



Cost and Benefit Optimization for Consumers

by Sophia Tutorial



WHAT'S COVERED

This tutorial will cover the topic of cost and benefit optimization for consumers, focusing on the choices that consumers need to make, given the respective constraints that they face.

Our discussion breaks down as follows:

1. Constraints
 - a. Budget Constraints: Example
2. Utility Maximization
3. Marginal Benefit/Marginal Cost

1. Constraints

Let's begin today's lesson with a definition. A **constraint** is an element that interrupts production of a firm or consumption by individuals.

In this tutorial, we will focus on this part of the definition: consumption by individuals.

If you think about the constraints that you face in your own life, most people would agree that time and money are the two biggest constraints that we as consumers face.

Today, let's focus on the income component.

1a. Budget Constraints: Example

Now, most people likely have some type of budget. Let's look at an example of a budget constraint, called "Fun for the Month."

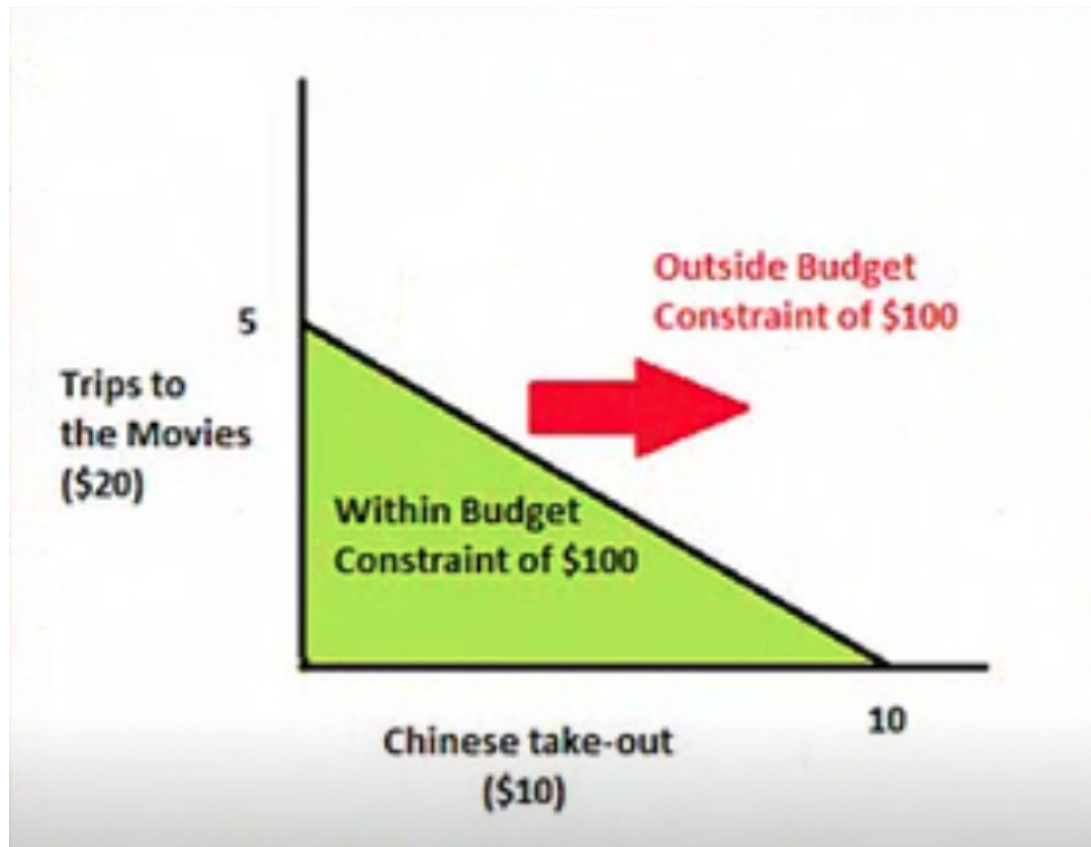
Tom and Sue are married, and they budget \$100 a month to either go to the movies or get Chinese take-out, their two designated "Fun for the Month" activities.

The movies will cost them \$20, because it's \$10 each, while the Chinese take-out will cost them \$10, because they have a coupon.

Budget = \$100
Movies = \$20
Chinese Take-Out = \$10

So, what are their options for the month?

Well, in economics, we make something called a budget constraint, shown below.



Notice the extremes for each option, which indicate that they can afford either:

- 5 trips to the movies
- 10 Chinese take-out meals

The extremes represent the scenarios of spending all \$100 on either *only* going to the movies, or *only* eating Chinese food.

Therefore, since the movies cost \$20 each time, their budgeted \$100 will afford them five trips to the movies in a month. On the other extreme, they could get Chinese take-out 10 times in a month, because that option costs \$10 each time.

Now, any combination along this line is possible, and most people would agree that you probably wouldn't want to do either of the extremes if you enjoyed both activities.

In fact, if you wanted to save money, anything inside the green area is affordable because it is within the budget constraint.

On the other hand, anything outside the green area is outside of the budget.

So, how do they decide how many times to go to the movies versus how many times to eat Chinese meals?

Well, they want to maximize their utility. Utility is satisfaction, and they want to get the most out of it that they can.



TERM TO KNOW

Constraints

An element that interrupts production of a firm or consumption by individuals

2. Utility Maximization

Utility maximization is achieving the highest amount of satisfaction while spending the least amount of money within a budget constraint.

In order to determine how Tom and Sue can get the highest amount of satisfaction out of these two activities, let's look at the movie situation as outlined in this chart, which shows:

- Number of trips to the movies
- Total utility or satisfaction (in dollars)
- Marginal utility or benefit

Trips To Movies	Total Utility	Marginal Utility (Benefit)
1	40	40
2	70	30
3	90	20
4	100	10
5	105	5
6	105	0

For instance, the first time they go to the movies, their total satisfaction is worth \$40. The second time they go to the movies, if they go twice, their total satisfaction out of trip one plus trip two would be \$70, and so forth.

Notice how total utility continues to increase as the number of trips increase, which makes sense. The more they go to the movies, the more enjoyment they get.

However, at a certain point, total utility slows down, until it actually slows completely and doesn't increase. Why does this happen?

Well, if Tom and Sue have already seen every good movie that is out this month, perhaps they don't need to go a sixth time, or even a fifth time. They are not increasing their satisfaction as much once they've already gone to the movies a couple of times.

This is where the concept of marginal utility comes in.

HINT

Anytime you see the word "marginal" in economics, think of the word "additional."

Therefore, the marginal utility column is actually showing the *additional* satisfaction they get each time.

➡ **EXAMPLE** For example, from trip one to trip two to the movies, their utility increased by 30, as in the difference from 40 to 70 is 30. The third time it increased their benefit, or utility, by 20, and so on.

This is what marginal benefit is, which we will cover next.

TERM TO KNOW

Utility Maximization

Achieving the highest amount of satisfaction (utility) subject to an individual's budget constraint

3. Marginal Benefit/Marginal Cost

Marginal benefit defined is the amount of utility gained by consuming an additional single unit of a product, incrementally.

Marginal cost, on the other hand, is the additional cost incurred when producing one additional product.

In this case, we're not talking about producing, but rather about consuming, so now we need to compare it to our cost.

Trips To Movies	Total Utility	Marginal Utility (Benefit)
1	40	40
2	70	30
3	90	20
4	100	10
5	105	5
6	105	0

Remember, each time they go to the movies, their additional cost is \$20.

If you look at the first trip to the movies, we are saying that it increased their satisfaction by \$40. Technically speaking, then, they'd be willing to pay up to \$40 for that trip to the movies, even though it is only costing them \$20. Therefore, they are definitely going to make that decision to go once.

Now, will they go a second time? Well, two trips to the movie increased their total utility by \$30. Again, if they are maximizing their utility, they will definitely decide to go twice, because it only costs them \$20.

The third trip increases their utility by \$20, so in this case, their marginal utility equals the marginal cost. Once again, they will make that trip.

However, look at the numbers in red. Does it make sense for them to go a fourth time if they are only

increasing their satisfaction by \$10, yet they have to pay \$20? No, it does not.

They would stop at the numbers in red, because they will consume up to the point where the marginal benefit equals the marginal cost of going to the movies. This is how we determine how many times they will go.

Consumer optimization, then, is the maximization of consumer utility within the parameters of household income and the price of goods or services.

In our example, we took into account the price or the cost of the movies.



BIG IDEA

Consumers will always optimize their choices when they consume up to the point where marginal benefit equals marginal cost.

Note, marginal utility is the same thing as marginal benefit. As long as that is greater than our marginal cost, we will continue consuming.

As soon as marginal cost jumps above the marginal benefit we are receiving, that is where we stop; we will go up to the point where these two things are equal to one another.



TERMS TO KNOW

Marginal Benefit

Amount of utility gained by consuming an additional single unit of product

Marginal Cost

Additional cost incurred when producing one additional product

Consumer Optimization

Maximization of consumer utility within the parameters of household income and price of goods or services



SUMMARY

Today we reviewed the definition of **constraints** and learned how to interpret a **budget constraint**. We learned that **utility maximization** is achieving the highest amount of satisfaction while spending the least amount of money within a budget constraint, and that this total utility, or overall satisfaction, increases as we consume, but begins to slow. Lastly, we learned that we will consume as long as our **marginal benefit** is greater than our **marginal cost**, and that we optimize our utility where marginal benefit equals marginal cost.

Source: Adapted from Sophia instructor Kate Eskra.



TERMS TO KNOW

Constraints

An element that interrupts production of a firm or consumption by individuals.

Consumer Optimization

Maximization of consumer utility within the parameters of household income and price of goods or services.

Marginal Benefit

Amount of utility gained by consuming an additional single unit of product.

Marginal Cost

Additional cost incurred when producing one additional product.

Utility Maximization

Achieving the highest amount of satisfaction (utility) subject to an individual's budget constraint.