GEPM-375
Professional Practices and Construction Management

Payback Period

Payback Period

What Is the Payback Period?

- Refers to the **amount of time it takes** to recover the cost of an investment.
- Simply put, it is the **length of time an investment reaches a breakeven point**.
- People and corporate **mainly invest their money to get paid back**, which is why the **payback period is so important**.
- In essence, the **shorter payback an investment** has, the more attractive it becomes.
- Determining the payback period is useful for anyone and can be done by **dividing the initial investment by the average cash flows.**

Payback Period

Understanding/Importance the Payback Period:

- Payback period is a **method commonly used by investors, financial professionals**, and **corporations** to calculate investment returns.
- It helps determine **how long it takes to recover the initial costs** associated with an investment.
- This metric is **useful before making any decisions**, especially when an investor needs to make a snap judgment about an investment venture.

You can figure out the payback period by using the following formula:

Payback Period = Cost of Investment ÷ Average Annual Cash Flows

Payback Period

- **Shorter the payback**, the more desirable the investment. Conversely, the **longer the payback**, the less desirable it becomes.

Example: If solar panels cost $5,000 to install and the **savings are $100 each month**, it would take 4.2 years to reach the payback period.

- In most cases, this is a **pretty good payback period** as experts say it can take as much as eight years for residential homeowners in the United States to break even on their investment.

- Capital budgeting is a key activity in corporate finance.

- One of the most important concepts every corporate financial analysist must learn is how to value different investments or operational projects to **determine the most profitable project** or **investment** to undertake.

- **One way** corporate financial analysts do this is **with the payback period**.

Payback Period

- Although calculating the payback period is useful in financial and capital budgeting, this metric **has applications in other industries.**
- It can be used by **homeowners and businesses** to calculate the return on energy-efficient technologies such as solar panels and insulation, including maintenance and upgrades.
- ***Average cash flows*** *represent the money going into and out of the investment.*
- *Inflows are any items that* ***go into the investment****, such as deposits, dividends, or earnings.*
- ***Cash outflows include any fees or charges*** *that are subtracted from the balance.*

Payback Period

Special Considerations of Payback Period:

There is one problem with the payback period calculation.

- Unlike other methods of capital budgeting, the **payback period ignores the TVM**.

TVM: Idea that money is worth more today than the same amount in the future because of the earning potential of the present money.

- Most capital budgeting formulas, such as NPV, IRR, and discounted cash flow, **consider the TVM**.

- So if you pay an investor tomorrow, it must **include an opportunity cost.**

- TVM is a concept that assigns a value to this opportunity cost.

Payback Period

- **Payback period disregards the time value of money** and is determined by counting the number of years it takes to recover the funds invested.
- For example, if it takes five years to recover the cost of an investment, the **payback period is five years.**
- This period **does not account for what happens after payback occurs**.
- Therefore, it ignores an investment's **overall profitability**.
- Many managers and investors thus **prefer to use NPV as a tool** for making investment decisions.
- NPV is the difference between the present value of cash coming in and the current value of cash going out over a period of time.
- Some analysts favor the **payback method for its simplicity**. Others like to use it as an additional point of reference in a capital budgeting decision framework.

Example of Payback Period:

Here's a hypothetical example to show how the payback period works.

- Assume Company A **invests $1 million** in a project that is expected to **save the company $250,000 each year**. If we divide $1 million by $250,000, we **arrive at the payback period of 4 years for this investment.**

Example: Consider another project that costs $200,000 with **no associated cash savings** that will make the company an incremental $100,000 each year for the next 20 years at $2 million.

- Clearly, the second project can make the company twice as much money, but **how long will it take to pay the investment back?**

- Answer is found by dividing $200,000 by $100,000, which is **two years**. The second project will take less time to pay back, and the company's earnings potential is greater.

- **Based solely on the payback period method, the second project is a better investment.**

Payback Period

Good Payback Period

- Best payback period is the **shortest one possible**.
- Getting repaid or recovering the initial cost of a project or investment should be achieved as quickly as it allows.
- However, **not all projects and investments have the same time horizon**, so the shortest possible payback period needs to be nested within the larger context of that time horizon.
- For example, the payback period on a **home improvement project can be decades** while the payback period on a **construction project may be five years or less**.

Payback Period

Is the Payback Period the Same Thing as the Break-Even Point?

- While the two **terms are related**, they are **not the same**.
- Breakeven point is the **price or value** that an investment or project **must rise to cover the initial costs or outlay.**
- Payback period refers to **how long it takes** to reach that breakeven point.

How Do You Calculate the Payback Period?

Payback Period = Initial Investment ÷ Annual Cash Flow

Payback Period

What Are Some of the Downsides of Using the Payback Period?

- As the equation above shows, the **payback period calculation is a simple one**.
- It **does not account for TVM**, **the effects of inflation**, or **the complexity of investments** that may have unequal cash flow over time.
- **Discounted Payback Periods** is often used to **better account for some of the shortcomings**, such as using the present value of future cash flows.
- For this reason, the **simple payback period may be favorable**, while the discounted payback period might indicate an unfavorable investment.

Payback Period

When a Company will Use the Payback Period for Capital Budgeting?

- Payback period is **favored when a company is under liquidity constraints** because it can not show how long it should take to recover the money laid out for the project.

- If short-term cash flows are a concern, a **short payback period may be more attractive** than a longer-term investment that has a higher NPV.

Problem-1:
A project required an upfront investment of $500,000 with no residual value. The pay back period had a maximum of 3 years. The company expects the following cash inflow from the investment over the next 5 years:

Year-1:	$100,000
Year-1:	150,000
Year-3:	150,000
Year-4:	50,000
Year-5:	125,000

What is the payback period for the investment? Should the company accept or reject the project bases on the required payback period?

Solution:

Initial Investment=$500,000

Up to Year-4 Cash Flow= (100,000+150,000+150,000+50,000) $**450,000**

Cash Flow needed for year-5= (500,000-450,000) $**50,000**

Cash Flow Year-5: $ 125,000

Portion period of Year-5 to recover 50,000= 50,000/125,000= 0.4 year

Pay back period= 4+0.4=4.4 years

Problem-2:

A project required an upfront investment of $500,000 with no residual value. The pay back period had a maximum of 5 years. The company expects the following cash inflow from the investment over the next 6 years:

		PV factor for $1 at 10%
Year-1:	$100,000	0.9091
Year-2:	150,000	0.8264
Year-3:	150,000	0.7513
Year-4:	50,000	0.6830
Year-5:	125,000	0.6209
Yea-6:	200,000	0.5645

Using the present value factors provided, what will be the **discounted payback period** for the investment? Should the company accept or reject the project bases on the required payback period?

Solution:

Step-1: PV adjusted cash Flows

Year-1:	$100,000		0.9091	$90,909
Year-2:	150,000		0.8264	123,967
Year-3:	150,000	x	0.7513 =	112,697
Year-4:	50,000		0.6830	34,151
Year-5:	125,000		0.6209	77,615
Yea-6:	200,000		0.5645	112,895

Step-2: PV Accumulated cash Flows

Year-1:	$90,909	$90,909
Year-2:	123,967	214,876
Year-3:	112,697	327,573
Year-4:	34,151	361,724
Year-5:	77,615	**439,339**
Yea-6:	**112,895**	552,234

Step-3: Cash Flow needed for in Year-6

Initial Investment $500,000

(-) Year 5 Cumulative Cash Flow 439,339

=$60,661

Step-4: Portion of year 6 needed,

Cash Flow needed for portion of Year-6 =$60,661

(Divide by) PV for Year 6 Cash Flow (***60,661/112,895)*** = **0.537 years**

Step-6: Discounted Pay back **Period=5+.54=5.54 years** (Reject)

Example-3:

Initial Investment	**$25000**
Cash Flow: Year-1	$4500
Year-2	6500
Year-3	5000
Year-4	6000
Year-5	5000
Year-6	1000

Calculate the payback period.

Solution:

Investment	**$25000**	**Balance=0**
Cash Flow Year-1	4500	(-) 20500
Year-2	6500	(-) 14000
Year-3	5000	(-) 9000
Year-4	6000	**(-) 3000**
Year-5	**5000**	(+) 2000
Year-6	1000	(+) 3000

Payback Period $= 4 \text{ years} + \frac{3000}{5000} \text{ year} = 4.6 \text{ years}$

Thanks