

Basics of Economics

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1 Model of an Economy

1.1 Production

The Economic Problem: How are production decisions made?

1.1.1 Production Possibilities Frontier (PPF)

Determines the set of possible goods that can be produced at a given point in time. It is the boundary between the combinations of goods that can be produced and those that cannot be produced. The shape of the PPF curve is determined by the resources available and the set of techniques available for producing something. If you have a finite amount of a resource, your PPF will be downwards sloping (true in almost all cases). Generally, the PPF is downwards sloping and convex.

1.1.2 Opportunity Cost (OC)

The opportunity cost of an action is the highest valued alternative for the action.

Example: If I value fruits in the following pattern:

$$mango > orange > apple$$

- My OC is mango if I choose apple.
- My OC is mango if I choose orange.
- My OC is orange if I choose mango.

Example: Two goods: grade on an economics exam (X), hours on a video game (Y), 6 hours available in total. The total cost of each hour spent on the game is:

| hours played | points lost |
|--------------|-------------|
| 0 | 0 |
| 1 | 2 |
| 2 | 15 |
| 3 | 30 |
| 4 | 50 |
| 5 | 75 |
| 6 | 100 |

The marginal cost of each hour is:

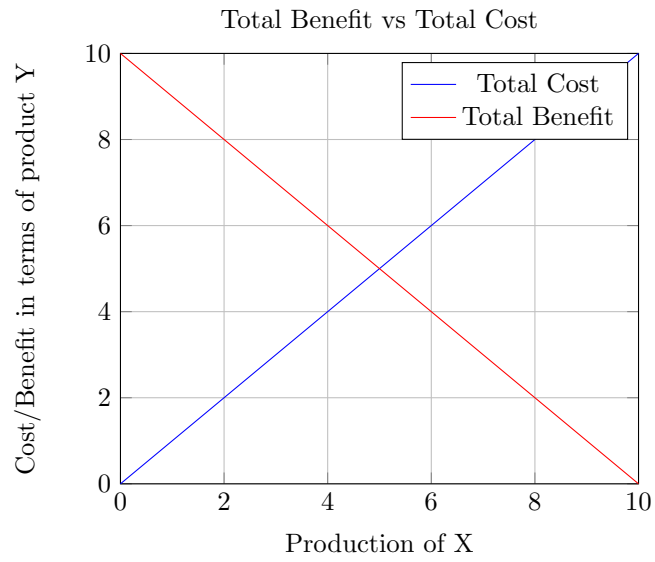
| hours played | marginal cost |
|--------------|---------------|
| 1 | 2 |
| 2 | 13 |
| 3 | 15 |
| 4 | 20 |
| 5 | 25 |
| 6 | 25 |

The PPF is:

| hours played | test grade |
|--------------|------------|
| 0 | 100 |
| 1 | 98 |
| 2 | 85 |
| 3 | 70 |
| 4 | 50 |
| 5 | 25 |
| 6 | 0 |

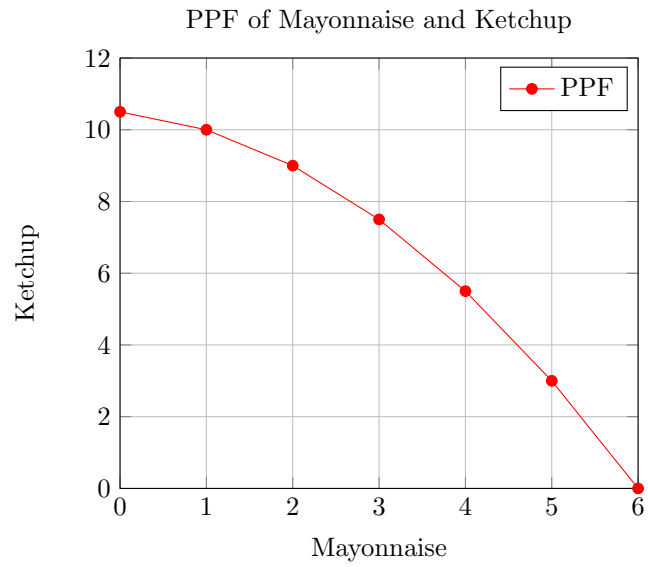
1.2 Decreasing Marginal Benefit

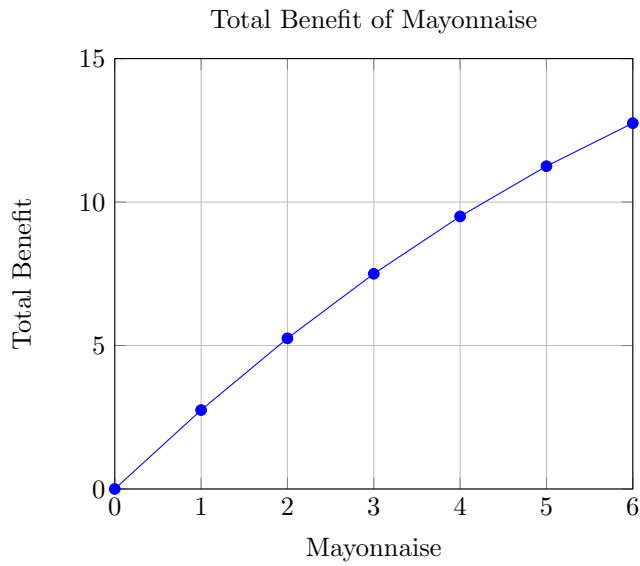
The more of a good we have, the less we are willing to give up for one more unit. The total benefit is always increasing, while the marginal benefit always decreases (but is always greater than 0). If we are maximizing our benefit, we need to find the allocation efficiency (total benefit - total cost).



The allocation efficiency is maximized where the total cost and total benefit meet.

1.2.1 Practice Problem 1





What is the allocative efficient amounts of x_1 and y ?

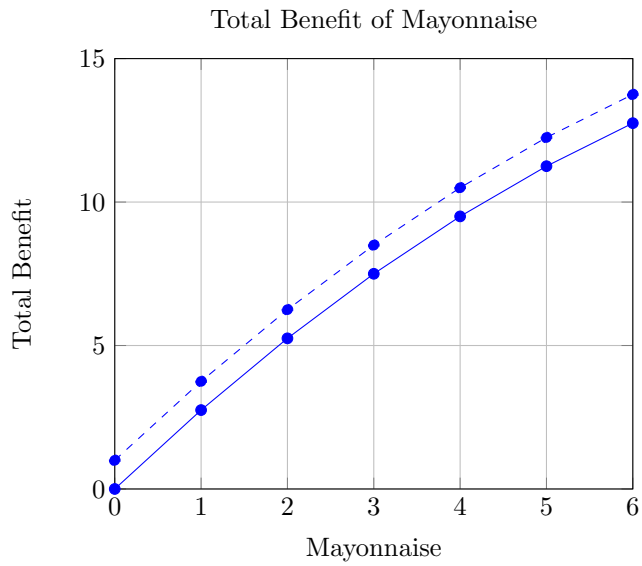
$$\text{Allocative efficiency} = MC - MB$$

| x | marginal cost | marginal benefit |
|---|---------------|------------------|
| 1 | 0.5 | 2.75 |
| 2 | 1 | 2.5 |
| 3 | 1.5 | 2.25 |
| 4 | 2 | 2 |
| 5 | 2.5 | 1.75 |
| 6 | 3 | 1.5 |

Producing 4 units of mayonnaise and 5.5 units of ketchup will maximize production as well as benefit.

1.2.2 Practice Problem 2

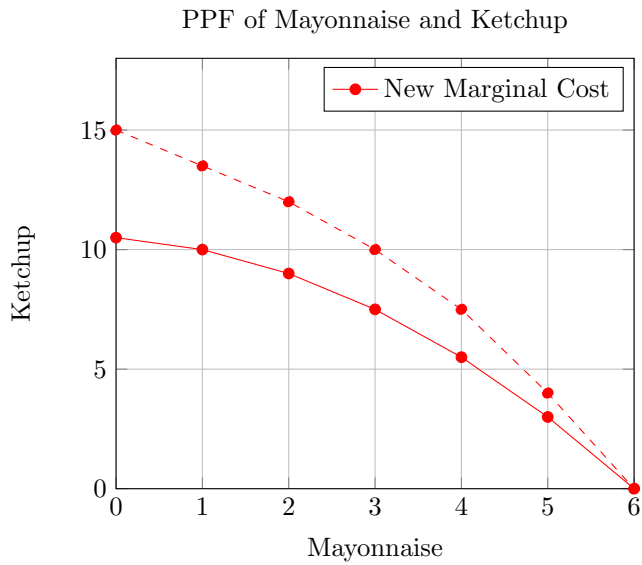
Suppose you wake up one morning and discover that mayonnaise is good for your health. What happens to allocative efficiency?

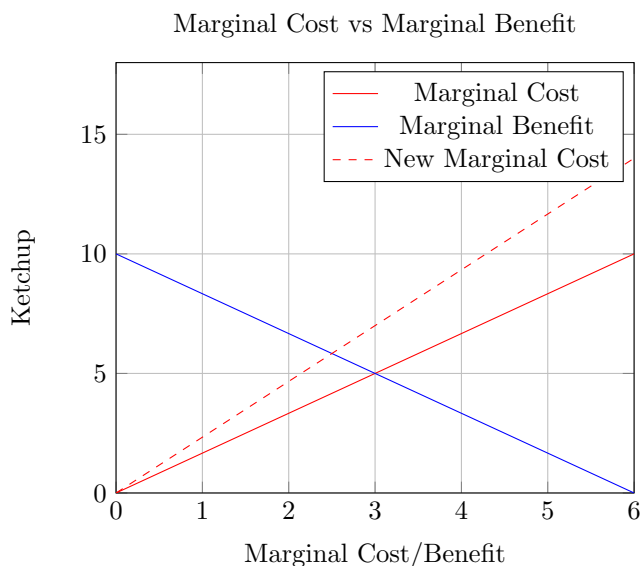


The marginal benefit curve of mayonnaise will shift upwards, causing us to consume more mayonnaise and less ketchup.

1.2.3 Practice Problem 3

Suppose it is a great season for your tomato garden. There are more resources available to produce ketchup with. What happens to the marginal cost and benefit of ketchup and mayonnaise?





The marginal cost for ketchup will increase since you are able to produce more. For each unit of mayonnaise you produce, you give up more ketchup that could have been produced.

1.3 Gains From Trade

People could produce all the goods they consume on their own, or they could specialize and conduct trade.

Comparative Advantage (CA): A person (or country) has a comparative advantage in an activity if they can perform that activity at a lower opportunity cost than everyone else.

Absolute Advantage (AA): A person (or country) has an absolute advantage if they are more productive than others.

| Example 1 | | |
|-----------|-------|-------------|
| | Autos | Natural Gas |
| US | 300 | 100 |
| Canada | 60 | 80 |

In this example, the opportunity cost for Canada is $\frac{3}{4}$ autos in terms of natural gas, while the opportunity cost for the US is 3 autos in terms of natural gas. Therefore, Canada has a comparative advantage in natural gas. Conversely, if this is the case, then the US must have a comparative advantage in autos.

However, the US has an **absolute advantage** in natural gas and autos since they produce more.

Whenever a country has a comparative advantage, it is always possible to realize gains from trade.

| Example 2 | | |
|-----------|-------|-------------|
| | Autos | Natural Gas |
| US | 150 | 50 |
| Canada | 30 | 40 |
| Totals | 180 | 90 |

If Canada were to shift more production to natural gas and the US were to shift production to autos, then there would be a greater total of both.

| After Specializing | | |
|--------------------|-------|-------------|
| | Autos | Natural Gas |
| US | 240 | 20 |
| Canada | 0 | 80 |
| Totals | 240 | 100 |

You can find all my notes at <http://omgimanerd.tech/notes>. If you have any questions, comments, or concerns, please contact me at alvin@omgimanerd.tech