Theme № 2. Choice in a World of Scarcity

Content:

1. Why it matters: choice in a world of scarcity

Scarcity refers to the basic economic problem, the gap between limited – that is, scarce – resources and theoretically limitless wants. Any resource that has a non-zero cost to consume is scarce to some degree, but what matters in practice is relative scarcity. Scarcity is also referred to as "paucity". Scarcity falls into three distinctive categories: demand-induced, supply-induced, and structural.

Demand-induced scarcity happens when the demand of the resource increases and the supply stays the same.

Supply-induced scarcity happens when a supply is very low in comparison to the demand.

Structural scarcity: Unequal access to natural resources in a given society makes them scarce for large segments of the population. Resources were also inequitably distributed within the restricted areas, as local elites controlled access to productive agriculture and grazing land.

As you now know, the study of economics is about choices that are made by individuals and entities, given the fact that we can never have enough. You might not argue that you don't have enough time or money, for instance, but why might you want to think about that in economic terms? Let's look at one situation in which the choices you make today—with limited time and money—have an impact on the choices available to you in the future.

It's generally true that the higher the educational degree a person has, the higher the salary he or she will earn. So why aren't more people pursuing higher degrees? The short answer: choices and trade-offs.

In 2012, the average annual salary for a full-time U.S. worker over age twenty-five with a master's degree was $67,600. Compare that to annual earnings for a full-time worker over twenty-five with no higher than a bachelor's degree: $55,432 a year. What about those with no higher than a high school diploma? They earn just $33,904 in a year. In other words, says the U.S. Bureau of Labor Statistics (BLS), earning a bachelor's degree boosted salaries 63 percent

above what you would have earned if you had stopped your education after high school. A master's degree yields a salary almost double that of a high school diploma.

What are your educational goals? Do you plan to complete a bachelor's degree? A master's degree? Given the salary data, shouldn't everyone pursue a master's degree? When you made your own educational plans and goals, perhaps you were motivated by the potential for financial returns later on—i.e., the expectation that a higher degree would lead to a higher-paid job or career. But what other factors did you consider? Perhaps you also thought about the time and cost of education and the other things you like to do when you aren't studying. Other people, it turns out, also think about these things when deciding whether or not to pursue college.

Considering salary data alone, you might expect a lot of people to choose to attend college and at least earn a bachelor's degree. In fact, in 2012, the BLS reported that while nearly 88 percent of the U.S. population had a high school diploma, only 31 percent had a bachelor's degree, and only 8 percent had earned a master's degree.

For the majority of Americans, the time, money, and effort required to earn a degree is too great, in spite of the resulting salary benefits. In recognition of these barriers, state and federal governments have created programs such as the Pell Grant program to help students pay the financial costs of going to college. However, these programs don't cover the opportunity costs that are often the most pressing concern for students. For example, the opportunity cost of lost income that could be used to support a student's family might be a significant factor.

So, now that you're in college, how can you make the best decision about which level of education to pursue? Perhaps more important, how can you be realistic about your scarce resources and develop a plan that provides the greatest benefit to you?

In this module we will look more closely at the idea of choices and trade-offs, revisit the concept of opportunity cost, and learn how to calculate it. This will help you assign dollar amounts to your choices and understand why your decision to pursue a college degree—in spite of the opportunity costs—is one of the most important decisions you can make toward improving your financial future.

2. Introduction to the cost of choices

What is choice cost?

Whenever a choice is made, something is given up. The opportunity cost of a choice is the value of the best alternative given up. Choices involve trading off the expected value of one opportunity against the expected value of its best alternative.

Do all choices have cost?

A fundamental principle of economics is that every choice has an opportunity cost. The idea behind opportunity cost is that the cost of one item is the lost opportunity to do or consume something else; in short, opportunity cost is the value of the next best alternative.

What is an opportunity cost example?

The opportunity cost is time spent studying and that money to spend on something else. A farmer chooses to plant wheat; the opportunity cost is planting a different crop, or an alternate use of the resources (land and farm equipment). A commuter takes the train to work instead of driving.

3. Budget constraints and choices

For most of us, the idea of scarcity and trade-offs is something we experience in a very real way when it comes to our own budget constraints. Most of us have a limited amount of money to spend on the things we need and want. Another kind of budget constraint is time. For instance, as a student, you only have twenty-four hours in the day to study, eat, sleep, and check Facebook. An hour spent studying economics is an hour that can't be used for sleep or play (or something else). As a result, you have to make choices, and every choice involves trade-offs.

In economics, a budget constraint refers to all possible combinations of goods that someone can afford, given the prices of goods and the income (or time) we have to spend.

Take the following example of someone who must choose between two different goods: Charlie has $10 in spending money each week that he can allocate between bus tickets for getting to work and the burgers he eats for lunch. Burgers cost $2 each, and bus tickets are 50 cents each. Figure 2 below, shows Charlie's budget constraint ($10) and all the possible combinations of burgers and bus tickets he can afford if he spends all his money.

Figure 1. Charlie's budget constraint
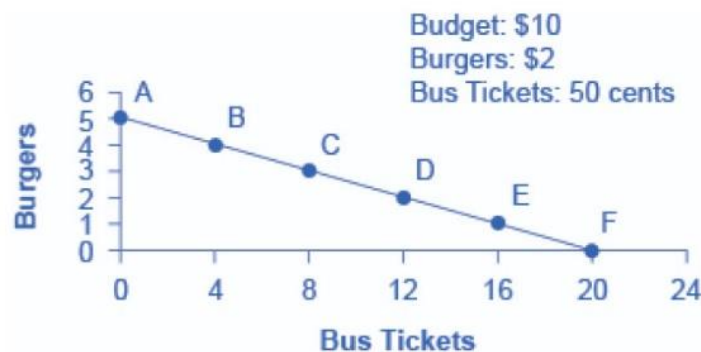
The vertical axis in the figure shows burger purchases, and the horizontal axis shows bus ticket purchases. If Charlie spends all his money on burgers, he can afford five per week. ($10 per week/$2 per burger = 5 burgers per week.) But if he does this, he won't be able to afford any bus tickets. This choice (zero bus tickets and 5 burgers) is shown by point A in the figure. Alternatively, if Charlie spends all his money on bus tickets, he can afford 20 per week. ($10 per week/$0.50 per bus ticket = 20 bus tickets per week.) Then, however, he will not be able to afford any burgers. This alternative choice (20 bus tickets and zero burgers) is shown by point F.

If Charlie is like most people, he will choose some combination that includes both bus tickets and burgers—that is, he will choose one of the points along the budget-constraint line that connects points A and F. Each point inside or on the budget constraint shows a combination of burgers and bus tickets that Charlie can afford. (A point inside the curve is definitely an option—it just means that Charlie isn't spending all his money.) Keep in mind that the curve represents the maximum number of burgers and bus tickets he can buy. Any point outside the constraint is not affordable, because it would cost more money than Charlie has in his budget. The slope of the budget constraint is determined by the relative price of burgers and bus tickets.

The budget constraint clearly shows the trade-off Charlie faces in choosing between burgers and bus tickets. Suppose he is currently at point D, where he can afford 12 bus tickets and 2 burgers. What would it cost Charlie for one more burger? It would be natural to answer $2, but that's not the way economists think. Instead, they ask: how many bus tickets would Charlie have to give up to get one more burger, while staying within his budget? The answer is four bus tickets. That is the true cost to Charlie of one more burger.

A budget-constraint diagram like the one above, with just two goods—burgers and bus tickets—is simple and not very realistic. After all, in an economy like ours (and Charlie's), people choose from thousands of goods. However, no matter how many goods a consumer has to choose from, every choice has an opportunity cost, i.e. the value of the other goods that aren't chosen. This is the point that carries over to the real world.

Sunk Costs

In the budget constraint framework, all decisions involve what will happen next: What quantities of goods will you consume? How many hours will you work? How much will you save? Choices made or costs in the past are not taken into account. The budget constraint framework assumes that sunk costs—costs incurred in the past that can't be recovered—should not affect the current decision.

Suppose you pay $8 to see a movie, but after watching the first thirty minutes, you decide that it's awful. Should you stick it out and watch the rest because you paid for the ticket, or should you leave? The money you spent on the ticket is a sunk cost, and unless the theater manager is feeling generous, you won't get a refund. But staying for the rest of the movie means paying an opportunity cost in time. Your choice is whether to spend the next ninety minutes suffering through a rotten movie or do something—anything—else. The lesson of sunk costs is to forget about the money and time that is irretrievably gone and to focus, instead, on the costs and benefits of current and future options. A sunk cost is water under the bridge, so to speak.

Figure 2. Water Under the Bridge.
Sunk costs are like "water under the bridge," an expression meaning that something is in the past and should be accepted because it can't be changed.

For people and organizations alike, dealing with sunk costs can be frustrating and difficult. For one thing, it often means admitting an earlier error of judgment. Many companies find it hard to give up on a new product that's doing poorly because they've invested so much time and money in the product development and launch. But the lesson of sunk costs is to ignore them and make decisions based on what will happen in the future.

4. Calculating opportunity cost

It makes intuitive sense that Charlie can buy only a limited number of bus tickets and burgers with a limited budget. Also, the more burgers he buys, the fewer bus tickets he can buy. With a simple example like this, it isn't too hard to determine what he can do with his very small budget, but when budgets and constraints are more complex, equations can be used to demonstrate budget constraints and opportunity cost.

Very simply, when Charlie is spending his full budget on burgers and tickets, his budget is equal to the total amount that he spends on burgers plus the total amount that he spends on bus tickets. For example, if Charlie buys four bus tickets and four burgers with his $10 budget (point B on the graph below), the equation would be

$$\$10 = (\$2 \times 4) + (\$.50 \times 4)$$

You can see this on the graph of Charlie's budget constraint on the figure below:

Figure 3. Charlie's Budget Constraint
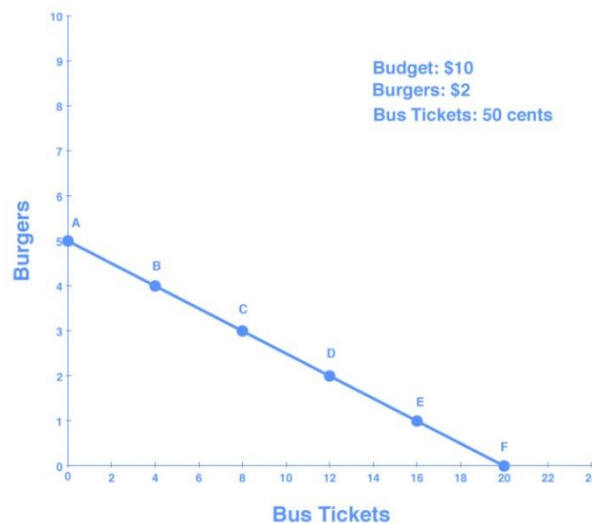
If we want to answer the question, "how many burgers and bus tickets can Charlie buy?" then we need to use the budget constraint equation:

$$Y = PA * QA + PB * QB$$

This is where Y = income, PA = price of item A, and QA= quantity of item A consumed, PB = price of item B, while QB = quantity of item B consumed.

5. The production possibilities frontier

What Is the Production Possibility Frontier (PPF)?
In business analysis, the production possibility frontier (PPF) is a curve that illustrates the possible quantities that can be produced of two products if both depend upon the same finite resource for their manufacture.

PPF also plays a crucial role in economics. It can be used to demonstrate the point that any nation's economy reaches its greatest level of efficiency when it produces only what it is best qualified to produce and trades with other nations for the rest of what it needs.

The PPF is also referred to as the production possibility curve or the transformation curve.

Interpreting the PPF

The PPF is graphically depicted as an arc, with one commodity represented on the X-axis and the other represented on the Y-axis. Each point on the arc shows the most efficient number of the two commodities that can be produced with available resources.

For example, if a non-profit agency provides a mix of textbooks and computers, the PPF may show that it can produce either 40 textbooks and seven computers, or 70 textbooks and three computers. The agency's leadership must determine which item is more urgently needed. In this example, the opportunity cost of producing an additional 30 textbooks equals four computers.

PPF on a National Scale

For another example, consider the chart below. Imagine a national economy that can produce only two things: wine and cotton. According to the PPF, points A, B, and C on the PPF curve represent the most efficient use of resources by the economy.

For instance, producing five units of wine and five units of cotton (point B) is just as desirable as producing three units of wine and seven units of cotton. Point X represents an inefficient use of resources, while point Y represents a goal that the economy simply cannot attain with its present levels of resources.

Production Possibility Frontier (PPF)

A
Y
B
X
C

Product A: Wine

Product B: Cotton
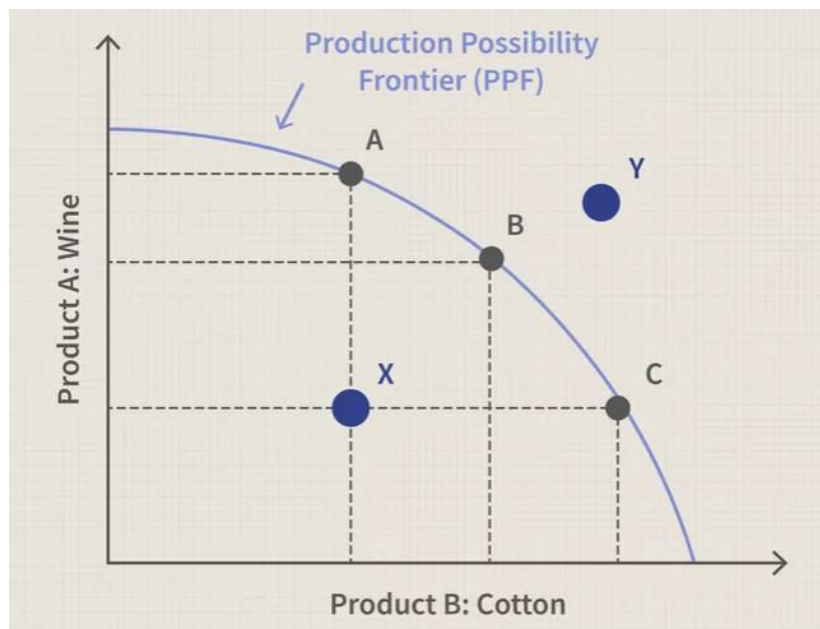
As we can see, in order for this economy to produce more wine, it must give up some of the resources it is currently using to produce cotton (point A). If the economy starts producing more cotton (represented by points B and C), it would need to divert resources from making wine and, consequently, it will produce less wine than it is producing at point A.

Moreover, by moving production from point A to B, the economy must decrease wine production by a small amount in comparison to the increase in cotton output. But if the economy moves from point B to C, wine output will be significantly reduced while the increase in cotton will be quite small.

Keep in mind that A, B, and C all represent the most efficient allocation of resources for the economy. The nation must decide how to achieve the PPF and which combination to use. If more wine is in demand, the cost of increasing its output is proportional to the cost of decreasing cotton production. Markets play an important role in telling the economy what the PPF ought to look like.

Consider point X on the figure above. Being at point X means that the country's resources are not being used efficiently or, more specifically, that the country is not producing enough cotton or wine, given the potential of its resources. On the other hand, point Y, as we mentioned above, represents an output level that is currently unattainable by this economy.

If there were an improvement in technology while the level of land, labor, and capital remained the same, the time required to pick cotton and grapes would be reduced.

The output would increase, and the PPF would be pushed outwards. A new curve, represented in the figure below on which Y would fall, would show the new efficient allocation of resources.
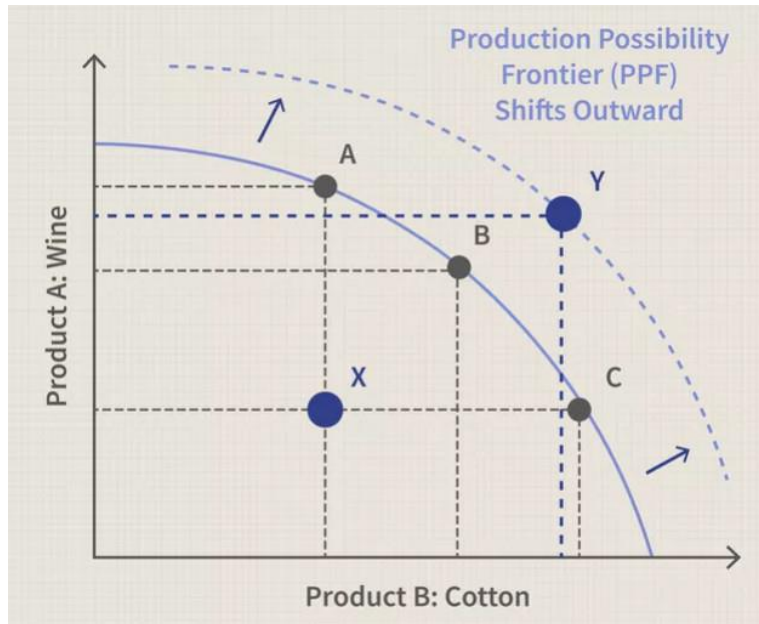
When the PPF shifts outwards, it implies growth in an economy. When it shifts inwards, it indicates that the economy is shrinking due to a failure in its allocation of resources and optimal production capability.

A shrinking economy could be a result of a decrease in supplies or a deficiency in technology.

An economy can only be produced on the PPF curve in theory. In reality, economies constantly struggle to reach an optimal production capacity. And because scarcity forces an economy to forgo some choice in favor of others, the slope of the PPF will always be negative. That is, if the production of product A increases then the production of product B will have to decrease.
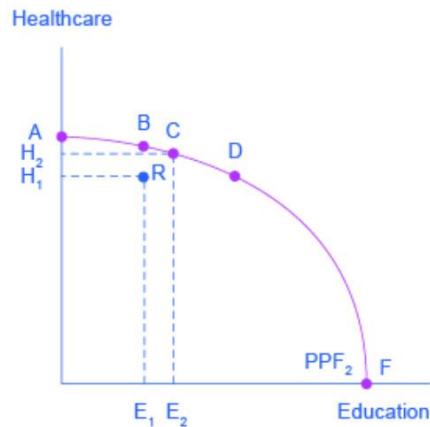
6. Productive efficiency and allocative efficiency

Efficiency

The study of economics does not presume to tell a society what choice it should make along its production possibilities frontier. In a market-oriented economy with a democratic government, the choice will involve a mixture of decisions by individuals, firms, and government. However, economics can point out that some choices are unambiguously better than others. This observation is based on the idea of efficiency. In everyday parlance, efficiency refers to lack of waste. An inefficient washing machine operates at high cost, while an efficient washing machine operates at lower cost, because it's not wasting water

or energy. An inefficient organization operates with long delays and high costs, while an efficient organization is focused, meets deadlines, and performs within budget.

The production possibilities frontier can illustrate two kinds of efficiency: productive efficiency and allocative efficiency. Figure 1, below, illustrates these ideas using a production possibilities frontier between health care and education.

Productive efficiency means that, given the available inputs and technology, it's impossible to produce more of one good without decreasing the quantity of another good that's produced. All choices along the PPF in Figure 1, such as points A, B, C, D, and F, display productive efficiency. As a firm moves from any one of these choices to any other, either health care increases and education decreases or vice versa. However, any choice inside the production possibilities frontier is productively inefficient and wasteful because it's possible to produce more of one good, the other good, or some combination of both goods.

For example, point R is productively inefficient because it is possible at choice C to have more of both goods: education on the horizontal axis is higher at point C than point R (E_2 is greater than E_1), and health care on the vertical axis is also higher at point C than point R (H_2 is greater than H_1).

Any time a society is producing a combination of goods that falls *along* the PPF, it is achieving productive efficiency. When the combination of goods produced falls *inside* the PPF, then the society is productively inefficient.

Allocative efficiency means that the particular mix of goods a society produces represents the combination that society most desires. For example, often a society with a younger population has a preference for production of education, over production of health care. If the society is producing the quantity or level of education that the society demands, then the society is achieving allocative efficiency. Determining "what a society desires" can

be a controversial question and is often discussed in political science, sociology, and philosophy classes, as well as in economics.

At the most basic level, allocative efficiency means that producers supply the quantity of each product that consumers demand. Only one of the productively efficient choices will be the allocative efficient choice for society as a whole. For example, in order to achieve allocative efficiency, a society with a young population will invest more in education. As the population ages, the society will shift resources toward health care because the older population requires more health care than education.

In the graph above, a society with a younger population might achieve allocative efficiency at point D, while a society with an older population that required more health care might achieve allocative efficiency at point B.

7. Rationality self-interest

Rational self-interest is when both parties are better off than they were before their exchange because each side is maximizing its own benefits to be better off, either financially or intrinsically.

Rational Self-Interest & Economics

Economic analysis is something we all do every day. We analyze whether to pack a lunch or go out to eat, where to go to work or stay home, and whether to find a different job or build seniority at a current job. Businesses analyze whether to diversify, what products to market for the holidays, how to best invest in a pension plan, and what benefits to offer employees.

We make decisions based on whether they are financially prudent and intrinsically satisfying to ourselves, not necessarily society as a whole. We do not think of our decisions in this way, but given that we are humans, it is assumed that:

1. We act rationally
2. We act in our own self-interest

These two assumptions are necessary for economic analysis, a pivotal piece of being successful in business.

9. Marginal analysis

What is marginal analysis give an example?

For example, if a company has room in its budget for another employee and is considering hiring another person to work in a factory, a marginal analysis indicates that hiring that

person provides a net marginal benefit. In other words, the ability to produce more products outweighs the increase in labor costs.

Understanding Marginal Analysis

Marginal analysis is also widely used in microeconomics when analyzing how a complex system is affected by marginal manipulation of its comprising variables. In this sense, marginal analysis focuses on examining the results of small changes as the effects cascade across the business as a whole.

Marginal Cost

In economics, the marginal cost of production is the change in total production cost that comes from making or producing one additional unit. To calculate marginal cost, divide the change in production costs by the change in quantity:

$$MC = \frac{\Delta C}{\Delta Q}$$

MC = marginal cost
ΔC = change in cost
ΔQ = change in quantity

Marginal Revenue

Marginal revenue equals the sale price of an additional item sold. To calculate MR, a company divides the change in its total revenue by that of its total output quantity. Below is the marginal revenue formula:

Marginal Revenue = Change in Revenue / Change in Quantity

Total Cost

In economics, total cost (TC) is the minimum dollar cost of producing some quantity of output. This is the total economic cost of production and is made up of variable cost, which varies according to the quantity of a good produced and includes inputs such as labor and raw materials, plus fixed cost, which is independent of the quantity of a good produced and includes inputs that cannot be varied in the short term such as buildings and machinery, including possibly sunk costs.

TC (total cost) = TFC (total fixed cost) + TVC (total variable cost)

Total revenue

Total revenue is the full amount of total sales of goods and services. It is calculated by multiplying the total amount of goods and services sold by the price of the goods and services:

Total Revenue = Number of Units Sold X Cost Per Unit

Example of Use of Marginal Analysis

Thus the level of output where marginal revenue is equal to marginal cost is the point of maximum profit. Here marginal analysis works as the guideline to take the decision relating to economic activities of production. Following table shows the example of it:

Output (Q)	Total cost	Total revenue	Marginal cost	Marginal revenue	Total profit
0	0	0	–	–	–
1	10	100	10	100	90
2	30	180	20	80	150
3	60	240	30	60	180
4	100	280	40	40	180
5	150	300	50	20	150

From the table, we see that when the number of output increases, both total cost and total revenue also increase. Marginal revenue is continuously decreasing with an increase in the output. The value of profit is initially increasing with the expansion of output but this is not the case forever. After a certain level of output, the profit starts to fall even there is an expansion of output. Thus to produce optimum output or profit-maximizing output we can take the help of marginal analysis. Here marginal revenue and marginal cost are equal where the total profit is maximized. Thus, to maximize the profit or to produce profit-maximizing output marginal revenue and margin costs are needed for a producer.

9. Positive and normative statements

Economists frequently distinguish between 'positive' and 'normative' economics. Positive economics is concerned with the development and testing of positive statements about the world that are objective and verifiable. Normative statements derive from an opinion or a point of view.

What is positive and normative economics and examples?

An example of positive economics is, "an increase in tax rates ultimately results in a decrease in total tax revenue". On the other hand, an example of normative economics is, "unemployment harms an economy more than inflation".

Positive and Normative Economics is rightly known as the two arms of Economics. Positive economics deals with various economic phenomena, while normative economics focuses on what economics should be, this branch of economics talks about the value of the company's fairness. In lucid language, positive economics answers the 'what' factor, whereas normative economics mandates the 'should be' or 'ought to be' section of economics.

Well, this was only a preface about the entire discussion. We will look forward to discussing 'What is Positive and Normative Economics?', we will take up the point of conflict between these two studies and also update ourselves with other knowledgeable facts on the same topic.

What is Positive Economics?

Positive economics is the stream of economics that has an objective approach, relied on facts. It concentrates on the description, quantification, and clarification of economic developments, prospects, and allied matters. This subdivision of economics relies on objective data analysis and relevant facts and figures. Therefore, it tries to establish a cause-and-effect relationship or behavioral relationship that can help determine as well as test the advancement of economic theories.

Here, the study of economics is more objective and focuses more on facts. Moreover, the statements are precise, descriptive, and measurable. Such reports can be quantified with respect to noticeable evidence and historical references.

A positive economics example is a statement, "Government-funded healthcare surges public expenditures." This statement is based on facts and has a considerable value judgment involved in it. Therefore, its credibility can be proven or dis-proven via a study of the government's involvement in healthcare.

What is Normative Economics?

Normative economics deals with prospective or theoretical situations. This division of economics has a more subjective approach. It focuses on the ideological, perspective-based, opinion-oriented statements towards economic activities. The aim here is to summarize the desirability quotient among individuals and quote factors like 'what can happen' or 'what ought to be'.

Normative economics statements are subjective and rely heavily on values originating from an individual opinion. These statements are often very rigid and perceptive. Therefore, they are considered political or authoritarian.

A normative economics example is, "The government should make available fundamental healthcare to every citizen". You can understand that this statement is based on personal perspective and satisfies the need for 'should be' or 'ought to be'.