

Question 3 (20 marks)

- i. 'It is a matter of indifference whether investment projects are selected by the internal rate of return method or the next present value method.'

Discuss the circumstances in which this statement may not hold.

- ii. Why cannot the accounting rate of return be used as a reliable capital budgeting technique? What are its advantages?

Question 4 (20 marks)

Crofton Printing is considering the purchase of a new printing press. The total installed cost of the press would be \$2.2 million. This outlay would be partially offset by the sale of an existing press. The old press which cost \$1 million 10 years ago, has zero book value and can be currently sold for \$1.5 million before taxes. As a result of the new press, sales in each of the next five years are expected to increase by \$1.6 million, but product costs (excluding depreciation) will represent 50% of sales. The new press will not affect the firm's net working capital requirements. The press will be depreciated using the prime cost (straight line) method with an effective life of five years. The firm is subject to a 30% tax rate. The terminal value of the new press and the old press at the end of the next five years will be \$0. Crofton's cost of capital is 11%.

- i. Determine the net present value (NPV) of the proposed project.
- ii. Determine the internal rate of return (IRR) of the proposed project.
- iii. Determine the payback period of the proposed project.
- iv. Determine the profitability index of the proposed project.
- v. Considering your results in i – iv above, make a recommendation to accept or reject the project and justify that recommendation.

Answer 3

i).

IRR v/s NPV

It is a matter of indifferences whether the investment projects are selected by the internal rate of return or net present value method. But at the same time, there are some circumstances in

which this statement may not hold. Some time, the NPV and IRR methods may give different results when comparing the two projects. A project can be selected on the basis of the NPV but may be rejected by the IRR method. It is because; the project selection in NPV method depends upon the discounted rate while the IRR always try to select the same project (Groppelli & Nikbakht, 2006). The NPV and IRR methods are given the different result for a project if the project's NPV is positive but on the other side, the project's IRR is lower the discounted rate. The NPV method is preferred on the IRR method for evaluation of investment project.

ii).

Disadvantage of Accounting Rate of Return

The accounting rate of return has a number of disadvantages that some time limits its usefulness in the project evaluation. The calculation of the ARR is based on profits rather than cash flows. So, the calculation can be affect by the non cash items such as depreciation. It is ignored the time value of the money in project appraisal process that is unscientific as money changes. The accounting rate of return also ignores the economic life of project that affects the investment decisions (Walker, 2008).

Advantage of Accounting Rate of Return

On the other side, the accounting rate of return has some advantages compare to other capital budgeting techniques. The accounting rate of return (ARR) is a capital budgeting techniques that is easy and simple to calculate. It is widely used to provide a rough guide about the attractiveness of the project. The calculation of this technique is based on the accounting information that is familiar to the business. It is considered all the benefits of the proposed project unlike the payback period that is effective to calculate the profit of the project (Walker, 2008).

Answer 4

Installation cost of new printing press = \$2.2 million

Sale value of old printing press (gain) = \$1.5 million (before tax)

Sales = \$1.6 million per year (for next five year)

Product cost (50% of sales) = $\$1.6 \times 50\%$

= \$0.80 million per year

Working life period = 5 years

Tax rate = 30%

Cost of capital = 11%

Gain from sale of old printing press (after tax) = $\$1.5 \times (1 - 0.30)$

= \$1.05 million

Initial investment (IO) = installation cost – gain from sale of old press

= $\$2.2 - \1.05

= \$1.15

Depreciation expenses = (installation cost – disposal value) ÷ working life

= $(2.2 - 1.05) \div 5$

= \$0.23 million

(Fitzgerald, 2002).

i). Calculation of NPV:

The calculation of net annual cash inflows after tax & before depreciation is as follows –

Note: All values are given in \$ million.

Year	1	2	3	4	5
Sales revenue (\$ millions)	\$1.60	\$1.60	\$1.60	\$1.60	\$1.60
Less: Product cost	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80
Less: Depreciation	\$0.23	\$0.23	\$0.23	\$0.23	\$0.23

Cash inflows after dep.	\$0.57	\$0.57	\$0.57	\$0.57	\$0.57
Less: Tax amount (30%)	\$0.17	\$0.17	\$0.17	\$0.17	\$0.17
Cash inflows after tax	\$0.40	\$0.40	\$0.40	\$0.40	\$0.40
Add: Depreciation	\$0.23	\$0.23	\$0.23	\$0.23	\$0.23
Net Cash inflows before dep.	\$0.63	\$0.63	\$0.63	\$0.63	\$0.63

$$\begin{aligned}
 NPV &= \sum_{t=0}^n \frac{C_t}{(1+r)^n} - IO \\
 &= \frac{0.63}{(1+0.11)^1} + \frac{0.63}{(1+0.11)^2} + \frac{0.63}{(1+0.11)^3} + \frac{0.63}{(1+0.11)^4} + \frac{0.63}{(1+0.11)^5} - 1.15 \\
 &= (0.57 + 0.51 + 0.46 + 0.41 + 0.37) - 1.15 \\
 &= \$2.32 - \$1.15 \\
 &= \$1.17 \text{ million}
 \end{aligned}$$

As the NPV is positive, the project can be accepted.

ii). Calculation of Internal Rate of Return:

$$\text{Internal Rate of Return (IRR)} = \text{LDR} + \frac{P_1 - Q}{P_1 - P_2} \times (\text{HDR} - \text{LDR})$$

Where, LDR (lower discount rate) = 40%

HDR (higher discount rate) = 50%

P1 = Present value at lower rate

P2 = Present value at higher rate

Q = Initial investment

Calculation of present value at higher and lower rate showing in following table –

Year	Net cash inflows	PV @ 40%	Present value	PV @ 50%	Present value
1	\$0.63	0.714	\$0.45	0.667	\$0.42
2	\$0.63	0.510	\$0.32	0.444	\$0.28
3	\$0.63	0.364	\$0.23	0.296	\$0.19
4	\$0.63	0.260	\$0.16	0.198	\$0.12
5	\$0.63	0.186	\$0.12	0.132	\$0.08
Total Present value			\$1.28		\$1.09

Then, IRR will be –

$$= 40\% + \frac{1.28-1.15}{1.28-1.09} \times (50\% - 40\%)$$

$$= 46.84\%$$

So, the internal rate of return (IRR) of this project is greater than the cost of capital (WACC) of this project ($46.84\% > 11\%$).

iii). Calculation of Payback Period:

Initial investment = \$1.15 million

Net annual cash inflows = \$0.63 million

Payback period = Initial investment \div Net annual cash inflows

$$= \$1.15 \div \$0.63$$

$$= 1.825 \text{ years}$$

iv). Calculation of Profitability Index:

Profitability index = PV \div IO

Where, PV = present of project's expected cash inflows

IO = Initial outlay = \$1.15

Total present of project's expected cash inflows = \$2.32

Then profitability index will be –

$$= \$2.32 \div \$1.15$$

$$= 2.0174$$

As profitability index is more than 1, the project can be accepted.

v). Results:

Initial Investment	\$1.15 million
NPV	\$1.17 million

IRR	46.84%
Payback period	1.825 years
Profitability Index	2.0174

On the basis of the above calculation, it can be recommended that the Crofton Printing will accept the project of purchase of new printing press. It is because; the above table exhibit that the NPV and IRR of project is very higher. The IRR of the project will be 46.84% that is higher than the cost of capital. On the other side, the payback period of the project is also shorter that shows the investment cost will recover in quick time. So, on the basis of the NPV, IRR, payback period, and Profitability index this project can be profitable for the company.

Assumptions:

The NPV, IRR, payback period, and profitability index all are calculated on the initial investment that is calculated by less the installation cost of new press form the after tax gain of sales of old press (\$2.2 - \$1.05). On the other side, it is assumed that the depreciation is calculated on the similar initial investment.

Reference

Fitzgerald, R. (2002). *Business Finance for Managers: An Essential Guide to Planning, Control and Decision Making* (3rd ed.). Kogan Page Publishers.

Groppelli, A.A & Nikbakht, E. (2006). *Finance* (5th ed.). Barron's Educational Series.

Walker, J. (2008). *Accounting in a Nutshell: Accounting for the Non-Specialist* (3rd ed.). Butterworth-Heinemann.