Raw Class Notes for 3012- Spring 2022

These notes are unedited versions of the notes we typed in class. For more polished notes, please see "Class Notes" on my webpage.

Contents

1 Class 1- 1/19/2022

X is the **feasible set**.

This a set of bundles. x.

We want the feasible set to be all the relevant bundles for a model.

For example, if we are modeling the choice of ice cream bowls. The bowl: "one scoop of vanilla and one of chocolate" is a single bundles in the set of feasible bundles.

A bundle will normally (in this class) consist of two goods.

For example the two goods might be chocolate ice cream and vanilla ice cream.

a bundle is now an amount of each good.

Let's say good 1 is chocolate and good 2 is vanilla.

$x = (1, 1)$ is the bundle "one scoop of chocolate and one scoop of vanilla.

$(0, 2)$ is two scoops of vanilla.

$(5, 1.8)$ five scoops of chocolate and 1.8 scoops of vanilla.

We could add strawberry to the model. now we have 3 goods.

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

Two goods is "enough" to learn about trade-offs so we work with 2.

Let's go back to chocolate and vanilla ice cream.

Let's define the feasible set for this model. We want the feasible set to be all bowls of ice cream with a positive (non-negative) real number of scoops of each flavor.

$$X = \mathbb{R}^2_+$$

$(0, 2), (1000, 5), (1000000, 29)$ all in the feasible set.

$(-1, 2)$ is not.

$$x = (1, 1) = (x_1, x_2)$$

x_1 is the amount of good 1. and x_2 is the amount of good 2.

Budget set is the set of bundles actually available to a particular consumer. B is the **budget set**.

Budget set might be all the bowls of ice cream with no more than two total scoops. The budget set is always a subset of the feasible set.

$$B \subseteq X$$

Let's write formally the set of all bowls of ice cream with no more than two total scoops.

$$B = \left\{ x | x \in \mathbb{R}^2_+ \,\&\, x_1 + x_2 \leq 2 \right\}$$

$$B = \left\{x|x \in \mathbb{R}^2 \,\&x_1 \geq 0\&x_2 \geq 0\&\, x_1 + x_2 \leq 2\right\}$$

We could a weird budget set:

$$B = \left\{x|x \in \mathbb{R}^2_+ \& \left(\sqrt{x_1^2 + x_2^2} \leq 1\right)\right\}$$

This is the the set of all bundles less than distance one from the origin. It is a circle. This is technically possible in our framework.

Normally we think of budgets as coming from income m and prices p_1 and p_2. *Competitive budgets.* The price of any bundle is:

$$p_1 x_1 + p_2 x_2$$

scoops of ice cream cost \$2 each $p_1 = 2$ and $p_2 = 2$. The cost of the bundle $(2, 1)$ is:

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

Suppose I have m dollars. What can I afford.

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

This is the formal version of a *competitive budget*.

$$B = \left\{x|x \in \mathbb{R}^2_+ \& p_1 x_1 + p_2 x_2 \leq m\right\}$$

This is the set of all bundles that someone can afford with income m at prices p_1 and p_2.

The **budget line** are all of the bundles that cost exactly m.

$$p_1 x_1 + p_2 x_2 = m$$

We can transform this by isolating x_2.

$$x_2 = \frac{m}{p_2} - \frac{p_1}{p_2} x_1$$

We get the x_2 intercept immediately. $\frac{m}{p_2}$. The slope is $-\frac{p_1}{p_2}$. The other intercept can be found by plugging 0 in for x_2. The x_1 intercept is $\frac{m}{p_1}$.