Chapter Six

- Demand

What's Next?

- We know how an individual consumer's demand comes about
- Simply aggregate individual demands to get market demand
- We are interested in how income, prices, etc., affect the market outcome
- It is necessary to understand the effects on the individual demand, first.

Properties of Demand Functions

- Comparative statics analysis of ordinary demand functions -- study of how ordinary demands $x_1^*(p_1,p_2,y)$ and $x_2^*(p_1,p_2,y)$ change as prices p_1, p_2 and income y change.

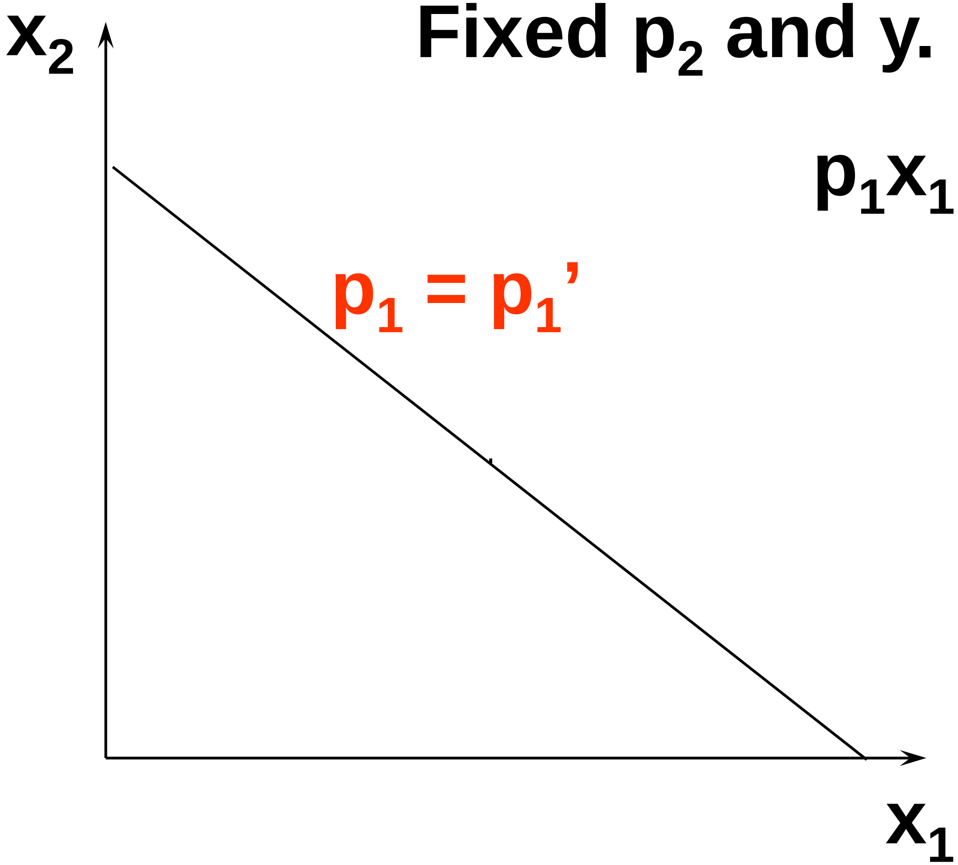
Effect of Own Price

Own-Price Changes

- How does $x_1^*(p_1,p_2,y)$ change as p_1 changes, holding p_2 and y constant?
- Suppose only p_1 increases, from p_1' to p_1'' and then to p_1'''.

Own-Price Changes

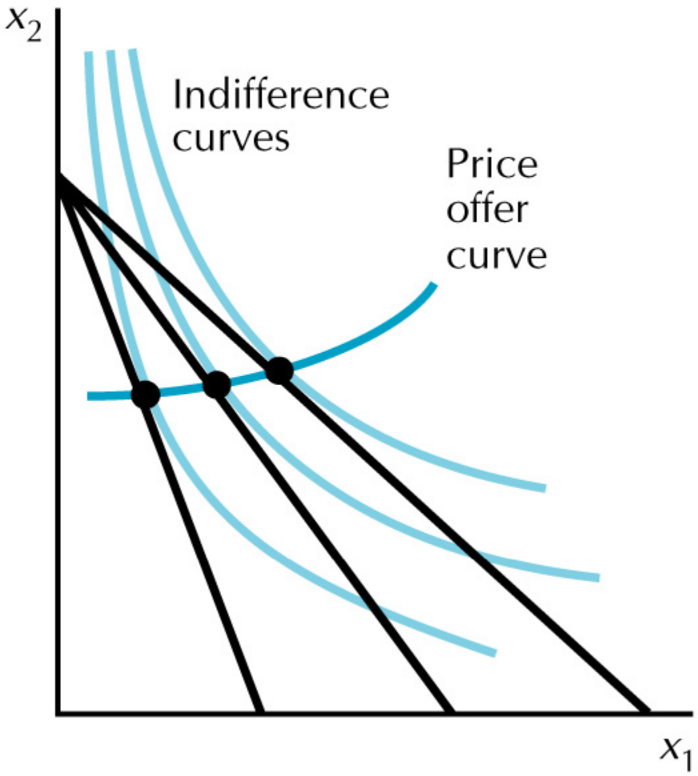
Fixed p_2 and y.



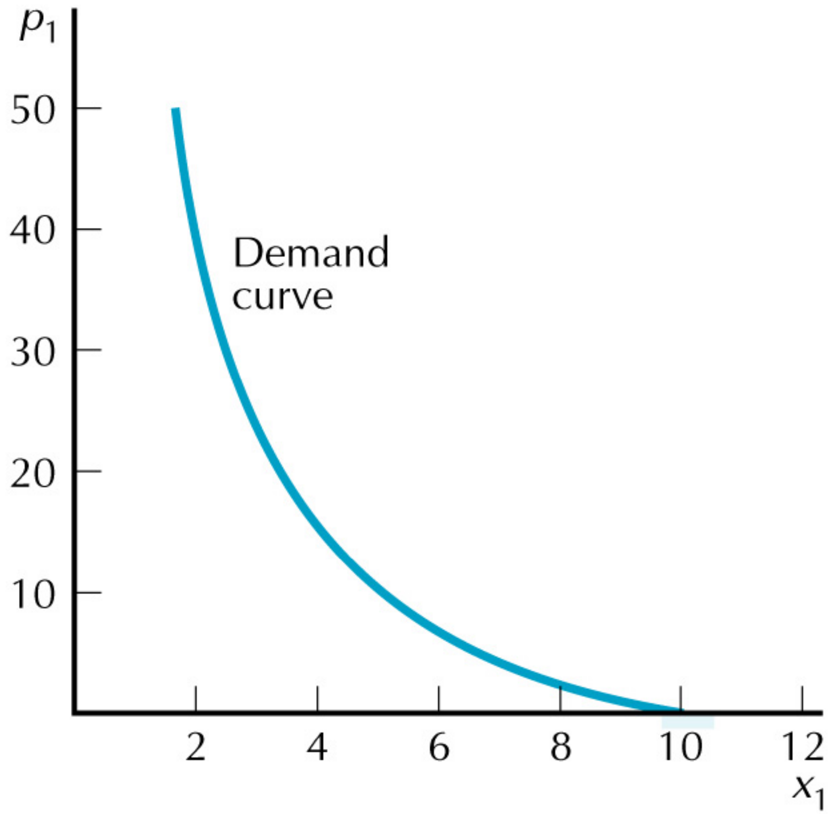
$$p_1x_1 + p_2x_2 = y$$

Own-Price Changes

- The curve containing all the utility-maximizing bundles traced out as p_1 changes, with p_2 and y constant, is the p_1- price offer curve.
- The plot of the x_1-coordinate of the p_1- price offer curve against p_1 is the ordinary demand curve for commodity 1.



A Price offer curve



B Demand curve

Own-Price Changes

- What does a p_1 price-offer curve look like for a perfect-complements utility function?

$$U(x_1, x_2) = \min\{x_1, x_2\}.$$

Then the ordinary demand functions for commodities 1 and 2 are

Own-Price Changes

$$x_1^*(p_1,p_2,y) = x_2^*(p_1,p_2,y) = \frac{y}{p_1+p_2}.$$

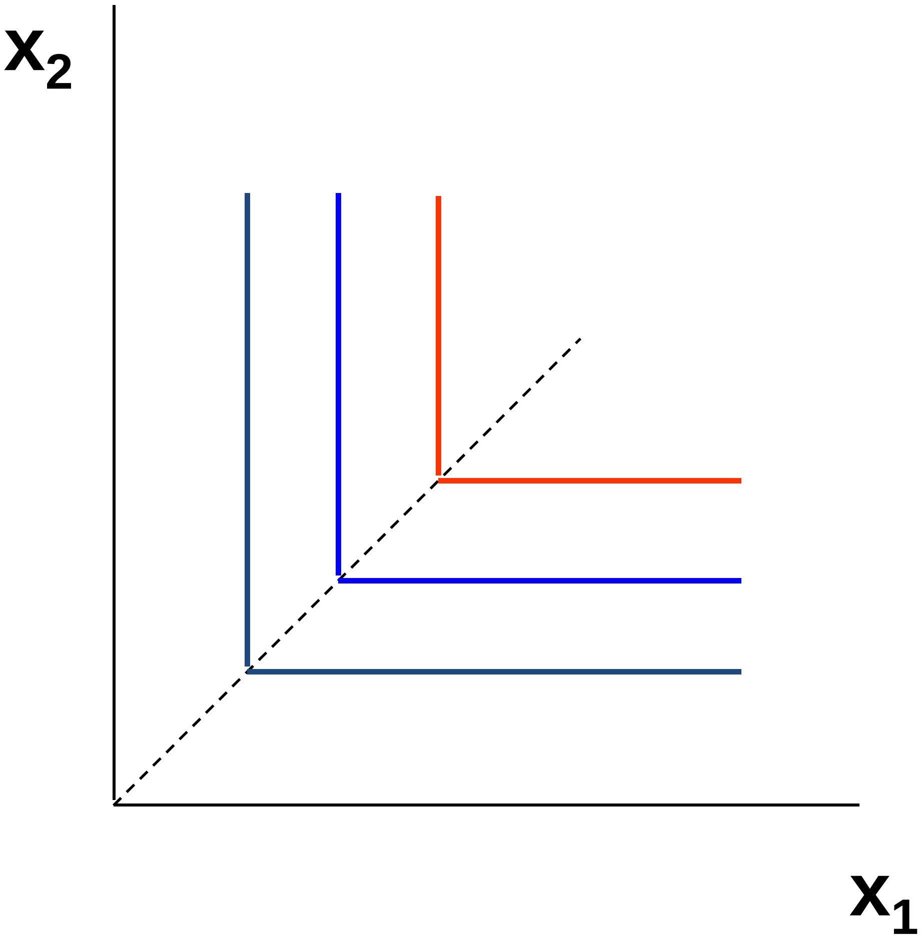
With p_2 and y fixed, higher p_1 causes smaller x_1* and x_2*.

As $p_1 \to 0, \quad x_1^* = x_2^* \to \dfrac{y}{p_2}.$

As $p_1 \to \infty, \quad x_1^* = x_2^* \to 0.$

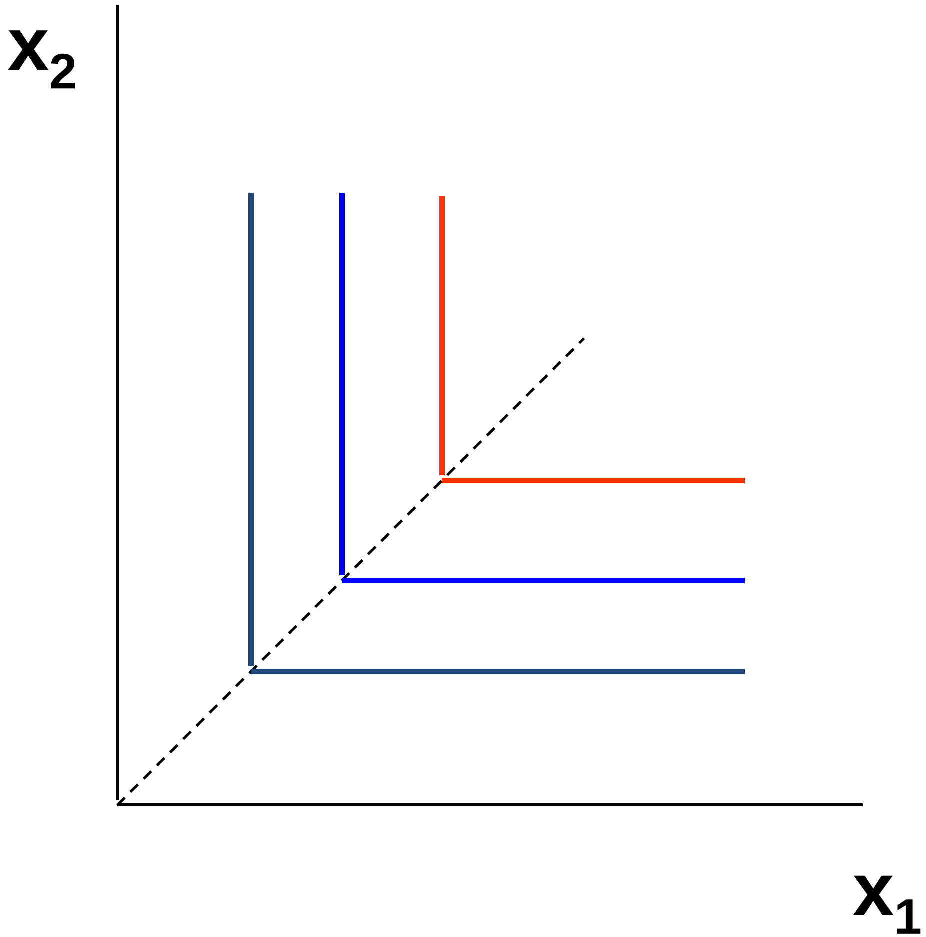
Own-Price Changes

Fixed p_2 and y.



Own-Price Changes

Fixed p_2 and y.



Own-Price Changes

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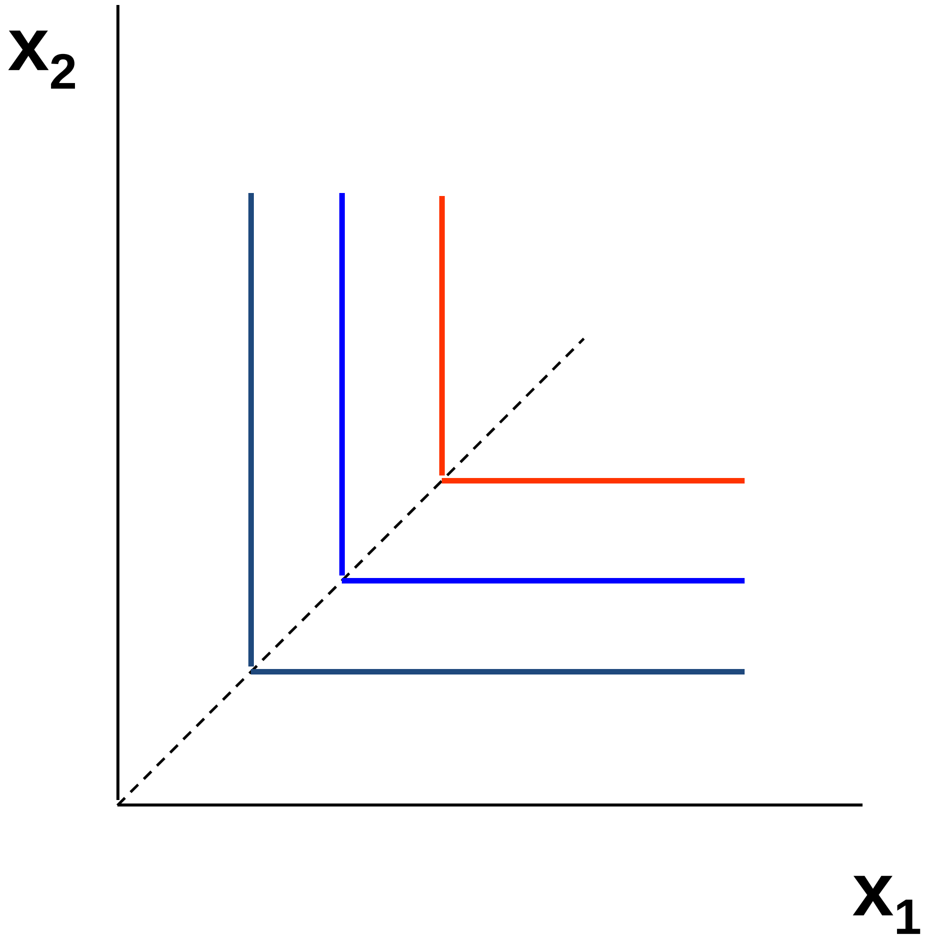

Own-Price Changes

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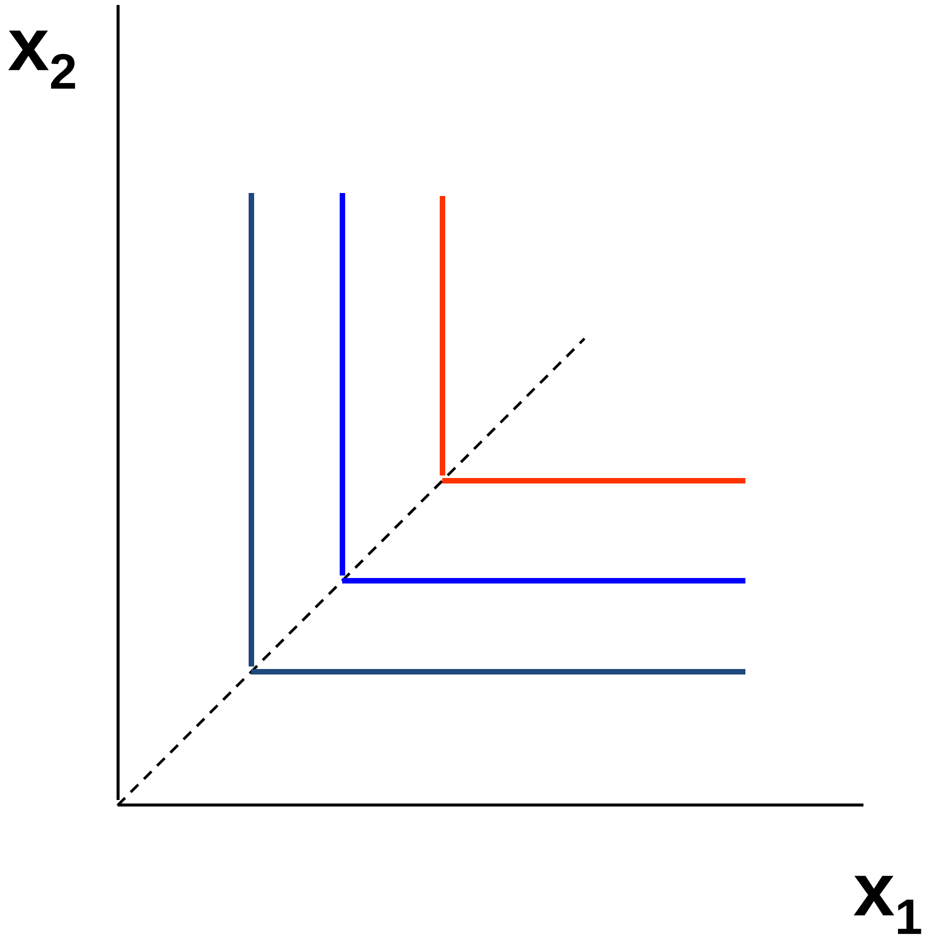
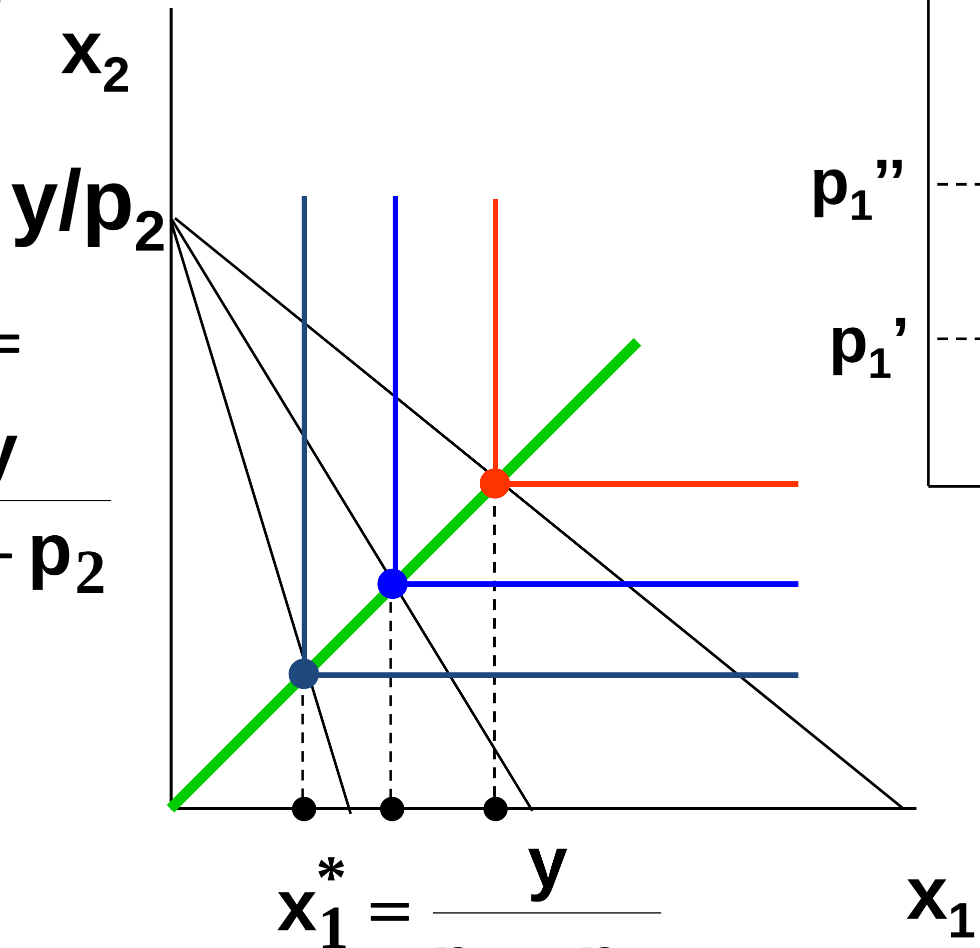


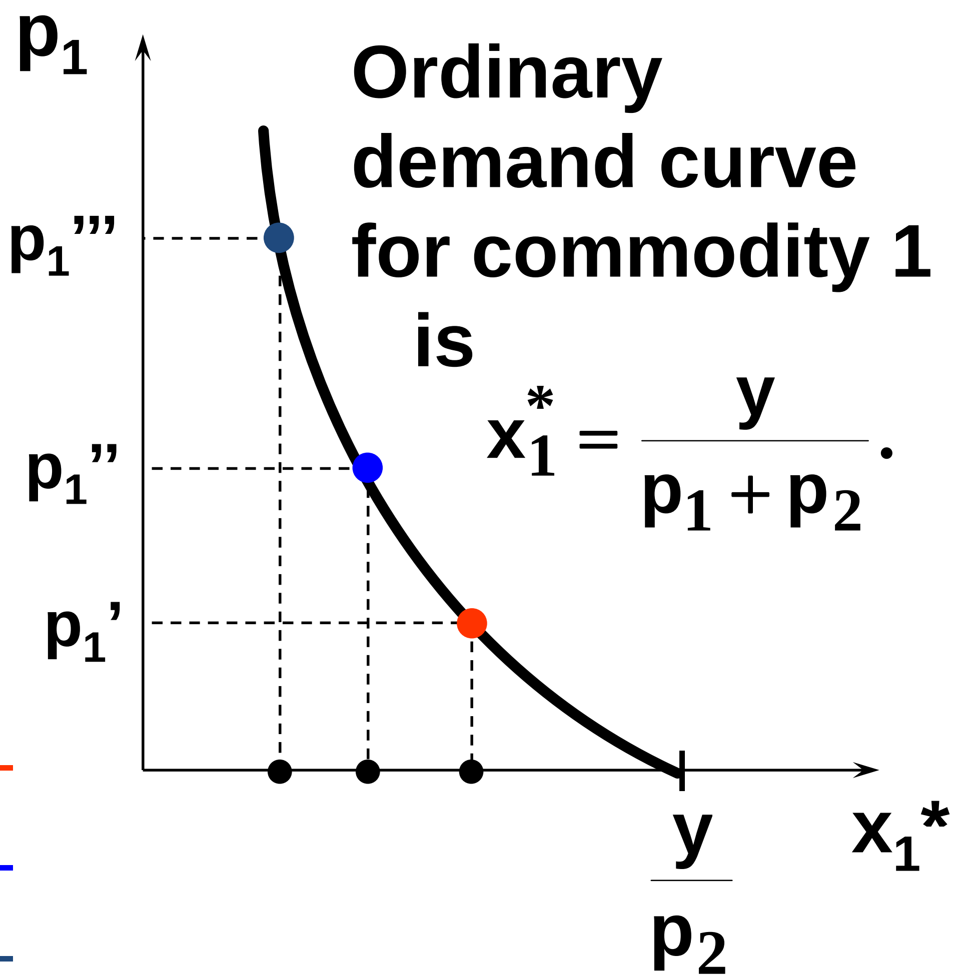
Own-Price Changes

Fixed p_2 and y.



$$x_2^* = \frac{y}{p_1 + p_2}$$

$$x_1^* = \frac{y}{p_1 + p_2}$$



Ordinary demand curve for commodity 1 is

$$x_1^* = \frac{y}{p_1 + p_2}.$$

Own-Price Changes

- Taking quantity demanded as given and then asking what must be price describes the inverse demand function of a commodity.

Own-Price Changes

A Cobb-Douglas example:

$$x_1^* = \frac{ay}{(a+b)p_1}$$

is the ordinary demand function and

$$p_1 = \frac{ay}{(a+b)x_1^*}$$

is the inverse demand function.

Own-Price Changes

A perfect-complements example:

$$x_1^* = \frac{y}{p_1 + p_2}$$

is the ordinary demand function and

$$p_1 = \frac{y}{x_1^*} - p_2$$

is the inverse demand function.

Effect of Income Changes

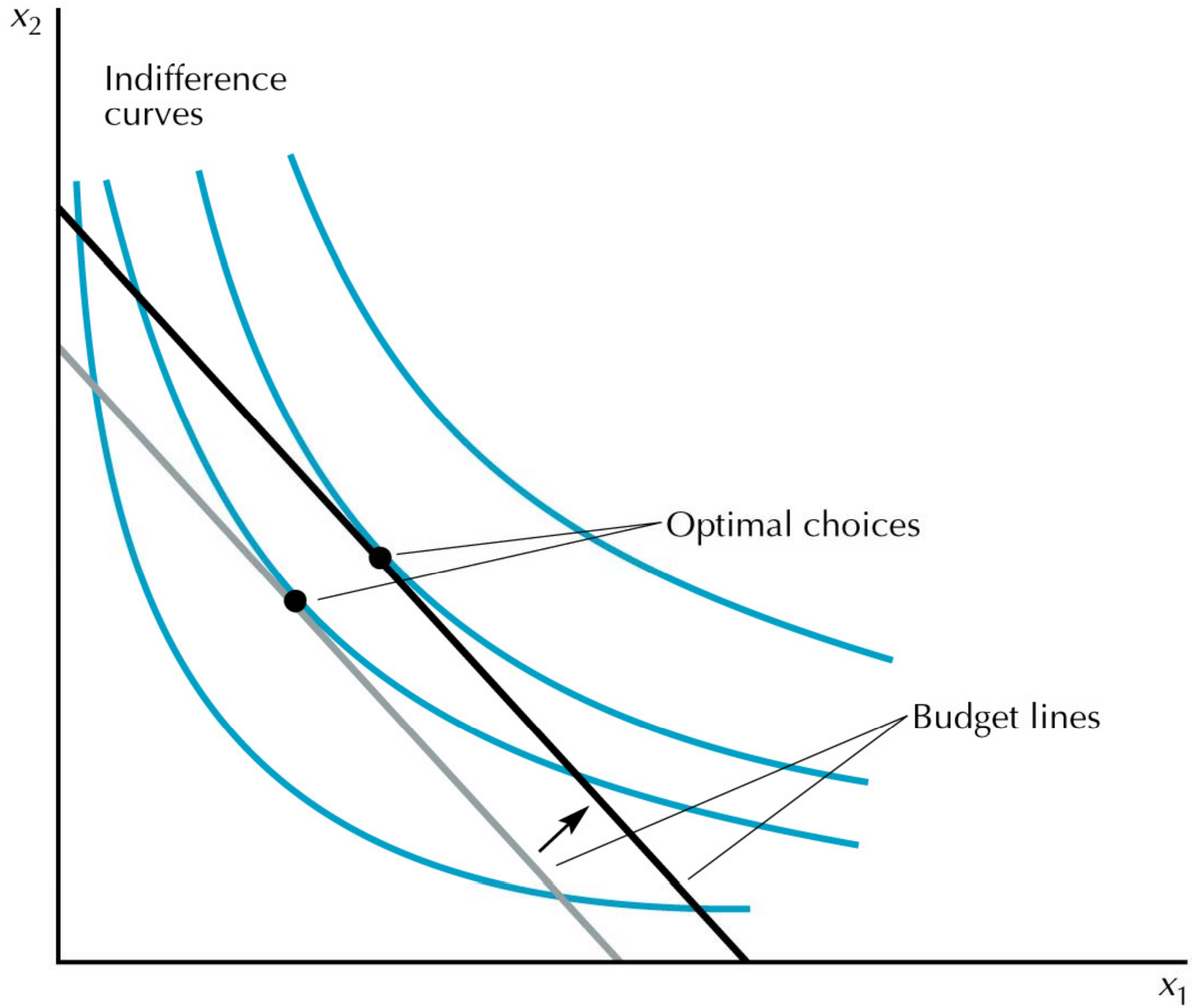
Income Changes

- How does the value of $x_1^*(p_1,p_2,y)$ change as y changes, holding both p_1 and p_2 constant?

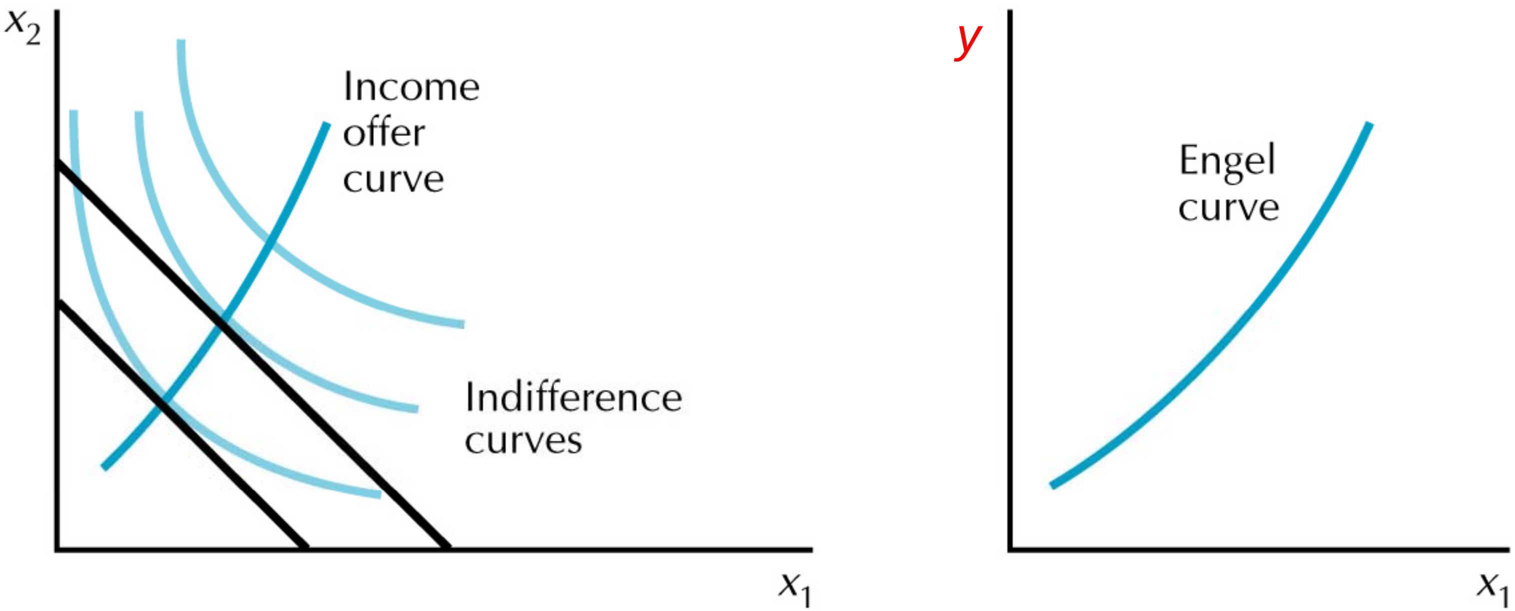
Income Changes

- A plot of quantity demanded against income is called an Engel curve.

Income Change



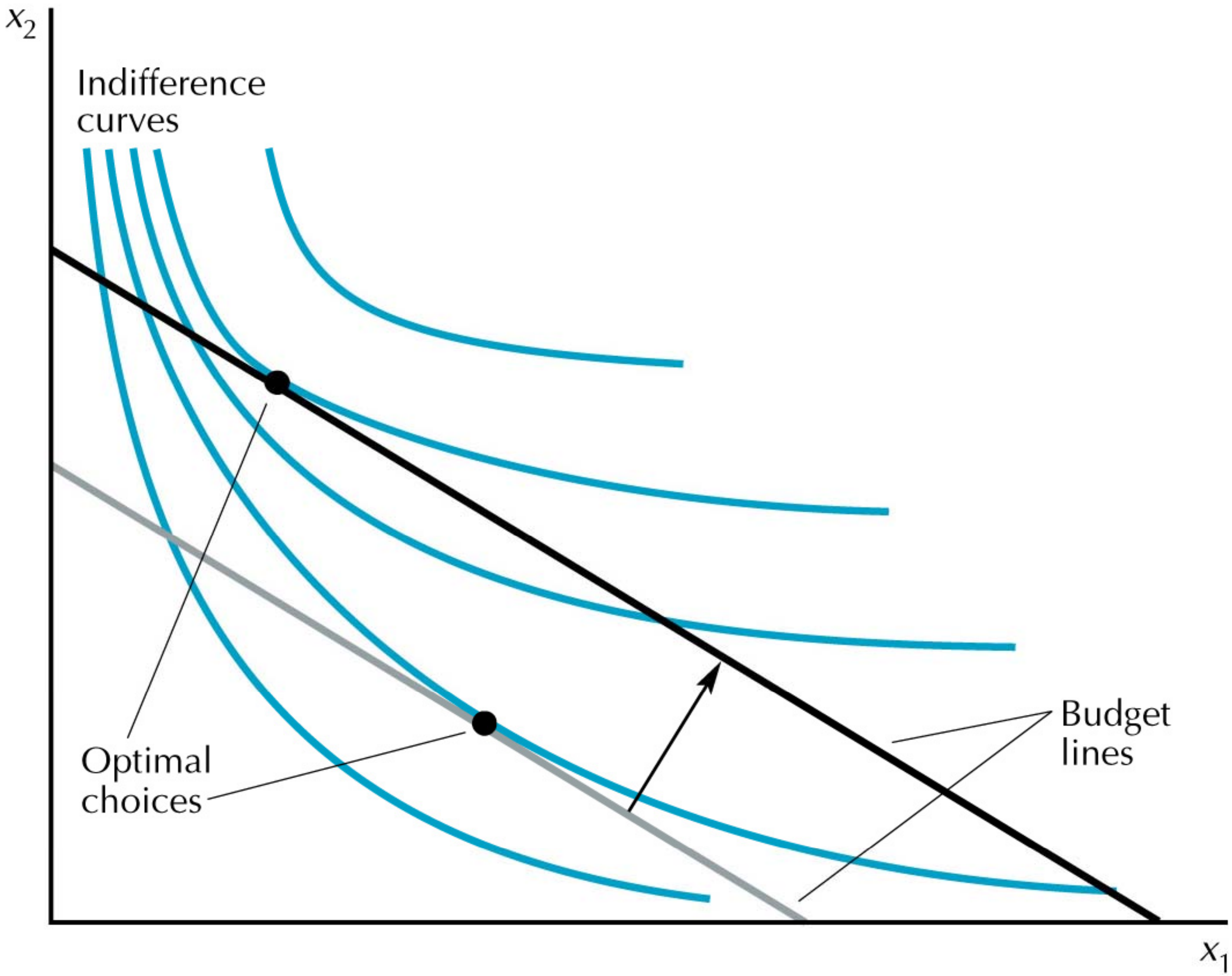
Engel Curve



A Income offer curve

B Engel curve

Inferior Good



Income Changes and Perfectly-Complementary Preferences

- Another example of computing the equations of Engel curves; the perfectly-complementary case.

$$U(x_1, x_2) = \min\{x_1, x_2\}.$$

- The ordinary demand equations are

$$x_1^* = x_2^* = \frac{y}{p_1 + p_2}.$$

Income Changes and Perfectly-Complementary Preferences

$$x_1^* = x_2^* = \frac{y}{p_1 + p_2}.$$

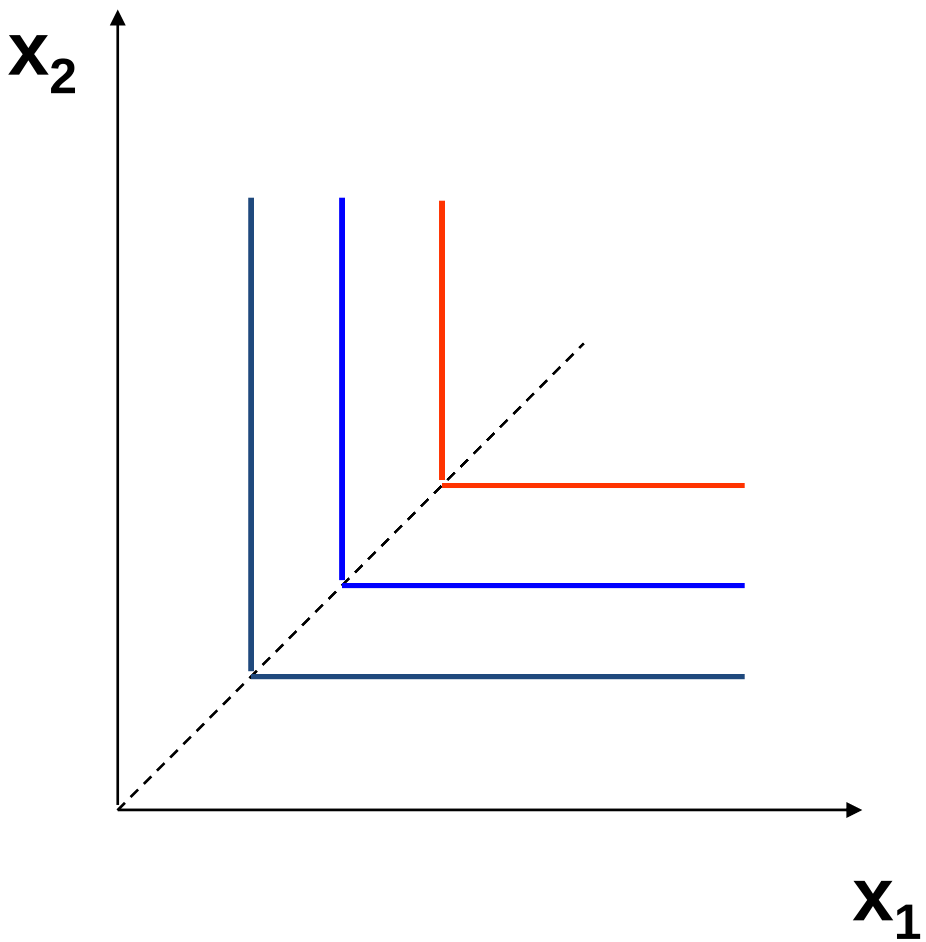
Rearranged to isolate y, these are:

$y = (p_1 + p_2)x_1^*$ **Engel curve for good 1**

$y = (p_1 + p_2)x_2^*$ **Engel curve for good 2**

Income Changes

Fixed p_1 and p_2.



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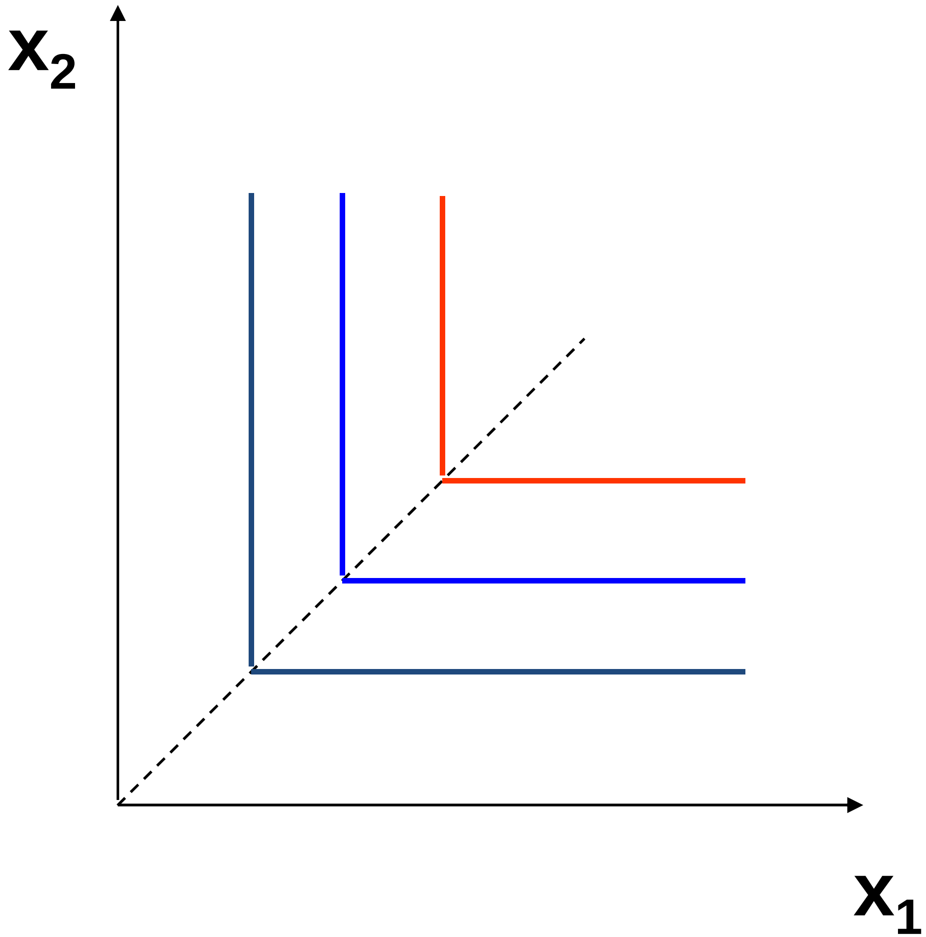

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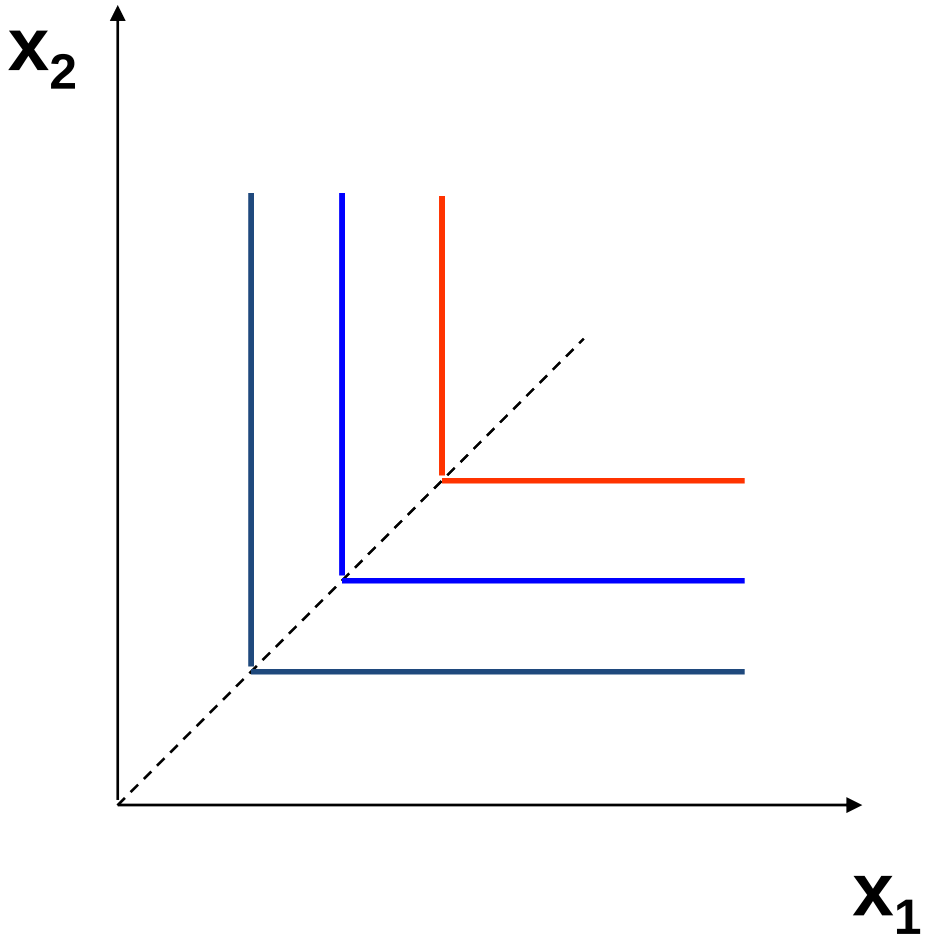

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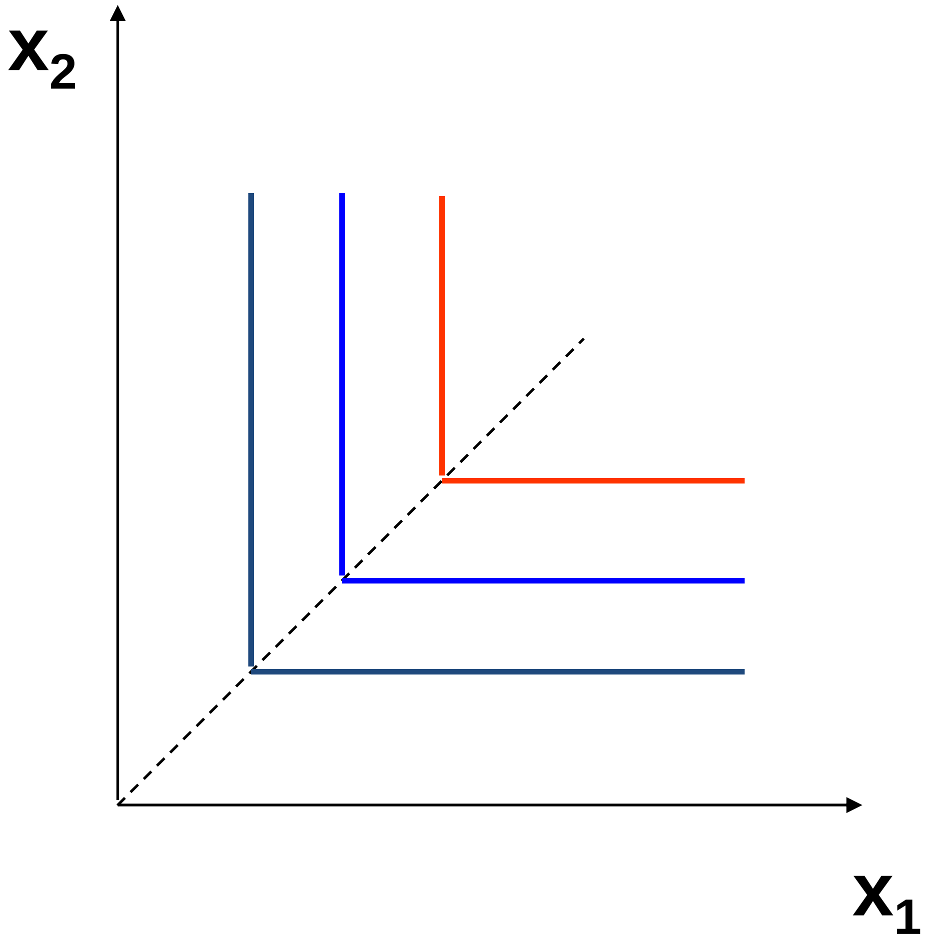

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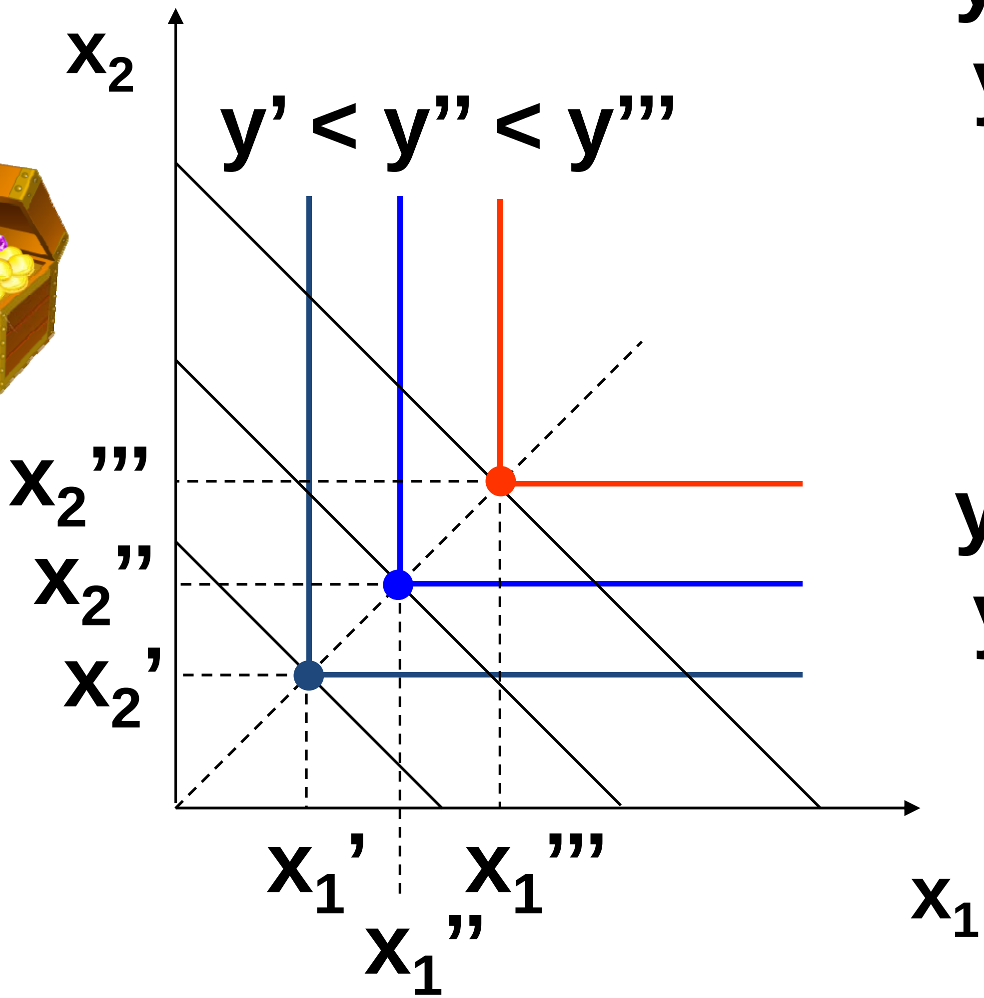

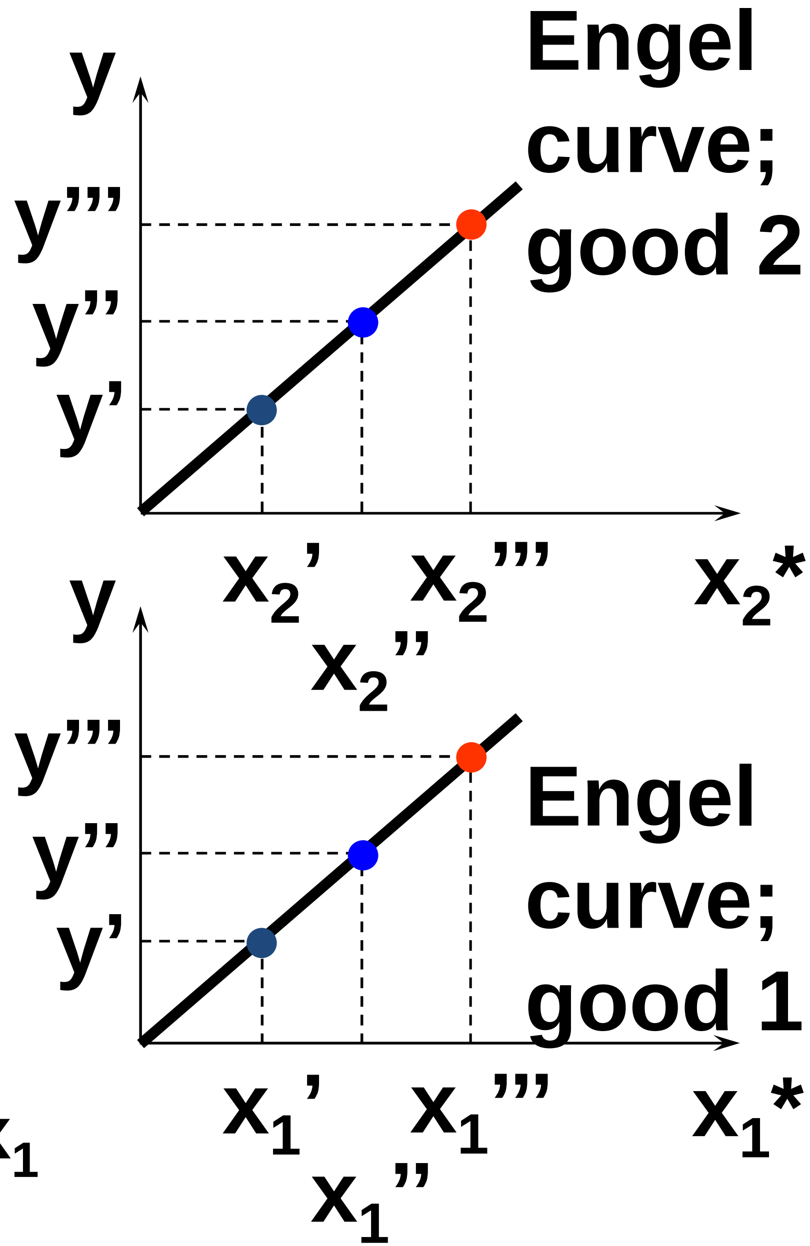

Income Changes

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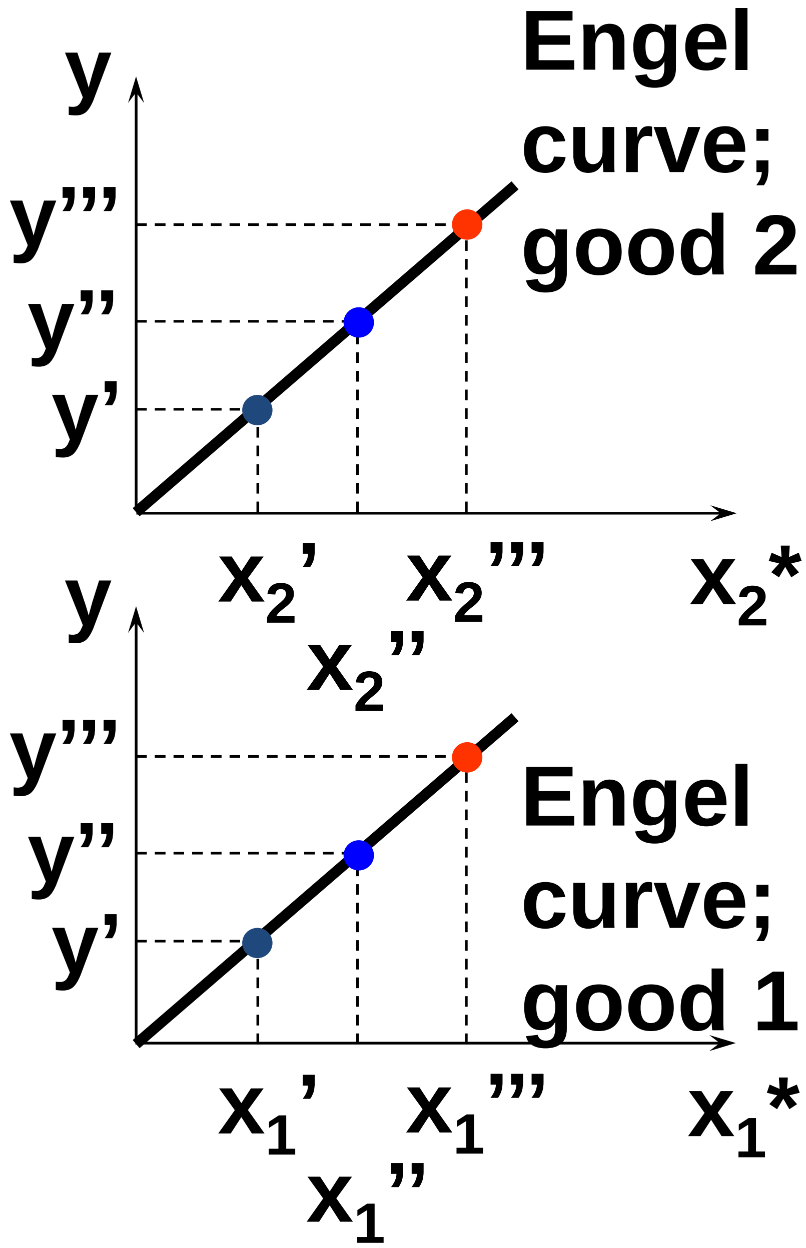


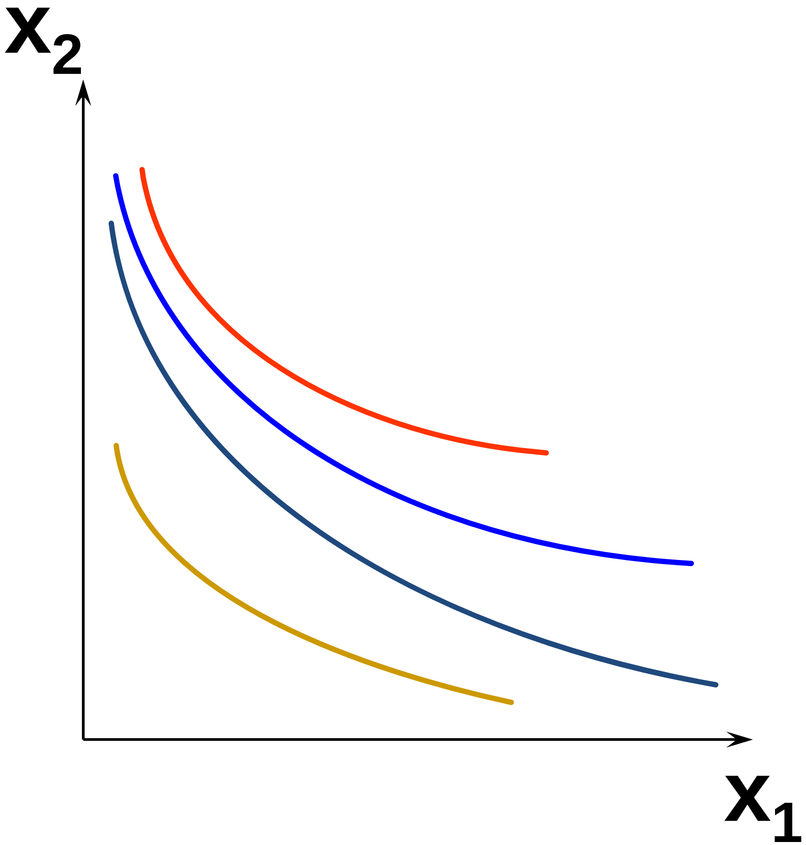
Income Effects

- A good for which quantity demanded rises with income is called normal.
- Therefore a normal good's Engel curve is positively sloped.

Income Effects

- A good for which quantity demanded falls as income increases is called income inferior.
- Therefore an income inferior good's Engel curve is negatively sloped.

Income Changes; Good 2 Is Normal, Good 1 Becomes Income Inferior

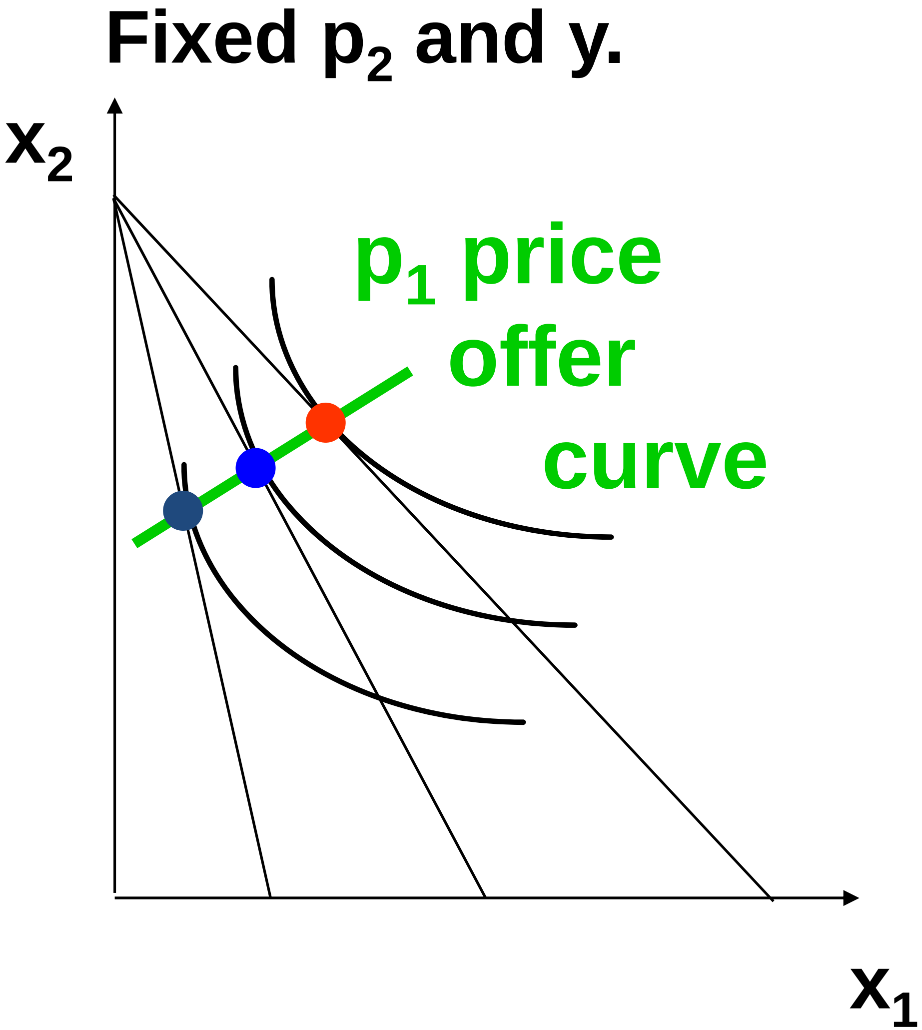


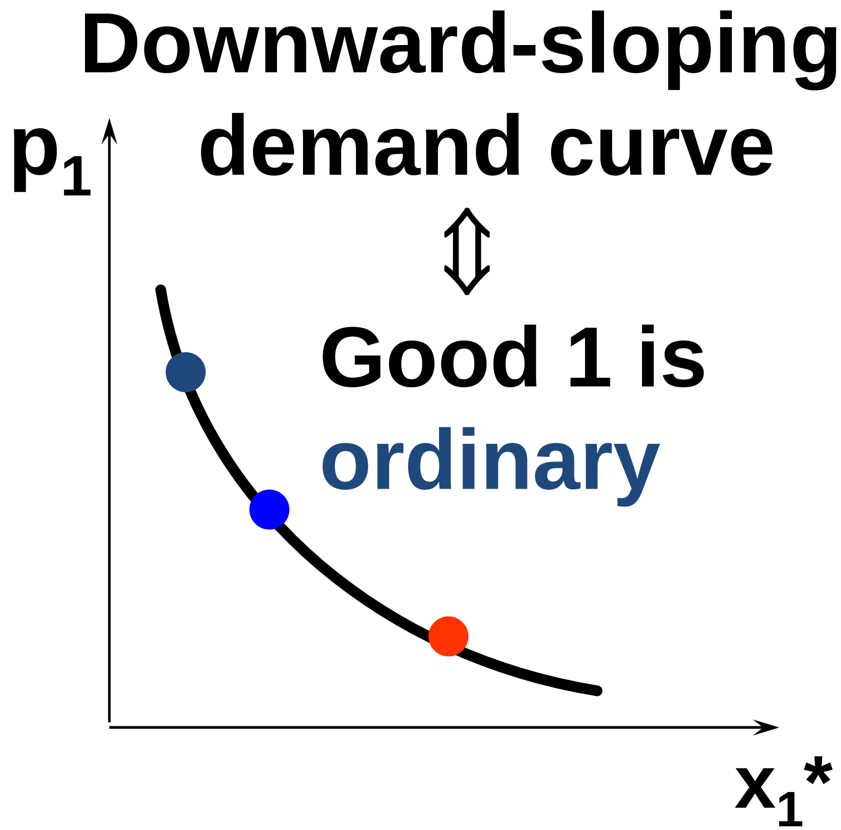
Effect of Price Changes

Ordinary Goods

- A good is called ordinary if the quantity demanded of it always increases as its own price decreases.

Ordinary Goods





Giffen Goods

- If, for some values of its own price, the quantity demanded of a good rises as its own-price increases then the good is called Giffen.

Giffen Goods

Fixed p_2 and y.