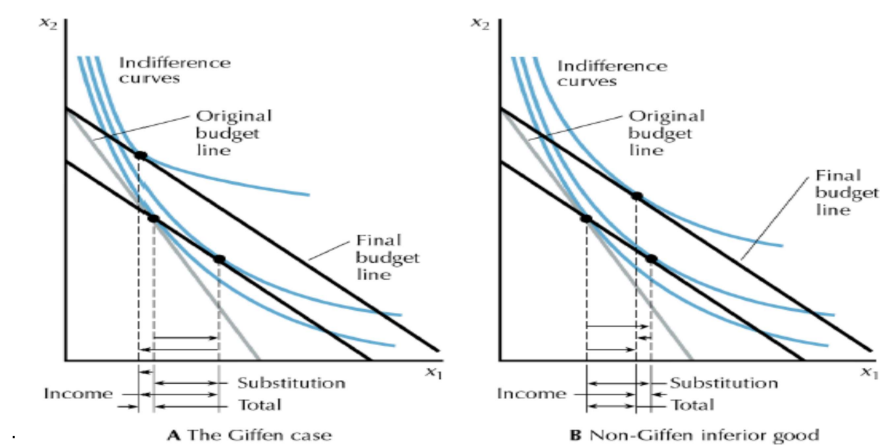
SE and IE work in opposite directions (需要通过哪个影响大, 来判断出总变化的方向)

- A price increase causes an ambiguous change in overall demand, through SE being negative and IE being positive:

Giffen good: IE is larger, and price increase => consume more

(Non-Giffen) Inferior good: SE is large, and price increase => consume less

图像：



练习：

1. $x_1 = 10 + \frac{m}{10p_1}$, $m = 100$, $p_1 = 1$, then p_1 increase to 2, what is the change in m ? IE? SE?

2. $U=xy$, $p_x=2$, $p_y=1$, $m=120$

then $p_x=1$, $p_y=1$ $m=120$

income effect? Substitution effect ? how much income need to buy the original bundle with the new price?

TRUE/FALSE

1. A Giffen good must be an inferior good.

ANS: T

2. If a good is an inferior good, then an increase in its price will increase the demand for it.

ANS: F

3. The Slutsky substitution effect measures the movement between two points on the same indifference curve.

ANS: F

4. In the case of homothetic preferences, the entire change in demand from a price change is due to the substitution effect.

ANS: F

5. If two goods x and y are perfect complements, then if the price of x falls, the entire change in the demand for x is due to the income effect.

ANS: T

6. If the Engel curve slopes up, then the demand curve slopes down.

ANS: T

MULTIPLE CHOICE

1. If the prices of all goods increase by the same proportion as income, the quantity demanded of good x will
 - a. decrease.
 - b. increase.
 - * c. remain unchanged.
 - d. change in a way that cannot be determined from the information given.

2. If income doubles and the quantity demanded of good x less than doubles, then good x can be described as a
 - a. substitute good.
 - b. complement good.
 - c. necessity.
 - * d. Normal.

3. If an individual buys only two goods and these must be used in a fixed relationship with one another (e.g., coffee and cream for a coffee drinker who never varies the amount of cream used in each cup), then
 - * a. there is no substitution effect from a change in the price of coffee.
 - b. there is no income effect from a change in the price of coffee.
 - c. Giffen's Paradox must occur if both coffee and cream are inferior goods.
 - d. an increase in income will not affect cream purchases.

4. Consider the two following statements:

I. x is an inferior good.

II. x exhibits Giffen's Paradox.

Which of the following is true?

a. I implies II, but II does not necessarily imply I.

* b. II implies I, but I does not necessarily imply II.

c. I and II are statements of the same phenomenon.

5. Assume x and y are the only two goods a person consumes and x is an inferior good. If after a fall in p_x the quantity demanded of x increases, one could say

a. the income effect dominates the substitution effect.

* b. the substitution effect dominates the income effect.

c. it is still impossible to determine whether the substitution or income effect dominates.

d. none of the above.