**Question:** Consider the following two mutually exclusive projects:

| Year | Cash Flow (A) | Cash Flow (B) |
|---|---|---|
| 0 | −$350,000 | −$35,000 |
| 1 | 25,000 | 17,000 |
| 2 | 70,000 | 11,000 |
| 3 | 70,000 | 17,000 |
| 4 | 430,000 | 11,000 |

Whichever project you choose, if any, you require a 15 percent return on your investment.

a) If you apply the payback criterion, which investment will you choose? Why?

**Answer:**

The payback period for each project is:
A: 3 + ($185,000/$430,000) = 3.43 years
B: 2 + ($7,000/$17,000) = 2.41 years
The payback criterion implies accepting project B, because it pays back sooner than project A.

b) If you apply the discounted payback criterion, which investment will you choose? Why?

**Answer:**

The discounted payback for each project is:
A: $25,000/1.15 + $70,000/1.15^2+ $70,000/1.15^3 = $120,695.32
$430,000/1.15^4= $245,853.90
Discounted payback = 3 + ($350,000 – 120,695.32)/$245,853.90 = 3.93 years
B: $17,000/1.15 + $11,000/1.15^2 + $17,000/1.15^3 = $34,277.96
$11,000/1.15^4 = $6,289.29
Discounted payback = 3 + ($35,000 – 34,277.96)/$6,289.29 = 3.11 years
The discounted payback criterion implies accepting project B because it pays back sooner than A

c) If you apply the NPV criterion, which investment will you choose? Why?

**Answer:**

The NPV for each project is:
A: NPV = –$350,000 + $25,000/1.15 + $70,000/1.15^2 + $70,000/1.15^3
+ $430,000/1.15^4
NPV = $16,549.22
B: NPV = –$35,000 + $17,000/1.15 + $11,000/1.15^2 + $17,000/1.15^3
+ $11,000/1.15^4
NPV = $5,567.25
NPV criterion implies we accept project A because project A has a higher NPV than project B.

d) If you apply the IRR criterion, which investment will you choose? Why?

**Answer:**

The IRR for each project is:

A: $350,000 = $25,000/(1+IRR) + $70,000/(1+IRR)^2 + $70,000/(1+IRR)^3 + $430,000/(1+IRR)^4

IRR = 16.57%

B: $35,000 = $17,000/(1+IRR) + $11,000/(1+IRR)^2 + $17,000/(1+IRR)^3 + $11,000/(1+IRR)^4

IRR = 23.05%

IRR decision rule implies we accept project B because IRR for B is greater than IRR for A.

e) If you apply the profitability index criterion, which investment will you choose? Why?

**Answer:**

The profitability index for each project is:

A: PI = ($25,000/1.15 + $70,000/1.15^2 + $70,000/1.15^3 + $430,000/1.15^4) / $350,000 = 1.047

B: PI = ($17,000/1.15 + $11,000/1.15^2 + $17,000/1.15^3 + $11,000/1.15^4) / $35,000 = 1.159

Profitability index criterion implies accept project B because its PI is greater than project A's.

f) Based on your answers in (a) through (e), which project will you finally choose? Why?

**Answer:**

In this instance, the NPV criteria implies that you should accept project A, while profitability index, payback period, discounted payback and IRR imply that you should accept project B. The final decision should be based on the NPV since it does not have the ranking problem associated with the other capital budgeting techniques. Therefore, you should accept project A.