These slides are by courtesy of Prof. 李稻葵 and Prof. 郑捷.

Chapter Nine

Buying and Selling

Endowments 禀赋

- The list of resource units with which a consumer starts is his **endowment**.
- A consumer's endowment will be denoted by the vector ω (omega).

Endowments

- E.g. $\omega = (\omega_1, \omega_2) = (10, 2)$ states that the consumer is endowed with 10 units of good 1 and 2 units of good 2.

Budget Constraints Revisited

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

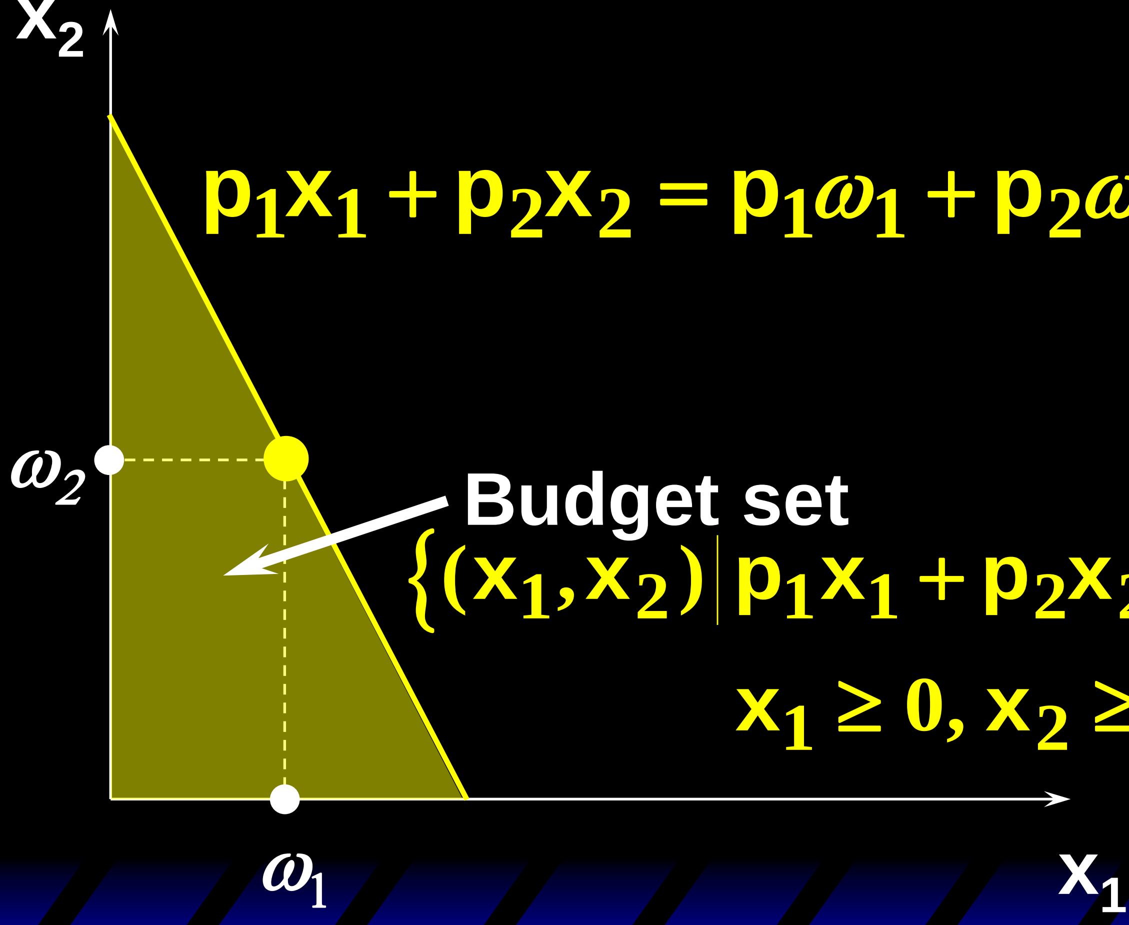
$$p_1 x_1 + p_2 x_2 \leq p_1 \omega_1 + p_2 \omega_2.$$

- The budget set is

$$\left\{ (x_1, x_2) \,\middle|\, p_1 x_1 + p_2 x_2 \leq p_1 \omega_1 + p_2 \omega_2, \right.$$

$$\left. x_1 \geq 0, x_2 \geq 0 \right\}.$$

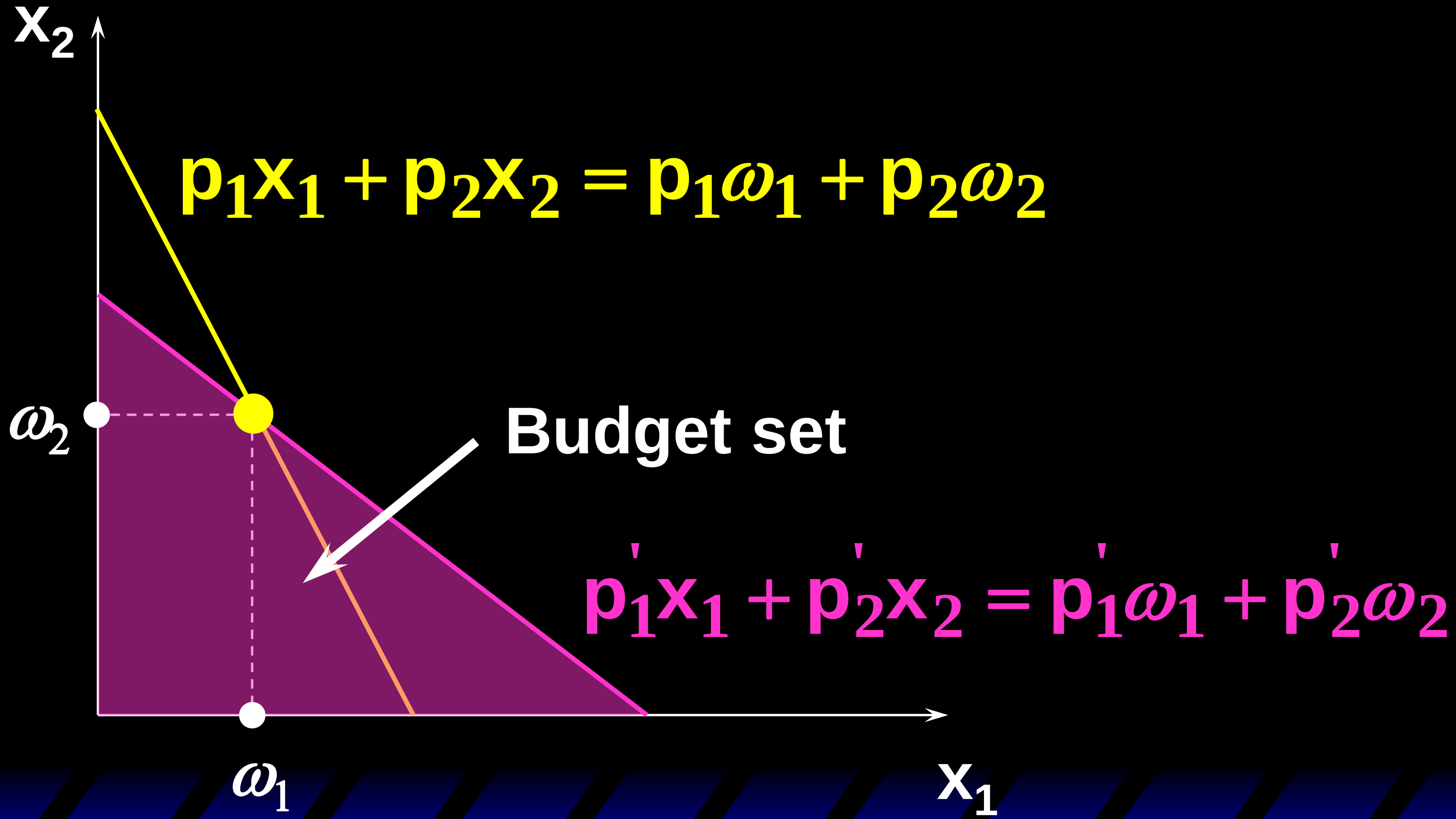
Budget Constraint



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

$$\left\{(x_1, x_2) \mid p_1x_1 + p_2x_2 \le p_1\omega_1 + p_2\omega_2,\ x_1 \ge 0, x_2 \ge 0\right\}$$

When Prices Change



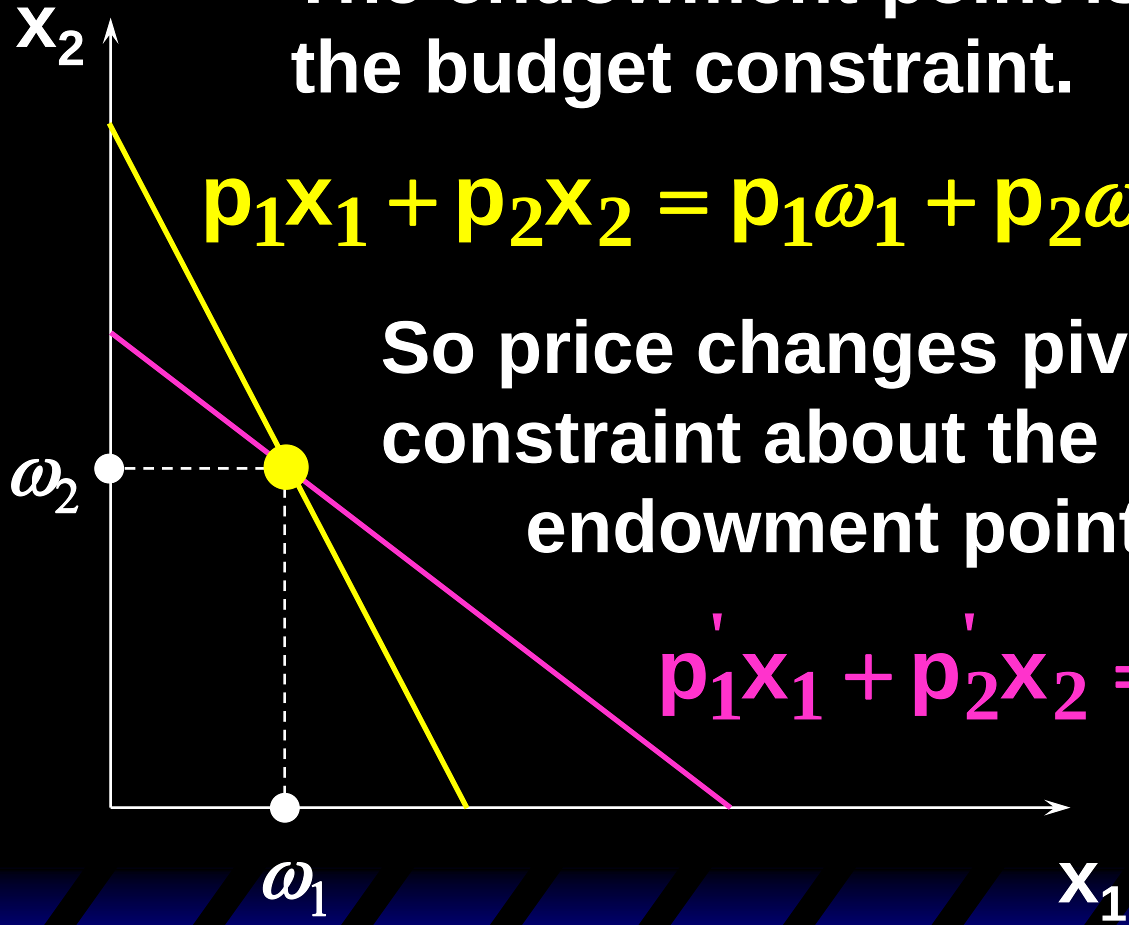
Budget Constraints Revisited

The endowment point is always on the budget constraint.

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

So price changes pivot the constraint about the endowment point.

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



Budget Constraints Revisited

- The budget line

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

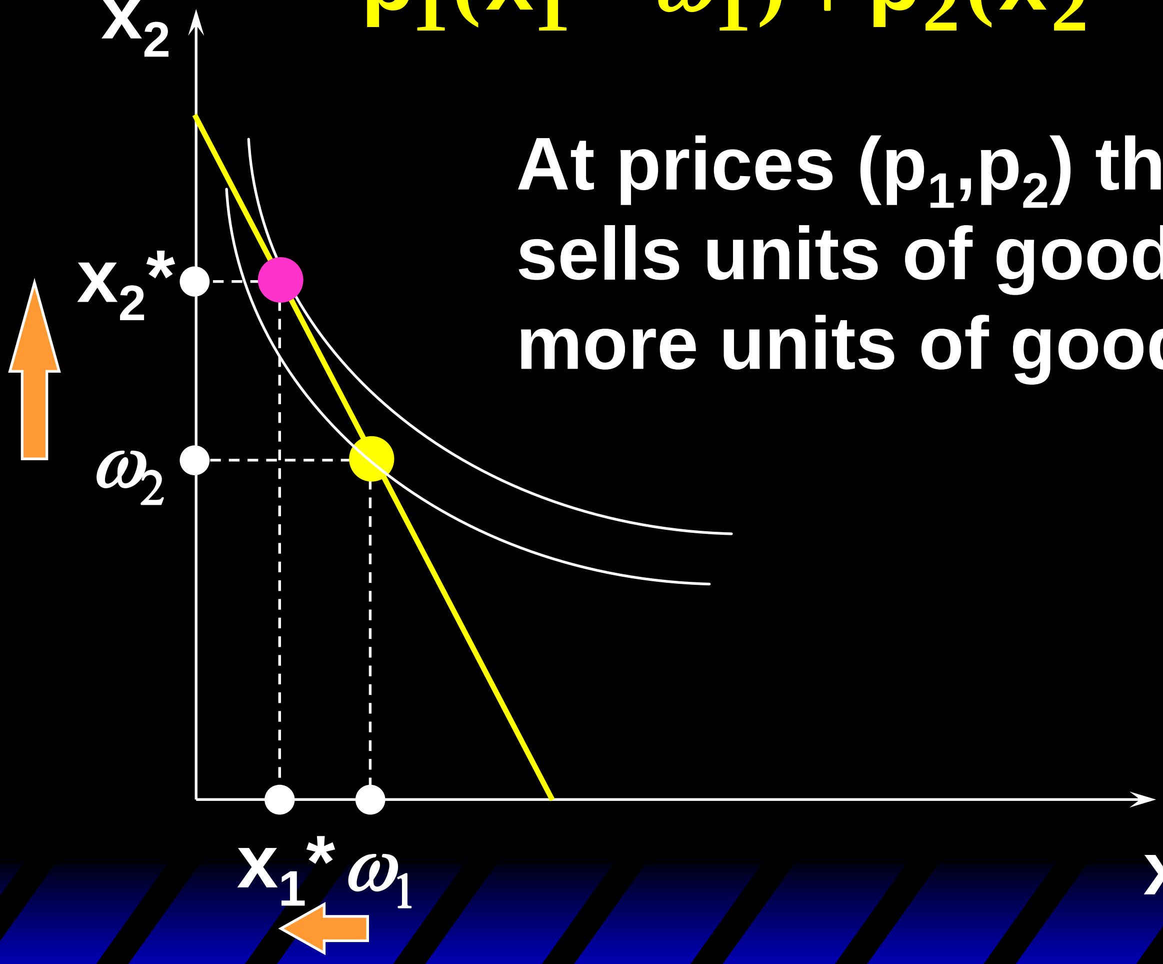
can be written as

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

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

Net Demands

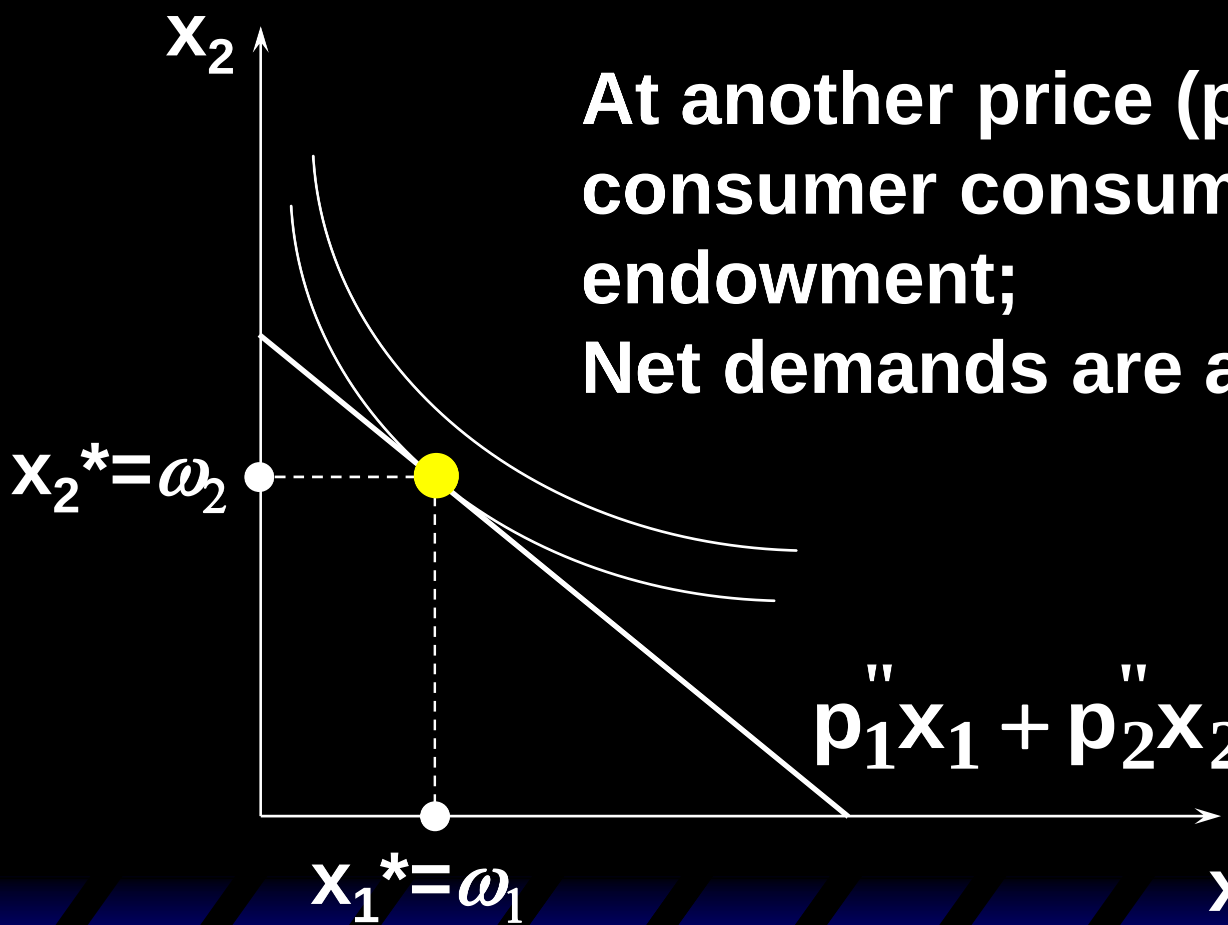
$$p_1(x_1 - \omega_1) + p_2(x_2 - \omega_2) = 0$$



At prices (p_1,p_2) the consumer sells units of good 1 to acquire more units of good 2.

Net Demands

At another price (p_1'',p_2'') the consumer consumes her endowment;
Net demands are all zero.



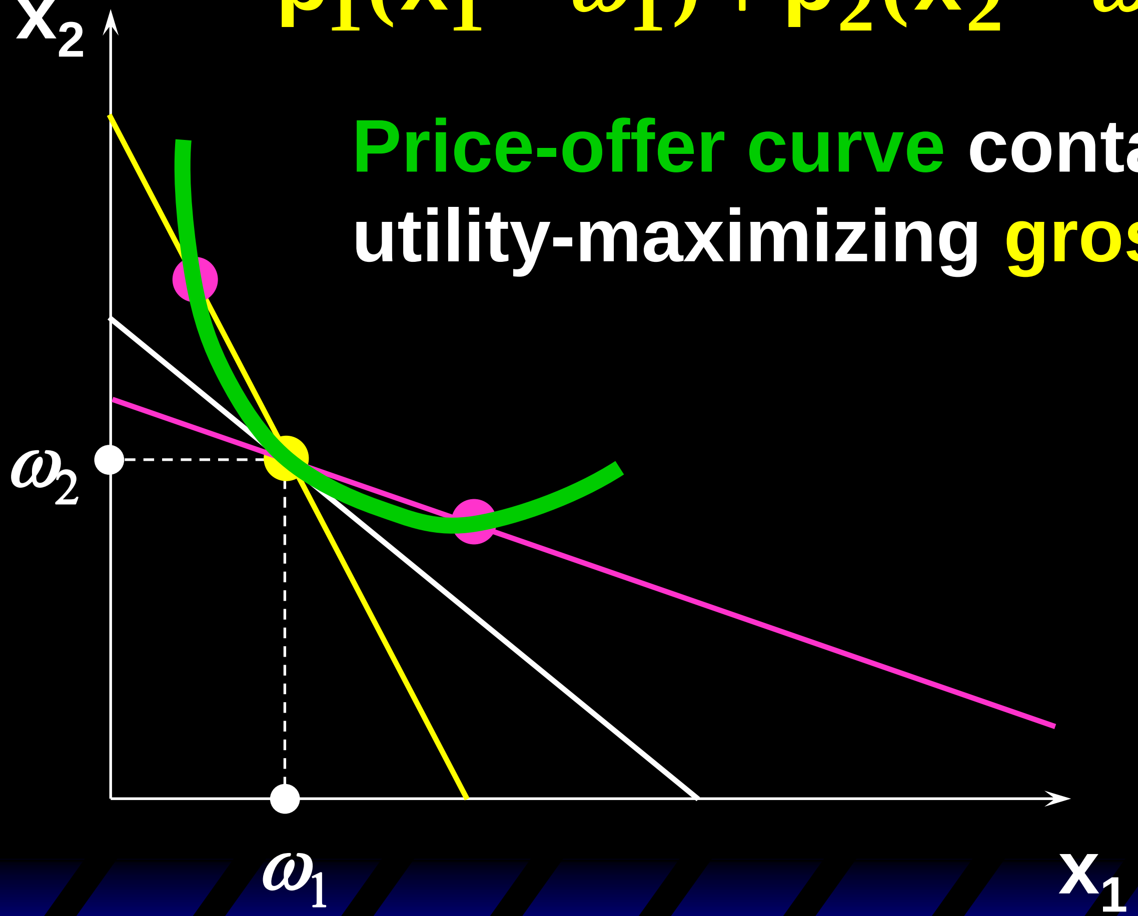
$$p_1''x_1 + p_2''x_2 = p_1''\omega_1 + p_2''\omega_2$$

Net Demands

Net Demands

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

Price-offer curve contains all the utility-maximizing gross demands.



Income from Labor

- A worker is endowed with \$m of nonlabor income and $\overline{R}$ hours of time which can be used for labor or leisure. $\omega = (\overline{R},m)$.
- Consumption good's price is p_c.
- w is the wage rate.

Labor Supply

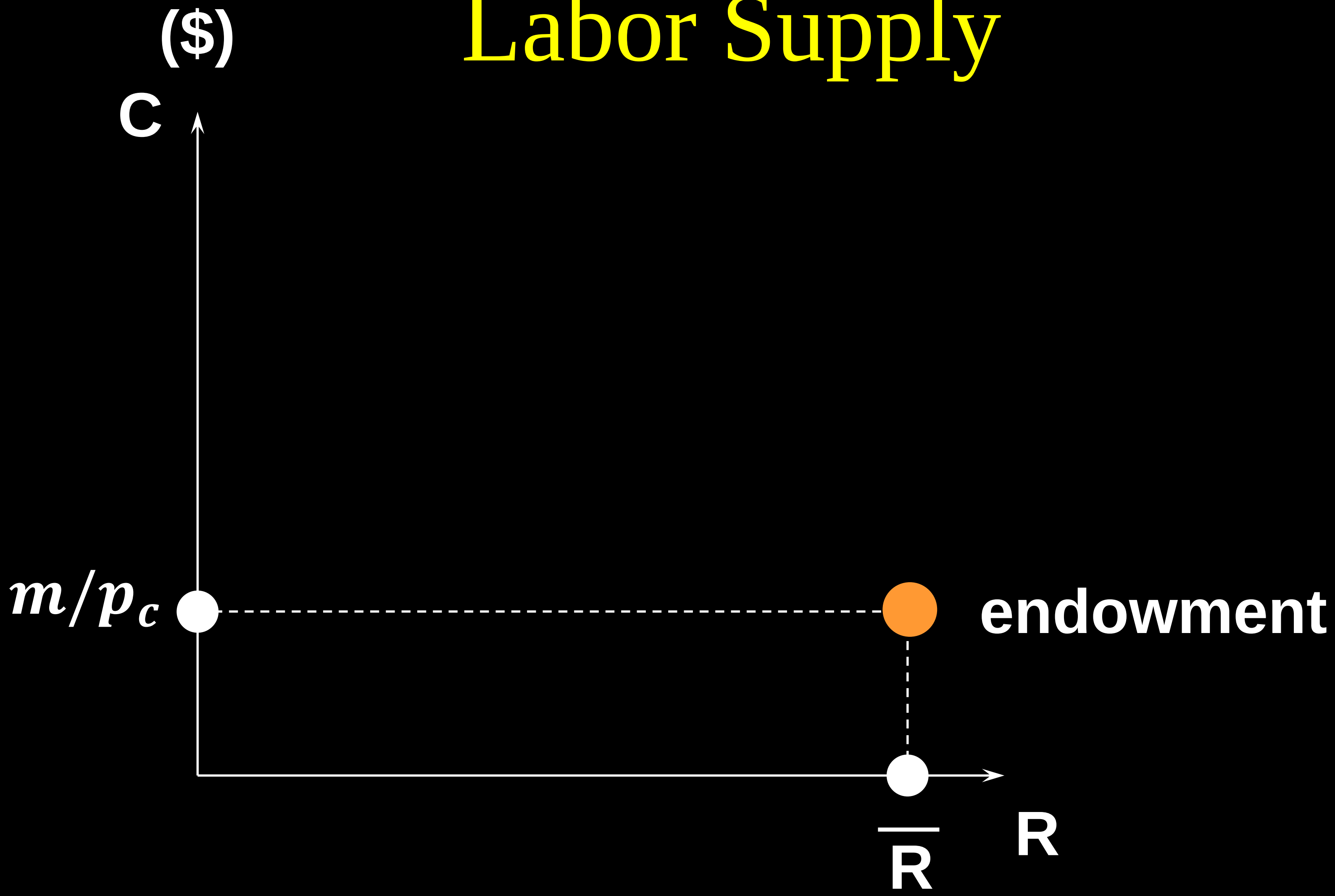
- The worker's budget constraint is

$$p_c C \leq w(\overline{R} - R) + m$$

where C, R denote gross demands for the consumption good and for leisure. Rearrange:

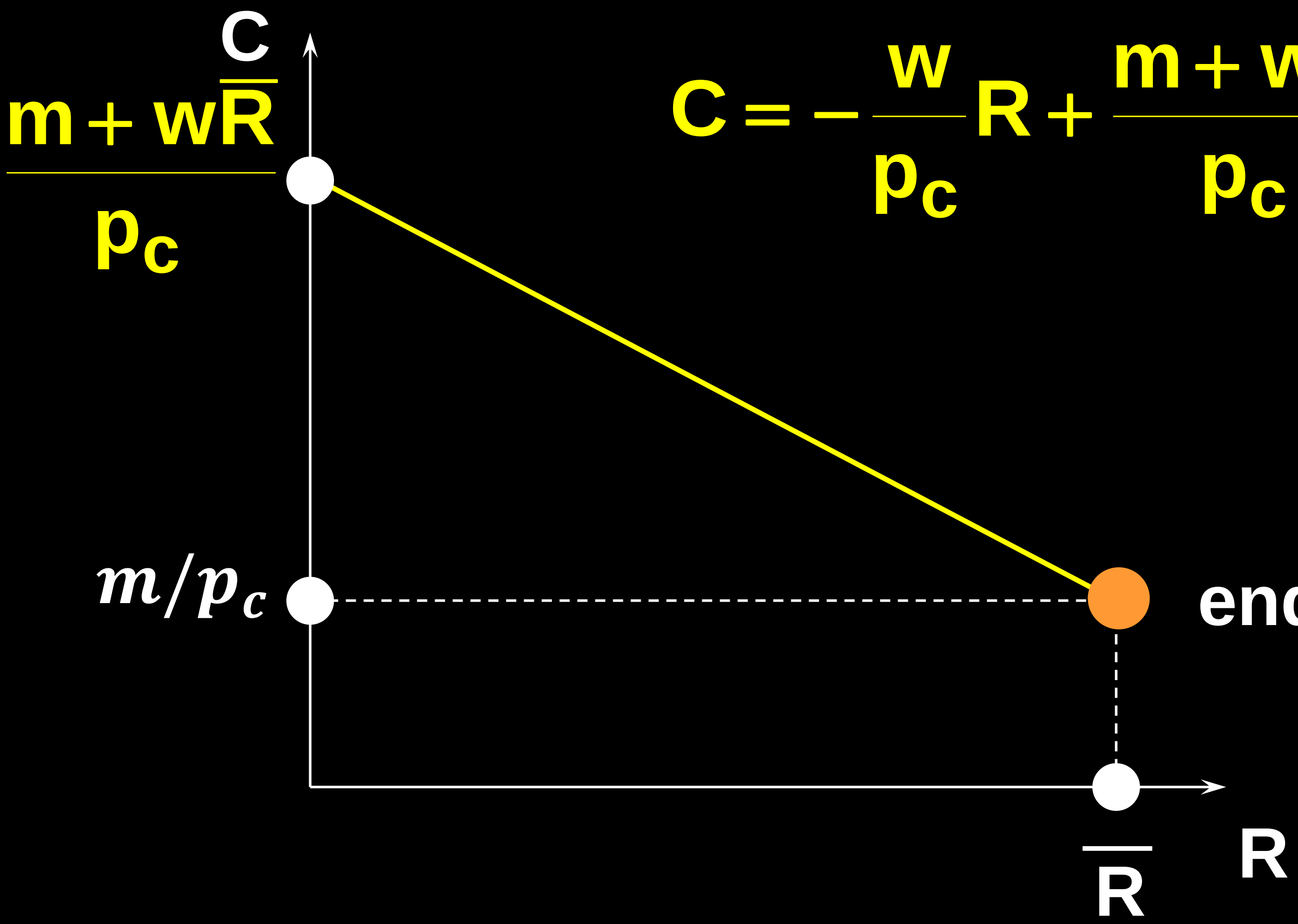
$$\underbrace{p_c C + wR}_{\text{expenditure}} \leq \underbrace{w\overline{R} + m}_{\text{endowment value}}$$

Labor Supply



Labor Supply

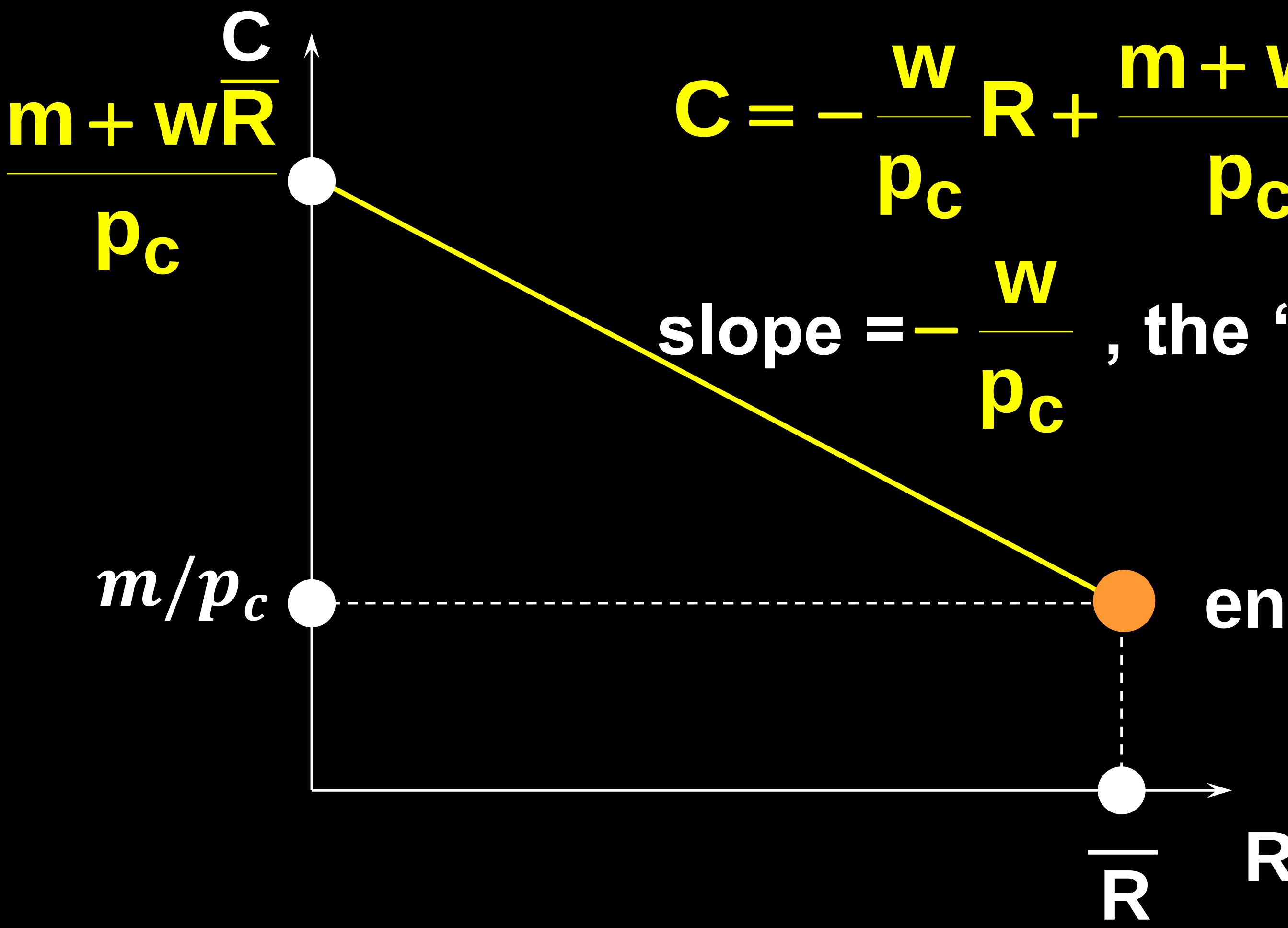
$$C = -\frac{w}{p_c}R + \frac{m + w\bar{R}}{p_c}$$



Labor Supply

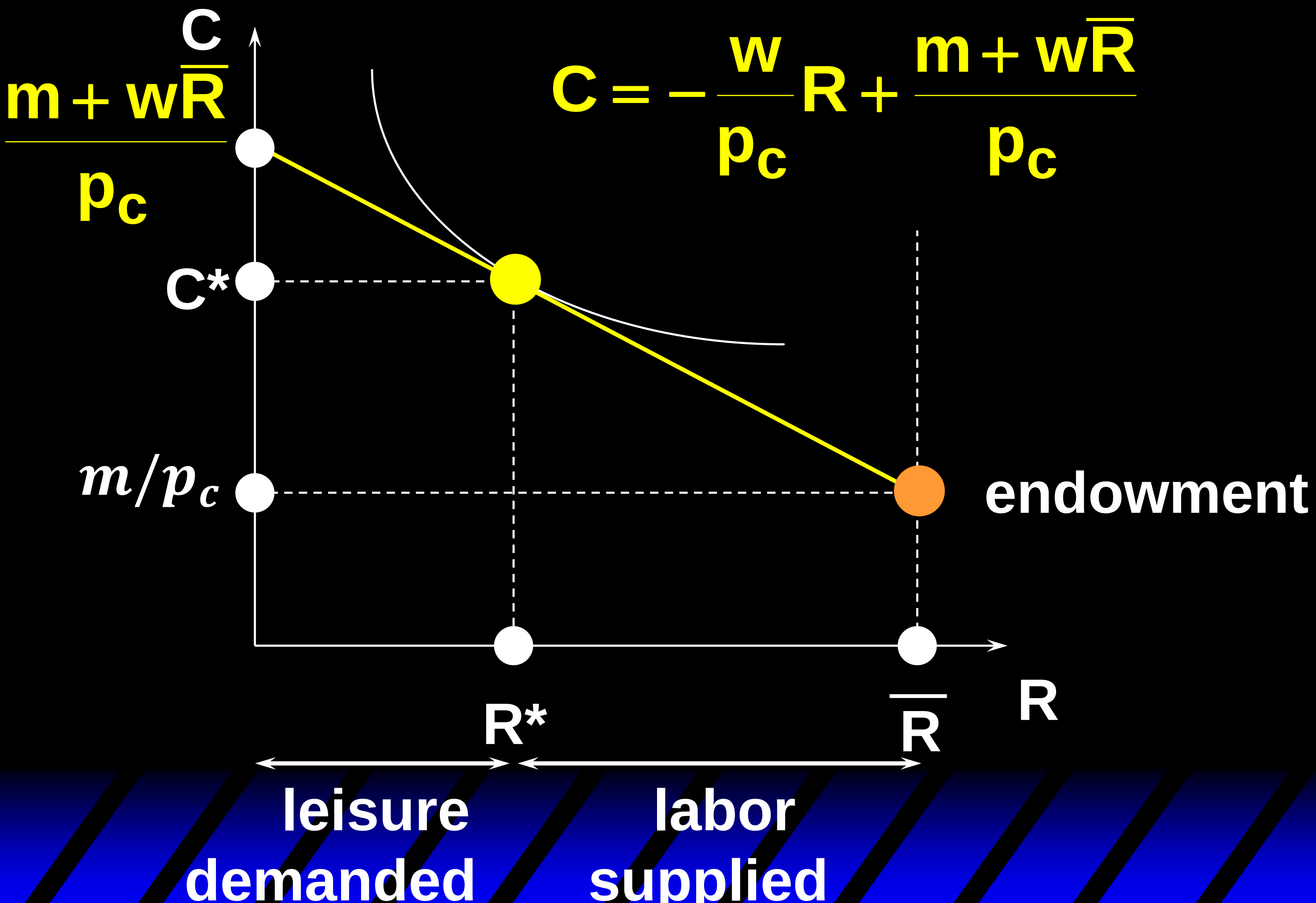
$$C = -\frac{w}{p_c}R + \frac{m + w\bar{R}}{p_c}$$

slope $= -\dfrac{w}{p_c}$, the ‘real wage rate’



Labor Supply

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



Slutsky's Equation Revisited

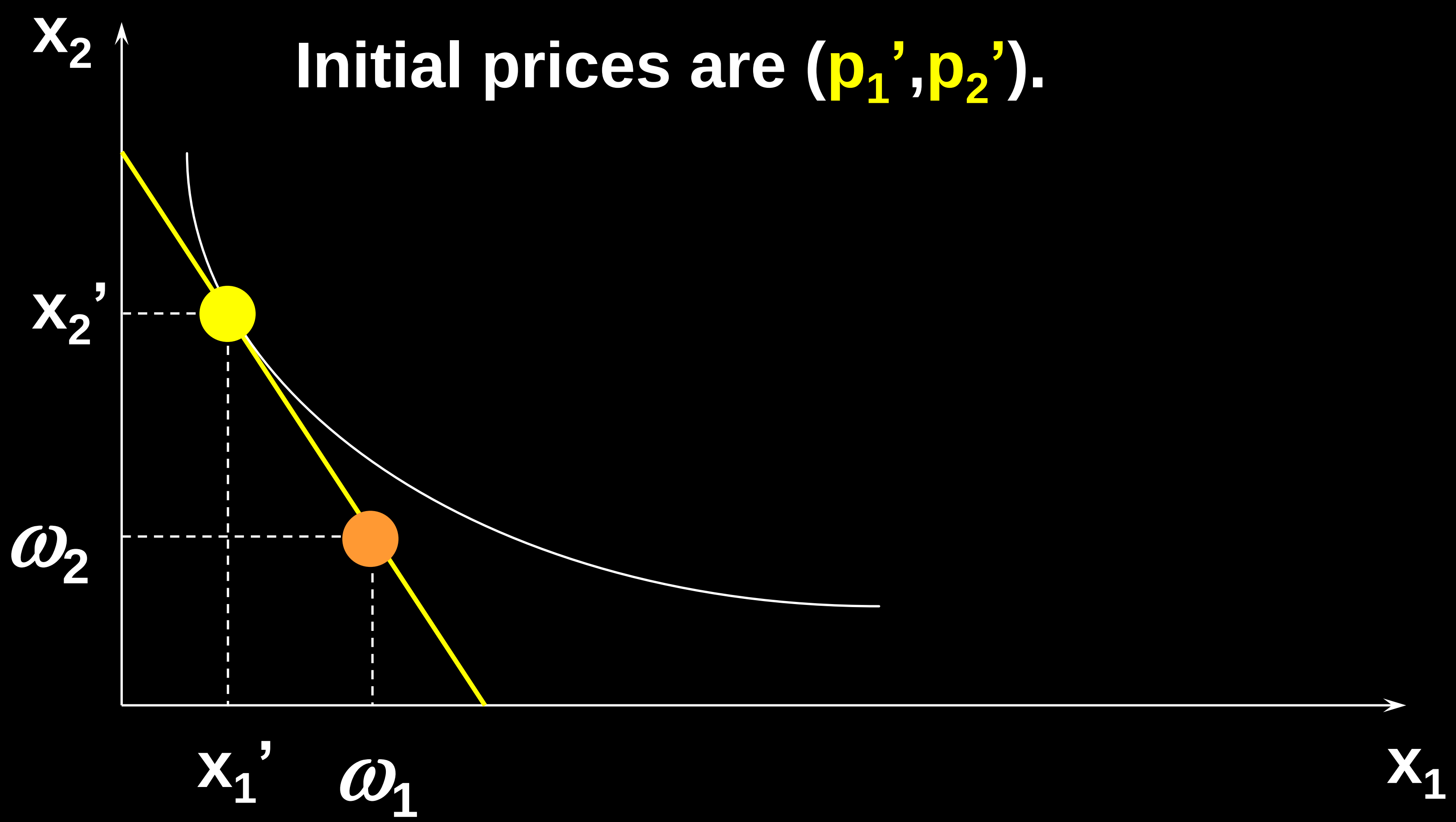
- Slutsky: changes to demands caused by a price change are the sum of
  - a substitution effect, and
  - an income effect.

This assumed that income y does NOT change as prices changed. But now,

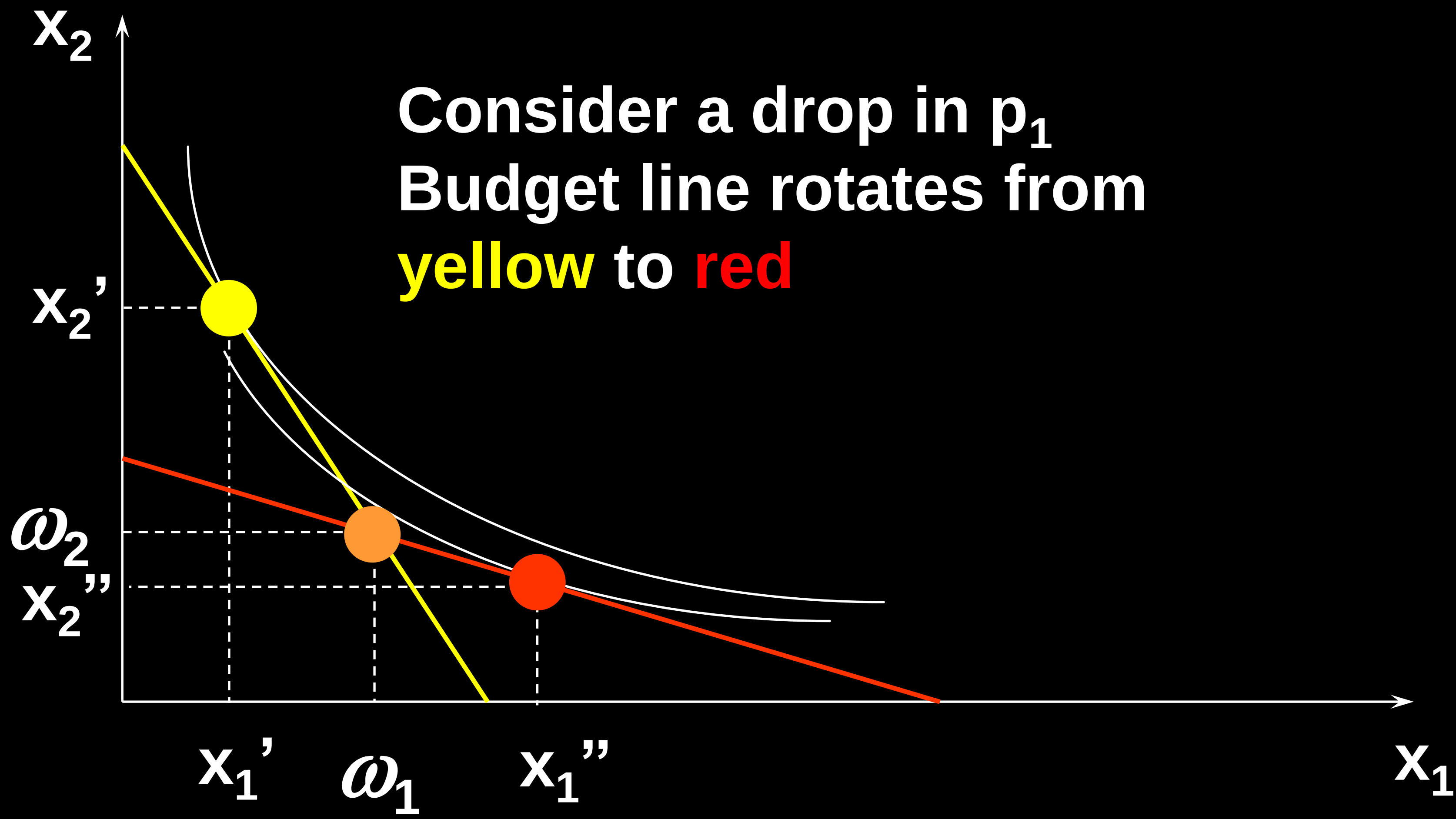
$$y = p_1\omega_1 + p_2\omega_2$$

does change with prices.

Slutsky's Equation Revisited



Slutsky's Equation Revisited

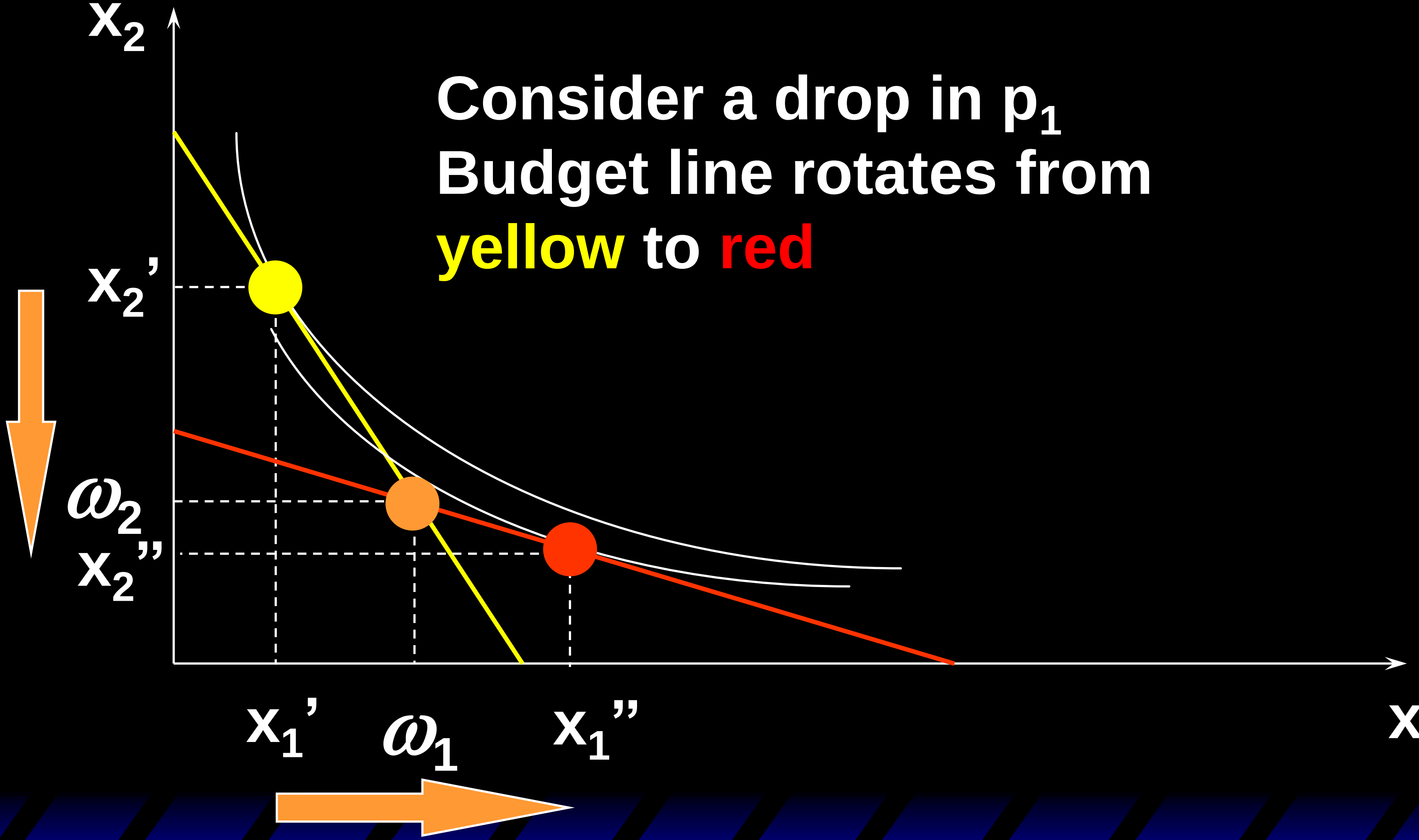


Consider a drop in p_1

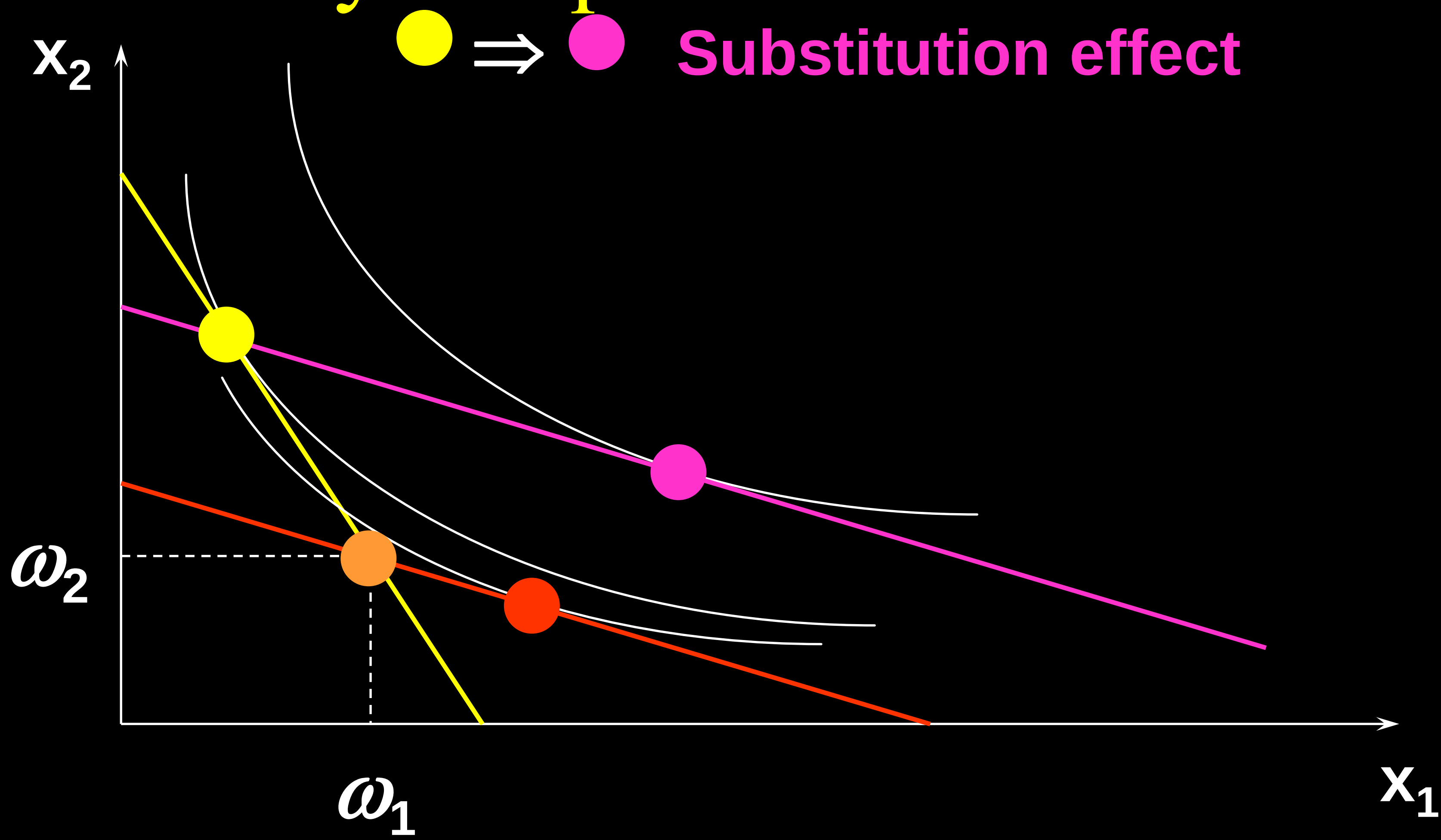
Budget line rotates from yellow to red

Slutsky's Equation Revisited

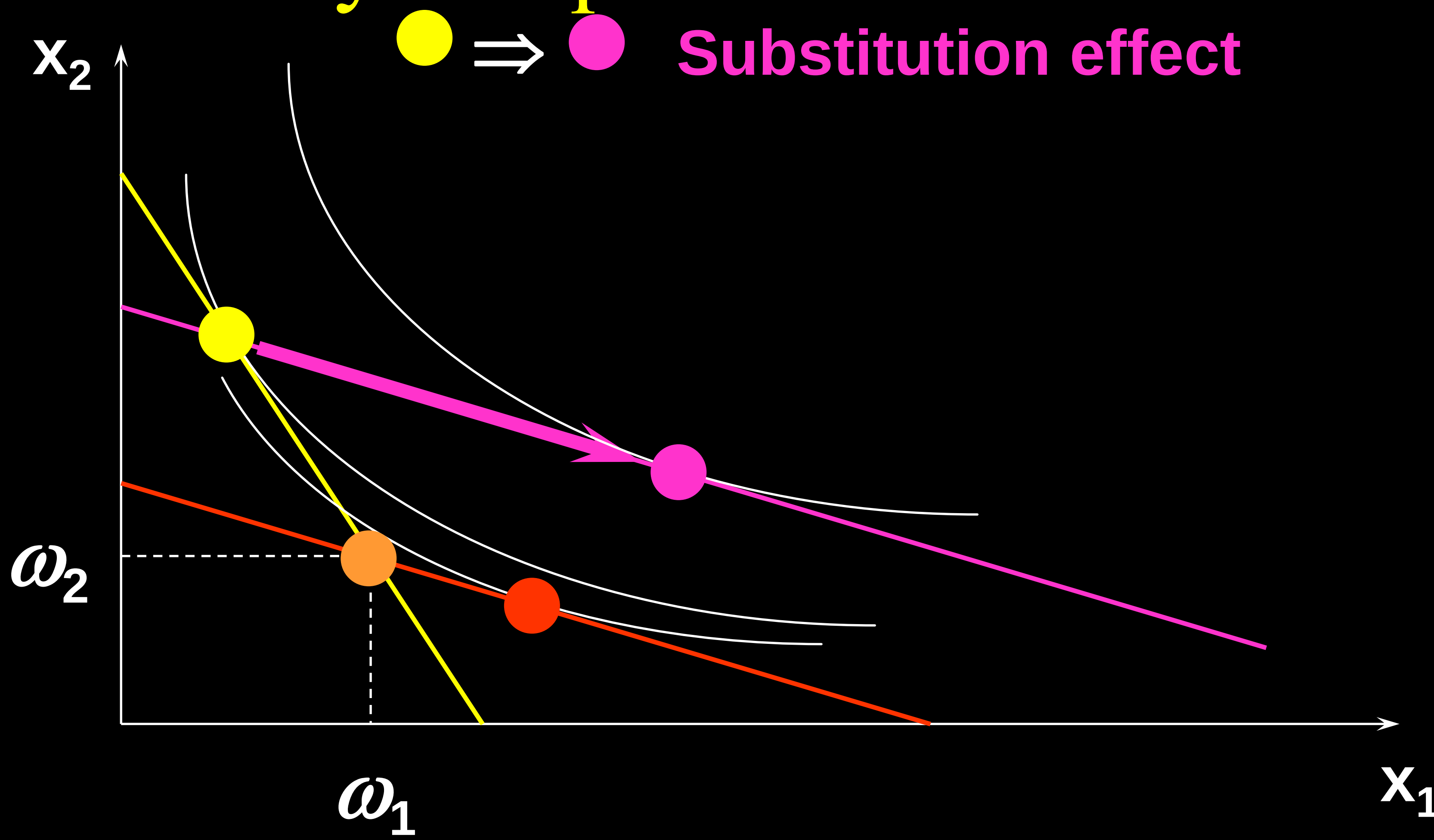
Consider a drop in p_1
Budget line rotates from yellow to red



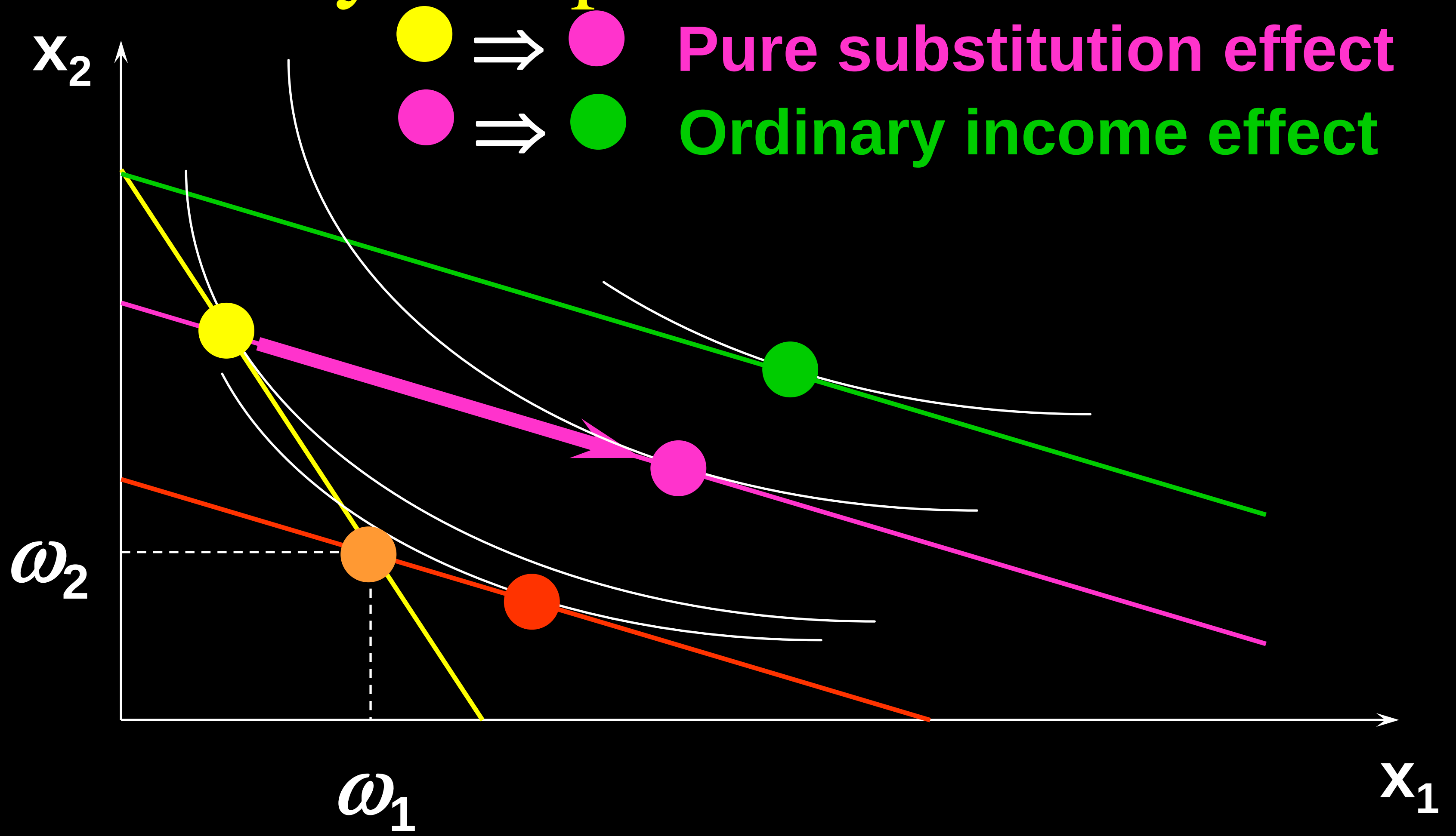
Slutsky's Equation Revisited



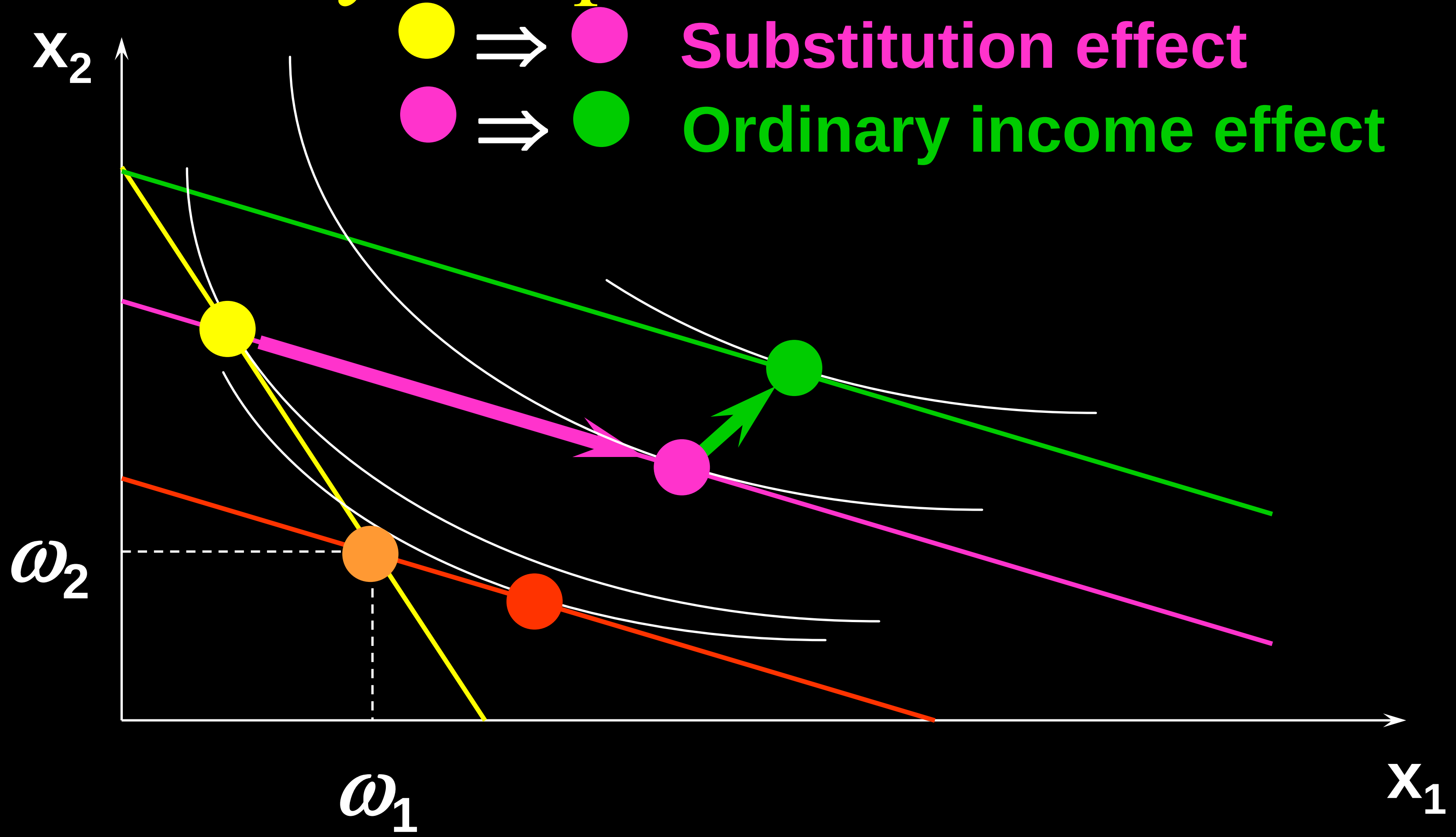
Slutsky's Equation Revisited



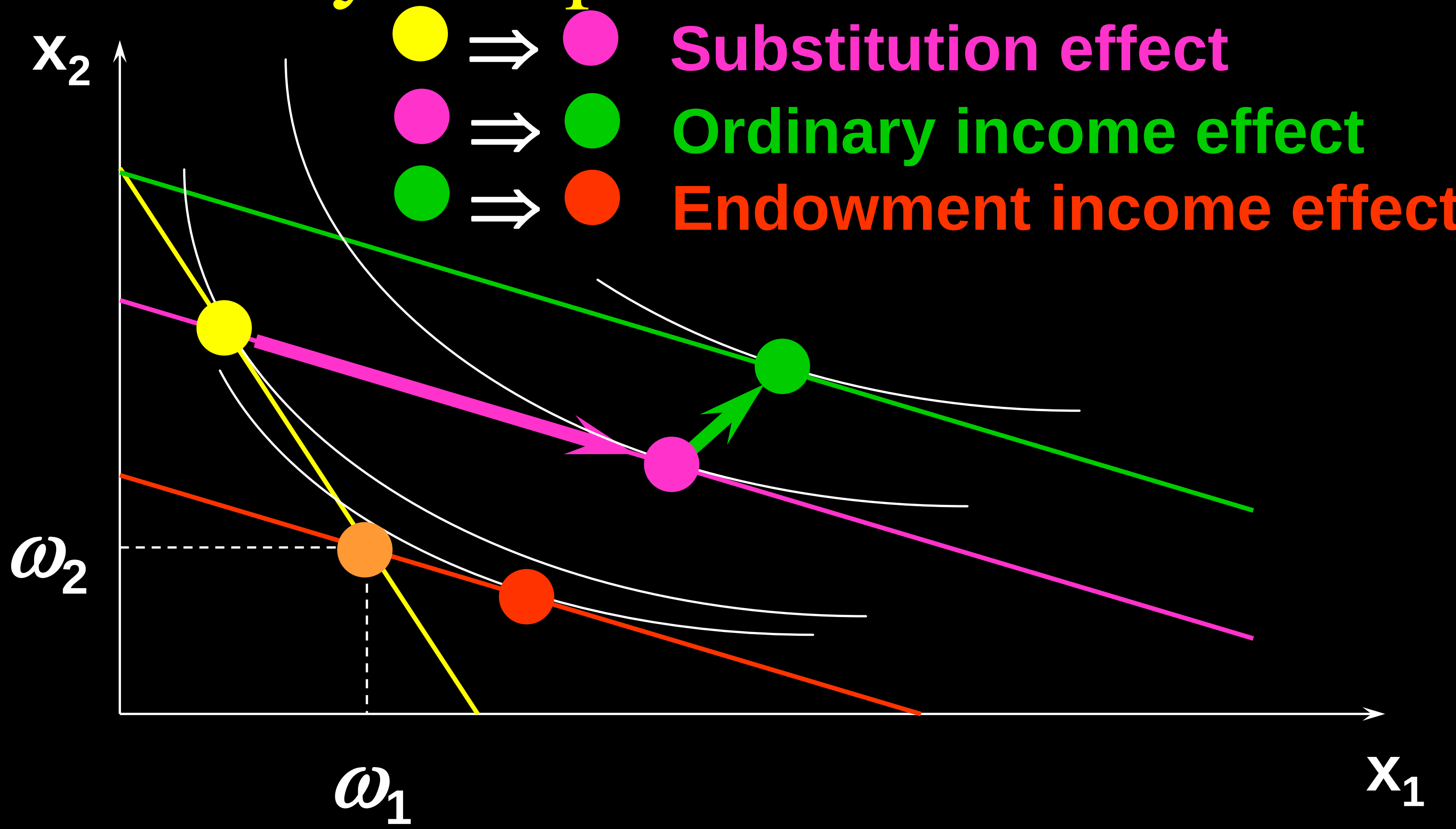
Slutsky's Equation Revisited



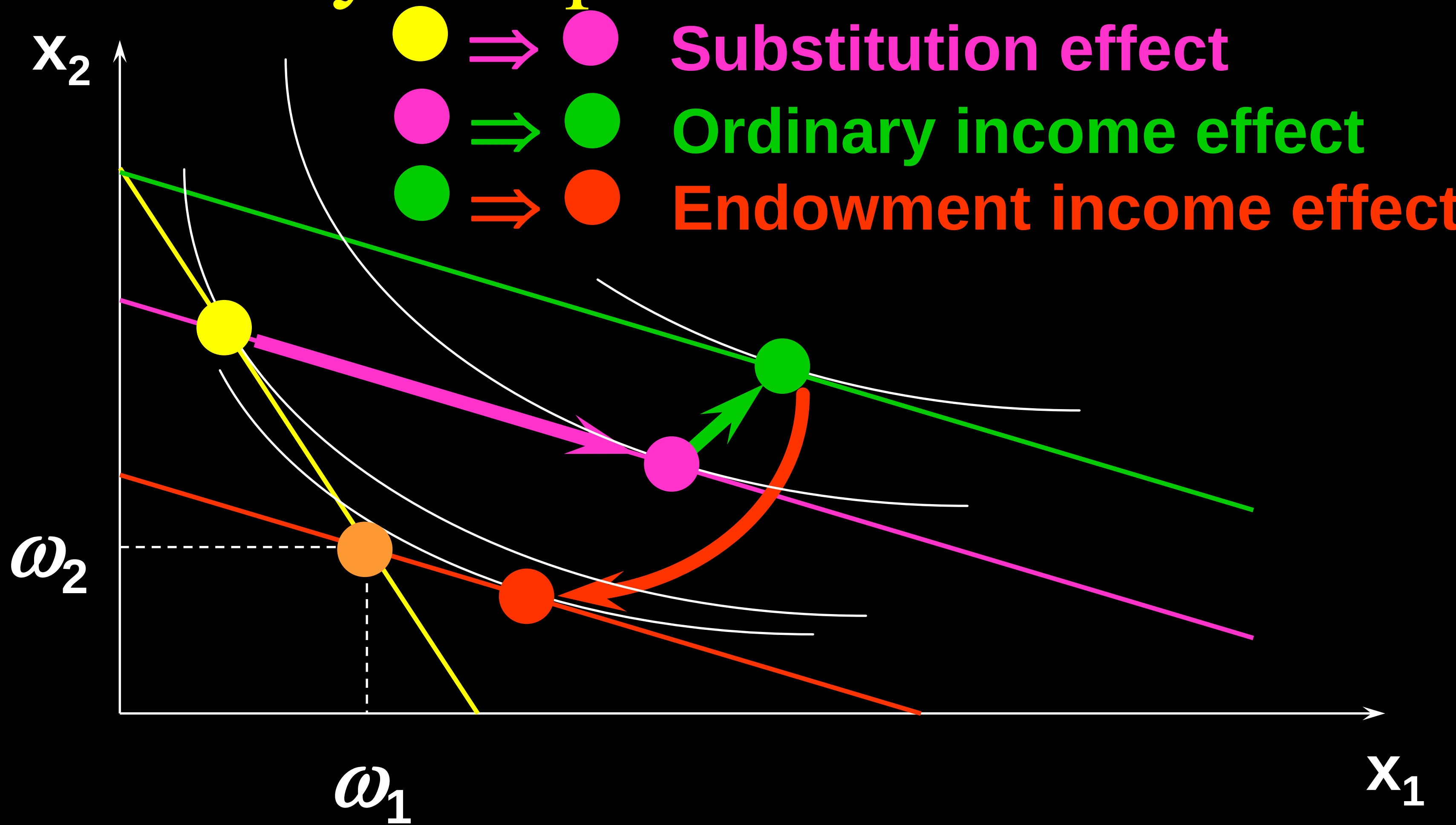
Slutsky's Equation Revisited



Slutsky's Equation Revisited



Slutsky's Equation Revisited



Slutsky's Equation Revisited

Overall change in demand caused by a change in price is the sum of:

(i) Substitution effect

(ii) Ordinary income effect

(iii) Endowment income effect

Income effect

Effect on Real Income

- A drop in p_1 will decrease the consumer's real income if he/she is a seller of x_1
- A drop in p_1 will increase the consumer's real income if he/she is a buyer of x_1