Intermediate Microeconomics

Chapter 9: Buying and Selling

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Endowments

The list of resource units with which a consumer start is his endowment.

Endowment: 禀赋

A consumer's endowment with denoted by the vector ω (omega).

Endowments

$p_1 = 3$ and $p_2 = 5$ so the value of the endowment $(\omega_1, \omega_2) = (8,2)$ is

$$p_1\omega_1 + p_2\omega_2 = 3 \times 8 + 5 \times 2 = 34$$

Question: For which consumption bundles may the endowment be exchanged?

$B = \{(x_1, x_2) \mid p_1 x_1 + p_2 x_2 \leq p_1 w_1 + p_2 w_2\}$.

Answer: For any bundles costing no more than the endowment's value.

Budget Constraints Revisited

Given p_1 and p_2, the budget constraint for a consumer with an endowment (ω_1, ω_2) is

$$p_1 x_1 + p_2 x_2 = p_1 \omega_1 + p_2 \omega_2$$

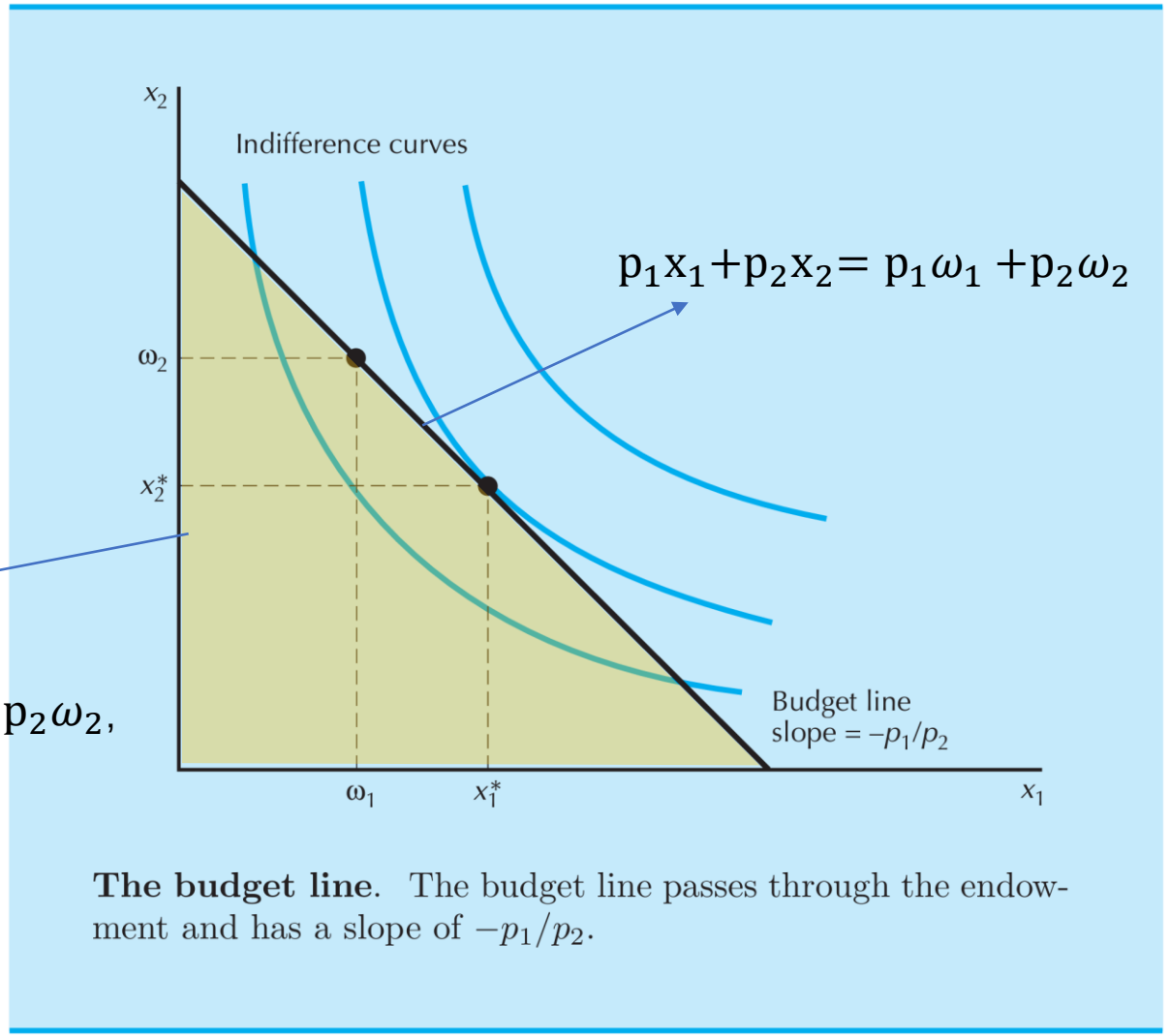
The budget set is $\{(x_1, x_2) | \ p_1 x_1 + p_2 x_2 \leq p_1 \omega_1 + p_2 \omega_2, x_1 \geq 0, x_2 \geq 0\}$

The constraint can be rewrite as

$$p_1(x_1 - \omega_1) + p_2(x_2 - \omega_2) = 0$$

That is, the sum of the values of a consumer's net demand is zero.

Budget Constraints Revisited



The budget line. The budget line passes through the endowment and has a slope of $-p_1/p_2$.

Budget set:
$\{(x_1, x_2)|\ p_1x_1+p_2x_2 \leq p_1\omega_1 +p_2\omega_2,$
$x_1 \geq 0, x_2 \geq 0\}$

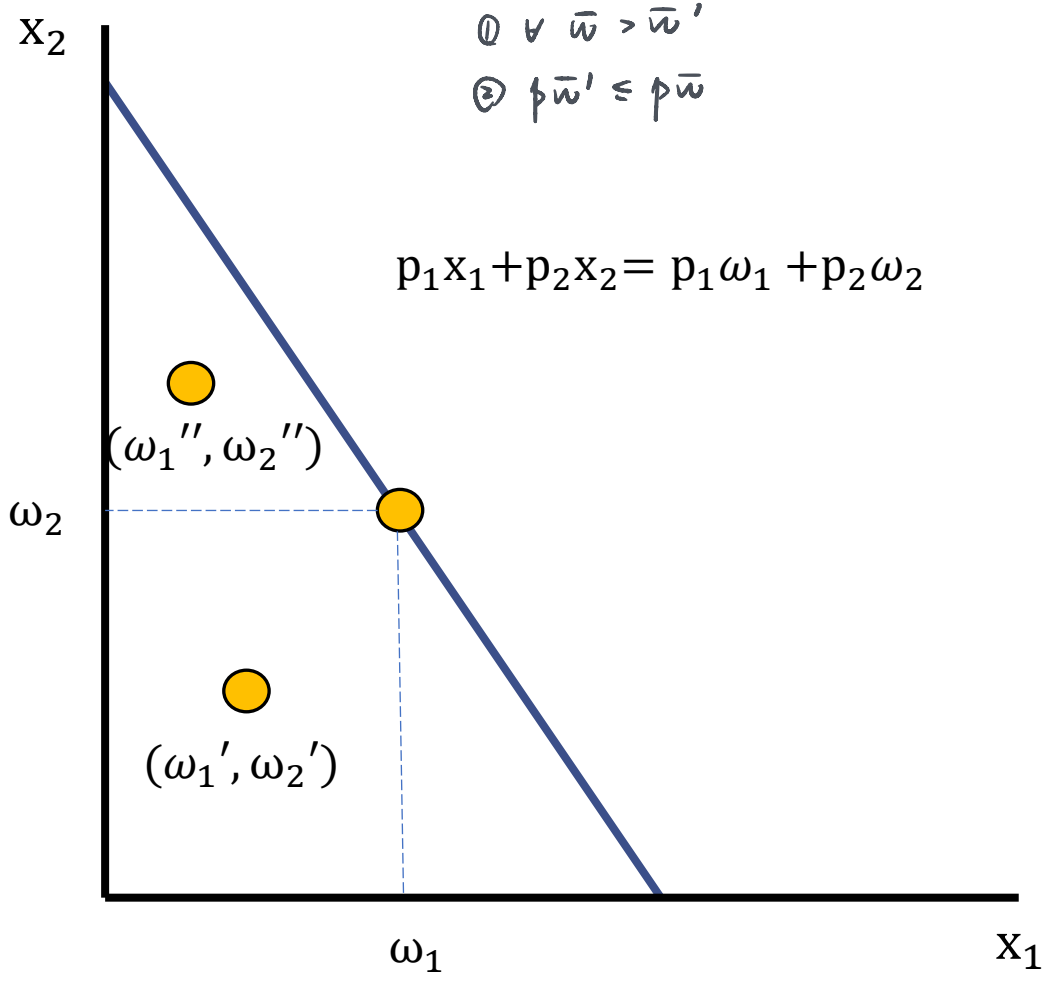
Changes in the Endowment

$B(p, \bar{w}') \in B(p, \bar{w})$.

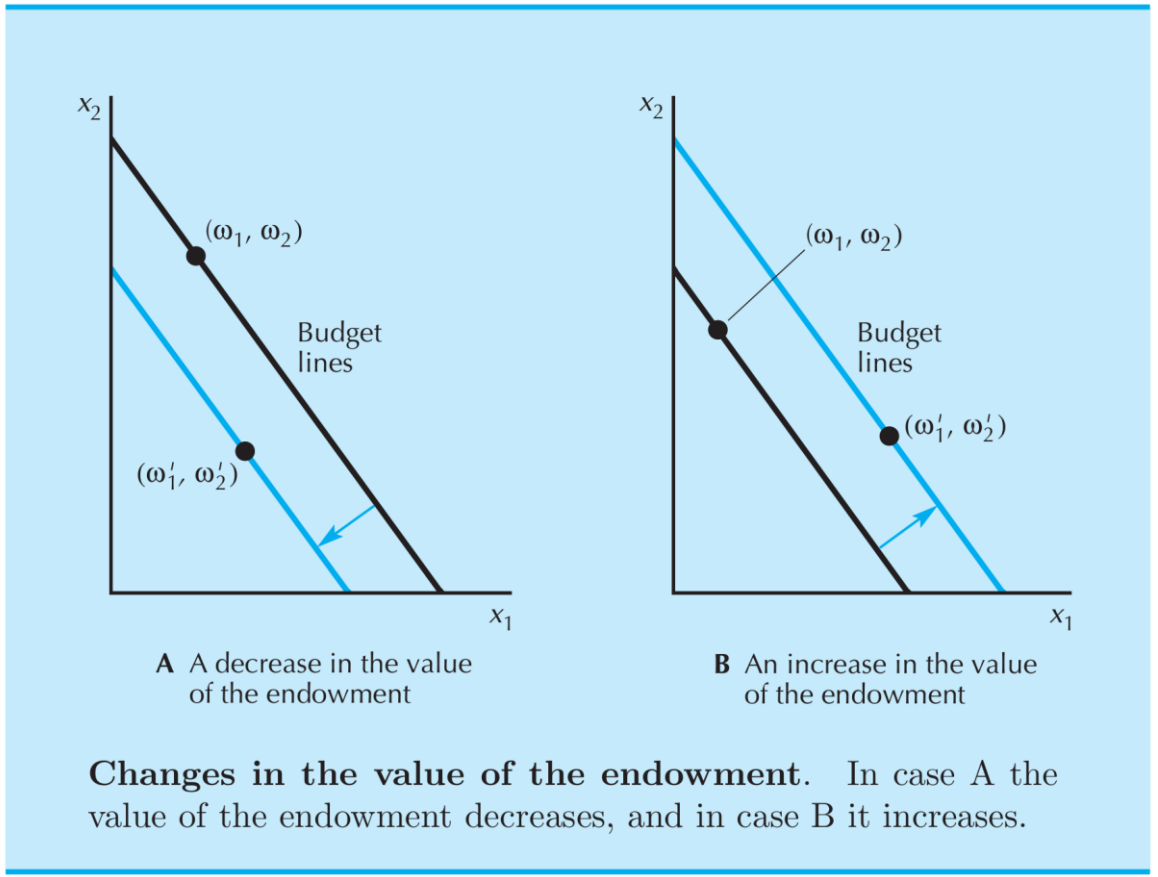
① $\forall\ \bar{w} > \bar{w}'$

② $p\bar{w}' \leq p\bar{w}$

$B(tp, \bar{w}) = B(p, w)$.

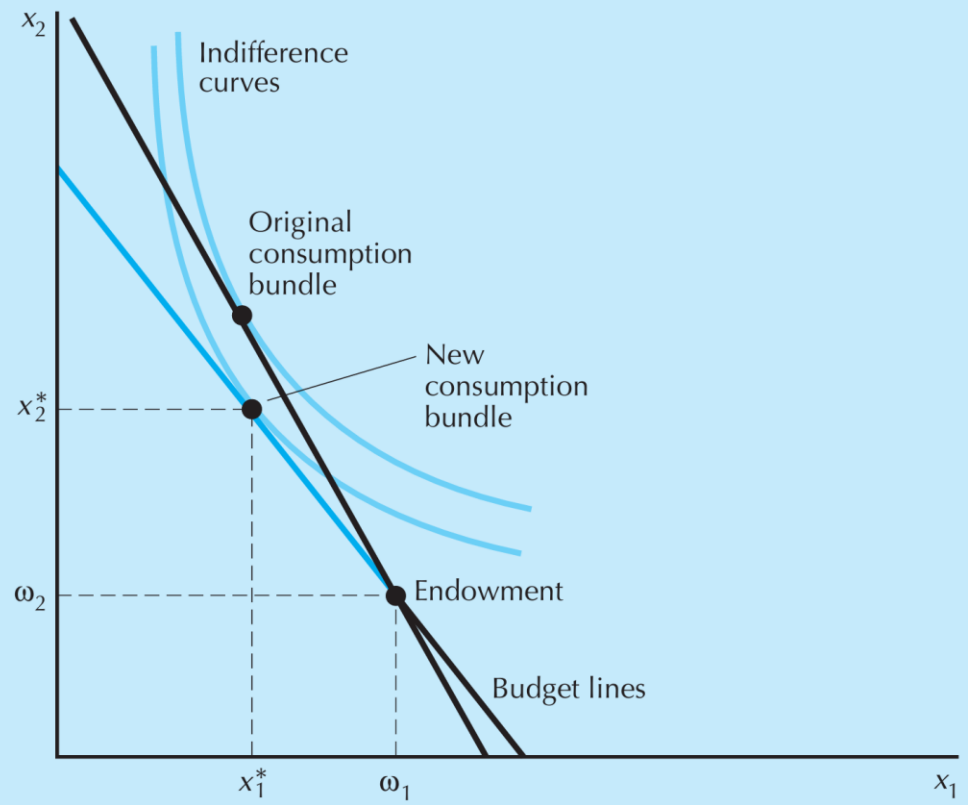


$$p_1x_1 + p_2x_2 = p_1\omega_1 + p_2\omega_2$$



Changes in the value of the endowment. In case A the value of the endowment decreases, and in case B it increases.

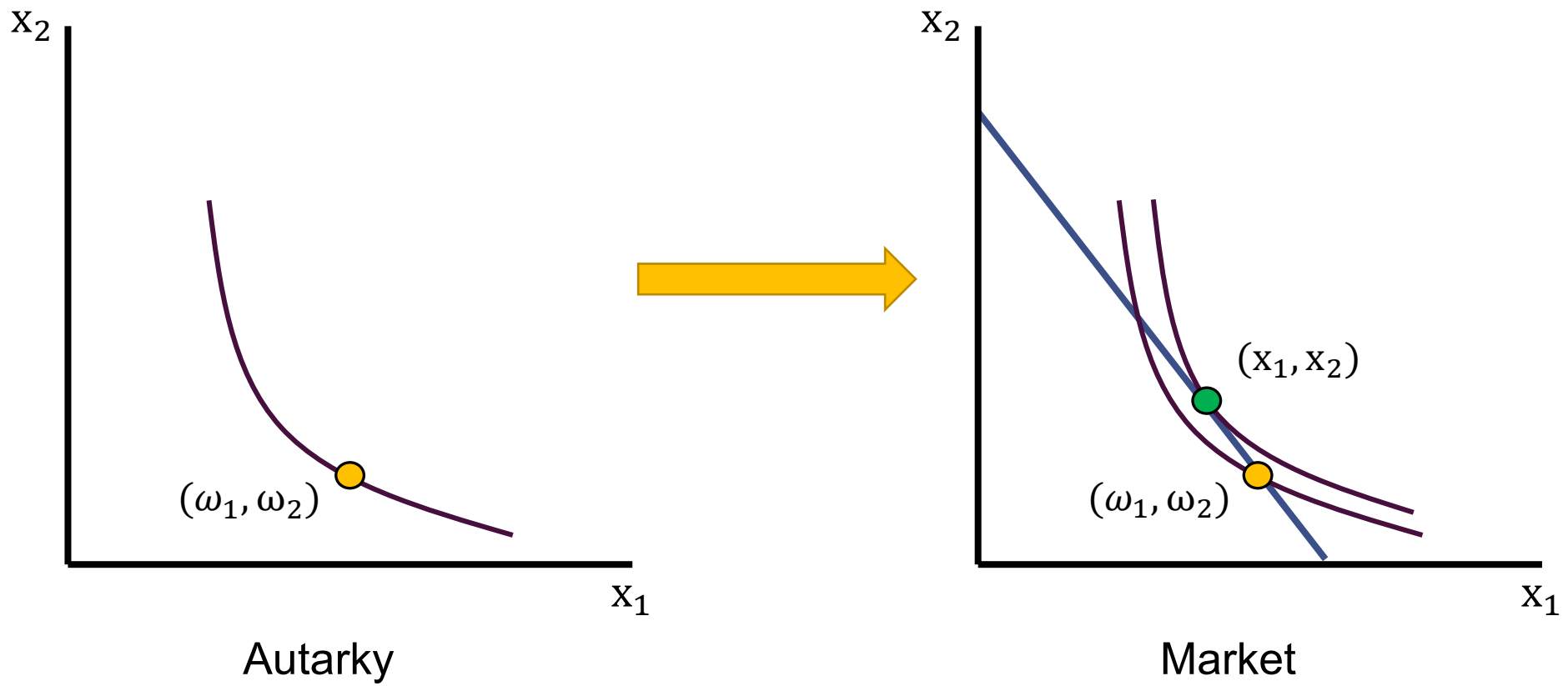
Changes in a Good's Price



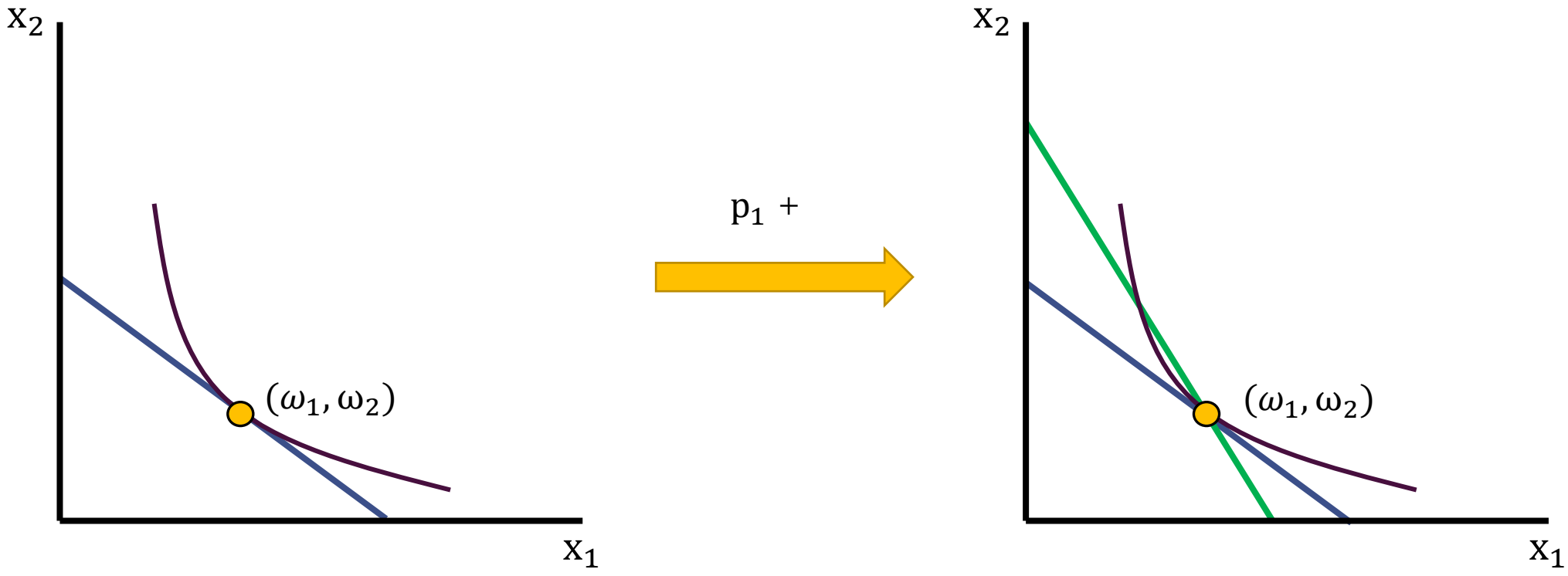
Decreasing the price of good 1. Lowering the price of good 1 makes the budget line pivot around the endowment. If the consumer remains a supplier she must be worse off.

From Autarky to Market

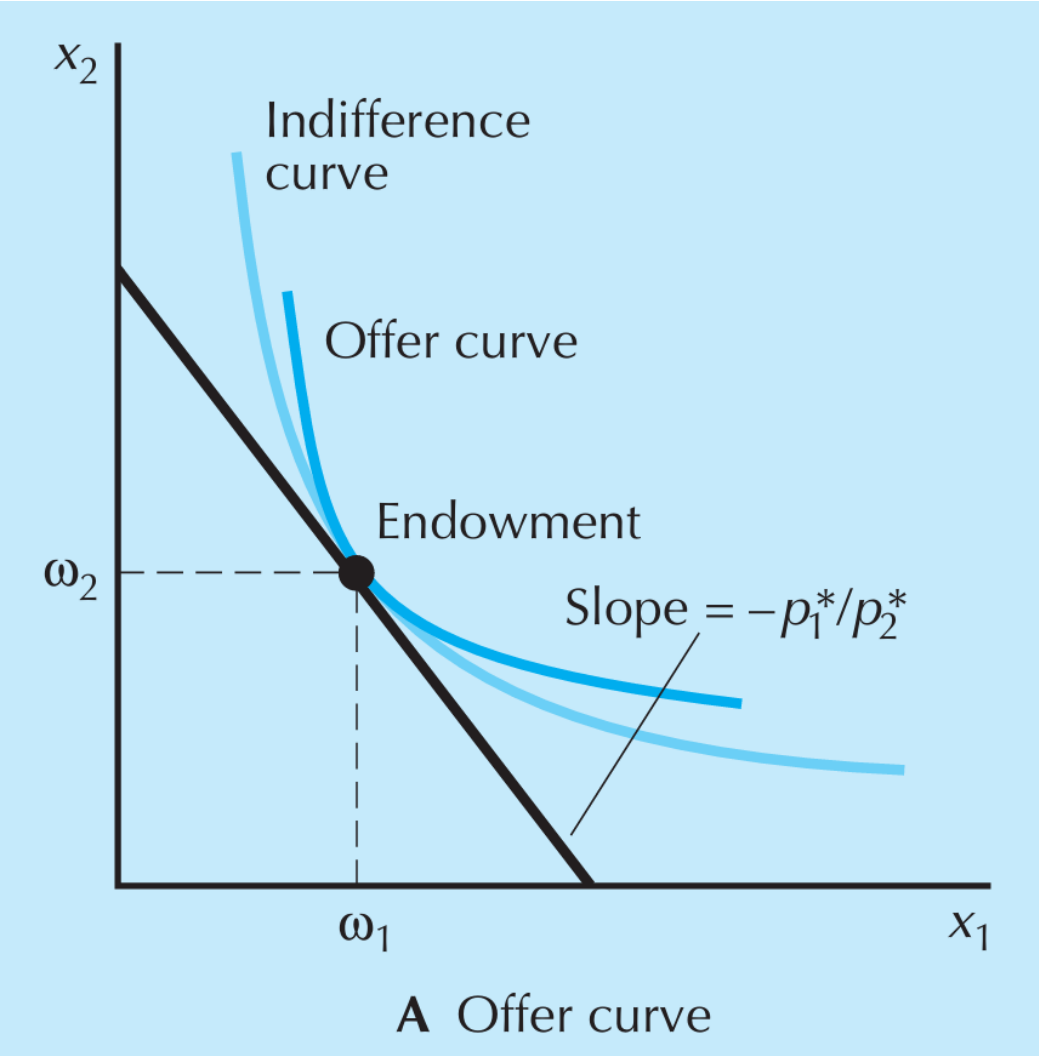
自给自足



When Good 1 Price Increases



Price-Offer Curve

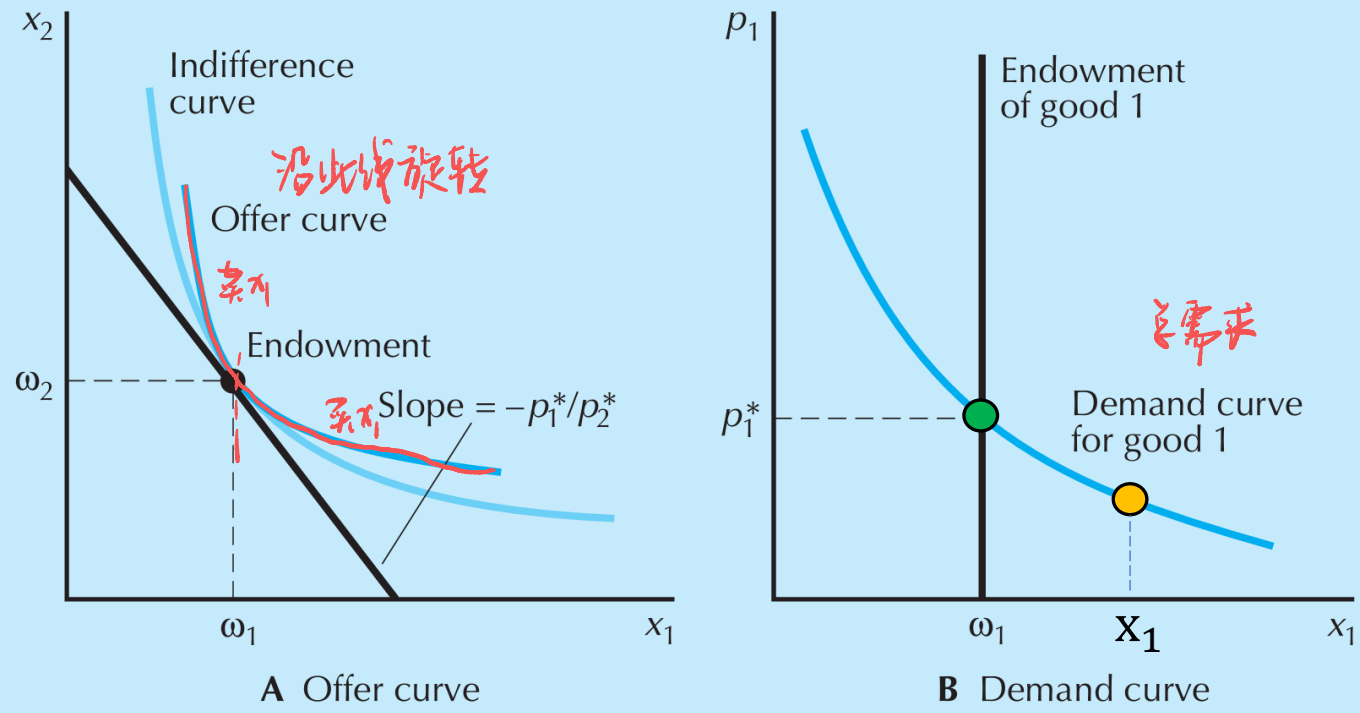


Price-offer curve:

$$p_1(x_1 - \omega_1) + p_2(x_2 - \omega_2) = 0$$

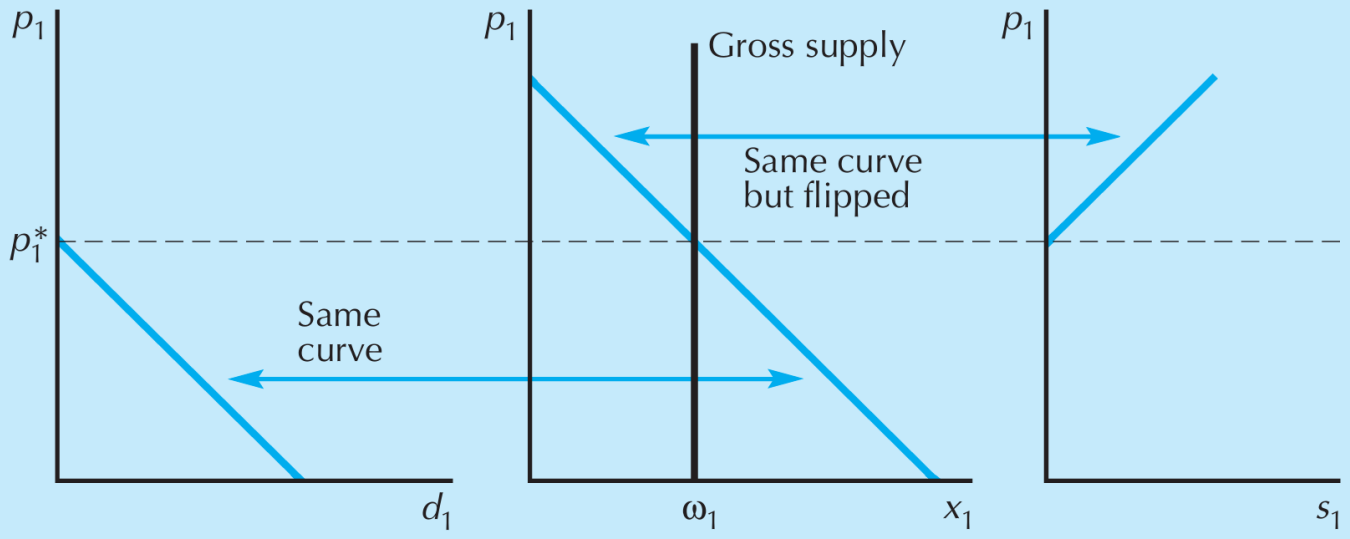
The curve contains all the utility-maximization gross demands for which the endowment can be changed.

Price-Offer Curve and Demand Curve



The offer curve and the demand curve. These are two ways of depicting the relationship between the demanded bundle and the prices when an endowment is present.

Gross Demand, Net Demand, and Net Supply



从享财出发.

Gross demand, net demand, and net supply. Using the gross demand and net demand to depict the demand and supply behavior.

Labor Supply

A worker is endowed with $\$\mathrm{m}$ of non-labor income and $\overline{\mathrm{R}}$ hours of time which can be used for labor or leisure. $\omega = (\overline{\mathrm{R}}, \mathrm{m})$.

Consumption good's price is $\mathrm{p_c}$

w is a wage rate.

Labor Supply

The worker's budget constraint is

$$p_c C = w(\bar{R} - R) + m$$

$\bar{R}$ total time
$\bar{R}$ rest time
endowment

where C, R denote gross demands for the consumption good and for leisure. That is

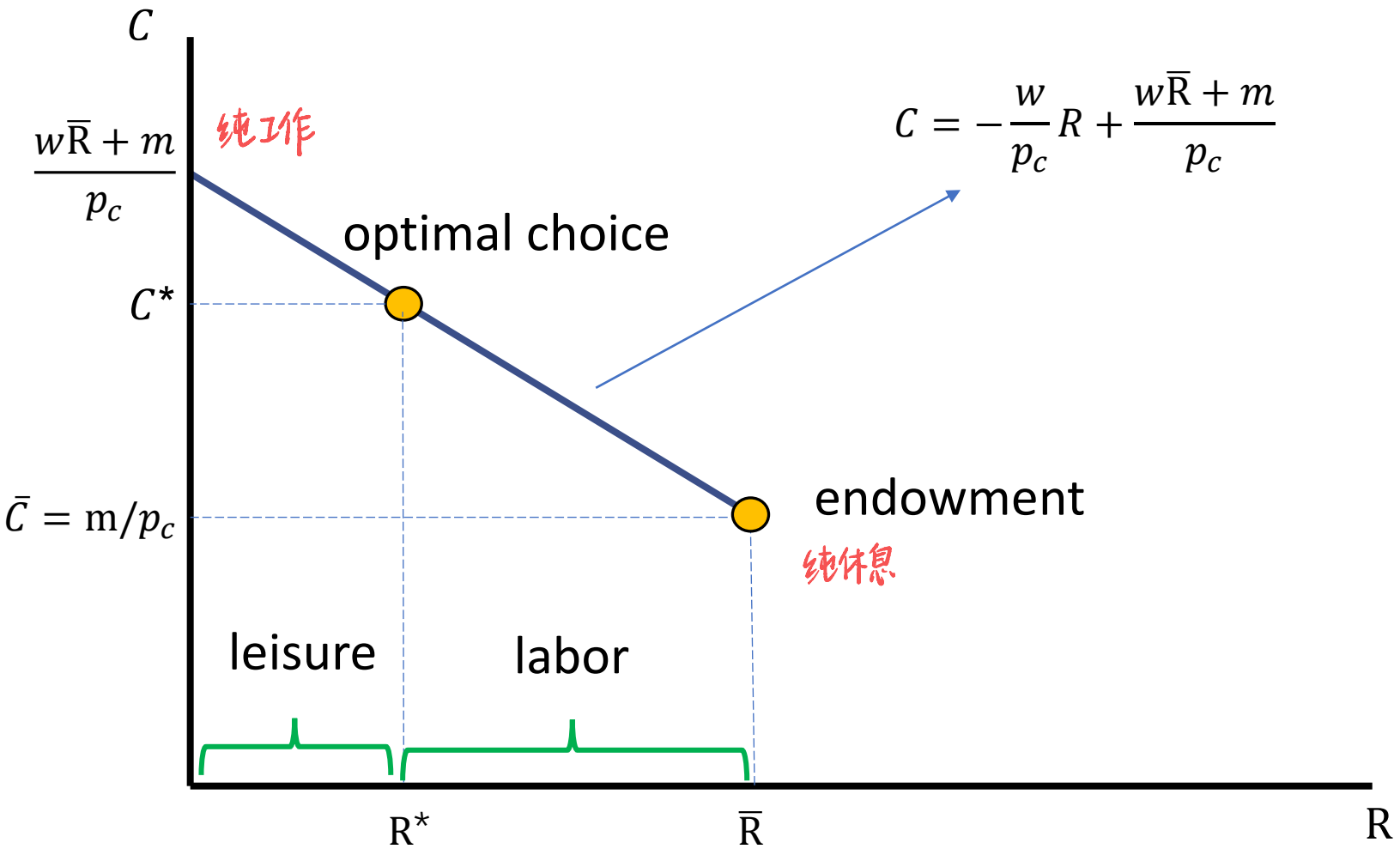
$$p_c C + wR = w\bar{R} + m$$

expenditure endowment value

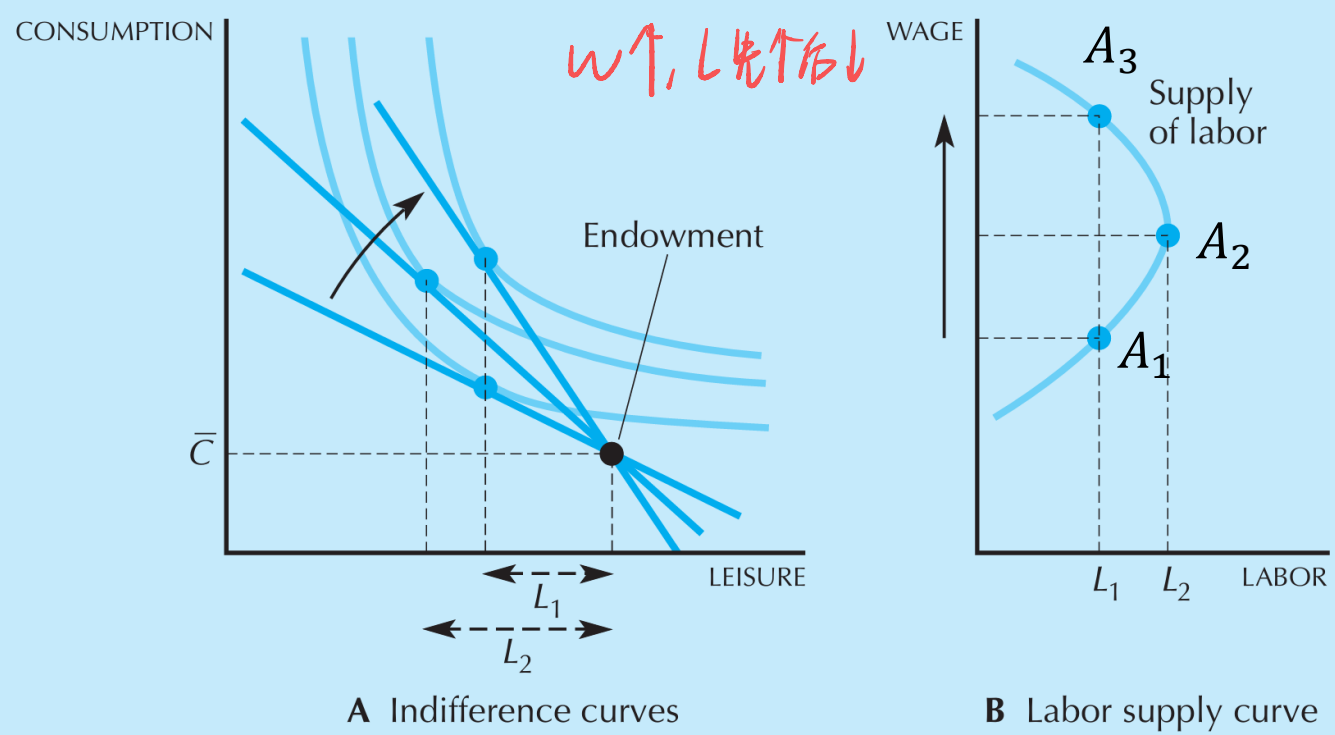
The budget constraint can be rearranged to

$$\Rightarrow C = -\frac{w}{p_c} R + \frac{w\bar{R} + m}{p_c}$$

Labor Supply



Labor Supply



A Indifference curves

B Labor supply curve

Backward-bending labor supply. As the wage rate increases, the supply of labor increases from L_1 to L_2. But a further increase in the wage rate reduces the supply of labor back to L_1.

Slutsky Equation Revision

Slutsky: Changes to demands caused by a price change are the sum of

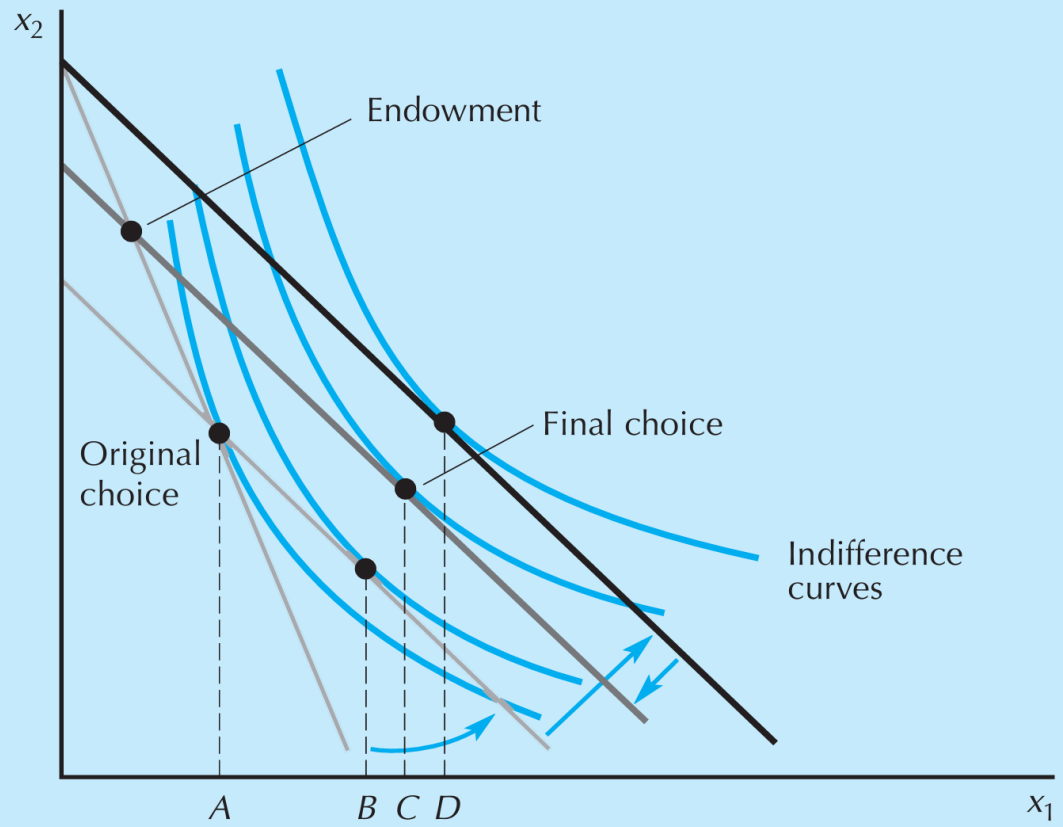
(1) a pure substitution effect, and
(2) an income effect

This assumed that income y did not change as prices changed. But

$$y = p_1\omega_1 + p_2\omega_2$$

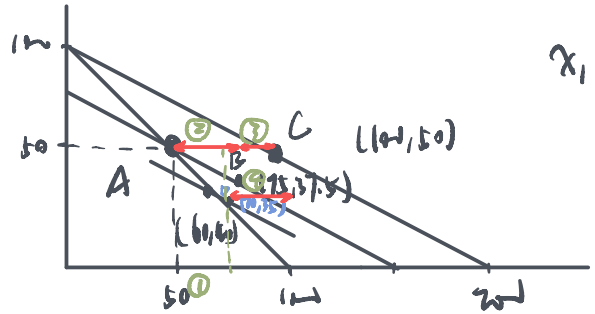
does change with price. How does this modify Slutsky Equation?

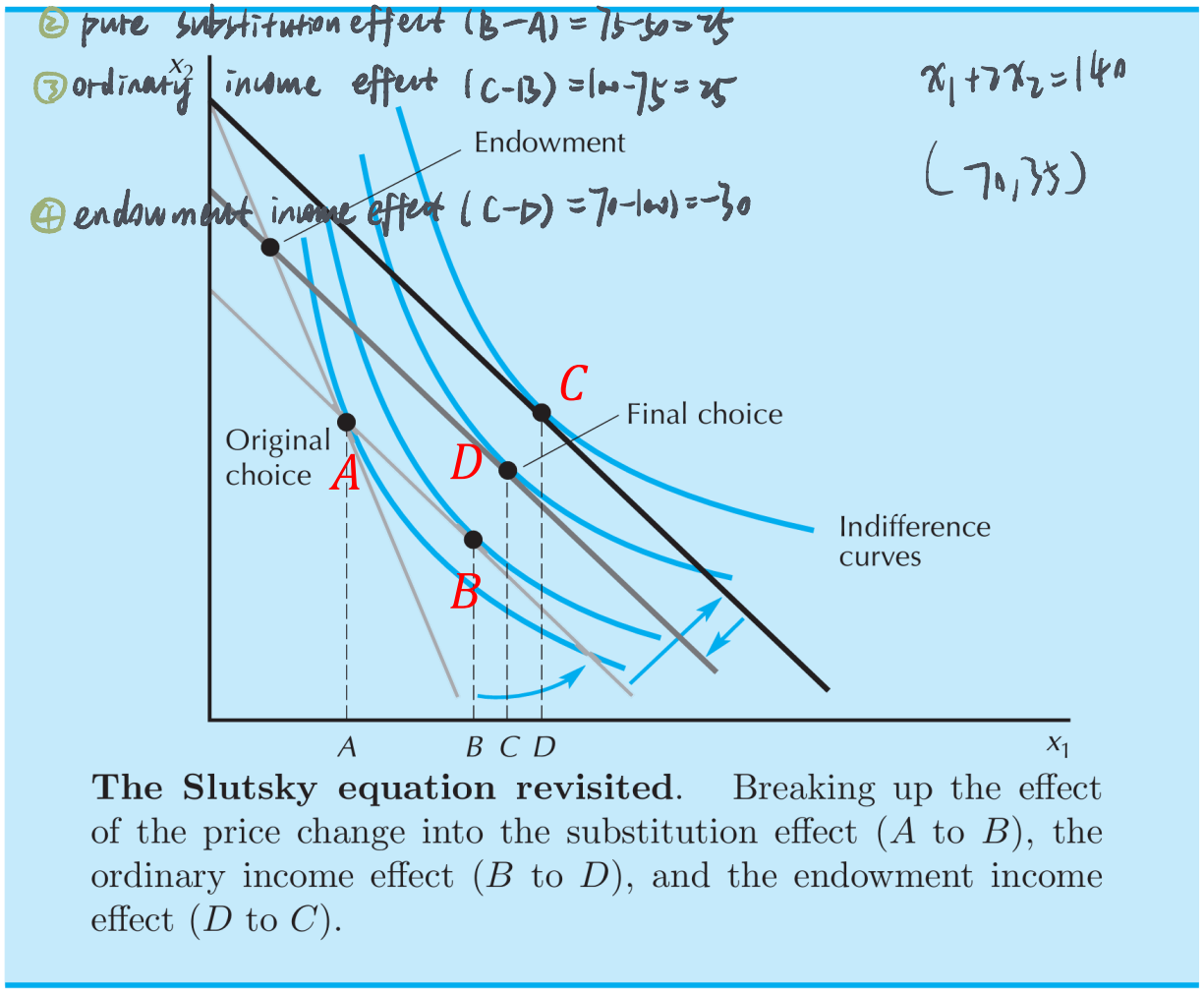
Slutsky Equation Revision



The Slutsky equation revisited. Breaking up the effect of the price change into the substitution effect (A to B), the ordinary income effect (B to D), and the endowment income effect (D to C).

An Exercise





The Slutsky equation revisited. Breaking up the effect of the price change into the substitution effect (A to B), the ordinary income effect (B to D), and the endowment income effect (D to C).

$$u(x_1, x_2) = \sqrt{x_1 x_2}$$

$p_1, p_2 = 2$, $\omega_1 = 60$, $\omega_2 = 40$

Considering a change in good 1 price from 2 to 1 ($p'_1 = 1$),

Questions:

(1) Substitution effect on the demand for good 1

(2) Ordinary income effect on the demand for good 1?

(3) Endowment income effect on the demand for good 1?

Slutsky Equation Revision with Endowments

$$\frac{\partial x_1(p_1, m(p_1))}{\partial p_1} = \frac{\partial x_1^s(p_1)}{\partial p_1} - \frac{\partial x_1(p_1, m)}{\partial m} x_1 + \frac{\partial x_1(p_1, m)}{\partial m} \omega_1$$

or

$$\frac{\partial x_1(p_1, m(p_1))}{\partial p_1} = \frac{\partial x_1^s(p_1)}{\partial p_1} + (\omega_1 - x_1) \frac{\partial x_1(p_1, m)}{\partial m}$$

$$(-) \qquad (+) \qquad (+)$$

Summary

1. Consumers earn income by selling their endowment of goods.
2. The gross demand for a good is the amount that the consumer ends up consuming. The net demand for a good is the amount the consumer buys. Thus the net demand is the difference between the gross demand and the endowment.
3. The budget constraint has a slope of $-p_1/p_2$ and passes through the endowment bundle.
4. When a price changes, the value of what the consumer has to sell will change and thereby generate an additional income effect in the Slutsky equation.
5. Labor supply is an interesting example of the interaction of income and substitution effects. Due to the interaction of these two effects, the response of labor supply to a change in the wage rate is ambiguous.