1 Bundles and Budget

1.1 Bundles

A bundle is something that you might choose. It consists of any amount of each "thing" (goods) in a model.

If we are writing a model of chocie of ince cream, the bundles represents bowls of ice cream. For example...

$(1, 1)$ 1 scoop of vanilla and 1 scoop of chocolate.

$(2, 0)$ 1 scoops of vanilla and 0 scoop of chocolate.

We could write down a model that has three flavors of ice crea, there the bundles would look like this:

$(1, 0, 0)$ 1 scoop of vanilla and 0 scoop of chocolate, 0 scoops of strawberry.

$(1, 1, 1)$ 1 scoop of each flavor.

1.2 Feasible Set

The feasible set is the set of all the imagineable bundles in a model.

The feasible set: X

The feasible set of bowls of ice cream consisting of scoops of vanilla and chocolate is the set of all bowls of ice cream with a positive or zero scoops of each flavor. Mathematically, it is the set of all vectors looking like this: (x_1, x_2)

In set theory notation, when a bundle is in the feasible set we write: $(x_1, x_2) \in X$. For example:

$(1, 1) \in X$ "the bundle $(1, 1)$ is in the set X"

$(1, 0) \in X$,

$(1000, 1000) \in X$

When a something is not in a set we write $\not\in$

$(-1, -1) \not\in X$

A note:

X is a set so it is in captial letter.

x might denote a particular bundle in this set. We use lower case letters for elements of a set.

1.3 Budget Set

The budget set is the set bundles that someone is actually choosing among.

The budget set: B

Finn can have up to **two scoops total** of ice cream of any flavor.

What is in Finn's budget set?

$$(0,0) \in B, (1,1) \in B, (2,0) \in B, (0,2) \in B, (1.6, 0.4) \in B$$

Note that while $(3,0) \in X, (3,0) \not\in B$. That is $(3,0)$ is a feasible bowl of ice cream, but not in Finn's budget.

Formally, we can write this set this way:

$$B = \{(x_1, x_2) \,|\, (x_1, x_2) \in X, x_1 + x_2 \leq 2\}$$

1.4 Prices and Income

Most of the budget sets we study will be generated by price and income.

Income m

Prices p_1, p_2

Here, the budget is the set of bundles that cost no more than m. That is, the the set of affordable bundles with income m.

Cost of bundle (x_1, x_2) is: $p_1 x_1 + p_2 x_2$

For example is $p_1 = 1, p_2 = 2$ the cost of bundle $(2,2)$ is:

$$(1 * 2) + (2 * 2) = 6$$

All of the (x_1, x_2) in the budget set are defined by the inequality below. We often refer to this inequality itself as the budget set.

$$p_1 x_1 + p_2 x_2 \leq m$$

For example, with $p_1 = 1, p_2 = 2$, $m = 10$

Budget set:

$$1x_1 + 2x_2 \leq 10$$

1.4.1 Budget Line

Budget line (the boundary of the budget set) is the set of bundles that are "just affordable". In the example above:

$$1x_1 + 2x_2 = 10$$

For general p_1, p_2, m:

$$p_1x_1 + p_2x_2 = m$$

1.5 Endpoints

There are two important bundles on the budget line. The endpoints. These are respectively how much x_1 we can afford if we only buy x_1 and how much x_2 we can afford if we only buy x_2:

$$\left(\frac{m}{p_1}, 0\right)$$

$$\left(0, \frac{m}{p_2}\right)$$

In the example above they are $(10, 0), (0, 5)$. If we plot these points and connect them with a line, that is the budget line. They make it very easy to draw the budget.

1.5.1 Slope of Budget Line

The other important part of the budget line is the slope. It is always

$$-\frac{p_1}{p_2}$$

The slope of the budget line represents the tradeoff a consumer has to make between the goods if they are spending all of their money. **It is the amount of x_2 you have to give up to get one more unit of x_1.**