

1. Details of Module and its structure

Module Detail	
Subject Name	Economics
Course Name	Economics 03 (Class XII, Semester - 1)
Module Name/Title	Micro economics / Consumer equilibrium with Indifference Curves – Part 1
Module Id	leec_10201
Pre-requisites	Definitions of Indifference Curve, Marginal rate of Substitution (MRS)
Objectives	After going through this lesson, the learners will be able to understand the following: • Budget set • Budget line/ price line • Effects of the change in price of a good and/or income of a consumer on the budget line
Keywords	Budget set, Budget line, Price line

2. Development Team

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1. Introduction:

Consumer theory analyses decisions made by consumers regarding what goods to buy and in what quantities. What a consumer buys depends on two things:

1. What does the consumer want?
2. What can the consumer afford to buy?

In this module, we will examine the second question. Given the consumer's income, and given prices of goods available in the market, what are the combinations of goods that a consumer can afford to buy?



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Suppose you have Rs.50. What are the things that you can buy from your school canteen? Imagine a situation where your school canteen sells chocolates at Rs. 10 each, and biscuits at Rs. 5 a packet, and nothing else. How many chocolates could you buy if you only bought chocolates? You could buy 5 chocolates at most.

What if you only bought biscuits? You would, in that case, at most buy 20 packets of biscuits.

In brief, how much you can buy depends on how much money you have for purchasing the goods, and the prices of those goods available in the market.

In any society, the resources are not unlimited in supply but they are scarce so they are priced. As a result, goods and services made from these resources are also priced. The problem of choice arises because goods and services are not free. You have to pay for them. As a first step, we assume that a consumer can only spend what she earns. So, the quantity of goods that she buys depends on her 'budget', or her income, given the prices of goods and services in the market.

We start this discussion by defining a 'budget set'.

3. Budget Set: Is the set of bundles of goods affordable to a consumer, given her income, and given prices of those goods?

Consider two goods X and Y with prices Rs. 2 and Rs. 5 per unit, respectively and consumer's income is Rs. 20. You can understand that it is not possible for the consumer to afford all possible combinations of goods X and Y given her income. In this context, the bundles that the consumer can afford to buy given her income and the prices of goods, constitutes the Budget Set. Let us consider the bundles - (1, 5), (3, 3), (4, 1), (5, 2) showing the various combinations of goods X and Y.

For the **first bundle**, she would require $(1 \times 2) + (5 \times 5) = \text{Rs. } 27$

For the **second bundle**, she would require $(3 \times 2) + (3 \times 5) = \text{Rs. } 21$

For the **third bundle** he would require $(4 \times 2) + (1 \times 5) = \text{Rs. } 13$

For the **fourth bundle** he would require $(5 \times 2) + (2 \times 5) = \text{Rs. } 20$

Hence, bundles 1 and 2 will be unaffordable to her, whereas she can afford bundles 3 and 4. We can say that bundles 3 and 4 are within her budget set. Bundle 4 is costing exactly the same as her Income, and so it is *on* her *budget line*. Bundle 3 which costs her less than her income is affordable and lies below the budget line, and, therefore, is affordable. The line that shows all the possible combinations of goods that exhaust the consumer's income for a given set of prices of the two goods is called a **Budget Line**.

Let us look at the diagram below: In this case, the two goods are Movie tickets (on X-axis) and Books (on Y- axis).

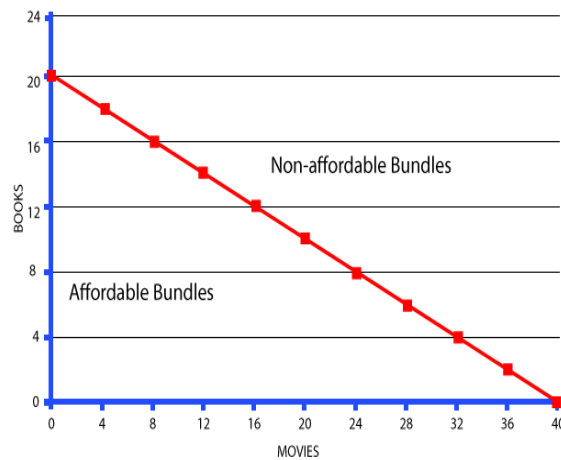


Figure 1: Budget Line

The price of each movie ticket is Rs. 50. The price of each book is Rs. 100. The total income of a consumer is Rs. 2000. The line in brick red colour, showing all possible combinations of movie tickets and books that exhaust the consumer's income for the given set of prices is the **Budget Line**. The triangular area formed by the two axes and the budget line constitutes the Budget Set, depicting all affordable bundles to a consumer. Any point *on or below* the Budget Line in the triangular region shows a combination of good X and Y as a bundle which is affordable to the consumer, while any point above the Budget Line is not affordable.

In the above example, if the consumer chooses to spend all her income on books only, she will be able to buy 20 books, given that the price of books is Rs 100 per book. If she chooses to spend all her Income on Movie tickets only, she can buy 40 movie tickets at the given price of Rs.50 per movie ticket. Or, she can choose to buy a combination such as 24 movie tickets and 8 books. This combination will exhaust the income of the consumer ($24 \times 50 + 8 \times 100 = 2000$) and so, it will lie on the budget line.

In fact, the consumer can also afford to buy a bundle like 8 movie tickets and 12 books. If she chooses such a bundle, then she will have some income left over after purchasing the bundle. Can you calculate how much income will be left with her? (Answer: Rs. 400)

Think of a bundle that contains 16 books and 16 movie tickets. How much would such a bundle cost at the existing prices? Can the consumer afford such a bundle? (Answer: Rs. 2400. No)

What happens when the price of movie tickets changes, other things remaining constant (*ceteris paribus*)?

Suppose the price of movie tickets goes up to Rs. 100. The consumer's income is still Rs. 2000, and the price of the book continues to be Rs. 100. What will her budget line now look like? This is described in the diagram below. The green line is the new budget line.

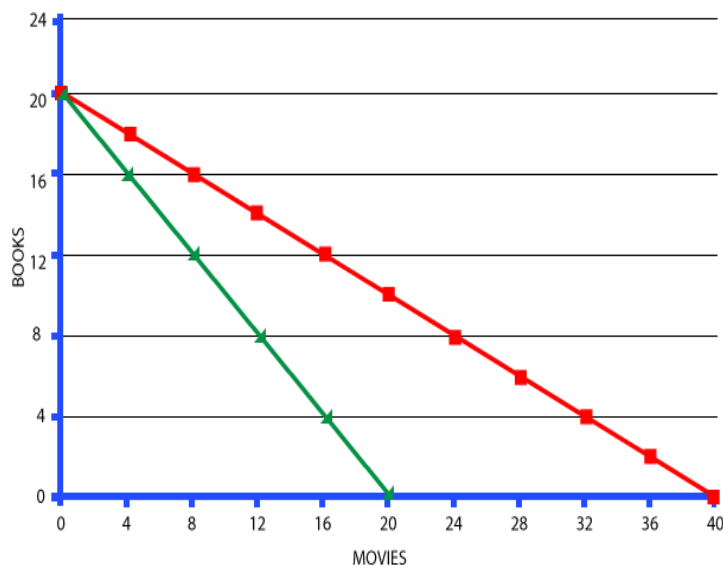


Figure 2: Changes in the budget line resulting from changes in the price of movie tickets

Notice that the budget line 'swings-in' along the X-axis. Let us understand why it happened.

The price of the books hasn't changed, so the consumer can still buy twenty books for Rs. 2000. However, with the increased price of movie tickets, she can buy at most 20 movie tickets now, rather than 40, which she was buying previously. This explains why the Budget Line hinges on

Y-axis and ‘swings in’ on the X-axis. The consumer could of course choose to buy any combination of books and movie tickets that lies on the new budget line. Notice that several of the combinations that were earlier available to her, like (24, 8) are now no longer affordable to the consumer. The budget set is smaller than before.

What happens if the price of the books increases, other things remaining constant?

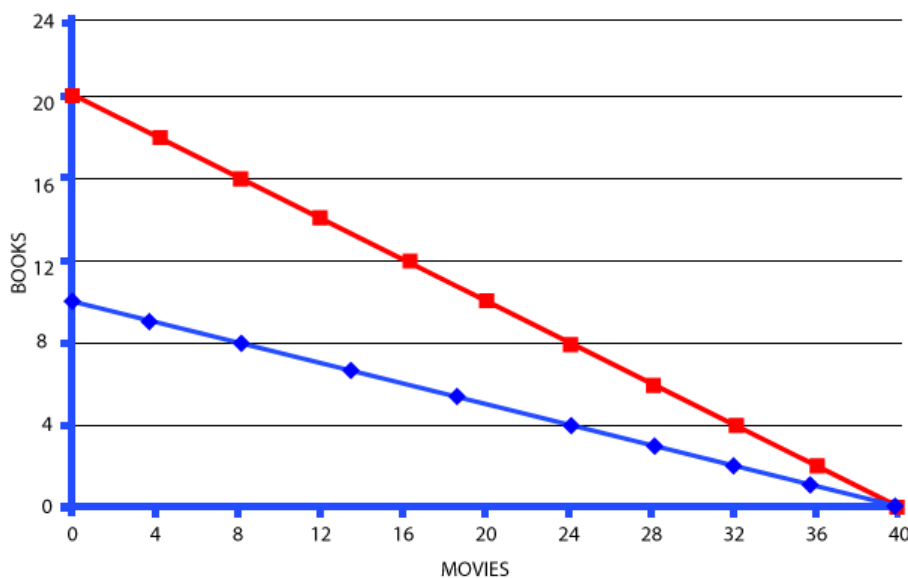


Figure 3: Change in the budget line resulting from the change in the price of the books

Suppose that the price of the books increases from Rs. 100 to Rs. 200, while the price of movie tickets and consumer’s income remain at their initial level. Figure 3 shows the changes. The blue line is the new budget line:

The price of movie tickets has not changed; the consumer can still buy 40 movie tickets for Rs 2000. However, given her income of Rs. 2000, and the increase in the price of books, the consumer can at most buy 10 books in place of 20 books, which she was buying previously. The budget line ‘swings in’ along the Y-axis. The consumer could of course choose to buy any combination of books and movie tickets that lies on the new (blue) budget line. You may notice

that she couldn't afford a bundle like (4, 12) which was previously affordable. Once again the budget set has become smaller.

The Budget line as a Price Line

Slope: Slope of a line segment is defined as rise over run. In other words, it is change in Y for a unit change in X. The easiest way to find the slope of the budget line is to divide its Y intercept by the X intercept. The X and Y intercept of the Budget Line are determined by the prices of goods X and Y and therefore, you'll notice that whenever prices of either of the goods have changed in the examples above, the new budget line has a different slope.

Can you calculate the slope of the budget line in Figure 1? (Answer: $20/40 = 0.5$)

What is the slope of the new budget line in Figure 2? (Answer: $20/20 = 1$)

In the diagrams above, notice that any change in prices changes the slope of the budget line. In fact, the slope of the budget line is actually the ratio of the price of the commodity on the X-axis to the price of the commodity on the Y-axis. You can easily verify this from the diagrams above. In the example above: slope of the budget line = (Price of Movie tickets) / (Price of Books). Since both numerator and denominator contain prices expressed in same units, slope is a pure numerical measure without any units.

What is the ratio of the price of movies to the price of books in the case shown in figure 1? Is it equal to the slope of the budget line? Verify this for yourself in all the other cases as well.

The budget line is also called the **price line** because the slope of the budget line is actually the ratio of the price of the commodity on the X-axis to the price of the commodity on the Y-axis .

What happens if consumer's income changes, all other things remaining the same?

Suppose the prices of books and movie tickets remain unchanged, but my income goes up to Rs. 2500. I can now afford more of both books and movies. If I spend all my income on movie tickets, I will be able to watch 50 movies. If, I choose to only buy books, I get 25 books. Or I can choose a combination of books and movies that lies on my new budget line. The diagram below shows what happens to my budget line; it shifts out parallel to the old budget line.

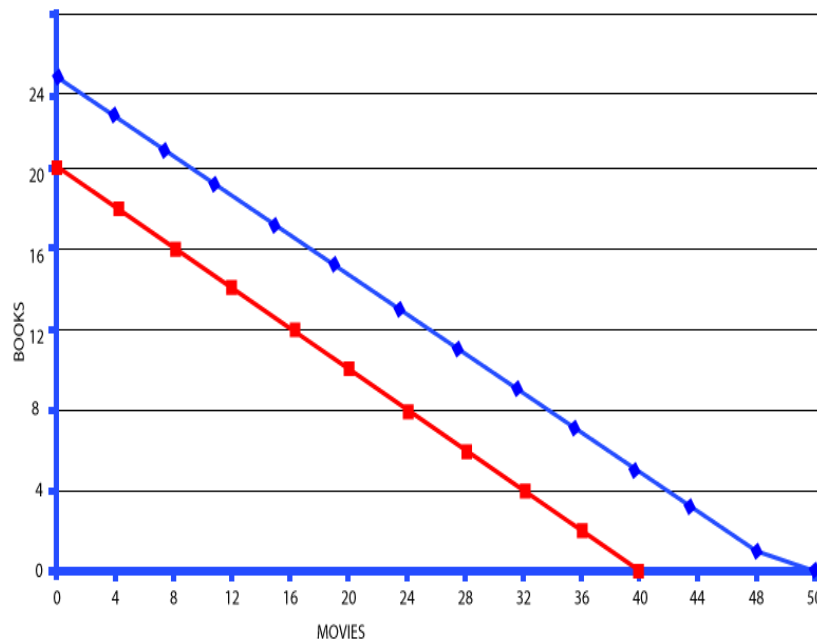


Figure 4: Change in the budget line resulting from the change in income

In this situation, the prices of the two goods haven't changed, so the slope of the new budget line must be the same as before. Notice that my budget set is now bigger than before. I could afford to buy a bundle such as (12 books and 24 movies), which I could not have, with my earlier income.

If I choose to buy 12 books and 24 movies, how much will I spend? How much income will I have left over? (Answer: Amount spent = Rs. 2400. Amount left = Rs. 100)

4. Summary:

In this module, we have discussed about a Budget Set. All those combinations of two goods that a consumer can buy, given her income and the prices of those goods, comprise the Budget set. It helps to answer the question - what a consumer can afford to buy? All the combinations that completely exhaust the income of a consumer, lie on the budget line. Recall that the slope of the budget line is the ratio of price of a good lying on the X-axis over the price of a good lying on

the Y-axis. The budget line is also known as the Price line. If the price of any of the two commodities change, then the budget line moves or swings in (if price has increased) or swings out (if price has decreased), thereby changing the slope of the budget line. The line moves / swings along that axis, for which the price of commodity has changed. The budget line hinges on the other side, where the price of commodity has not changed. If the income of a consumer increases, the budget line undergoes a parallel rightward shift. In case of decrease in consumer's income, the budget line undergoes a parallel leftward shift. As the shift in the budget line is parallel, the slope of the budget line does not change.