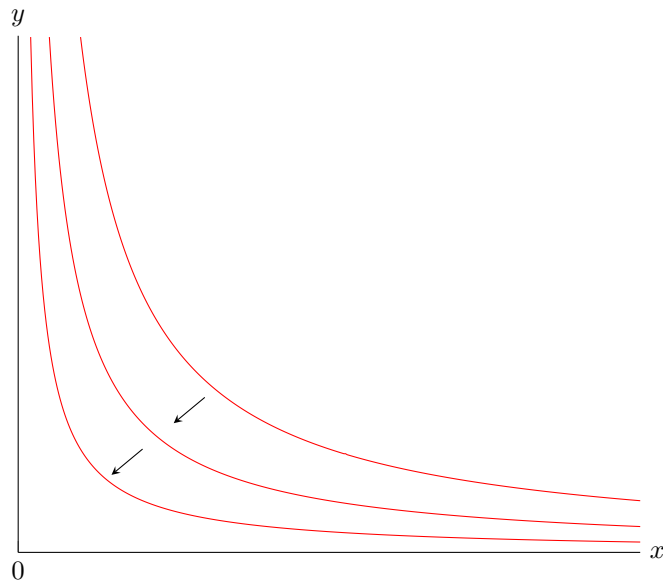# Bad goods

In the realm of microeconomics, bad goods are those that consumers would prefer to consume less of, even when they are offered for free. A classic example of a bad good is pollution. No one desires more pollution, and an increase in its level is usually seen as detrimental. Similarly, harmful substances like asbestos once used extensively in construction, are now recognized as health hazards and their presence can devalue a property. Even certain foods can be considered bad goods in specific contexts; for example, foods with high trans fat content became less desired as awareness of their health implications grew. It's important to note that the classification of a good as "bad" can be context-specific and might evolve over time with advancements in knowledge and societal values. Such preferences do not satisfy the strong monotonicity criterion.

Two Bad Goods

Consider a utility function where both goods are "bad" for the consumer. Such a function can be represented as:

$$U = \frac{1}{x^\alpha y^\beta}$$

where $\alpha, \beta > 0$. The indifference curves resemble those of the Cobb-Douglas utility function; however, in this case, greater utility corresponds to indifference curves that are closer to the origin.
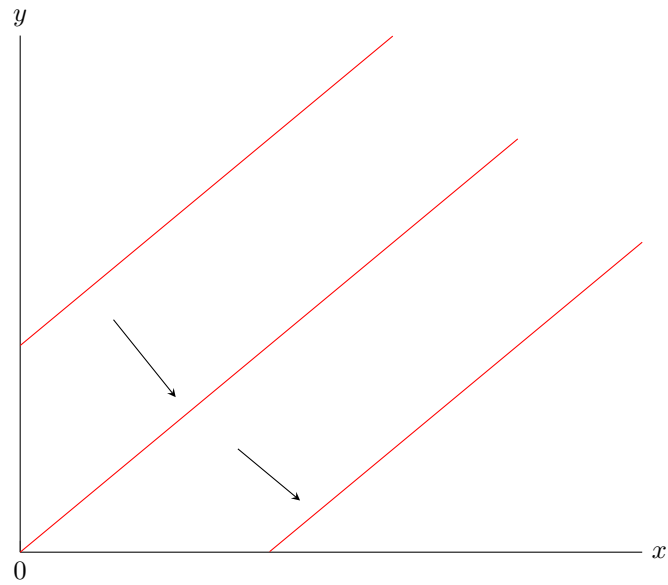

One Good and One Bad

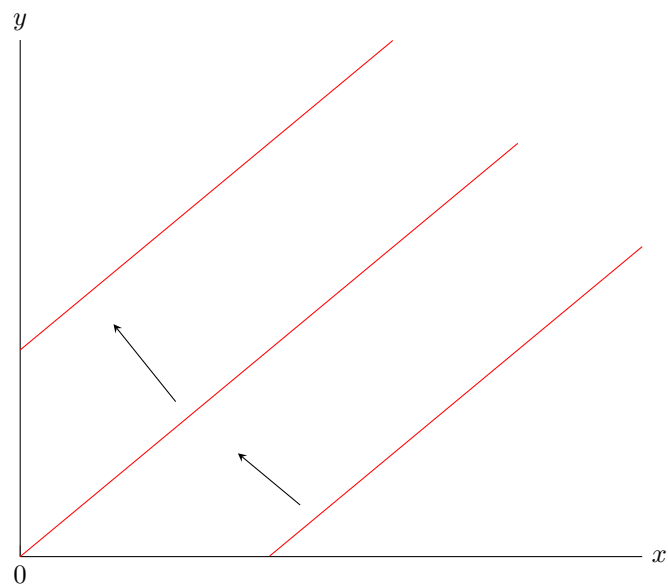The utility function can also be represented as:

$$U = ax - by$$

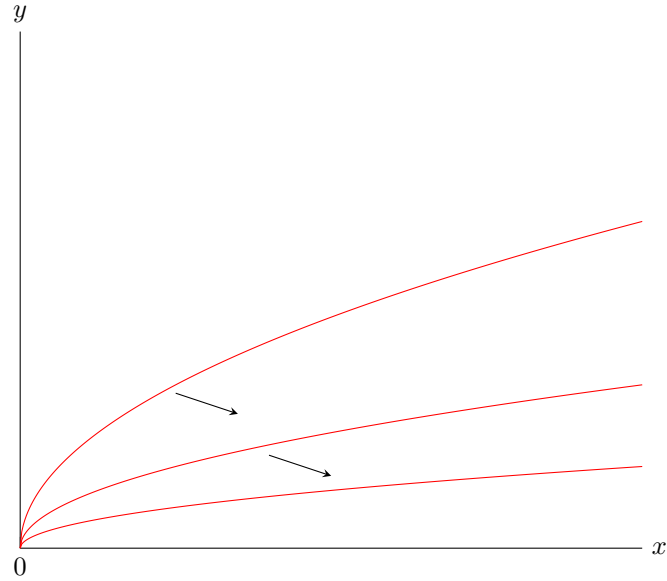where $a, b > 0$.

Another utility function formulation is:

$$U = -ax + by$$

Here, x is the "bad" good.

Another example could be:

$$U = \frac{x}{y^2}$$

Utility maximization

In a microeconomic context where we have two goods and one of them is considered a "bad", the consumer's behavior when maximizing utility will be to minimize the consumption of that bad. The rationale behind this is straightforward: a consumer aims to maximize their well-being or utility, and if consuming more of a particular good diminishes their well-being, they will strive to reduce its consumption. In many cases, this means reducing the consumption of the bad to zero. However, in situations where there are constraints or where the bad is an unavoidable byproduct of another beneficial process, the consumer might consume more than zero units of the bad but will keep it at the minimum feasible level. This behavior aligns with the consumer choice theory, which posits that individuals make decisions based on maximizing their utility given their constraints.

Example

Maximize $U = \alpha x - \beta y$, where $\alpha, \beta > 0$ and subject to: $M = p_1 x + p_2 y$ and $y \geq 2$.

$$y^* = 2$$

$$M = p_1 x + 2p_2$$
$$x^* = \frac{M - 2p_2}{p_1}$$