What is Net Present Value (NPV)?

Worksheet

NPV is the sum of all a project's future cash flows discounted to present value, minus the initial investment; NPV = CFt/(1+r)^t C0. If NPV > 0, the investment is expected to be profitable.

$$@sum_{t=0}^{n} @frac{CF_t}{(1+r)^t} - I_0$$

Questions

1. A project has NPV = $500. What should you do?

A) Reject it
B) Accept it
C) Ignore it
D) Wait indefinitely

2. In the NPV formula, what does C0 represent?

A) Final cash flow
B) Discount rate
C) Initial investment
D) Number of years

3. If the discount rate increases, what typically happens to NPV (holding cash flows fixed)?

A) NPV increases
B) NPV decreases
C) NPV is unaffected
D) NPV becomes zero

4. Between two mutually exclusive projects, which is generally preferred?

A) The one with lower initial cost
B) The one with the higher NPV
C) The one with more cash flows
D) The one with the shortest life

5. A project costs $10,000 today and returns a single cash flow of $15,000 in 5 years. At an 8% discount rate, what is the NPV?

6. A project costs $50,000 today and produces cash flows of $20,000 at the end of each of the next 3 years. At a 10% discount rate, what is the NPV?

7. Two projects both cost $5,000. Project A returns $6,500 in 2 years; Project B returns $7,000 in 4 years. At a 6% discount rate, which has the higher NPV?

8. Define: What is Net Present Value (NPV)?

9. Define: What is the NPV formula?

10. Define: What does a positive NPV mean?

Answer Key

1. B) Accept it - A positive NPV means the project adds value above the discount rate - generally accept.

2. C) Initial investment - C0 is the upfront cost of the investment, subtracted from the sum of discounted cash flows.

3. B) NPV decreases - A higher discount rate shrinks the present value of future cash flows, lowering NPV.

4. B) The one with the higher NPV - NPV directly measures value added, so the project with the higher NPV is generally preferred.

5. NPV = -C0 + CF/(1+r)^t NPV = -10000 + 15000/(1.08)^5 (1.08)^5 1.4693 NPV = -10000 + 15000/1.4693 -10000 + 10208.80 = $208.80 Since NPV > 0, the project is worth pursuing

6. NPV = -C0 + CF1/(1+r)^1 + CF2/(1+r)^2 + CF3/(1+r)^3 NPV = -50000 + 20000/1.10 + 20000/1.21 + 20000/1.331 NPV = -50000 + 18181.82 + 16528.93 + 15026.30 NPV = -50000 + 49737.05 = -$262.95 Since NPV < 0, the project should be rejected

7. Project A: NPV = -5000 + 6500/(1.06)^2 = -5000 + 6500/1.1236 -5000 + 5785.26 = $785.26 Project B: NPV = -5000 + 7000/(1.06)^4 = -5000 + 7000/1.26248 -5000 + 5545.28 = $545.28 Project A has the higher NPV ($785.26 > $545.28), so it's the better choice

8. The sum of a project's discounted future cash flows minus its initial investment cost.

9. NPV = [CFt/(1+r)^t] C0, summed over all periods t.

10. The project is expected to add value above the required rate of return - generally accept it.