Financial Management
Homework 1 (Due on 10 Oct)

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Question 1. Synovec Company has a debt-equity ratio of 0.70, return on assets is 8.4 percent, and total equity is $840,000. What is the equity multiplier? Return on equity? Net income?

Equity multiplier = 1+ debt − equity ratio = 1+0.70 = 1.70

Return on equity = return on assets × equity multiplier = 0.084 × 1.70 = 14.28%.

Total assets = total equity × equity multiplier = 840,000 × 1.70 = $1,428,000

Net income = total asset × return on assets = 0.084 × 1,428,000 = $119,952

Question 2. What is the present value of $7,500 per year, at a discount rate of 7.1 percent, if the first payment is received 6 years from now and the last payment is received 25 years from now?

Number of annuity periods $n = 25-6+1 = 20$.

Deferral period $m = 5$

The PV of the annuity at $ $PV_1 = PMT \times \dfrac{1-(1+r)^{-n}}{r} = 7500 \times \dfrac{1-(1+0.071)^{-20}}{0.071} = \$78841.29$.

The PV of the compound interest $PV_2 = PV_1 \times (1+r)^{-m} = 78841.29 \times (1+0.071)^{-5} = \$55950.81$

Question 3. Shelton Inc., has sales of $435,000, costs of $216,000, depreciation expense of $40,000, interest expense of $21,000, and a tax rate of 35 percent. What is the net income for the firm? Suppose the company paid out $30,000 in cash dividends. What is the addition to retained earnings?

$$EBIT = sales - costs - depreciation\ expense = 435,000 - 216,000 - 40,000$$
$$= \$179,000$$
$$PBT = EBIT - interest\ expense = 179,000 - 21,000 = \$158,000$$
$$net\ profits = PBT \times (1 - tax\ rate) = 158,000 \times (1 - 0.35) = \$102,700$$
$$addition\ to\ retained\ earnings = net\ profits - cash\ dividends$$
$$= 102,700 - 30000 = \$72,700$$

Question 4. You have just purchased a new warehouse. To finance the purchase, you've also arranged for a 30-year mortgage for 80 percent of the $5,200,000 purchase price. The monthly payment on this loan will be $27,500. What is the annual percentage rate (APR) on this loan? The effective annual rate (EAR)?

$$using\ EXCEL.\ IRR = RATE(360, -27500, 4160000, 0) \approx 0.578\%$$
$$APR = IRR \times 12 = 6.936\%.$$
$$EPR = (1 + \frac{APR}{m})^m - 1 = (1 + \frac{6.936\%}{12})^{12} - 1 \approx 7.161\%$$

Question 5. Comparing Investment Criteria. Consider the following cash flows of two mutually exclusive projects for Tokyo Rubber Company. Assume the discount rate for both projects is 8 percent.

| | DP | SP |
Year	Dry Prepreg	Solvent Prepreg
0	-$1,700,000	-$750,000
1	1,100,000	375,000
2	900,000	600,000
3	750,000	390,000

   a. Based on the payback period, which project should be taken?
   b. Based on the NPV, which project should be taken?
   c. Based on the IRR, which project should be taken?
   d. Based on the above analysis, which project should be taken?

a. DP payback period $= 1 + \dfrac{1,700,000 - 1,100,000}{900,000} \approx 1.67$ year

                                                 choose SP.

SP payback period $= 1 + \dfrac{750,000 - 375,000}{600,000} = 1.625$ year

b. $NPV_{DP} = \sum_{t=0}^{3} \dfrac{CF_t}{(1+r)^t} \approx \$685,497.64$ $NPV_{SP} = \sum_{t=0}^{3} \dfrac{CF_t}{(1+r)^t} = \$422,219.08$

   choose DP.

c. $IRR_{DP} = IRR(\{-1700000, 1100000, 900000, 750000\}) \approx 30.898\% > 8\%$ choose SP is better
   $IRR_{SP} = IRR(\{-750000, 375000, 600000, 390000\}) \approx 36.509\% > 8\%$

d. NPV directly reflects the absolute value of the project, so it's preferred to choose DP.

Question 6. A company is considering a new three-year expansion project that requires an initial fixed asset investment of $1.65 million. The fixed asset will be depreciated straight-line to zero over its three-year tax life, after which it will be worthless. The project is estimated to generate $1.24 million in annual sales, with costs of $485,000. The tax rate is 35 percent and the required return is 12 percent. What is the project's NPV?

depreciation expense per year $= 1,650,000/3 = \$550,000.$

$EBT = 1,240,000 - 485,000 - 550,000 = \$205,000.$

net profits $= 205,000 \times (1-0.35) = \$133,250.$

$OCF = 133,250 + 550,000 = \$683,250$

$NPV = -1,650,000 + OCF \times \dfrac{1-(1+r)^{-n}}{r} = \$-8948.79.$

$r = 12\%.$