

## CHAPTER 9

### *Net Present Value and Other Investment Criteria*

#### I. DEFINITIONS

##### NET PRESENT VALUE

- a 1. The difference between the present value of an investment and its cost is the:
  - a. net present value.
  - b. internal rate of return.
  - c. payback period.
  - d. profitability index.
  - e. discounted payback period.

##### DISCOUNTED CASH FLOW VALUATION

- b 2. The process of valuing an investment by determining the present value of its future cash flows is called (the):
  - a. constant dividend growth model.
  - b. discounted cash flow valuation.
  - c. average accounting valuation.
  - d. expected earnings model.
  - e. Capital Asset Pricing Model.

##### NET PRESENT VALUE RULE

- c 3. Which one of the following statements concerning net present value (NPV) is correct?
  - a. An investment should be accepted if, and only if, the NPV is exactly equal to zero.
  - b. An investment should be accepted only if the NPV is equal to the initial cash flow.
  - c. An investment should be accepted if the NPV is positive and rejected if it is negative.
  - d. An investment with greater cash inflows than cash outflows, regardless of when the cash flows occur, will always have a positive NPV and therefore should always be accepted.
  - e. Any project that has positive cash flows for every time period after the initial investment should be accepted.

##### PAYBACK

- c 4. The length of time required for an investment to generate cash flows sufficient to recover the initial cost of the investment is called the:
  - a. net present value.
  - b. internal rate of return.
  - c. payback period.
  - d. profitability index.
  - e. discounted cash period.

**PAYBACK RULE**

- a 5. Which one of the following statements is correct concerning the payback period?
  - a. An investment is acceptable if its calculated payback period is less than some pre-specified period of time.
  - b. An investment should be accepted if the payback is positive and rejected if it is negative.
  - c. An investment should be rejected if the payback is positive and accepted if it is negative.
  - d. An investment is acceptable if its calculated payback period is greater than some pre-specified period of time.
  - e. An investment should be accepted any time the payback period is less than the discounted payback period, given a positive discount rate.

**DISCOUNTED PAYBACK**

- e 6. The length of time required for a project's discounted cash flows to equal the initial cost of the project is called the:
  - a. net present value.
  - b. internal rate of return.
  - c. payback period.
  - d. discounted profitability index.
  - e. discounted payback period.

**DISCOUNTED PAYBACK RULE**

- d 7. The discounted payback rule states that you should accept projects:
  - a. which have a discounted payback period that is greater than some pre-specified period of time.
  - b. if the discounted payback is positive and rejected if it is negative.
  - c. only if the discounted payback period equals some pre-specified period of time.
  - d. if the discounted payback period is less than some pre-specified period of time.
  - e. only if the discounted payback period is equal to zero.

**AVERAGE ACCOUNTING RETURN**

- c 8. An investment's average net income divided by its average book value defines the average:
  - a. net present value.
  - b. internal rate of return.
  - c. accounting return.
  - d. profitability index.
  - e. payback period.

**AVERAGE ACCOUNTING RETURN RULE**

- b 9. An investment is acceptable if its average accounting return (AAR):
  - a. is less than a target AAR.
  - b. exceeds a target AAR.
  - c. exceeds the firm's return on equity (ROE).
  - d. is less than the firm's return on assets (ROA).
  - e. is equal to zero and only when it is equal to zero.

**INTERNAL RATE OF RETURN**

- b. 10. The discount rate that makes the net present value of an investment exactly equal to zero is called the:
  - a. external rate of return.
  - b. internal rate of return.
  - c. average accounting return.
  - d. profitability index.
  - e. equalizer.

**INTERNAL RATE OF RETURN RULE**

- d. 11. An investment is acceptable if its IRR:
  - a. is exactly equal to its net present value (NPV).
  - b. is exactly equal to zero.
  - c. is less than the required return.
  - d. exceeds the required return.
  - e. is exactly equal to 100 percent.

**MULTIPLE RATES OF RETURN**

- e. 12. The possibility that more than one discount rate will make the NPV of an investment equal to zero is called the \_\_\_\_\_ problem.
  - a. net present value profiling
  - b. operational ambiguity
  - c. mutually exclusive investment decision
  - d. issues of scale
  - e. multiple rates of return

**MUTUALLY EXCLUSIVE PROJECTS**

- c. 13. A situation in which accepting one investment prevents the acceptance of another investment is called the:
  - a. net present value profile.
  - b. operational ambiguity decision.
  - c. mutually exclusive investment decision.
  - d. issues of scale problem.
  - e. multiple choices of operations decision.

**PROFITABILITY INDEX**

- d. 14. The present value of an investment's future cash flows divided by the initial cost of the investment is called the:
  - a. net present value.
  - b. internal rate of return.
  - c. average accounting return.
  - d. profitability index.
  - e. profile period.

**PROFITABILITY INDEX RULE**

- a 15. An investment is acceptable if the profitability index (PI) of the investment is:
  - a. greater than one.
  - b. less than one.
  - c. greater than the internal rate of return (IRR).
  - d. less than the net present value (NPV).
  - e. greater than a pre-specified rate of return.

**II. CONCEPTS**

**CAPITAL BUDGETING DECISIONS**

- a 16. Capital budgeting decisions generally:
  - a. have long-term effects on a firm.
  - b. are of short-duration.
  - c. are easy to revise once implemented.
  - d. focus solely on whether or not a particular asset should be purchased.
  - e. have minimal effects on a firm's operations.

**CAPITAL BUDGETING DECISIONS**

- e 17. Which of the following are capital budgeting decisions?
  - I. determining whether to sell bonds or issue stock
  - II. deciding which product markets to enter
  - III. deciding whether or not to purchase a new piece of equipment
  - IV. determining which, if any, new products should be produced
  - a. I only
  - b. III only
  - c. II and IV only
  - d. I, III, and IV only
  - e. II, III, and IV only

**NET PRESENT VALUE**

- d 18. All else constant, the net present value of a project increases when:
  - a. the discount rate increases.
  - b. each cash inflow is delayed by one year.
  - c. the initial cost of a project increases.
  - d. the rate of return decreases.
  - e. all cash inflows occur during the last year of a project's life instead of periodically throughout the life of the project.

**NET PRESENT VALUE**

- a 19. The primary reason that company projects with positive net present values are considered acceptable is that:
  - a. they create value for the owners of the firm.
  - b. the project's rate of return exceeds the rate of inflation.
  - c. they return the initial cash outlay within three years or less.
  - d. the required cash inflows exceed the actual cash inflows.
  - e. the investment's cost exceeds the present value of the cash inflows.

**NET PRESENT VALUE**

- d 20. If a project has a net present value equal to zero, then:
- I. the present value of the cash inflows exceeds the initial cost of the project.
  - II. the project produces a rate of return that just equals the rate required to accept the project.
  - III. the project is expected to produce only the minimally required cash inflows.
  - IV. any delay in receiving the projected cash inflows will cause the project to have a negative net present value.
- a. II and III only
  - b. II and IV only
  - c. I, II, and IV only
  - d. II, III, and IV only
  - e. I, II, and III only

**NET PRESENT VALUE**

- b 21. When computing the net present value of a project, the net amount received from salvaging the fixed assets used in the project is:
- a. subtracted from the initial cash outlay.
  - b. included in the final cash flow of the project.
  - c. excluded from the analysis since it occurs only when the project ends.
  - d. subtracted from the original cost of the assets.
  - e. added to the net present value of the project to determine if the project is acceptable.

**NET PRESENT VALUE**

- d 22. Net present value:
- I. when applied properly, can accurately predict the cash flows that will occur if a project is implemented.
  - II. is highly independent of the rate of return assigned to a particular project.
  - III. is the preferred method of analyzing a project even though the cash flows are only estimates.
  - IV. is affected by the timing of each and every cash flow related to a project.
- a. I only
  - b. III only
  - c. II and IV only
  - d. III and IV only
  - e. I, III, and IV only

**NET PRESENT VALUE**

- b 23. Net present value:
- a. cannot be used when deciding between two mutually exclusive projects.
  - b. is more useful to decision makers than the internal rate of return when comparing different sized projects.
  - c. is easy to explain to non-financial managers and thus is the primary method of analysis used by the lowest levels of management.
  - d. is computed the same as present value when using excel spreadsheets to analyze a project.
  - e. is very similar in its methodology to the average accounting return.

## CHAPTER 9

### PAYBACK

- c 24. Payback is frequently used to analyze independent projects because:
  - a. it considers the time value of money.
  - b. all relevant cash flows are included in the analysis.
  - c. the cost of the analysis is less than the potential loss from a faulty decision.
  - d. it is the most desirable of all the available analytical methods from a financial perspective.
  - e. it produces better decisions than those made using either NPV or IRR.

### PAYBACK

- c 25. The advantages of the payback method of project analysis include the:
  - I. application of a discount rate to each separate cash flow.
  - II. bias towards liquidity.
  - III. ease of use.
  - IV. arbitrary cutoff point.
  - a. I and II only
  - b. I and III only
  - c. II and III only
  - d. II and IV only
  - e. II, III, and IV only

### PAYBACK

- d 26. Under the payback method of analysis:
  - a. the initial cash outlay is ignored.
  - b. the cash flow in year 3 is ignored if the required payback period is 4 years.
  - c. a project's initial cost is discounted.
  - d. the cash flow in year 2 is valued just as highly as the cash flow in year 1 as long as the required payback period is 3 years or more.
  - e. a project will be acceptable whenever the payback period exceeds the pre-specified number of years.

### PAYBACK

- d 27. All else equal, the payback period for a project will decrease whenever the:
  - a. initial cost increases.
  - b. required return for a project increases.
  - c. assigned discount rate decreases.
  - d. cash inflows are moved forward in time.
  - e. duration of a project is lengthened.

### DISCOUNTED PAYBACK

- e 28. Discounted payback is used less frequently than payback because:
  - a. the methodology is less desirable from a financial perspective.
  - b. it is so simple to calculate.
  - c. it requires an arbitrary cutoff point.
  - d. it is biased towards liquidity.
  - e. it includes time value of money calculations.

**DISCOUNTED PAYBACK**

- d 29. The discounted payback period of a project will decrease whenever the:
  - a. discount rate applied to the project is increased.
  - b. initial cash outlay of the project is increased.
  - c. time period of the project is increased.
  - d. amount of each project cash flow is increased.
  - e. costs of the fixed assets utilized in the project increase.

**DISCOUNTED PAYBACK**

- a 30. The discounted payback rule may cause:
  - a. some positive net present value projects to be rejected.
  - b. the most liquid projects to be rejected in favor of less liquid projects.
  - c. projects to be incorrectly accepted due to ignoring the time value of money.
  - d. projects with negative net present values to be accepted.
  - e. some projects to be accepted which would otherwise be rejected under the payback rule.

**AVERAGE ACCOUNTING RETURN**

- e 31. The average accounting rate of return:
  - a. is actually based more on financial values than on accounting values.
  - b. measures net income against the market value of a firm.
  - c. is highly recommended by financial professionals as one of the two best methodologies used in the analysis of independent projects.
  - d. is the primary methodology used in analyzing independent projects.
  - e. is similar to the return on assets ratio.

**AVERAGE ACCOUNTING RETURN**

- d 32. Assuming that straight line depreciation is used, the average accounting return for a project is computed as the average:
  - a. net income of a project divided by the average total assets of a firm.
  - b. book value of a project multiplied by the average profit margin of the project.
  - c. book value of a project divided by the average net income of the project.
  - d. net income of a project divided by the average investment in the project.
  - e. net income of the firm divided by the average investment in a project.

**AVERAGE ACCOUNTING RETURN**

- d 33. Which of the following are disadvantages associated with the average accounting return?
  - I. difficulty in obtaining necessary information to do computation
  - II. exclusion of time value of money considerations
  - III. the use of a cutoff rate as a benchmark
  - IV. the accounting basis of the values used in the computation
  - a. I and IV only
  - b. II and III only
  - c. I, II, and III only
  - d. II, III, and IV only
  - e. I, II, and IV only

**AVERAGE ACCOUNTING RETURN**

- b 34. The average accounting return:
  - a. reflects the projected net effect of the cash flows from a project on the overall firm.
  - b. is comparable to the return on assets and thus provides a similar measure of performance.
  - c. reflects the anticipated net impact of a project on the shareholders of the firm.
  - d. rule, when applied, guarantees that only projects that increase shareholder wealth will be accepted.
  - e. ignores all income produced by a project after an arbitrarily assigned cutoff point.

**INTERNAL RATE OF RETURN**

- b 35. The internal rate of return (IRR):
  - I. rule states that a project with an IRR that is less than the required rate should be accepted.
  - II. is the rate generated solely by the cash flows of an investment.
  - III. is the rate that causes the net present value of a project to exactly equal zero.
  - IV. can effectively be used to analyze all investment scenarios.
    - a. I and IV only
    - b. II and III only
    - c. I, II, and III only
    - d. II, III, and IV only
    - e. I, II, III, and IV

**INTERNAL RATE OF RETURN**

- e 36. The internal rate of return method of analysis:
  - I. may produce multiple rates of return for a single project.
  - II. may lead to incorrect decisions when comparing mutually exclusive projects.
  - III. is generally more popular in practice than NPV.
  - IV. works best for independent projects with conventional cash flows.
    - a. I and II only
    - b. III and IV only
    - c. I, III, and IV only
    - d. I, II, and IV only
    - e. I, II, III, and IV

**INTERNAL RATE OF RETURN**

- a 37. The internal rate of return for a project will increase if:
  - a. the initial cost of the project can be reduced.
  - b. the total amount of the cash inflows is reduced.
  - c. each cash inflow is moved such that it occurs one year later than originally projected.
  - d. the required rate of return is reduced.
  - e. the salvage value of the project is omitted from the analysis.



**INTERNAL RATE OF RETURN**

- c 38. The internal rate of return is:
  - a. more reliable as a decision making tool than net present value whenever you are considering mutually exclusive projects.
  - b. equivalent to the discount rate that makes the net present value equal to one.
  - c. difficult to compute without the use of either a financial calculator or a computer.
  - d. dependent upon the interest rates offered in the marketplace.
  - e. a better methodology than net present value when dealing with unconventional cash flows.

**INTERNAL RATE OF RETURN**

- d 39. Which of the following are elements of the internal rate of return method of analysis?
  - I. the timing of the cash flows
  - II. the cutoff point after which any future cash flows are ignored
  - III. the rate designated as the minimum acceptable rate for a project to be accepted
  - IV. the initial cost of an investment
  - a. I and II only
  - b. III and IV only
  - c. I, II, and III only
  - d. I, III, and IV only
  - e. II, III, and IV only

**INTERNAL RATE OF RETURN**

- a 40. The internal rate of return tends to be:
  - a. easier for managers to comprehend than the net present value.
  - b. extremely accurate even when cash flow estimates are faulty.
  - c. ignored by most financial analysts.
  - d. used primarily to differentiate between mutually exclusive projects.
  - e. utilized in project analysis only when multiple net present values apply.

**CROSSOVER POINT**

- e 41. You are trying to determine whether to accept project A or project B. These projects are mutually exclusive. As part of your analysis, you should compute the crossover point by determining:
  - a. the internal rate of return for the cash flows of each project.
  - b. the net present value of each project using the internal rate of return as the discount rate.
  - c. the discount rate that equates the discounted payback periods for each project.
  - d. the discount rate that makes the net present value of each project equal to 1.
  - e. the internal rate of return for the differences in the cash flows of the two projects.

**CROSSOVER POINT**

- c 42. You are comparing two mutually exclusive projects. The crossover point is 9 percent. You determine that you should accept project A if the required return is 6 percent. This implies that you should:
- I. reject project B if the required return is 6 percent.
  - II. always accept project A and always reject project B.
  - III. always reject project A any time the discount rate is greater than 9 percent.
  - IV. accept project A any time the discount rate is less than 9 percent.
- a. I and II only
  - b. III and IV only
  - c. I, III, and IV only
  - d. I, II, and IV only
  - e. I, II, III, and IV

**CROSSOVER POINT**

- b 43. Graphing the crossover point helps explain:
- a. why one project is always superior to another project.
  - b. how decisions concerning mutually exclusive projects are derived.
  - c. how the duration of a project affects the decision as to which project to accept.
  - d. how the net present value and the initial cash outflow of a project are related.
  - e. how the profitability index and the net present value are related.

**PROFITABILITY INDEX**

- d 44. The profitability index is closely related to:
- a. payback.
  - b. discounted payback.
  - c. the average accounting return.
  - d. net present value.
  - e. mutually exclusive projects.

**PROFITABILITY INDEX**

- b 45. Analysis using the profitability index:
- a. frequently conflicts with the accept and reject decisions generated by the application of the net present value rule.
  - b. is useful as a decision tool when investment funds are limited.
  - c. is useful when trying to determine which one of two mutually exclusive projects should be accepted.
  - d. utilizes the same basic variables as those used in the average accounting return.
  - e. produces results which typically are difficult to comprehend or apply.

**PROFITABILITY INDEX**

- e 46. If you want to review a project from a benefit-cost perspective, you should use the \_\_\_\_\_ method of analysis.
- a. net present value
  - b. payback
  - c. internal rate of return
  - d. average accounting return
  - e. profitability index

**PROFITABILITY INDEX**

- b 47. When the present value of the cash inflows exceeds the initial cost of a project, then the project should be:
- a. accepted because the internal rate of return is positive.
  - b. accepted because the profitability index is greater than 1.
  - c. accepted because the profitability index is negative.
  - d. rejected because the internal rate of return is negative.
  - e. rejected because the net present value is negative.

**MUTUALLY EXCLUSIVE PROJECTS**

- c 48. Which one of the following is the best example of two mutually exclusive projects?
- a. planning to build a warehouse and a retail outlet side by side
  - b. buying sufficient equipment to manufacture both desks and chairs simultaneously
  - c. using an empty warehouse for storage or renting it entirely out to another firm
  - d. using the company sales force to promote sales of both shoes and socks
  - e. buying both inventory and fixed assets using funds from the same bond issue

**MUTUALLY EXCLUSIVE PROJECTS**

- d 49. The Liberty Co. is considering two projects. Project A consists of building a wholesale book outlet on lot #169 of the Englewood Retail Center. Project B consists of building a sit-down restaurant on lot #169 of the Englewood Retail Center. When trying to decide whether or build the book outlet or the restaurant, management should rely most heavily on the analysis results from the \_\_\_\_\_ method of analysis.
- a. profitability index
  - b. internal rate of return
  - c. payback
  - d. net present value
  - e. accounting rate of return

**MUTUALLY EXCLUSIVE PROJECTS**

- c 50. When two projects both require the total use of the same limited economic resource, the projects are generally considered to be:
- a. independent.
  - b. marginally profitable.
  - c. mutually exclusive.
  - d. acceptable.
  - e. internally profitable.

**MUTUALLY EXCLUSIVE PROJECTS**

- b 51. The final decision on which one of two mutually exclusive projects to accept ultimately depends upon the:
- a. initial cost of each project.
  - b. required discount rate.
  - c. total cash inflows of each project.
  - d. assigned payback period of each project.
  - e. length of each project's life.

### MUTUALLY EXCLUSIVE PROJECTS

- c 52. Matt is analyzing two mutually exclusive projects of similar size and has prepared the following data. Both projects have 5 year lives.

	<u>Project A</u>	<u>Project B</u>
Net present value	\$15,090	\$14,693
Payback period	2.76 years	2.51 years
Average accounting return	9.3 percent	9.6 percent
Required return	8.3 percent	8.0 percent
Required AAR	9.0 percent	9.0 percent

Matt has been asked for his best recommendation given this information. His recommendation should be to accept:

- project B because it has the shortest payback period.
- both projects as they both have positive net present values.
- project A and reject project B based on their net present values.
- project B and reject project A based on their average accounting returns.
- project B and reject project A based on both the payback period and the average accounting return.

### INVESTMENT ANALYSIS

- a 53. Given that the net present value (NPV) is generally considered to be the best method of analysis, why should you still use the other methods?
- The other methods help validate whether or not the results from the net present value analysis are reliable.
  - You need to use the other methods since conventional practice dictates that you only accept projects after you have generated three accept indicators.
  - You need to use other methods because the net present value method is unreliable when a project has unconventional cash flows.
  - The average accounting return must always indicate acceptance since this is the best method from a financial perspective.
  - The discounted payback method must always be computed to determine if a project returns a positive cash flow since NPV does not measure this aspect of a project.

### INVESTMENT ANALYSIS

- e 54. In actual practice, managers frequently use the:
- AAR because the information is so readily available.
  - IRR because the results are easy to communicate and understand.
  - payback because of its simplicity.
  - net present value because it is considered by many to be the best method of analysis.
- I and III only
  - II and III only
  - I, III, and IV only
  - II, III, and IV only
  - I, II, III, and IV

**INVESTMENT ANALYSIS**

- a 55. No matter how many forms of investment analysis you do:
  - a. the actual results from a project may vary significantly from the expected results.
  - b. the internal rate of return will always produce the most reliable results.
  - c. a project will never be accepted unless the payback period is met.
  - d. the initial costs will generally vary considerably from the estimated costs.
  - e. only the first three years of a project ever affect its final outcome.

**INVESTMENT ANALYSIS**

- b 56. Which of the following may have contributed to the change in the primary methods used by chief financial officers to evaluate projects over the past forty years?
  - I. an increased emphasis on ease of use and simplicity of method
  - II. an increased availability of computers and financial calculators to handle the more complex computations
  - III. an increased level of financial knowledge by increasing sophisticated business executives
  - IV. an increasing emphasis by financial executives on accounting values rather than financial values
  - a. I and II only
  - b. II and III only
  - c. III and IV only
  - d. I, II, and IV only
  - e. II, III, and IV only

**INVESTMENT ANALYSIS**

- b 57. Which of the following methods of project analysis are biased towards short-term projects?
  - I. internal rate of return
  - II. accounting rate of return
  - III. payback
  - IV. discounted payback
  - a. I and II only
  - b. III and IV only
  - c. II and III only
  - d. I and IV only
  - e. II and IV only

**INVESTMENT ANALYSIS**

- a 58. If a project is assigned a required rate of return equal to zero, then:
  - a. the timing of the project's cash flows has no bearing on the value of the project.
  - b. the project will always be accepted.
  - c. the project will always be rejected.
  - d. whether the project is accepted or rejected will depend on the timing of the cash flows.
  - e. the project can never add value for the shareholders.

**DECISION RULES**

e 59. You are considering a project with the following data:

Internal rate of return	8.7 percent
Profitability ratio	.98
Net present value	-\$393
Payback period	2.44 years
Required return	9.5 percent

Which one of the following is correct given this information?

- a. The discount rate used in computing the net present value must have been less than 8.7 percent.
- b. The discounted payback period will have to be less than 2.44 years.
- c. The discount rate used to compute the profitability ratio was equal to the internal rate of return.
- d. This project should be accepted based on the profitability ratio.
- e. This project should be rejected based on the internal rate of return.

**DECISION RULES**

c 60. Which of the following statements are correct?

- I. A positive net present value signals an accept decision.
  - II. Projects should be accepted when the profitability index is less than 1.
  - III. A payback period that is less than the required period signals an accept decision.
  - IV. When the internal rate of return exceeds the required return, a project should be accepted.
- a. I and III only
  - b. II, III, and IV only
  - c. I, III, and IV only
  - d. I, II, and III only
  - e. I, II, III, and IV

**III. PROBLEMS**

**NET PRESENT VALUE**

b 61. What is the net present value of a project with the following cash flows and a required return of 12 percent?

Year	Cash Flow
0	-\$28,900
1	\$12,450
2	\$19,630
3	\$ 2,750

- a. -\$287.22
- b. -\$177.62
- c. \$177.62
- d. \$204.36
- e. \$287.22

**NET PRESENT VALUE**

- a 62. What is the net present value of a project that has an initial cash outflow of \$12,670 and the following cash inflows? The required return is 11.5 percent.

<u>Year</u>	<u>Cash Inflows</u>
1	\$4,375
2	\$ 0
3	\$8,750
4	\$4,100

- a. \$218.68  
 b. \$370.16  
 c. \$768.20  
 d. \$1,249.65  
 e. \$1,371.02

**NET PRESENT VALUE**

- b 63. A project will produce cash inflows of \$1,750 a year for four years. The project initially costs \$10,600 to get started. In year five, the project will be closed and as a result should produce a cash inflow of \$8,500. What is the net present value of this project if the required rate of return is 13.75 percent?

- a. -\$5,474.76  
 b. -\$1,011.40  
 c. -\$935.56  
 d. \$1,011.40  
 e. \$5,474.76

**NET PRESENT VALUE**

- a 64. You are considering the following two mutually exclusive projects. The required rate of return is 11.25 percent for project A and 10.75 percent for project B. Which project should you accept and why?

<u>Year</u>	<u>Project A</u>	<u>Project B</u>
0	-\$48,000	-\$126,900
1	\$18,400	\$ 69,700
2	\$31,300	\$ 80,900
3	\$11,700	\$ 0

- a. project A; because its NPV is about \$335 more than the NPV of project B  
 b. project A; because it has the higher required rate of return  
 c. project B; because it has the largest total cash inflow  
 d. project B; because it returns all its cash flows within two years  
 e. project B; because it is the largest sized project

## CHAPTER 9

### NET PRESENT VALUE

- a 65. You are considering two mutually exclusive projects with the following cash flows. Will your choice between the two projects differ if the required rate of return is 8 percent rather than 11 percent? If so, what should you do?

<u>Year</u>	<u>Project A</u>	<u>Project B</u>
0	-\$240,000	-\$198,000
1	\$ 0	\$110,800
2	\$ 0	\$ 82,500
3	\$325,000	\$ 45,000

- a. yes; Select A at 8 percent and B at 11 percent.
- b. yes; Select B at 8 percent and A at 11 percent.
- c. yes; Select A at 8 percent and select neither at 11 percent.
- d. no; Regardless of the required rate, project A always has the higher NPV.
- e. no; Regardless of the required rate, project B always has the higher NPV.

### INTERNAL RATE OF RETURN

- b 66. What is the internal rate of return on an investment with the following cash flows?

<u>Year</u>	<u>Cash Flow</u>
0	-\$123,400
1	\$ 36,200
2	\$ 54,800
3	\$ 48,100

- a. 5.93 percent
- b. 5.96 percent
- c. 6.04 percent
- d. 6.09 percent
- e. 6.13 percent

### INTERNAL RATE OF RETURN

- a 67. An investment has the following cash flows. Should the project be accepted if it has been assigned a required return of 9.5 percent? Why or why not?

<u>Year</u>	<u>Cash Flow</u>
0	-\$24,000
1	\$ 8,000
2	\$12,000
3	\$ 9,000

- a. yes; because the IRR exceeds the required return by about 0.39 percent
- b. yes; because the IRR is less than the required return by about 3.9 percent
- c. yes; because the IRR is positive
- d. no; because the IRR exceeds the required return by about 3.9 percent
- e. no; because the IRR is 9.89 percent



**INTERNAL RATE OF RETURN AND NET PRESENT VALUE**

- e 68. You are considering two independent projects with the following cash flows. The required return for both projects is 10 percent. Given this information, which one of the following statements is correct?

<u>Year</u>	<u>Project A</u>	<u>Project B</u>
0	-\$950,000	-\$125,000
1	\$330,000	\$ 55,000
2	\$400,000	\$ 50,000
3	\$450,000	\$ 50,000

- a. You should accept project B since it has the higher IRR and reject project A because you can not accept both projects.  
 b. You should accept project A because it has the lower NPV and reject project B.  
 c. You should accept project A because it has the higher NPV and you can not accept both projects.  
 d. You should accept project B because it has the higher IRR and reject project A.  
 e. You should accept both projects if the funds are available to do so.

**INTERNAL RATE OF RETURN**

- e 69. You are considering an investment with the following cash flows. If the required rate of return for this investment is 13.5 percent, should you accept it based solely on the internal rate of return rule? Why or why not?

<u>Year</u>	<u>Cash Flow</u>
0	-\$12,000
1	\$ 5,500
2	\$ 8,000
3	-\$ 1,500

- a. yes; because the IRR exceeds the required return  
 b. yes; because the IRR is a positive rate of return  
 c. no; because the IRR is less than the required return  
 d. no; because the IRR is a negative rate of return  
 e. You can not apply the IRR rule in this case because there are multiple IRRs.

**PROFITABILITY INDEX**

- d 70. What is the profitability index for an investment with the following cash flows given a 9 percent required return?

<u>Year</u>	<u>Cash Flow</u>
0	-\$21,500
1	\$ 7,400
2	\$ 9,800
3	\$ 8,900

- a. .96  
 b. .98  
 c. 1.00  
 d. 1.02  
 e. 1.04

**PROFITABILITY INDEX**

- e 71. Based on the profitability index (PI) rule, should a project with the following cash flows be accepted if the discount rate is 8 percent? Why or why not?

<u>Year</u>	<u>Cash Flow</u>
0	-\$18,600
1	\$10,000
2	\$ 7,300
3	\$ 3,700

- a. yes; because the PI is 1.008
- b. yes; because the PI is .992
- c. yes; because the PI is .999
- d. no; because the PI is 1.008
- e. no; because the PI is .992

**PROFITABILITY INDEX**

- c 72. You are considering two independent projects both of which have been assigned a discount rate of 8 percent. Based on the profitability index, what is your recommendation concerning these projects?

Project A		Project B	
<u>Year</u>	<u>Cash Flow</u>	<u>Year</u>	<u>Cash Flow</u>
0	-\$38,500	0	-\$42,000
1	\$20,000	1	\$10,000
2	\$24,000	2	\$40,000

- a. You should accept both projects since both of their PIs are positive.
- b. You should accept project A since it has the higher PI.
- c. You should accept both projects since both of their PIs are greater than 1.
- d. You should only accept project B since it has the largest PI and the PI exceeds 1.
- e. Neither project is acceptable.

**PROFITABILITY INDEX**

- d 73. You would like to invest in the following project.

<u>Year</u>	<u>Cash Flow</u>
0	-\$55,000
1	\$30,000
2	\$37,000

Victoria, your boss, insists that only projects that can return at least \$1.10 in today's dollars for every \$1 invested can be accepted. She also insists on applying a 10 percent discount rate to all cash flows. Based on these criteria, you should:

- a. accept the project because it returns almost \$1.22 for every \$1 invested.
- b. accept the project because it has a positive PI.
- c. accept the project because the NPV is \$2,851.
- d. reject the project because the PI is 1.05.
- e. reject the project because the IRR exceeds 10 percent.

**PAYBACK PERIOD**

- c 74. It will cost \$2,600 to acquire a small ice cream cart. Cart sales are expected to be \$1,400 a year for three years. After the three years, the cart is expected to be worthless as that is the expected remaining life of the cooling system. What is the payback period of the ice cream cart?
- a. .86 years
  - b. 1.46 years
  - c. 1.86 years
  - d. 2.46 years
  - e. 2.86 years

**PAYBACK PERIOD**

- e 75. You are considering a project with an initial cost of \$4,300. What is the payback period for this project if the cash inflows are \$550, \$970, \$2,600, and \$500 a year over the next four years, respectively.
- a. 2.04 years
  - b. 2.36 years
  - c. 2.89 years
  - d. 3.04 years
  - e. 3.36 years

**PAYBACK PERIOD**

- d 76. A project has an initial cost of \$1,900. The cash inflows are \$0, \$500, \$900, and \$700 over the next four years, respectively. What is the payback period?
- a. 2.71 years
  - b. 2.98 years
  - c. 3.11 years
  - d. 3.71 years
  - e. never

**PAYBACK PERIOD**

- e 77. Jack is considering adding toys to his general store. He estimates that the cost of inventory will be \$4,200. The remodeling expenses and shelving costs are estimated at \$1,500. Toy sales are expected to produce net cash inflows of \$1,200, \$1,500, \$1,600, and \$1,750 over the next four years, respectively. Should Jack add toys to his store if he assigns a three-year payback period to this project?
- a. yes; because the payback period is 2.94 years
  - b. yes; because the payback period is 2.02 years
  - c. yes; because the payback period is 3.80 years
  - d. no; because the payback period is 2.02 years
  - e. no; because the payback period is 3.80 years

## CHAPTER 9

### DISCOUNTED PAYBACK PERIOD

- e 78. A project has an initial cost of \$8,500 and produces cash inflows of \$2,600, \$4,900, and \$1,500 over the next three years, respectively. What is the discounted payback period if the required rate of return is 7 percent?
- a. 2.13 years
  - b. 2.33 years
  - c. 2.67 years
  - d. 2.91 years
  - e. never

### DISCOUNTED PAYBACK PERIOD

- c 79. Yancy is considering a project which will produce cash inflows of \$900 a year for 4 years. The project has a 9 percent required rate of return and an initial cost of \$2,800. What is the discounted payback period?
- a. 3.11 years
  - b. 3.18 years
  - c. 3.82 years
  - d. 4.18 years
  - e. never

### DISCOUNTED PAYBACK PERIOD

- e 80. Ginny Trueblood is considering an investment which will cost her \$120,000. The investment produces no cash flows for the first year. In the second year the cash inflow is \$35,000. This inflow will increase to \$55,000 and then \$75,000 for the following two years before ceasing permanently. Ginny requires a 10 percent rate of return and has a required discounted payback period of three years. Ginny should \_\_\_\_\_ this project because the discounted payback period is \_\_\_\_\_
- a. accept; 2.03 years.
  - b. accept; 2.97 years.
  - c. accept; 3.97 years.
  - d. reject; 3.03 years.
  - e. reject; 3.97 years.

### DISCOUNTED PAYBACK PERIOD

- e 81. Tim is considering two projects both of which have an initial cost of \$12,000 and total cash inflows of \$15,000. The cash inflows of project A are \$1,000, \$2,000, \$4,000, and \$8,000 over the next four years, respectively. The cash inflows for project B are \$8,000, \$4,000, \$2,000 and \$1,000 over the next four years, respectively. Which one of the following statements is correct if Tim requires a 10 percent rate of return and has a required discounted payback period of 3 years?
- I. Tim should accept project A because it has a payback period of 2.65 years.
  - II. Tim should reject project A because it never pays back at a 10 percent rate.
  - III. Tim should accept project B as long as the discount rate is 10 percent or less.
  - IV. Tim should accept project B because it has a discounted payback period of 2.95 years.
- a. I and III only
  - b. I and IV only
  - c. II and III only
  - d. II and IV only
  - e. II, III, and IV only

### AVERAGE ACCOUNTING RETURN

- e 82. Larry's Lanterns is considering a project which will produce sales of \$240,000 a year for the next five years. The profit margin is estimated at 6 percent. The project will cost \$290,000 and be depreciated straight-line to a book value of zero over the life of the project. Larry's has a required accounting return of 8 percent. This project should be \_\_\_\_\_ because the AAR is \_\_\_\_\_
- rejected; 4.14 percent.
  - rejected; 6 percent.
  - rejected; 8.28 percent.
  - accepted; 8.28 percent.
  - accepted; 9.93 percent.

**AVERAGE ACCOUNTING RETURN**

- d 83. A project has an initial cost of \$38,000 and a four-year life. The company uses straight-line depreciation to a book value of zero over the life of the project. The projected net income from the project is \$1,000, \$1,200, \$1,500, and \$1,700 a year for the next four years, respectively. What is the average accounting return?
- 3.55 percent
  - 4.13 percent
  - 4.28 percent
  - 7.11 percent
  - 14.21 percent

**AVERAGE ACCOUNTING RETURN**

- d 84. A project produces annual net income of \$9,500, \$12,500, and \$15,500 over the three years of its life, respectively. The initial cost of the project is \$260,400. This cost is depreciated straight-line to a zero book value over three years. What is the average accounting rate of return if the required discount rate is 7 percent?
- 4.80 percent
  - 7.32 percent
  - 8.97 percent
  - 9.60 percent
  - 10.27 percent

**AVERAGE ACCOUNTING RETURN**

- d 85. A project has average net income of \$2,100 a year over its 4-year life. The initial cost of the project is \$65,000 which will be depreciated using straight-line depreciation to a book value of zero over the life of the project. The firm wants to earn a minimal average accounting return of 8.5 percent. The firm should \_\_\_\_\_ the project based on the AAR of \_\_\_\_\_
- accept; 6.46 percent.
  - accept; 9.69 percent.
  - accept; 12.92 percent.
  - reject; 6.46 percent.
  - reject; 12.92 percent.

## CHAPTER 9

### AVERAGE ACCOUNTING RETURN

- a 86. Martin is analyzing a project and has gathered the following data. Based on this data, what is the average accounting rate of return? The firm depreciates its assets using straight-line depreciation to a zero book value over the life of the asset.

<u>Year</u>	<u>Cash Flow</u>	<u>Net Income</u>
0	-\$642,000	n/a
1	\$170,000	\$ 9,500
2	\$240,000	\$79,500
3	\$205,000	\$44,500
4	\$195,000	\$34,500

- a. 13.08 percent
- b. 15.77 percent
- c. 21.83 percent
- d. 26.17 percent
- e. 31.54 percent

### CROSSOVER RATE

- e 87. You are analyzing the following two mutually exclusive projects and have developed the following information. What is the crossover rate?

	<u>Project A</u>	<u>Project B</u>
<u>Year</u>	<u>Cash Flow</u>	<u>Cash Flow</u>
0	-\$84,500	-\$76,900
1	\$29,000	\$25,000
2	\$40,000	\$35,000
3	\$27,000	\$26,000

- a. 11.113 percent
- b. 13.008 percent
- c. 14.901 percent
- d. 16.750 percent
- e. 17.899 percent

### CROSSOVER RATE

- b 88. The Winston Co. is considering two mutually exclusive projects with the following cash flows. The crossover rate is \_\_\_\_\_ and if the required rate is higher than the crossover rate then project \_\_\_\_\_ should be accepted.

	<u>Project A</u>	<u>Project B</u>
<u>Year</u>	<u>Cash Flow</u>	<u>Cash Flow</u>
0	-\$75,000	-\$60,000
1	\$30,000	\$25,000
2	\$35,000	\$30,000
3	\$35,000	\$25,000

- a. 13.94 percent; A
- b. 13.94 percent; B
- c. 15.44 percent; A
- d. 15.44 percent; B
- e. 15.86 percent; A

Use the following information to answer questions 89 through 92.

You are analyzing a project and have prepared the following data:

<u>Year</u>	<u>Cash flow</u>
0	-\$169,000
1	\$ 46,200
2	\$ 87,300
3	\$ 41,000
4	\$ 39,000
Required payback period	2.5 years
Required AAR	7.25 percent
Required return	8.50 percent

### PROFITABILITY INDEX

- b 89. Based on the profitability index of \_\_\_\_\_ for this project, you should \_\_\_\_\_ the project.
- .97; accept
  - 1.05; accept
  - 1.18; accept
  - .97; reject
  - 1.05; reject

### INTERNAL RATE OF RETURN

- b 90. Based on the internal rate of return of \_\_\_\_\_ for this project, you should \_\_\_\_\_ the project.
- 8.95 percent; accept
  - 10.75 percent; accept
  - 8.44 percent; reject
  - 9.67 percent; reject
  - 10.33 percent; reject

### NET PRESENT VALUE

- c 91. Based on the net present value of \_\_\_\_\_ for this project, you should \_\_\_\_\_ the project.
- \$2,021.28; reject
  - \$406.19; reject
  - \$7,978.72; accept
  - \$9,836.74; accept
  - \$12,684.23; accept

### PAYBACK PERIOD

- c 92. Based on the payback period of \_\_\_\_\_ for this project, you should \_\_\_\_\_ the project.
- 1.87 years; accept
  - 2.87 years; accept
  - 2.87 years; reject
  - 3.13 years; reject
  - 3.87 years; reject

## CHAPTER 9

Use the following information to answer questions 93 through 97.

You are considering the following two mutually exclusive projects. Both projects will be depreciated using straight-line depreciation to a zero book value over the life of the project. Neither project has any salvage value.

Project A		Project B	
Year	Cash Flow	Year	Cash Flow
0	-\$75,000	0	-\$70,000
1	\$19,000	1	\$10,000
2	\$48,000	2	\$16,000
3	\$12,000	3	\$72,000
Required rate of return	10 percent		13 percent
Required payback period	2.0 years		2.0 years
Required accounting return	8 percent		11 percent

### NET PRESENT VALUE

- c 93. Based on the net present value method of analysis and given the information in the problem, you should:
- accept both project A and project B.
  - accept project A and reject project B.
  - accept project B and reject project A.
  - reject both project A and project B.
  - accept whichever one you want as they represent equal opportunities.

### INTERNAL RATE OF RETURN

- e 94. Based upon the internal rate of return (IRR) and the information provided in the problem, you should:
- accept both project A and project B.
  - reject both project A and project B.
  - accept project A and reject project B.
  - accept project B and reject project A.
  - ignore the IRR rule and use another method of analysis.

### PAYBACK PERIOD

- b 95. Based upon the payback period and the information provided in the problem, you should:
- accept both project A and project B.
  - reject both project A and project B.
  - accept project A and reject project B.
  - accept project B and reject project A.
  - require that management extend the payback period for project A since it has a higher initial cost.



**PROFITABILITY INDEX**

- e 96. Based upon the profitability index (PI) and the information provided in the problem, you should:
- accept both project A and project B.
  - accept project A and reject project B.
  - accept project B and reject project A.
  - reject both project A and project B.
  - disregard the PI method in this case.

**AVERAGE ACCOUNTING RETURN**

- e 97. Based upon the average accounting return (AAR) and the information provided in the problem, you:
- should accept both project A and project B.
  - should accept project A because the AAR exceeds the required rate.
  - should accept project A because the AAR is less than the required rate.
  - should accept whichever project you prefer as they are equivalent from an AAR perspective.
  - can not compute the AAR of either project.

**ESSAYS****NPV AND FIRM VALUE**

98. According to the text, the NPV rule states that, “An investment should be accepted if the net present value [NPV] is positive and rejected if it is negative.” What does an NPV of zero mean? If you were a decision-maker faced with a project with a zero NPV (or very close to zero) what would you do? Why?

Although the possibility of a zero NPV is remote, it makes for an interesting question and tests the student’s understanding of the underlying theory. In strict economic terms, one should be indifferent to the project; however, many projects require further considerations. A key point in the student’s answer should be that they stress the project provides a return just equal to the firm’s required return. This question provides a good lead-in to the two capital budgeting chapters that follow.

**INTERNAL RATE OF RETURN**

99. List and briefly discuss the advantages and disadvantages of the internal rate of return (IRR) rule.

The advantages of the rule are its close relationship with NPV and the ease with which it is understood and communicated. The two disadvantages are that there may be multiple solutions and the rule may lead to a ranking conflict in evaluating mutually exclusive investments. The student should add a brief explanation demonstrating their understanding of each.

**NPV VS. PI**

100. Explain the differences and similarities between net present value (NPV) and the profitability index (PI).

The NPV and PI are basically the same calculation, and both rules lead to the same accept/reject decision. The main difference between the two is that the PI may be useful in determining which projects to accept if funds are limited; however, the PI may lead to incorrect decisions in considering mutually exclusive investments.

**NPV AND PROJECT VALUE**

101. Given the goals of firm value and shareholder wealth maximization, we have stressed the importance of net present value (NPV). And yet, many financial decision-makers at some of the most prominent firms in the world continue to use less desirable measures such as the payback period and the average accounting return (AAR). Why do you think this is the case?

This is an open-ended question which allows the creative student to speculate on the value of non-discounted cash flow evaluation measures. We use it as a springboard to stress that even rational financial managers sometimes find it expedient to use a group of measures. For example, firms may rely on the IRR because it is easier to explain to board members than NPV. Also, for large projects, AAR provides shareholders with some insights as to the project's impact on net income and earnings per share.