Chapter 6

#5, #10~#11, #15, #19, #22, #24, and #26~#28

5. NPV and Modified ACRS In the previous problem, suppose the fixed asset actually falls into the three-year MACRS class. All the other facts are the same. What is the project's Year 1 net cash flow now? Year 2? Year 3? What is the new NPV?

10. Calculating EAC You are evaluating two different silicon wafer milling machines. The Techron I costs $215,000, has a three-year life, and has pretax operating costs of $35,000 per year. The Techron II costs $270,000, has a five-year life, and has pretax operating costs of $44,000 per year. For both milling machines, use straight-line depreciation to zero over the project's life and assume a salvage value of $20,000. If your tax rate is 35 percent and your discount rate is 12 percent, compute the EAC for both machines. Which do you prefer? Why?

11. Cost-Cutting Proposals Massey Machine Shop is considering a four-year project to improve its production efficiency. Buying a new machine press for $640,000 is estimated to result in $270,000 in annual pretax cost savings. The press falls in the MACRS five-year class, and it will have a salvage value at the end of the project of $70,000. The press also requires an initial investment in spare parts inventory of $20,000, along with an additional $3,500 in inventory for each succeeding year of the project. If the shop's tax rate is 35 percent and its discount rate is 14 percent, should Massey buy and install the machine press?

15. Capital Budgeting with Inflation Consider the following cash flows on two mutually exclusive projects:

Year	Project A	Project B
0	−$50,000	−$65,000
1	30,000	29,000
2	25,000	38,000
3	20,000	41,000

The cash flows of project *A* are expressed in real terms, whereas those of project *B* are expressed in nominal terms. The appropriate nominal discount rate is 13 percent and the inflation rate is 4 percent. Which project should you choose?

19. Equivalent Annual Cost Bridgton Golf Academy is evaluating different golf practice equipment. The "Dimple-Max" equipment costs $94,000, has a three-year life, and costs $8,600 per year to operate. The relevant discount rate is 12 percent. Assume that the straight-line depreciation method is used and that the equipment is fully depreciated to zero. Furthermore, assume the equipment has a salvage value of $18,000 at the end of the project's life. The relevant tax rate is 34 percent. All cash flows occur at the end of the year. What is the equivalent annual cost (EAC) of this equipment?

22. **Project Analysis and Inflation** Sanders Enterprises, Inc., has been considering the purchase of a new manufacturing facility for $270,000. The facility is to be fully depreciated on a straight-line basis over seven years. It is expected to have no resale value after the seven years. Operating revenues from the facility are expected to be $105,000, in nominal terms, at the end of the first year. The revenues are expected to increase at the inflation rate of 5 percent. Production costs at the end of the first year will be $30,000, in nominal terms, and they are expected to increase at 6 percent per year. The real discount rate is 8 percent. The corporate tax rate is 34 percent. Sanders has other ongoing profitable operations. Should the company accept the project?

24. **Calculating Project NPV** You have been hired as a consultant for Pristine Urban-Tech Zither, Inc. (PUTZ), manufacturers of fine zithers. The market for zithers is growing quickly. The company bought some land three years ago for $1 million in anticipation of using it as a toxic waste dump site but has recently hired another company to handle all toxic materials. Based on a recent appraisal, the company believes it could sell the land for $900,000 on an aftertax basis. In four years, the land could be sold for $1,200,000 after taxes. The company also hired a marketing firm to analyze the zither market, at a cost of $125,000. An excerpt of the marketing report is as follows:

> The zither industry will have a rapid expansion in the next four years. With the brand name recognition that PUTZ brings to bear, we feel that the company will be able to sell 6,700, 7,500, 9,100, and 6,200 units each year for the next four years, respectively. Again, capitalizing on the name recognition of PUTZ, we feel that a premium price of $275 can be charged for each zither. Because zithers appear to be a fad, we feel at the end of the four-year period, sales should be discontinued.

PUTZ feels that fixed costs for the project will be $350,000 per year, and variable costs are 15 percent of sales. The equipment necessary for production will cost $3.1 million and will be depreciated according to a three-year MACRS schedule. At the end of the project, the equipment can be scrapped for $300,000. Net working capital of $120,000 will be required immediately. PUTZ has a 38 percent tax rate, and the required return on the project is 13 percent. What is the NPV of the project? Assume the company has other profitable projects.

26. **EAC and Inflation** Office Automation, Inc., must choose between two copiers, the XX40 or the RH45. The XX40 costs $900 and will last for three years. The copier will require a real aftertax cost of $120 per year after all relevant expenses. The RH45 costs $1,400 and will last five years. The real aftertax cost for the RH45 will be $95 per year. All cash flows occur at the end of the year. The inflation rate is expected to be 5 percent per year, and the nominal discount rate is 14 percent. Which copier should the company choose?

26. **EAC and Inflation** Office Automation, Inc., must choose between two copiers, the XX40 or the RH45. The XX40 costs $900 and will last for three years. The copier will require a real aftertax cost of $120 per year after all relevant expenses. The RH45 costs $1,400 and will last five years. The real aftertax cost for the RH45 will be $95 per year. All cash flows occur at the end of the year. The inflation rate is expected to be 5 percent per year, and the nominal discount rate is 14 percent. Which copier should the company choose?

27. **Project Analysis and Inflation** Dickinson Brothers, Inc., is considering investing in a machine to produce computer keyboards. The price of the machine will be $975,000, and its economic life is five years. The machine will be fully depreciated by the straight-line method. The machine will produce 20,000 keyboards each year. The price of each keyboard will be $40 in the first year and will increase by 5 percent per year. The production cost per keyboard will be $15 in the first year and will increase by 6 percent per year. The project will have an annual fixed cost of $195,000 and require an immediate investment of $25,000 in net working capital. The corporate tax rate for the company is 34 percent. If the appropriate discount rate is 11 percent, what is the NPV of the investment?

28. **Project Evaluation** Aguilera Acoustics, Inc. (AAI), projects unit sales for a new seven-octave voice emulation implant as follows:

Year	Unit Sales
1	83,000
2	92,000
3	104,000
4	98,000
5	84,000

Production of the implants will require $1,500,000 in net working capital to start and additional net working capital investments each year equal to 15 percent of the projected sales increase for the following year. Total fixed costs are $2,400,000 per year, variable production costs are $190 per unit, and the units are priced at $345 each. The equipment needed to begin production has an installed cost of $23,000,000. Because the implants are intended for professional singers, this equipment is considered industrial machinery and thus qualifies as seven-year MACRS property. In five years, this equipment can be sold for about 20 percent of its acquisition cost. AAI is in the 35 percent marginal tax bracket and has a required return on all its projects of 18 percent. Based on these preliminary project estimates, what is the NPV of the project? What is the IRR?