Chapter Nine

Buying and Selling

Buying and Selling

- Trade involves exchange -- when something is bought something else must be sold.
- What will be bought? What will be sold?
- Who will be a buyer? Who will be a seller?

Buying and Selling

- And how are incomes generated?
- How does the value of income depend upon commodity prices?
- How can we put all this together to explain better how price changes affect demands?

Endowments

- 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.
- What is the endowment's value?
- For which consumption bundles may it be exchanged?

Endowments

- p_1=2 and p_2=3 so the value of the endowment $(\omega_1, \omega_2) = (10, 2)$ is

$$p_1\omega_1 + p_2\omega_2 = 2 \times 10 + 3 \times 2 = 26$$

- Q: For which consumption bundles may the endowment be exchanged?
- A: For any bundle costing no more than the endowment's value.

Budget Constraints Revisited

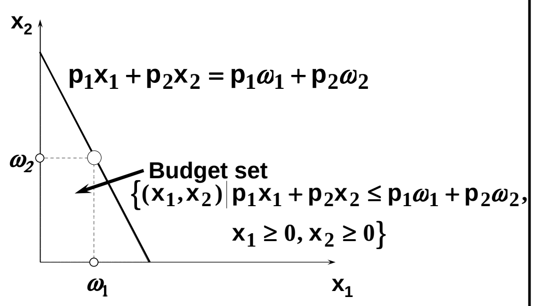
- So, given p_1 and p_2, the budget constraint for a consumer with an endowment (ω_1, ω_2) is

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

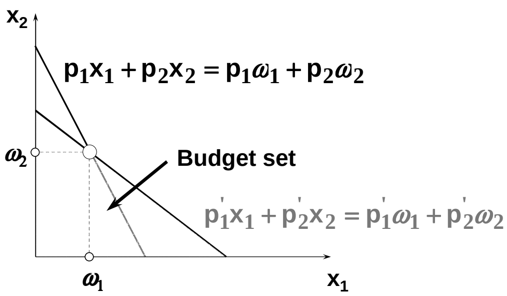
- The budget set is

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

Budget Constraints Revisited

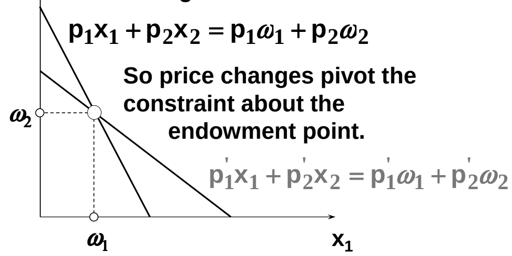


Budget Constraints Revisited



Budget Constraints Revisited

The endowment point is always on the budget constraint.



So price changes pivot the constraint about the endowment point.

Budget Constraints Revisited

- The constraint

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

is

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

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

Net Demands

- Suppose $(\omega_1, \omega_2) = (10,2)$ and p_1=2, p_2=3. Then the constraint is $p_1x_1 + p_2x_2 = p_1\omega_1 + p_2\omega_2 = 26.$
- If the consumer demands (x_1^*, x_2^*) = (7,4), then 3 good 1 units exchange for 2 good 2 units. Net demands are
  $x_1^* - \omega_1$ = 7-10 = -3 and
  $x_2^* - \omega_2$ = 4 - 2 = +2.

Net Demands

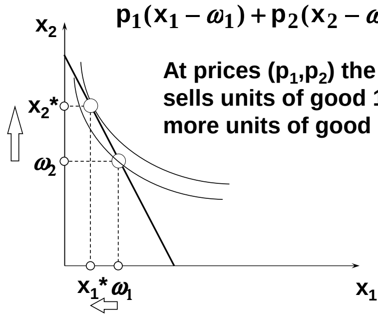
p_1=2, p_2=3, x_1^*-ω_1 = -3 and x_2^*-ω_2 = +2 so

$$p_1(x_1-\omega_1)+p_2(x_2-\omega_2) =$$
$$2\times(-3) \quad + \quad 3\times 2 \quad = 0.$$

The purchase of 2 extra good 2 units at \$3 each is funded by giving up 3 good 1 units at \$2 each.

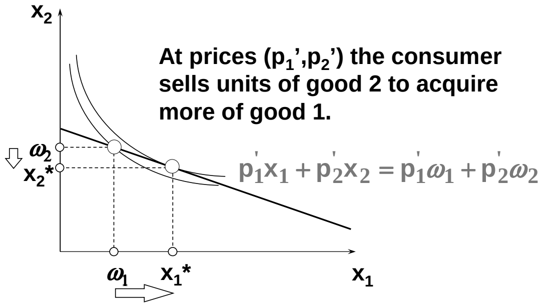
Net Demands

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



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

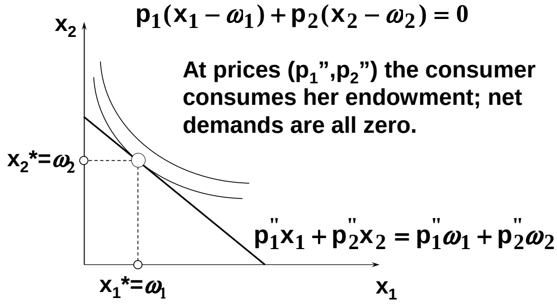
Net Demands



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

Net Demands

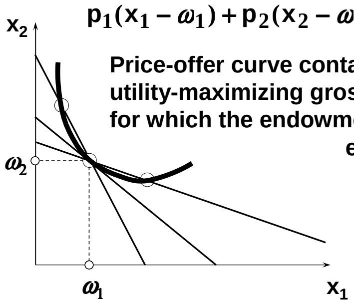
$$p_1(x_1-\omega_1)+p_2(x_2-\omega_2)=0$$



At prices (p_1",p_2") the consumer consumes her endowment; net demands are all zero.

Net Demands

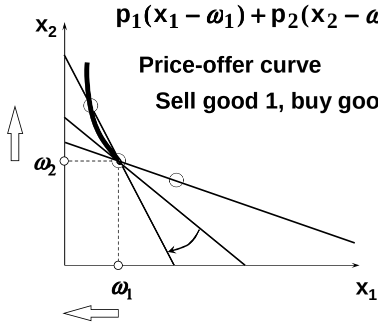
$$p_1(x_1 - \omega_1) + p_2(x_2 - \omega_2) = 0$$



Price-offer curve contains all the utility-maximizing gross demands for which the endowment can be exchanged.

Net Demands

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

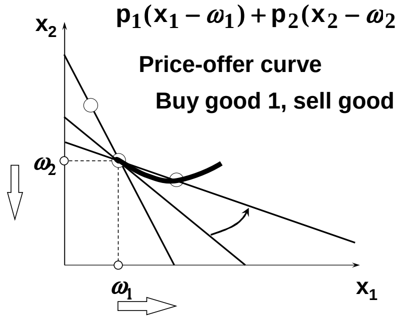


Price-offer curve

Sell good 1, buy good 2

Net Demands

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



Price-offer curve

Buy good 1, sell good 2

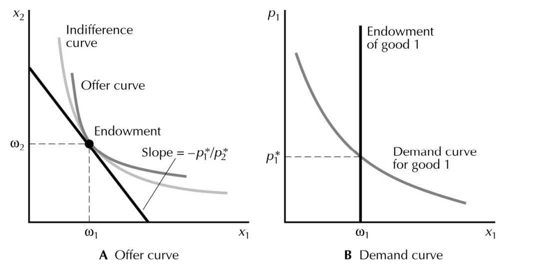


FIGURE 9.5 **The offer curve and the demand curve**

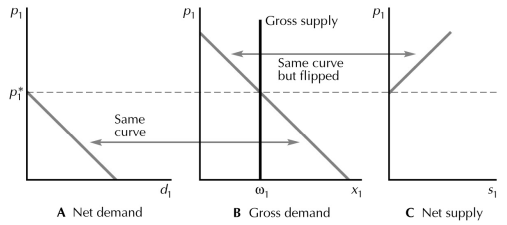


FIGURE 9.6 **Gross demand, net demand, and net supply**

Labor Supply

- A worker is endowed with \$m of nonlabor income and 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

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

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

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

Labor Supply

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

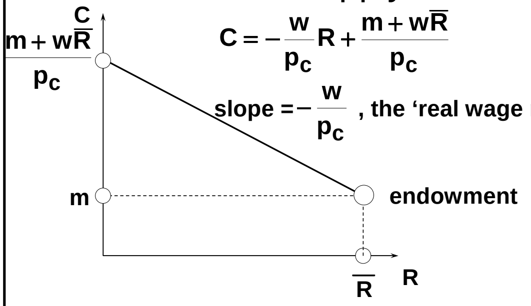
rearranges to

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

Labor Supply

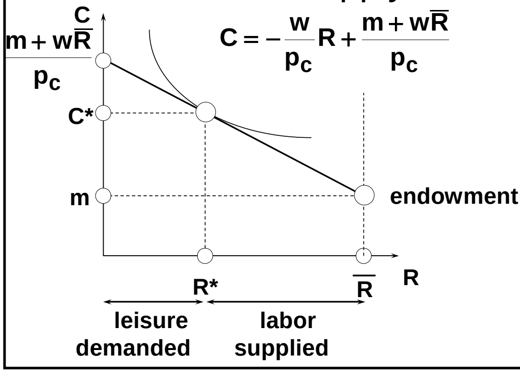
$$C = -\frac{w}{p_C}R + \frac{m + w\bar{R}}{p_C}$$

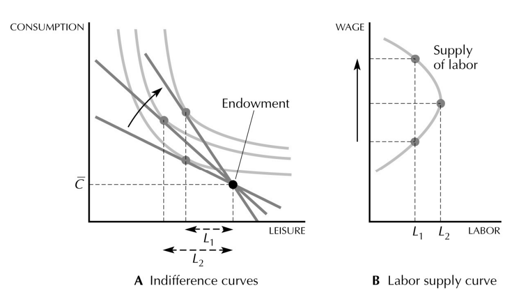
slope $= -\frac{w}{p_C}$, the 'real wage rate'



Labor Supply

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





A Indifference curves **B** Labor supply curve

FIGURE 9.9 **Backward-bending labor supply**

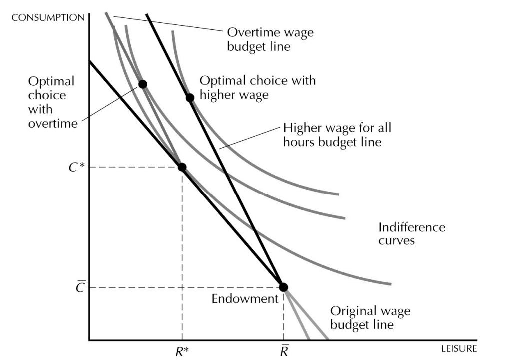


FIGURE 9.10 **Overtime versus an ordinary wage increase**

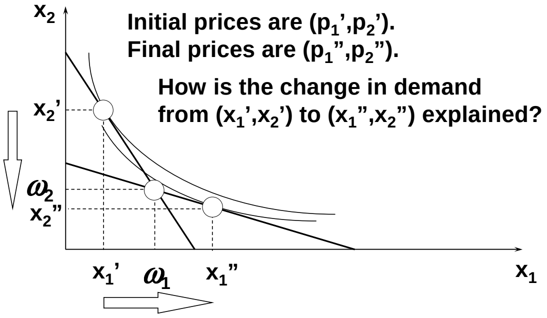
Slutsky's Equation Revisited

- Slutsky: changes to demands caused by a price change are the sum of
  - a pure substitution effect, and
  - 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's equation?

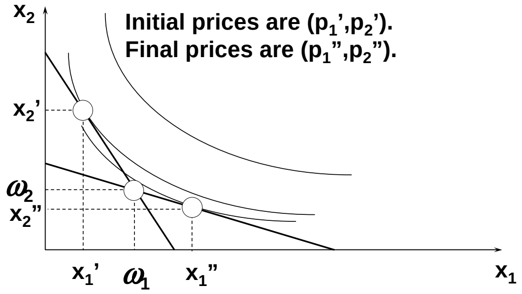
Slutsky's Equation Revisited

- A change in p_1 or p_2 changes $y = p_1\omega_1 + p_2\omega_2$ so there will be an additional income effect, called the endowment income effect.
- Slutsky's decomposition will thus have three components
  - a pure substitution effect
  - an (ordinary) income effect, and
  - an endowment income effect.

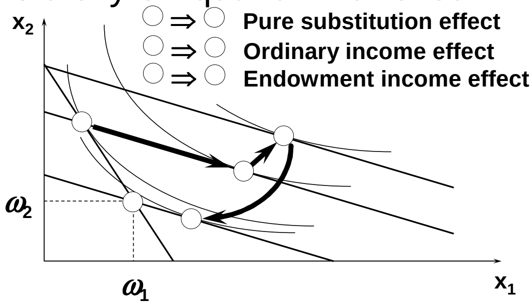
Slutsky's Equation Revisited



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) a pure substitution effect

(ii) an ordinary income effect

(iii) an endowment income effect