1 Buying and Selling

So far out budget constraints are based on "money" or "income". The amount of money m is exogenous (it comes from somewhere else, it is given to us).

We change income to be "endogenous" the amount of determined within the model.

Old:

$$p_1x_1 + p_2x_2 = m$$

We want to move from m (and endowment of money) to ω_1, ω_2 which are endowments of goods.

x_1 is apples and x_2 is crusts. $u = min\left\{\frac{1}{2}x_1, x_2\right\}$

We might model a farmer as someone who has an "endowment" of apple.

$$(\omega_1, \omega_2) = (10, 0)$$

The farmer has endowment of 10 apples to start the model.

$$(\omega_1, \omega_2) = (0, 5)$$

The baker has endowment of 5 crusts to start the model.

1.1 Income to Endowments

Given prices p_1,p_2 the new budget constraint says that the consumer can buy a bundle of goods (x_1, x_2) that cost no more than the value of their endowment (ω_1, ω_2).

$$p_1x_1 + p_2x_2 \leq p_1\omega_1 + p_2\omega_2$$

Now we have modeled income in terms of the "goods" in the model.

1.2 Example. Apple farmer who eats only pies.

$p_1 = 1, p_2 = 2, \omega_1 = 10, \omega_2 = 0$. $u\left(x_1, x_2\right) = min\left\{\frac{1}{2}x_1, x_2\right\}$

$$\frac{1}{2}x_1 = x_2, x_1 + 2x_2 = 1 * 10 + 2 * 0$$

$$\frac{1}{2}x_1 = x_2, x_1 + 2x_2 = 10$$

$$x_1 = 2x_2$$

$$x_1 + x_1 = 10$$

$$2x_1 = 10$$

$$x_1 = 5$$

$$x_2 = \frac{5}{2}$$

$$x_1 = 5, x_2 = \frac{5}{2}$$

1.3 Gross Demand vs Net Demand

$\left(5, \frac{5}{2}\right)$ this is the **Gross Demand**. The bundle the consumer actually wants to consume.

$\left(-5, \frac{5}{2}\right)$ if we subtract the endowment from the gross demand, we get the **net demand**. This represents how much extra the consumers wants of a good in addition to their endowment.

the net demand represents how much of each good the consumer needs to "buy" or "sell" to get from their endowment to their gross demand (the actual bundle they want).

If one net demand is strictly positive, the other has to be strictly negative. This is because of the budget constraint– the value of the gross demand has to be equal to the value of the endowment.

1.4 Net Buyers/Sellers

If net demand is negative for a good, we say the consumer is a "**net seller**/**seller**" of that good.

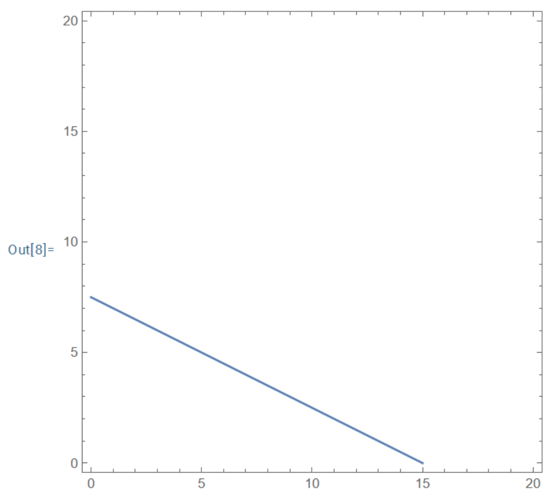
If net demand is positive for a good, we say the consumer is a "**net buyer**/**buyer**" of that good.

Our apple farmer is a net seller of apples and a net buyer of crusts.

1.5 Drawing the Budget Line and Changes to Price

1. The budget line will always contain the endowment.
2. The slope of the budget constraint is still $-\frac{p_1}{p_2}$

Suppose we have $\omega_1 = 5, \omega_2 = 5,\ p_1 = 1, p_2 = 2$



1.6 Price Changes and Net Buyers/Sellers

1.7 Example Problem

Suppose we have an apple farmer with an endowment of $w_1 = 10$ apples and $w_2 = 0$ crusts. Their utility function is $u = min\left\{\frac{1}{2}x_1, x_2\right\}$. Initially the prices are $p_1 = 1$, $p_2 = 1$.

1.8 Example Problem

Suppose we have an apple farmer with an endowment of $w_1 = 10$ apples and $w_2 = 0$ crusts. Their utility function is $u = x_1 x_2$. Initially the prices are $p_1 = 1$, $p_2 = 1$.

$$-\frac{x_2}{x_1} = -1, x_1 + x_2 = 10$$

$$x_2 = x_1, x_1 + x_2 = 10$$

$$x_1 = 5, x_2 = 5$$

Gross demand:

$$(5, 5)$$

Is this consumer a net buyer of x_1 or a net seller of x_1?

Net demand is:

$$(-5, 5)$$

Net seller of good 1 and a net buyer of good 2.

Now suppose: $p_1 = 2$, $p_2 = 1$.

If a consumer is a net seller of a good, and the price of that good increases, they have to remain a net seller and will be strictly better off.

If a consumer is a net buyer of a good, and the price of that good decreases, they have to remain a net buyer and will be strictly better off.