

Compute The Discounted Payback Statistic For Project C If The Appropriate Cost Of Capital Is 6 Percent

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Understanding the discounted payback period is essential for investors and financial managers aiming to evaluate the viability of investment projects. Specifically, when analyzing Project C with a given cost of capital of 6%, calculating the discounted payback statistic provides insight into how quickly the project can recover its initial investment in present value terms. This article guides you through the step-by-step process of computing the discounted payback period for Project C, highlighting its importance, methodology, and practical implications for decision-making.

What Is the Discounted Payback Period?

The discounted payback period is a financial metric used to determine the time required for an investment to recover its initial cost in terms of discounted cash flows. Unlike the simple payback period, which considers raw cash flows, the discounted payback accounts for the time value of money, providing a more accurate picture of an investment's risk and profitability.

Key Points About Discounted Payback Period:

- Measures the time to recover the initial investment in discounted terms.
- Accounts for the cost of capital (or discount rate).
- Serves as a liquidity assessment tool and a risk indicator.
- Useful in comparing projects with similar initial investments but different cash flow timings.

Why Is The Discounted Payback Period Important?

Financial managers and investors use the discounted payback period for several reasons:

- Risk Assessment: It indicates how quickly a project can recoup its investment, thus reflecting its liquidity

- and risk profile.
- Decision-Making: Projects with shorter discounted payback periods are often preferred, especially when liquidity is a concern.
 - Comparison Tool: It allows comparison across multiple projects, considering the timing of cash flows and the cost of capital.
 - Limitations Awareness: While useful, it should be used alongside other metrics like NPV and IRR for comprehensive analysis.

Given Data for Project C

Before diving into the calculation, it's essential to gather the necessary data:

1. Initial Investment: The upfront amount invested in Project C.
2. Annual Cash Flows: The expected cash inflows from Project C for each period.
3. Cost of Capital: 6% (the discount rate to be used).
4. Time Horizon: The period over which cash flows are expected.

Note: For this tutorial, assume the following hypothetical data for Project C:

Year	Cash Flow	Discounted Cash Flow (at 6%)
-----	-----	-----
0	\$100,000	-\$100,000
1	\$20,000	\$18,867
2	\$25,000	\$22,321
3	\$30,000	\$25,945
4	\$35,000	\$29,516
5	\$40,000	\$33,781

Step-by-Step Calculation of Discounted Payback Period for Project C

The process involves calculating the present value of each year's cash flow, then cumulatively summing these discounted flows until the initial investment is recovered.

Step 1: Discount Future Cash Flows

Using the formula for present value:

$$PV = \frac{\text{Cash Flow}}{(1 + r)^t}$$

where:

- PV = Present value
- r = discount rate (6% or 0.06)
- t = year

For Project C, the discounted cash flows are already computed in the table above.

Step 2: Calculate Cumulative Discounted Cash Flows

Create a cumulative sum of discounted cash flows until the total equals or exceeds the initial investment.

Year	Discounted Cash Flow	Cumulative Discounted Cash Flow
0	-\$100,000	-\$100,000
1	\$18,867	-\$81,133
2	\$22,321	-\$58,812
3	\$25,945	-\$32,867
4	\$29,516	-\$3,351
5	\$33,781	\$30,430

Step 3: Identify When the Investment Is Recovered

From the cumulative figures, we see that:

- At the end of Year 4, the cumulative discounted cash flow is approximately -\$3,351.
- At Year 5, it turns positive, reaching \$30,430.

Thus, the payback occurs sometime during Year 5.

Step 4: Calculate Exact Point in Year 5

Since the cumulative sum is negative at the end of Year 4 and positive at Year 5, interpolate to find the exact time within Year 5 when the initial investment is recovered.

$$\text{Fraction of Year 5} = \frac{\text{Remaining amount to recover at end of Year 4}}{\text{Discounted Cash Flow in Year 5}}$$

cash flow in Year 5}}

\]

\[

$= \frac{3,351}{33,781} \approx 0.0992$

\]

Therefore, the discounted payback period:

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$\text{Payback period} = 4 + 0.0992 \approx 4.10 \text{ years}$

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Interpreting the Discounted Payback Period Result

The calculated discounted payback period of approximately 4.10 years indicates that Project C will recover its initial investment in just over four years when considering the time value of money at a 6% discount rate.

Practical Implications:

- Investment Decision: If the company's maximum acceptable payback period is, say, 5 years, Project C would be considered acceptable.
- Risk Profile: A shorter payback period generally suggests a lower risk of your investment not being recovered.
- Comparison With Other Projects: Comparing discounted payback periods across projects helps prioritize investments that recover costs faster.

Advantages and Limitations of Discounted Payback Period

Advantages:

- Incorporates the time value of money.
- Provides a quick assessment of liquidity and risk.
- Simple to understand and communicate.

Limitations:

- Ignores cash flows beyond the payback period.
- Does not measure overall profitability.
- Sensitive to the chosen discount rate.
- May favor shorter-term projects even if longer-term projects are more profitable.

Conclusion: Why Computing The Discounted Payback Statistic For Project C Is Crucial

Calculating the discounted payback period for Project C at a 6% cost of capital offers a clear picture of how long it takes for the project to recover its initial investment in present value terms. This metric aids in assessing the project's liquidity, risk, and alignment with strategic financial goals. While it should not be the sole criterion for investment decisions, understanding and applying the discounted payback period enhances your overall financial analysis toolkit.

By following the step-by-step method detailed above, financial analysts and decision-makers can confidently evaluate Project C or similar projects, ensuring that investments are aligned with the company's risk appetite and financial thresholds. Incorporating this metric into broader analyses like NPV and IRR will lead to more informed, balanced, and strategic investment decisions.

Keywords:

- Discounted payback period
- Project C investment analysis
- Cost of capital 6%
- How to calculate discounted payback
- Investment recovery in present value
- Financial metrics for project evaluation
- Capital budgeting techniques
- Cash flow analysis
- Risk assessment in investments

Frequently Asked Questions

What is the discounted payback period, and how is it relevant for Project C?

The discounted payback period measures the time it takes for the present value of cash inflows to recover the initial investment, accounting for the cost of capital. For Project C, it helps assess how quickly the project recovers its investment considering a 6% discount rate.

How do you compute the discounted cash flows for Project C at a 6% discount rate?

You calculate the present value of each future cash flow by dividing the cash flow by $(1 + 0.06)^t$, where t is the year number. Summing these discounted cash flows helps determine when the initial investment is recovered.

What is the initial investment for Project C, and how does it impact the calculation?

The initial investment is the upfront cost of Project C. It serves as the baseline for calculating the discounted payback period, as the sum of discounted cash flows must equal or exceed this amount to determine the payback time.

How do you determine the discounted payback period for Project C with a 6% cost of capital?

Calculate the discounted cash inflows for each period, then cumulatively sum these values until the total equals or exceeds the initial investment. The period at which this occurs is the discounted payback period.

Why is using a 6% discount rate appropriate in this context?

A 6% discount rate reflects the project's cost of capital or required rate of return, ensuring the discounted payback period accounts for the time value of money at a rate aligned with the project's risk profile.

What are the advantages of calculating the discounted payback period over the simple payback period?

The discounted payback period accounts for the time value of money, providing a more accurate measure of investment recovery time, especially for projects with cash flows spread over multiple years.

How can this calculation inform investment decisions for Project C?

By understanding the discounted payback period, investors can assess how quickly Project C recovers its initial investment at a 6% discount rate, aiding in comparing its viability against other projects or benchmarks.

What potential challenges exist when computing the discounted payback statistic for Project C?

Challenges include accurately estimating future cash flows, choosing an appropriate discount rate, and dealing with projects where cash flows are irregular or negative in future periods.

Can the discounted payback period be used as the sole criterion for project acceptance?

No, while useful, it should be combined with other metrics like net present value (NPV) and internal rate of return (IRR) to make a comprehensive investment decision.

Additional Resources

Compute The Discounted Payback Statistic For Project C If The Appropriate Cost Of Capital Is 6 Percent

Introduction

In the realm of capital budgeting and investment appraisal, understanding the financial viability of projects hinges upon various metrics. Among these, the discounted payback period stands out as a crucial measure that combines the concepts of time value of money with liquidity considerations. Specifically, it evaluates how long it takes for a project's discounted cash flows to recover the initial investment. This metric provides insights into risk, liquidity, and profitability, especially when compared to traditional payback periods that ignore the time value of money.

This article delves into the detailed process of calculating the discounted payback period for Project C, assuming an appropriate cost of capital of 6%. Through comprehensive explanations, step-by-step calculations, and analytical insights, we aim to elucidate the significance of this metric and its role in investment decision-making.

Understanding the Discounted Payback Period

What is the Discounted Payback Period?

The discounted payback period is the length of time required for the present value of a project's cash inflows to equal its initial investment. Unlike the simple payback period, which simply sums cash inflows without discounting, the discounted version accounts for the time value of money—a fundamental principle in finance that recognizes money today is worth more than the same amount in the future.

Why is it Important?

- Risk Assessment: Projects with shorter discounted payback periods are generally less risky, as they recover initial investments sooner.
- Liquidity Preferences: Stakeholders often prefer projects that return capital quickly.
- Complement to NPV and IRR: While Net Present Value (NPV) and Internal Rate of Return (IRR) are common metrics, the discounted payback period offers an additional perspective on project viability and cash flow timing.

Data and Assumptions

To facilitate the calculation, certain assumptions and data points are typically necessary. For Project C, the following information is usually considered:

- Initial Investment (C0): The upfront capital outlay required to start the project.
- Annual Cash Flows (CF): Expected cash inflows generated by the project each year.
- Cost of Capital (r): The discount rate, specified as 6% in this case.
- Project Duration: The period over which cash flows are projected.

Note: Since the user prompt does not specify the exact cash flows or initial investment of Project C, for analytical purposes, we will assume hypothetical data consistent with typical capital budgeting analyses. If actual data is available, the calculation can be directly adapted.

Hypothetical Data for Project C

Year	Cash Flows (CF)	Discounted Cash Flows (DCF)
0	-\$100,000	-\$100,000
1	\$20,000	\$18,868
2	\$30,000	\$26,670
3	\$40,000	\$33,607
4	\$50,000	\$39,677

| 5 | \$60,000 | \$44,996 |

Note: The discounting is performed using the formula:

$$DCF = \frac{CF}{(1 + r)^t}$$

where:

- CF = cash flow in year t ,
- r = discount rate (6% or 0.06),
- t = year number.

Step-by-Step Calculation of Discounted Payback Period

1. Discount the Cash Flows

Using the formula above, each year's cash flow is discounted to its present value:

- Year 1: $\frac{\$20,000}{(1 + 0.06)^1} = \$18,868$
- Year 2: $\frac{\$30,000}{(1 + 0.06)^2} = \$26,670$
- Year 3: $\frac{\$40,000}{(1 + 0.06)^3} = \$33,607$
- Year 4: $\frac{\$50,000}{(1 + 0.06)^4} = \$39,677$
- Year 5: $\frac{\$60,000}{(1 + 0.06)^5} = \$44,996$

2. Calculate the Cumulative Discounted Cash Flows

Next, sum these discounted cash flows cumulatively to determine at which point the initial investment is recovered:

Year	Discounted Cash Flow	Cumulative DCF	Remaining Investment
0	-\$100,000	-\$100,000	\$100,000 owed
1	\$18,868	-\$81,132	\$81,132
2	\$26,670	-\$54,462	\$54,462
3	\$33,607	-\$20,855	\$20,855
4	\$39,677	+\$18,822	Fully recovered at some point during Year 4
5	\$44,996	N/A (beyond recovery)	

Note: The initial investment is \$100,000 (a negative cash flow at Year 0). The cumulative discounted cash flows gradually increase from negative towards zero, indicating the recovery process.

3. Determining the Discounted Payback Period

The key step involves identifying the point at which the cumulative discounted cash flows turn positive, signifying full recovery of the initial investment.

- After Year 3: Cumulative DCF = -\$20,855, still not recovered.
- During Year 4: Cumulative DCF turns positive.

To pinpoint the exact moment during Year 4 when the investment is recovered, linear interpolation is employed:

$$\begin{aligned} \text{Fraction of Year 4} &= \frac{\text{Remaining Investment at Year 3}}{\text{Discounted Cash Flow in Year 4}} = \frac{20,855}{39,677} \approx 0.526 \end{aligned}$$

Thus,

$$\text{Discounted Payback Period} = 3 + 0.526 \approx 3.53 \text{ years}$$

This indicates that Project C recovers its initial investment in approximately 3.53 years when considering discounted cash flows at a 6% discount rate.

Interpretation and Analytical Insights

Significance of the Result

- **Short Payback Period:** A payback period of roughly 3.5 years suggests that Project C is relatively quick in recouping its initial outlay, which is often viewed favorably by investors seeking liquidity.
- **Risk Considerations:** Given the low discount rate of 6%, the project appears to be less risky compared to higher-rate projects. The relatively swift recovery also indicates lower exposure to long-term uncertainties.
- **Comparison to Non-Discounted Payback:** Had we ignored discounting, the payback period might have appeared even shorter, but this would have overestimated the project's liquidity profile by ignoring the time value of money.

Limitations and Considerations

- Cash Flow Assumptions: The calculation hinges on the accuracy and realism of cash flow projections. Any deviation could significantly alter the payback period.
- Investment Size: Larger initial investments naturally extend the payback period; thus, it's important to contextualize this metric alongside other indicators like NPV and IRR.
- Project Duration and Beyond: While the discounted payback period indicates liquidity, it does not measure overall profitability or value creation beyond recovery.

Broader Implications in Capital Budgeting

The discounted payback period, while valuable, is just one piece of the investment appraisal puzzle. Its importance lies in providing a time-based perspective on risk and liquidity, especially for projects where rapid recovery is crucial.

In practice, firms often set maximum acceptable payback periods based on strategic priorities. For Project C, a 3.5-year recovery aligns with many corporate policies favoring shorter-term returns, especially in industries with volatile markets or rapid technological change.

Furthermore, the discounted payback period complements other financial metrics:

- NPV: Measures the absolute value added.
- IRR: Indicates the rate of return.
- Profitability Index: Assesses relative profitability.

Together, these tools enable comprehensive decision-making.

Conclusion

Calculating the discounted payback period for Project C at a 6% cost of capital reveals a recovery time of approximately 3.53 years. This metric underscores the project's liquidity and risk profile, providing stakeholders with a nuanced understanding of its financial viability.

In a broader context, the discounted payback period remains a vital component of capital budgeting, especially when used alongside other evaluation metrics. Its emphasis on the time value of money highlights the importance of cash flow timing in investment decisions, ensuring that firms can balance profitability with liquidity and risk considerations.

Ultimately, while the discounted payback period offers valuable insights, it should be integrated into a holistic financial analysis to guide sound investment choices that align with corporate strategy and risk appetite.

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