

# The Payback Method

by Sophia



## WHAT'S COVERED

In this lesson, you will learn about the payback period of an investment. Specifically, this lesson will cover:

### 1. Defining the Payback Method

#### 1a. Advantages

#### 1b. Disadvantages

### 2. The Payback Period

### 3. The Discounted Payback Period

## 1. Defining the Payback Method

In the context of capital budgeting, the **payback period** refers to the amount of time it takes for an investment, by way of return, to recover the cost of the initial investment.



### TERM TO KNOW

#### **Payback Period**

The amount of time required for the return on an investment to return the sum of the original investment.

#### 1a. Advantages

The payback period is often determined using a tool of analysis called the payback method, because it is easily applicable and understandable for most people, regardless of their level of academic training or particular field of endeavor. The payback method can be beneficial to compare similar investments, when applied carefully. The only explicit criteria required when utilizing the payback method as a self-contained tool to compare an investment is that the payback period should be less than infinity; other than this qualifier, the payback method has no specific criteria for decision-making.

#### 1b. Disadvantages

As a method of analysis, there are, however, some significant limitations and qualifications attached to using the payback method; namely, it fails to account for considerations such as the time value of money, risk, financing, and opportunity cost. Now, the issue with the time value of money can be remedied by applying a weighted average cost of capital discount. Prevailing opinion dictates that this particular tool for investment decisions should not be used in a vacuum or isolation. Alternatively, economists prefer measures of return like net present value and internal rate of return.

When utilizing the payback method, it is implicitly assumed that returns to the investment persist after the payback period. Lastly, it should be noted that the payback method does not cite required comparisons, to either other investments or to a scenario of not making an investment at all.

## 2. The Payback Period

The payback period is usually expressed in years. Start by calculating net cash flow for each year, which is the cash inflow subtracted by the cash outflow for that year. Then calculate the cumulative cash flow:



### FORMULA TO KNOW

#### Cumulative Cash Flow

$$\text{Cumulative Cash Flow} = \text{Net CF}_1 + \text{Net CF}_2 + \text{Net CF}_3 \dots$$

Accumulate by year until the cumulative cash flow is a positive number; this year will be the payback year.

### IN CONTEXT

Suppose a business is considering investing \$150,000 in a project with the anticipated net cash flows:

- Year 1: \$60,000
- Year 2: \$30,000
- Year 3: \$45,000
- Year 4: \$35,000
- Year 5: \$50,000

The business will experience the payback period during Year 4 since the investment is recovered during this period.

Year	Investment	Cashflow	Cumulative Cash Flow
Year 0	-\$150,000	0	-\$150,000
Year 1	0	\$60,000	-\$90,000
Year 2	0	\$30,000	-\$60,000
Year 3	0	\$45,000	-\$15,000
Year 4	0	\$35,000	\$20,000

Year 5	0	\$50,000	\$70,000
--------	---	----------	----------



#### HINT

To calculate a more exact payback period, use the following formula: you can divide the amount to be initially invested by the estimated annual net cash inflow.

The payback period method does not take into account the time value of money. Some businesses modified this method by adding the time value of money to get the discounted payback period. They discounted the cash inflows of the project by a chosen discount rate (cost of capital), and then followed the usual steps of calculating the payback period.

The calculation becomes more complex when the cash flow fluctuates between positive and negative values multiple times – that is, it contains outflows in the middle or at the end of the project's lifetime. In this situation, the modified payback period algorithm can be applied:



#### STEP BY STEP

1. Calculate the sum of all the cash outflows.
2. Determine the cumulative positive cash flows for each period.
3. Calculate the modified payback period as the point at which cumulative positive cash flow surpasses the total cash outflow.

#### IN CONTEXT

Suppose a business has the following net cash flows:

- Year 0: -\$1,000
- Year 1: \$4,000
- Year 2: -\$5,000
- Year 3: \$6,000
- Year 4: -\$6,000
- Year 5: \$7,000.

The sum of all cash outflows = \$1,000 + \$5,000 + \$6,000 = \$12,000.

The sum of all cash inflows = \$4,000 + \$6,000 + \$7,000 = \$17,000.

The modified payback period is in year 5, since the cumulative positive cash flows (\$17,000) exceed the total cash outflows (\$12,000) in year 5.

### 3. The Discounted Payback Period

The payback method is quite a simple concept. The majority of business projects (or even entire business plans for an organization) will require capital. When investing capital into a project, it will take a certain amount of time before the profits from the endeavor offset the capital requirements. Of course, if the project never makes enough profit to cover the start-up costs, it is not an investment to pursue. In the simplest sense, the project with the shortest payback period is most likely the best of possible investments, or the lowest risk, at any rate.

Time is a commodity with cost from a financial point of view. Having the money sooner means more potential investment and thus less opportunity cost. The shorter time scale project also would appear to have a higher profit rate in this situation, making it better for that reason as well.

⇒ **EXAMPLE** A project that costs \$100,000 and pays back within 6 years is not as valuable as a project that costs \$100,000 which pays back in 5 years.

If a payback method does not take into account the time value of money, the real net present value (NPV) of a given project is also not being calculated. This is a significant strategic omission, particularly relevant in longer-term initiatives. As a result, all corporate financial assessments should discount payback to weigh in the opportunity costs of capital being locked up in the project.

One way to do this is to find the **discounted payback period** by discounting projected cash flows into present dollars based upon the cost of capital using the following formula:



#### FORMULA TO KNOW

##### Discounted Cash Flow Analysis

$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_n}{(1+r)^n}$$

#### IN CONTEXT

Suppose a project costs \$10,000. If it will return \$2,000 each year in profit (after all expenses and taxes), then this means that it will take a total of 5 years without a time value of money discount being applied. However, applying time value of money is a fairly simple process, and can be accomplished utilizing the discounted cash flow analysis equation.

For the sake of simplicity, let's assume the cost of capital is 10%, meaning the investor can turn 10% on this money elsewhere and it is their required rate of return. If this is the case, then we can use the following equation:

$$DCF = \frac{\$2,000}{(1+0.10)^1} + \frac{\$2,000}{(1+0.10)^2} + \frac{\$2,000}{(1+0.10)^3} + \frac{\$2,000}{(1+0.10)^4} + \frac{\$2,000}{(1+0.10)^5} + \frac{\$2,000}{(1+0.10)^6} + \frac{\$2,000}{(1+0.10)^7}$$
$$DCF = \$9,736.84$$

At your expected \$2,000 each year, it will take over 7 years for full payback.



#### BIG IDEA

Discounting the payback period can have enormous impacts on profitability. Understanding and accounting for the time value of money is an important aspect of strategic thinking.



#### TERM TO KNOW

##### Discounted Payback Period

The amount of time that it takes to cover the cost of a project, by adding positive discounted cash flow coming from the profits of the project.



#### SUMMARY

In this lesson, you learned more about the **definition of the payback method**, which is a simple way of assessing long-term investments by determining the length of time until investment costs are recovered. **Advantages** of this method are its simplicity and straightforwardness. However, these same characteristics create a set of **disadvantages** related to the method's failure to account for other factors like the time value of money, risk, and opportunity cost.

Calculating the **payback period** is relatively uncomplicated, whether annual cash flows are consistent or variable. Managers can also calculate the **discounted payback period** for a project, which allows them to weigh the opportunity costs of capital being locked up in that particular project versus another.

Best of luck in your learning!

Source: THIS TUTORIAL HAS BEEN ADAPTED FROM "BOUNDLESS FINANCE" PROVIDED BY LUMEN LEARNING BOUNDLESS COURSES. ACCESS FOR FREE AT [LUMEN LEARNING BOUNDLESS COURSES](#). LICENSED UNDER [CREATIVE COMMONS ATTRIBUTION-SHAREALIKE 4.0 INTERNATIONAL](#).



#### TERMS TO KNOW

##### Discounted Payback Period

The amount of time that it takes to cover the cost of a project, by adding positive discounted cash flow coming from the profits of the project.

##### Payback Period

The amount of time required for the return on an investment to return the sum of the original investment.

**Cumulative Cash Flow**

$$\text{Cumulative Cash Flow} = \text{Net CF}_1 + \text{Net CF}_2 + \text{Net CF}_3 \dots$$

**Discounted Cash Flow Analysis**

$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_n}{(1+r)^n}$$