

Study Problems I

Problem 2.1. Forecast the cash flow streams associated with the following equipment purchases. In each case assume the tax rate is 35%.

a. Original cost of \$125,000, depreciated straight-line to an ending book value of \$25,000 at the end of year 5, scrapped at the end of year 5, zero scrap value.

b. Original cost of \$2 million, depreciated using the five-year depreciation schedule (p. 272 of textbook) to an ending book value of zero, scrapped for \$250,000 at the end of year 8.

c. Original cost of \$750,000, depreciated straight-line to an ending book value of \$150,000 at the end of year 3, scrapped for \$60,000 at the end of year 5, scrap value expressed in today's dollars. Projected inflation is 4% per year.

Problem 2.2. Snootjoy Wines is considering the purchase of an automatic winepress for \$160,000. The press will be operated for six years, after which it will be scrapped. At the end of year 6 a scrap value of \$20,000 will be received. Further, a major overhaul of the winepress will be required at the end of year 3, at a cost of \$10,000.

For tax purposes, 20% of the initial investment may be depreciated in each year for years 1 through 4, and 10% in years 5 and 6. The overhaul cost will be treated as SG&A. The tax rate is 35%. Forecast the cash flow stream associated with this purchase.

Problem 2.3. Sunset Properties, Inc., is considering investing \$250 million in land that it will hold for 25 years and then resell. The investment generates pretax net cash flows of \$40 million per year, expressed in today's prices. Land values are expected to rise at the rate of 7% per year, while other prices are expected to rise at 2% per year. The tax rate is 45%. Forecast the cash flow stream generated by this investment.

Problem 2.4. Hightower Equipment Co. is considering the purchase of a new heavy duty crane for \$320,000. Rental of the crane will generate cash revenue of \$150,000 per year, while cash operating expenses will be \$30,000 per year, for the lifetime of the crane. In four years the crane must be overhauled at a cost of \$80,000, and in eight years the crane will be scrapped at a cost of \$25,000. All of these figures are in today's prices.

For tax purposes, the purchase price is depreciated straight-line for eight years to an ending book value of zero, while the overhaul cost is depreciated straight-line for four years to an ending book value of zero. The tax rate is 35% and the projected inflation rate is 3% per year. Forecast the cash flow stream generated by this investment.

Problem 2.5. Rehash Records is considering a new album by their pop group, the Derivatives. Recording requires an immediate investment of \$160,000. Rehash will receive \$10

per CD for each CD sold. Sales of the album are projected at 100,000 CDs in the first year, declining by 50% per year for the next two years.

Production costs are \$1 per CD. Initial inventory will consist of 65,000 CDs, and inventory holdings will be 55,000 and 25,000 CDs at the end of years 1 and 2, respectively. Marketing costs of \$500,000 will also be incurred at the end of year 1.

For tax purposes the recording investment may be depreciated straight-line for two years to an ending book value of \$40,000, while marketing costs are treated as SG&A. Rehash has a tax rate of 35%. Forecast cash flows from the project.

Problem 2.6. BlabNet Systems, Inc., has been offered a contract to install a network system for another company. The project will take two years to complete, and BlabNet will be paid \$1.2 million upon completion. Labor and materials costs are projected as follows:

Year	0	1	2
Labor Costs	\$200,000	\$250,000	\$300,000
Materials Costs	\$150,000	\$100,000	0

All costs are carried as Work in Process until the project is completed. The tax rate is 35%. Forecast cash flows from the project.

Problem 2.7. Profound Products, Inc., is planning to market a new banana peeler. Projected sales are \$80,000 per year in the first two years, declining at a rate of 25% per year for the next four years. The peeler will be discontinued after year 6. COGS amounts to 85% of sales. Required inventories are \$10,000 now, rising by 15% per year for the first two years, then falling by 40% per year for the next three years. Inventory shrinkage amounts to 2% of inventory in the previous year. Inventory is zero at the end of year 6.

The tax rate is 35%. Forecast cash flows from the project.

Problem 2.8. The Lucrative Liquidation Co. can purchase two warehouses now, and three more one year from now. Lucrative expects to sell one warehouse per year for the next five years. In terms of today's dollars, each warehouse costs \$500,000, and will sell for \$650,000. The tax rate is 35%.

a. Suppose projected inflation is zero. Forecast cash flows from the project.

b. Recalculate the cash flow forecast under the assumption that projected inflation is 4% per year.

Problem 2.9. The Greenback Gallery can purchase a collection of paintings for \$20 million, and resell them for \$30 million in one year. One third of the sales will be paid in cash, and two thirds will be credit sales. Buyers will repay half the credit sales two years from now, and the remainder three years from now. The tax rate is 35%.

a. Suppose the Gallery charges no interest on credit sales. Forecast cash flows from the project.

b. Recalculate the cash flow forecast under the assumption that the Gallery charges 14% annual interest, payable in cash at the end of each year.

Problem 2.10. The Chasm clothing store is considering expanding its selling area by converting existing storage space. The cost of the conversion is \$100,000. By the end of the first year, the expansion is expected to generate new sales of \$75,000, and new sales are expected to grow at a rate of 3% per year. Added selling costs and working capital requirements are estimated at \$50,000 and \$80,000, respectively, in the first year, and these are expected to remain constant. Further, additional storage area will need to be rented at a cost of \$10,000 per year. The store will operate for six more years, and then it will be closed with zero scrap value.

The conversion cost will be depreciated straight-line to an ending book value of \$10,000 at the end of year 6. The tax rate is 35%. Forecast cash flows from the project.

Problem 2.11. Atomic Nutrition, Inc., has perfected a process for turning radioactive waste into a dietary supplement. Production and distribution require an up front investment of \$6 million, of which \$4 million is plant and equipment and \$2 million is startup cost. Annual sales of the supplement and selling costs are projected to be \$5.5 million and \$2.5 million, respectively, starting in the first year. The product will be discontinued at the end of year 4. Working capital requirements are projected to be 7.5% of sales. The plant and equipment will be scrapped at the end of year 5, yielding projected scrap revenue of \$1 million. All of these figures are expressed in today's prices.

For tax purposes, the plant and equipment can be depreciated using the three-year tax depreciation schedule (p.272 of textbook) to an ending book value of \$500,000, while the startup cost can be treated as SG&A. The tax rate is 35% and projected inflation is 3%. Forecast cash flows from the project.

Problem 3.1. Use CAPM to answer the following questions:

a. Market return is 10.4%, risk-free rate is 3.2%, beta of Asset Q is .85. What is the OCC of Asset Q ?

b. Market risk premium is 6.9%, risk-free rate is 2.1%, Asset R return is 9.3%. What is the beta of Asset R ?

c. Market return is 12.6%, Asset S return is 14.9%, Asset S beta is 1.30. What is the risk-free rate?

Problem 3.2. Calculate the PVs of the following cash flows at the given discount rates:

a. \$80,000 received at the end of year 6, discount rate 11%.

b. \$120,000 received at the end of year 15, discount rate 4%.

c. \$40,000 received at the end of year 2, discount rate 6%.

Problem 3.3. Calculate the PVs of the following cash flow streams at the given discount rates:

a. \$20,000 received at the end of years 1 through 15, discount rate 5%.

b. \$100,000 received at the end of years 1 through 4, discount rate 15%.

c. \$65,000 received now and at the end of years 1 through 20, discount rate 6%.

Problem 3.4. Calculate the PVs of the following cash flow streams at the given discount rates:

- a. \$14,000 per year starting at the end of the current year, continuing in perpetuity, discount rate 12%.
- b. \$60,000 at the end of the current year, followed by cash flows at the end of every future year that rise by 2% per year, discount rate 7%.
- c. \$750,000 received at the end of year 1, growing at an annual rate of 4% for years 2 through 12, discount rate 18%.

Problem 3.5. Starting at the end of the current year, you will receive \$10,000 per year for 11 years, but you will have to pay \$50,000 at the end of year 12. Your discount rate is 13%.

- a. What is the PV of these future cash flows?
- b. Suppose the cash flow stream is delayed for six years. What is the PV in this case?

Problem 3.6. You will receive \$300,000 one year from now, followed by cash flows in each succeeding year that decline at an annual rate of 5% for 13 more years. Cash flows then level out and continue in perpetuity. Your discount rate is 9%. What is the PV of these future cash flows?

Problem 3.7. Calculate the PVs of the following cash flow streams at the given discount rates:

- a. \$60,000 received at the end of the current quarter, followed by quarterly cash flows at the same level until the end of year 5, discount rate 14% per year.
- b. \$1,500 received at the end of the current month, followed by monthly cash flows that decline at a rate of 1% per month, with the final cash flow received at the end of year 4, discount rate 17% per year.

Problem 3.8. You will receive cash payments totaling \$500,000, to be spread over the next two years. Your discount rate is 13% per year. Calculate the PVs of the following payment plans:

- a. Equal quarterly payments for two years, starting one quarter from now.
- b. Equal weekly payments for two years, starting one week from now.

Problem 3.9. A new retail outlet can be opened for an initial investment of \$350,000. The store will yield new cash flows of \$60,000 per year for 10 years, after which time it will be closed. There is no scrap value. The OCC is 9%. What is the NPV of this investment?

Problem 3.10. A new oil well can be drilled for \$800,000. The well will yield net cash flows of \$140,000 per year for the first six years. At the end of the sixth year, an added \$90,000 must be invested for secondary recovery, and net cash flows will be \$60,000 per year for years 7 through 10. At the end of year 10, the well must be closed down, at a cost of \$25,000. The OCC is 15%. What is the NPV of this investment?

Problem 3.11. A soap company is considering an investment of \$5 million to introduce a new brand. The project will yield a cash flow of \$1.2 million at the end of the first year. The OCC is 12%.

a. Positive cash flows are expected to continue in perpetuity, but they will decline at a rate of 8% per year. What is the NPV of this project?

b. Suppose instead that cash flows will continue for 10 years only, still declining at 8% per year. Now what is the NPV?