

Optimum choice, Price change, and Income Change

References

1. Intermediate Microeconomics by Hal R. Varian
2. The Structure of Economics by Silberberg & Suen
(Euler's Theorem)

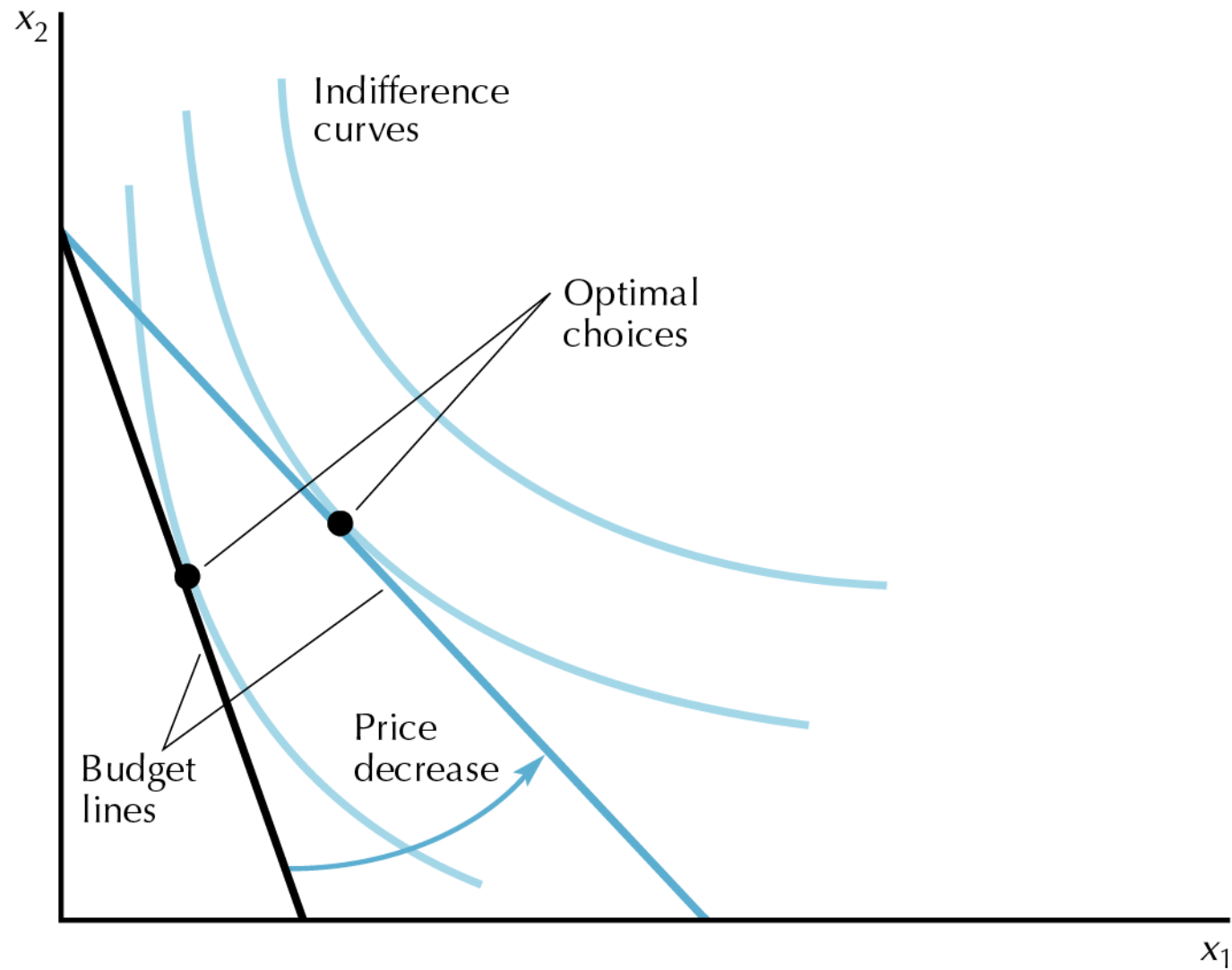
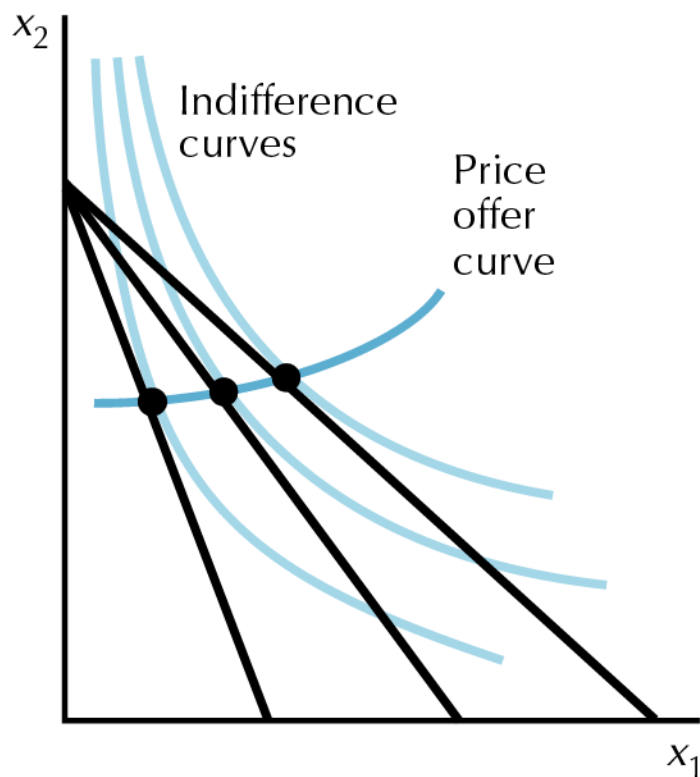
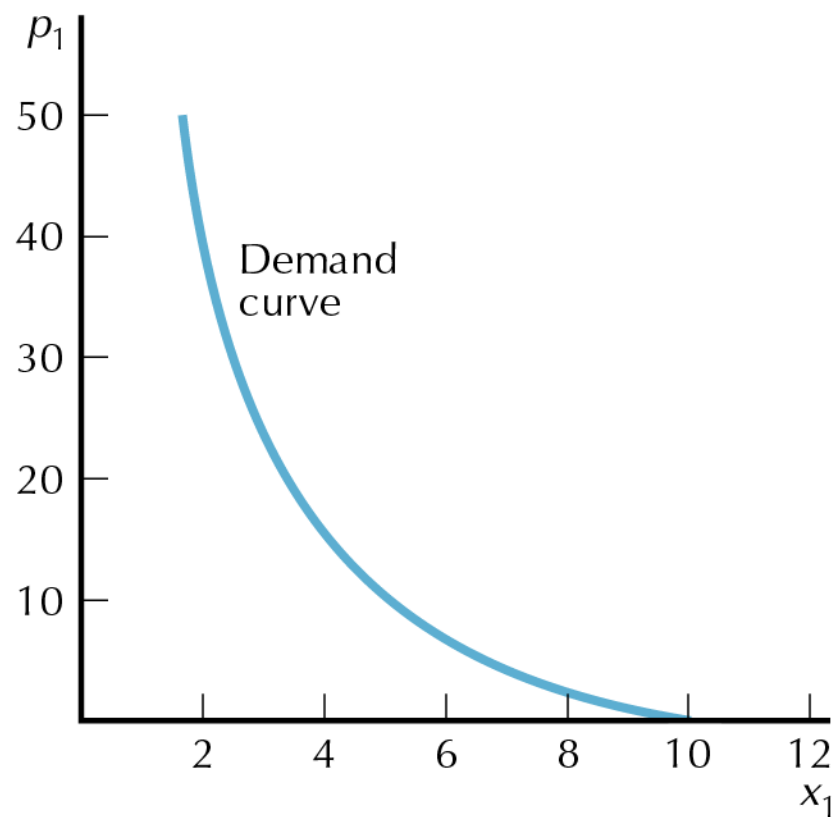


Figure 6.9 An ordinary good



A Price offer curve



B Demand curve

Figure 6.11 The price offer curve and demand curve

Price Consumption Curve (PCC)

PCC for x_1 : It is the locus of the MPBs corresponding to different prices of x_1 , given income and P_2 .

- Shape of PCC is related to price elasticity.
- In terms of PCC we can define ordinary good & Giffen good.

An upward rising PCC corresponds to inelastic demand.

Proof. Along any PCC budget constraint is satisfied.

$$x_1' > x_1^0, x_2' > x_2^0 \dots \dots (1)$$

Now $P_1^0 x_1^0 + P_2^0 x_2^0 = \overline{M} = P_1' x_1' + P_2^0 x_2' \dots \dots (2)$

Since P_2 is unchanged and $x_2' > x_2^0$
from (1) and (2) we can write $P_2^0 x_2' > P_2^0 x_2^0$

But since M is unchanged, from (3) we can write:

$$P_1' x_1' < P_1^0 x_1^0$$

Now since

$$x_1^0 < x_1' \ \& \ p_1' < p_1^0$$

$$\therefore |e_p| < 1$$

PCC and Demand Curves

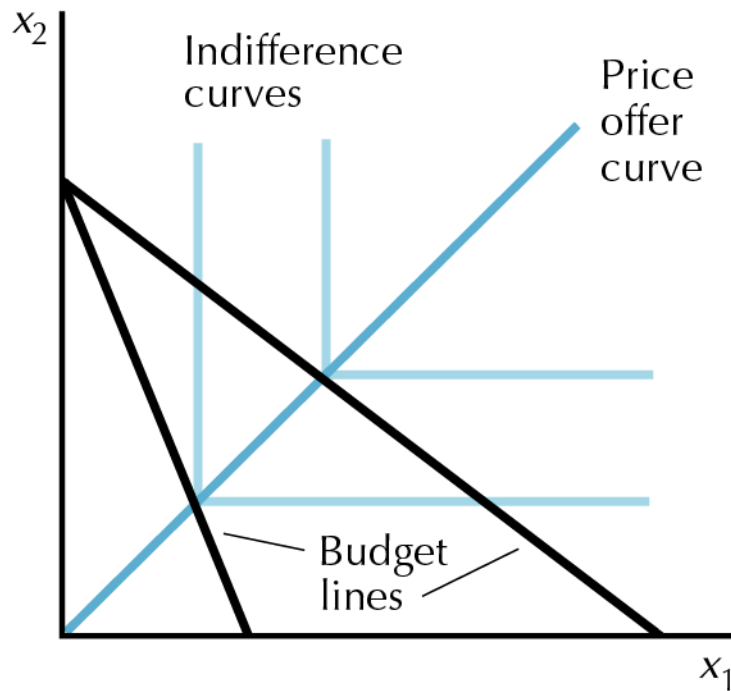
Perfect complements

Let the two goods be consumed in the following proportion:

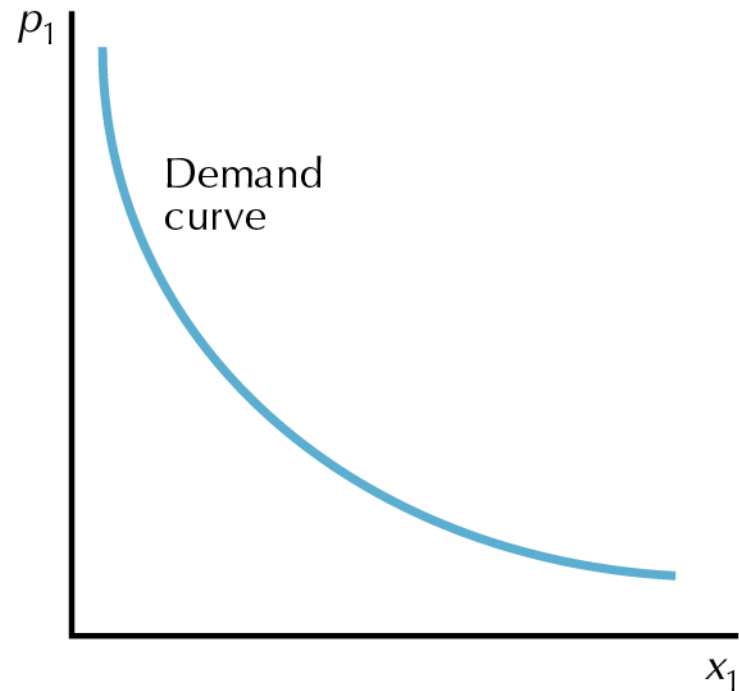
$$x_1 : x_2 = a : b$$

$$\bar{M} = P_1 x_1 + P_2 x_2 = P_1 x_1 + P_2 x_1 \frac{b}{a}$$

$$\therefore x_1 = \frac{\bar{M}}{P_1 + P_2 \frac{b}{a}}$$



A Price offer curve



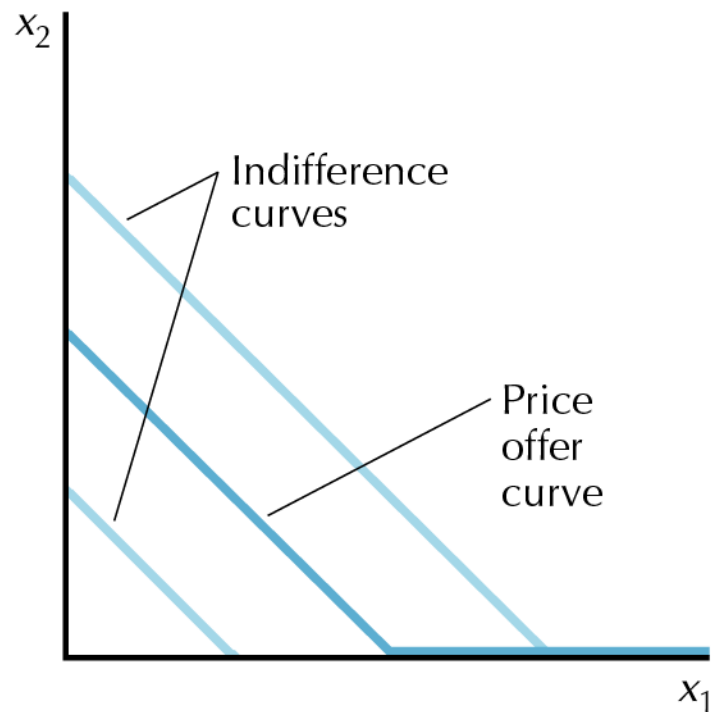
B Demand curve

Figure 6.13 Perfect complements

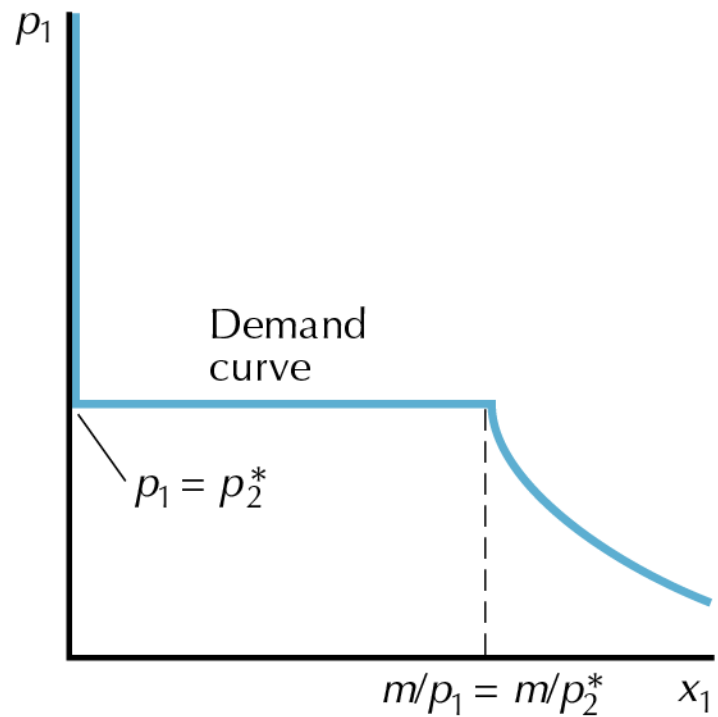
Perfect substitutes

When price of both the goods are same consumer is indifferent between consuming the two goods; otherwise s/he will consume the cheaper good.

$$\therefore x_1 = \begin{cases} 0 \forall p_1 > p_2 \\ x_1 \in \left[0, \frac{\bar{M}}{P_1}\right] \forall p_1 = p_2 \\ \frac{\bar{M}}{P_1} \forall p_1 < p_2 \end{cases}$$



A Price offer curve



B Demand curve

Figure 6.12 Perfect substitutes

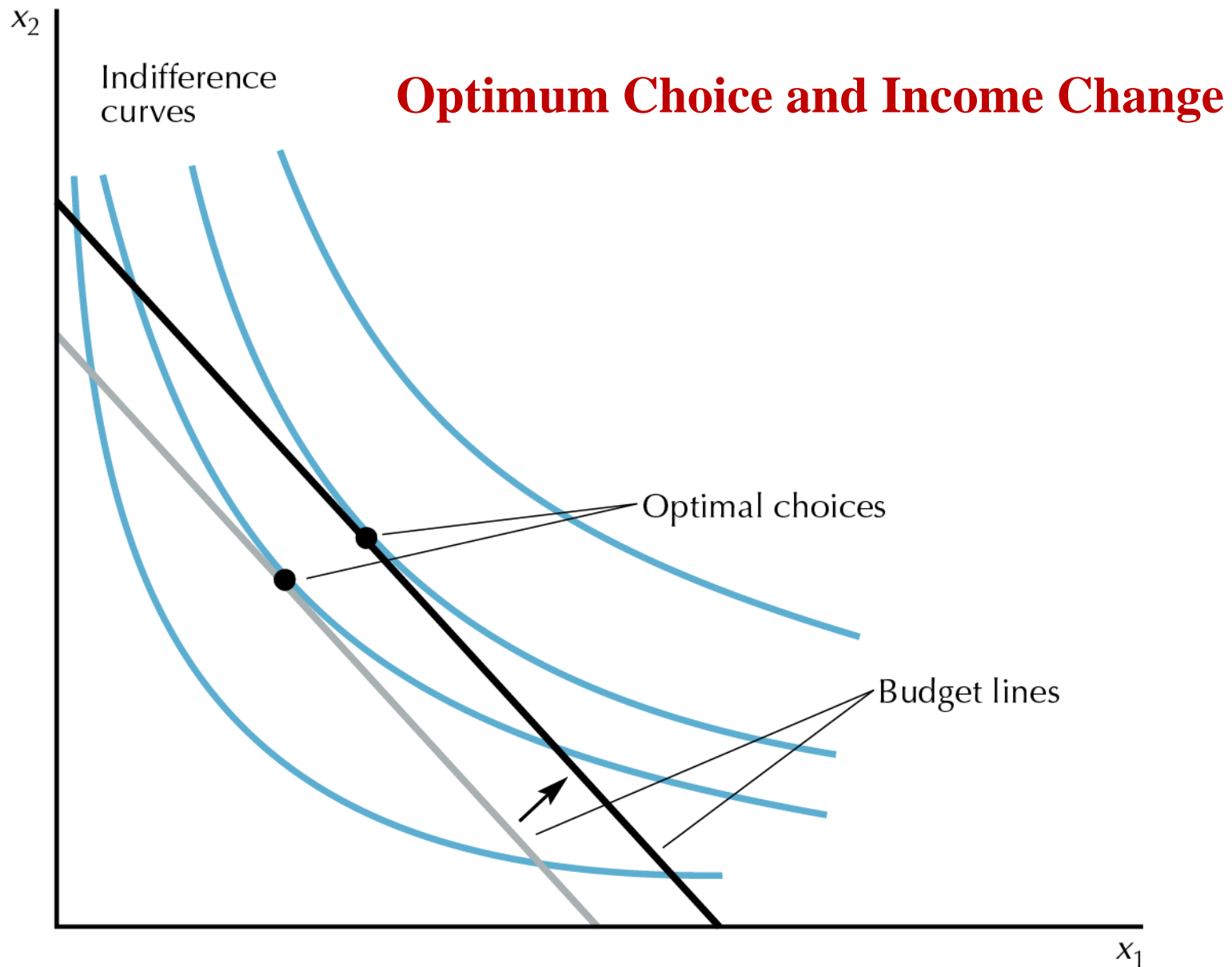


Figure 6.1 Normal goods

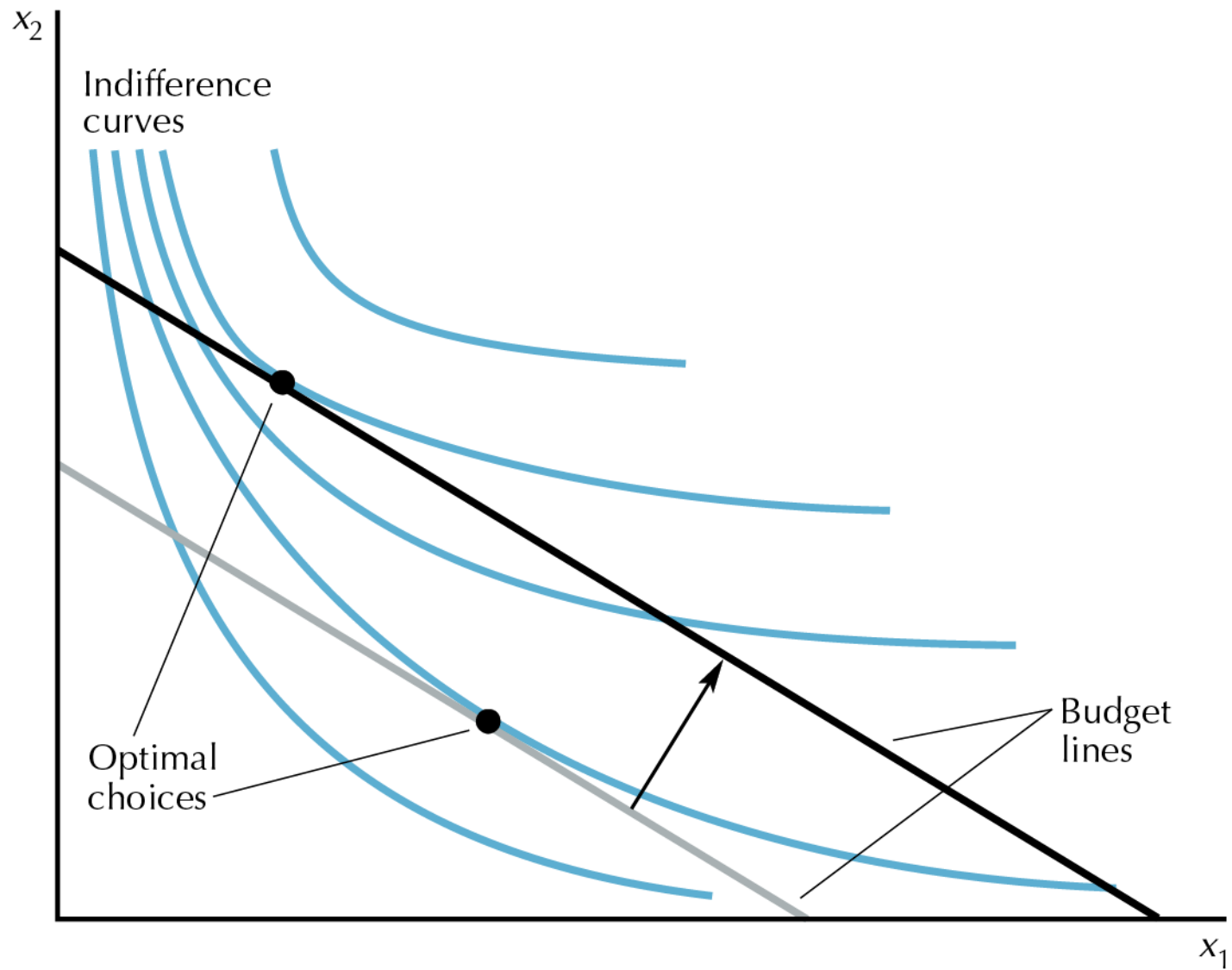
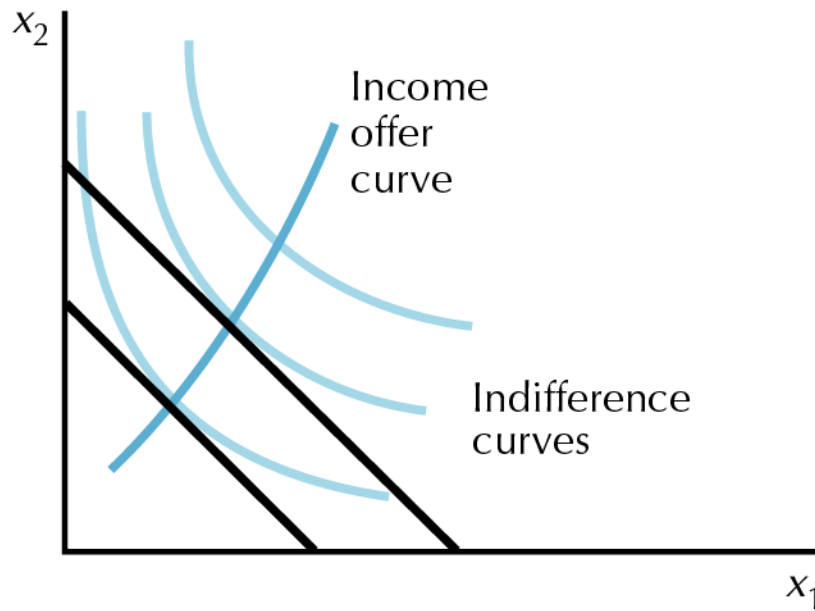


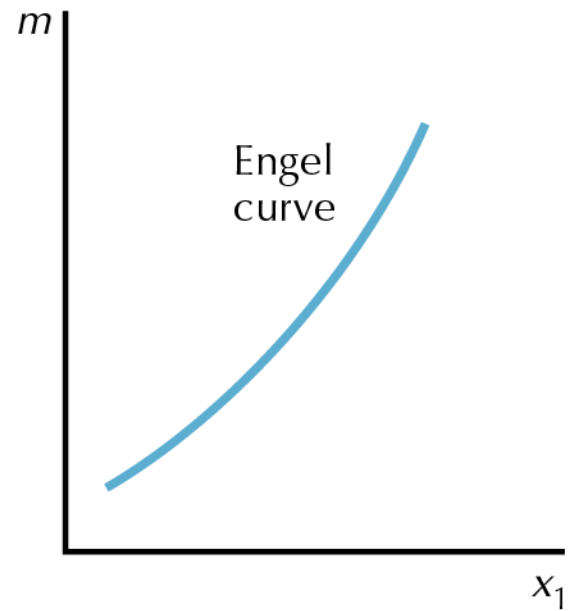
Figure 6.2 An inferior good

Income Consumption Curve (ICC)

- ICC is the locus of all MPBs when M changes, *Ceteris Paribus*.
- When both the goods are normal, ICC and Engel curve are upward rising.
- When one of the goods is normal, ICC and Engel curve are backward bending.
- Both goods cannot be inferior.



A Income offer curve



B Engel curve

Figure 6.3 How demand changes as income changes

Good 2

C

A

a

b

B

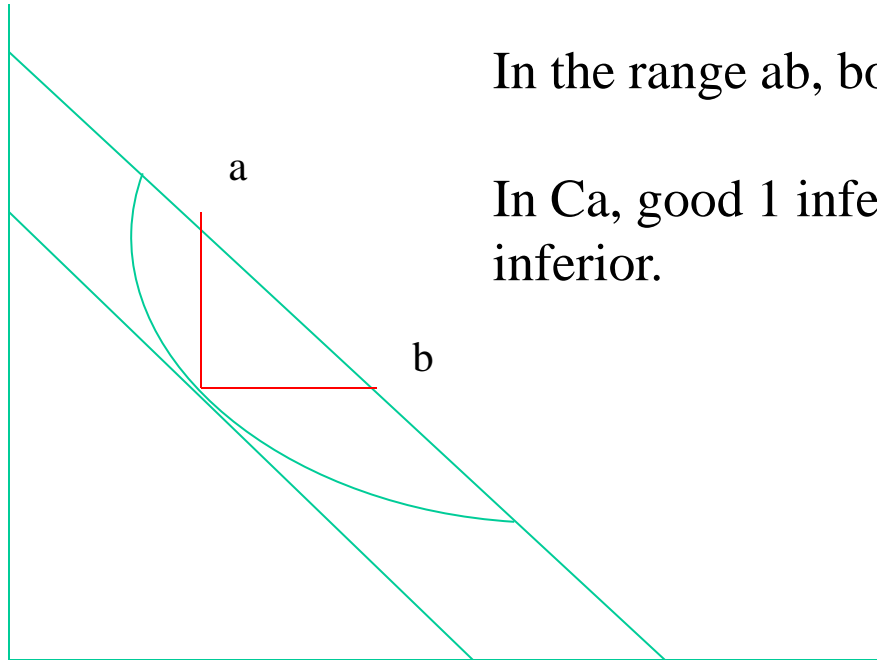
D

Good 1

If the optimum is:

In the range ab, both are normal.

In Ca, good 1 inferior, In bD, good 2 inferior.



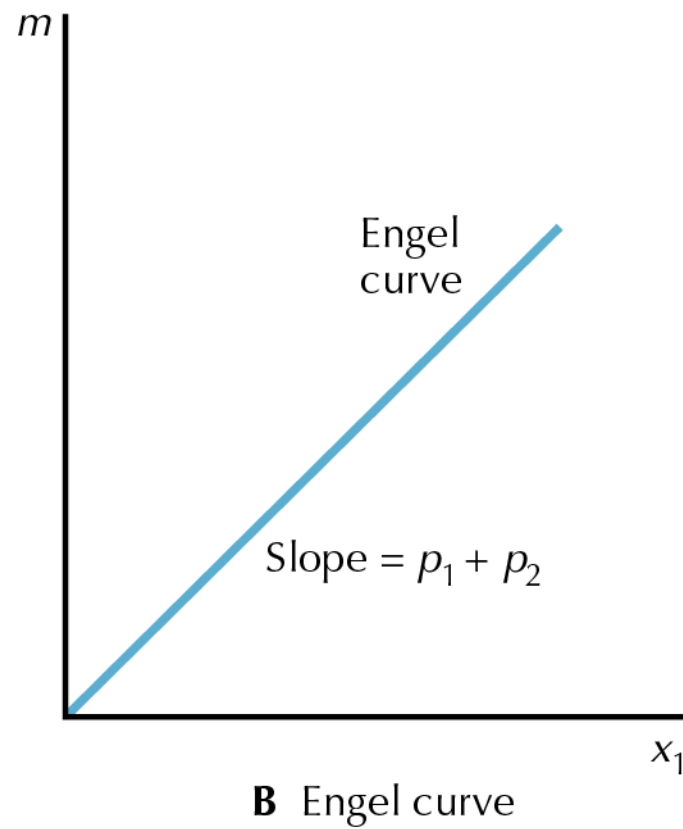
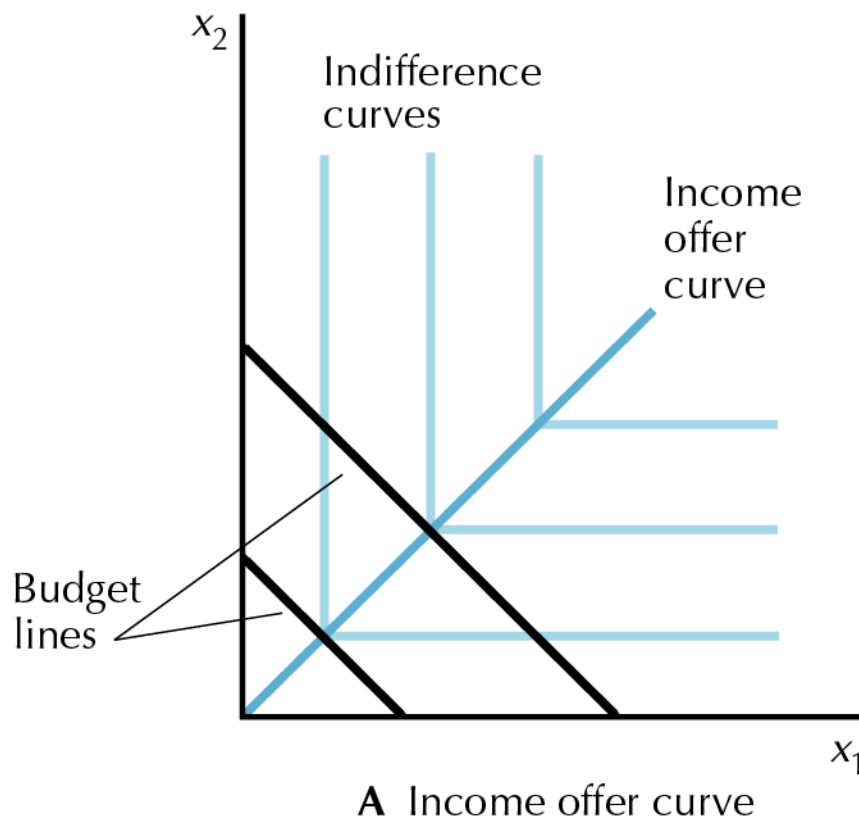
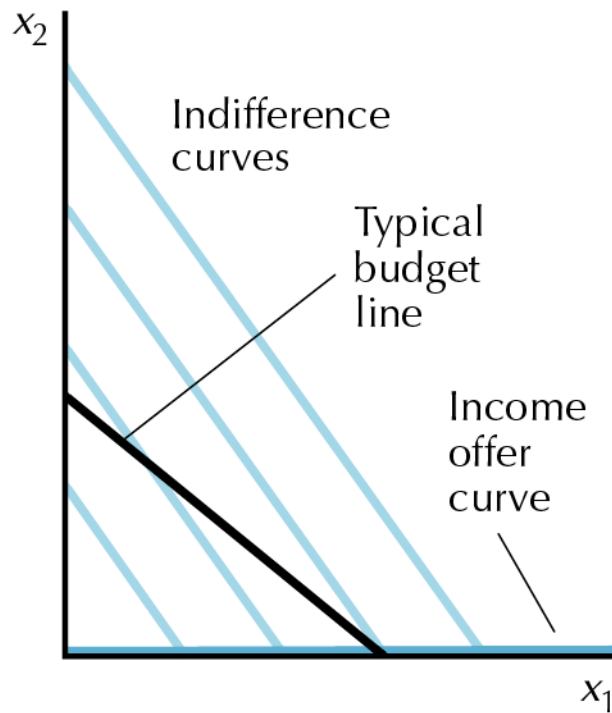
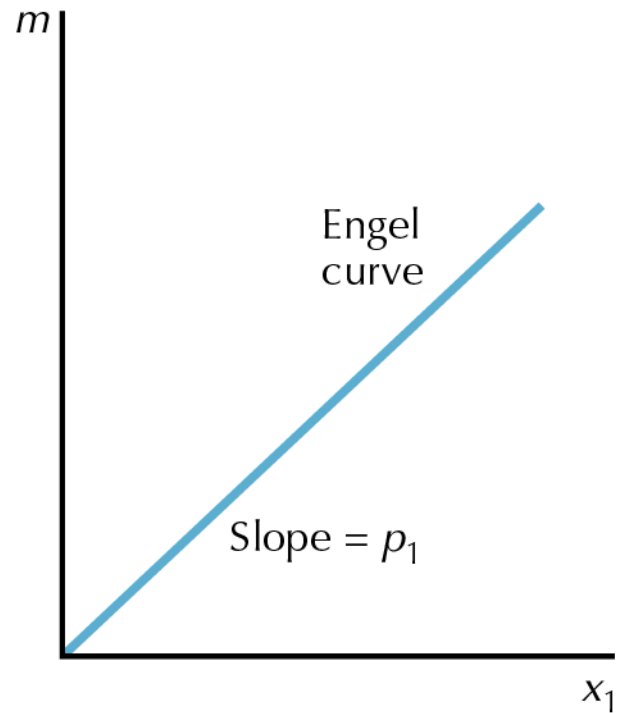


Figure 6.5 Perfect complements



A Income offer curve



B Engel curve

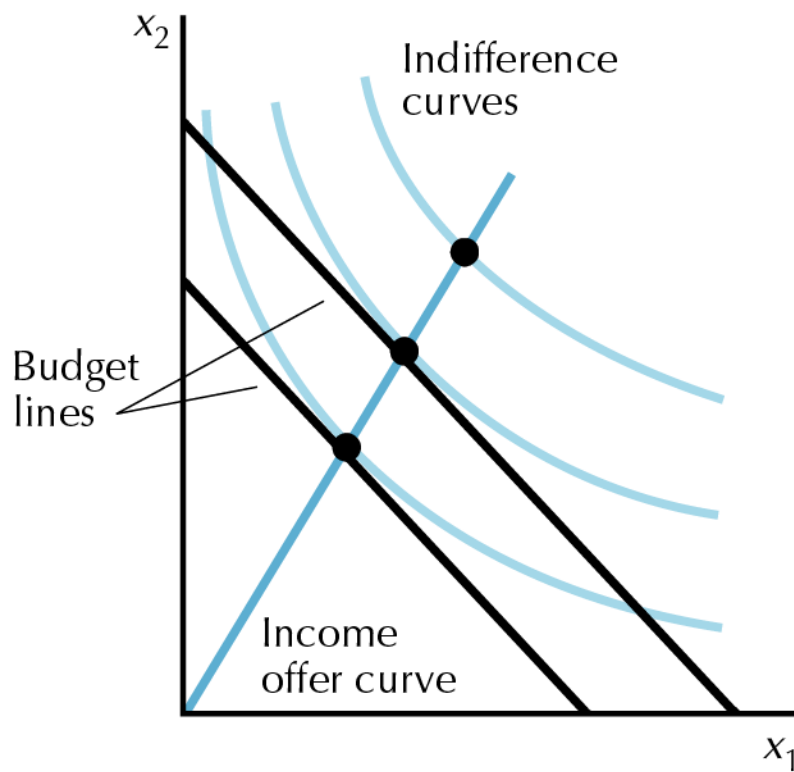
Figure 6.4 Perfect substitutes

Homothetic preference

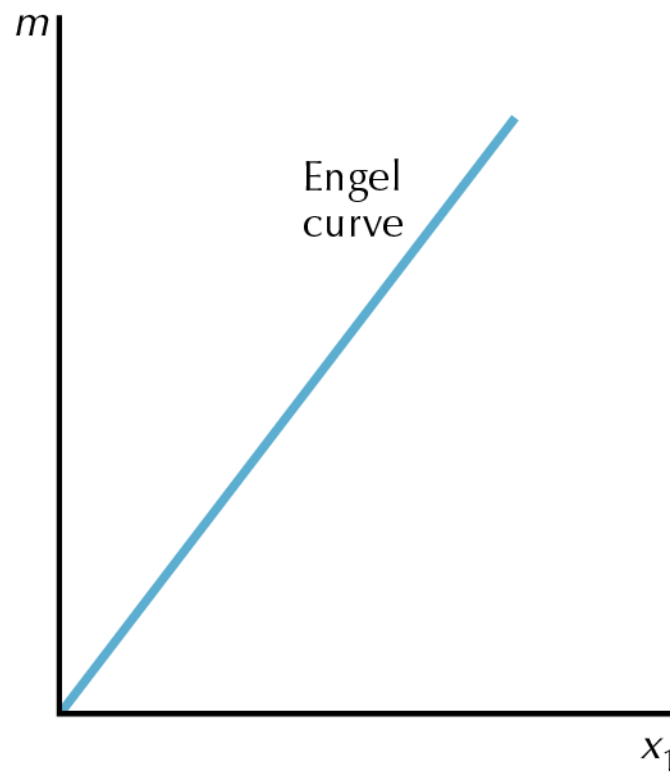
A preference is said to be *homothetic* if it depends only on the ratio in which the two goods are consumed, e.g., perfect substitutes, and perfect complements.

If $(x_1, x_2)P(y_1, y_2)$ then $(tx_1, tx_2)P(ty_1, ty_2)$ for all $t>0$

Therefore, $MRS(x_1, x_2) = MRS(tx_1, tx_2)$ for all $t>0$

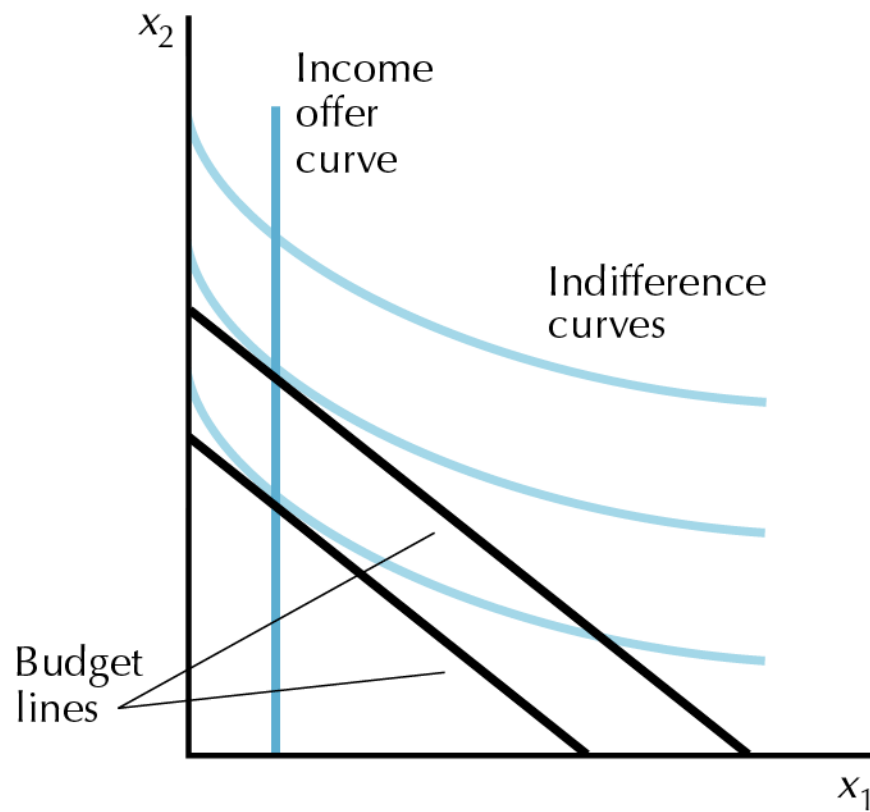


A Income offer curve

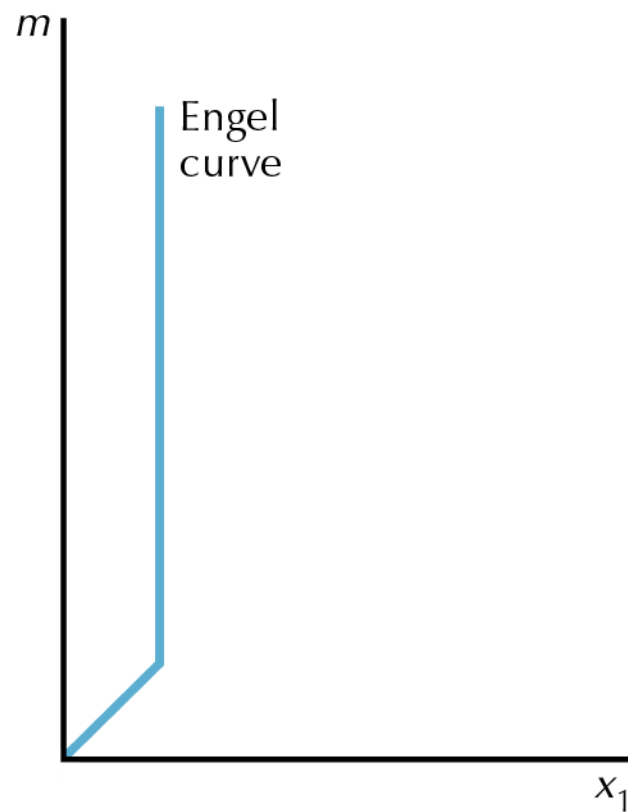


B Engel curve

Figure 6.7 Homothetic preferences



A Income offer curve



B Engel curve

Figure 6.8 Quasilinear preferences

Optimum Choice

- A proportionate increase in all prices is the same in effect as an equi-proportionate fall in money income of the consumer.
- Equi-proportionate increase in M & P will leave the MPB unchanged.
- Demand function is homogeneous of degree 0.
Consumer is free of money illusion.

Homogeneous function

A function is said to be homogeneous of degree 'r' if increase in all its argument by the rate λ increases the function value by the rate λ^r .

$$f(\lambda x, \lambda z) = \lambda^r f(x, z) = \lambda^r y$$