32 Financial Statement Analysis

Problems

1. GoodRed Corp. started operations at the beginning of Year 1. Given the pre-closing (but post adjustments) trial balance below, prepare the income statement for Year 1 and the balance sheet at the end of Year 1. Classify balance sheet items into assets, liabilities, and equity. Further classification into subcategories, e.g., current versus non-current is NOT required. T-accounts are neither required nor expected.

Debits

Salesperson salary expenses	2
Depreciation expense on sales offices	4
Administrative expenses	5
Cash	4
Inventory	3
Cost of goods sold	9
Plant and Equipment	45
Bad debts expense	1
Receivables	5
Goodwill	6
Total	84

Credits

Allowance for bad debts	1
Revenue	30
Payables	4
Long-term loan	7
Accumulated depreciation on plant and equipment	12
Contributed capital	30
Total	84

2. AfterCo: Compute the return on equity on an after-tax basis given the following data:
Profit before interest and taxes = $500
Equity = $1,000
Debt = $2000
Interest rate = 10%
Margin = 30%
Average tax rate = 40%

3. NoDebt has $500 in assets and $500 in equity. Its return on assets before taxes (Earnings before interest and taxes/ Total assets) is 20%, and the income-tax rate is 40%. SellDebt approaches NoDebt with the offer to lend $200 to NoDebt. The interest rate is 25% APR paid annually. SellDebt tells NoDebt that, since the interest is tax-deductible, the after-tax interest rate is effectively 25% multiplied by 0.6 = 15%, which is lower than the ROA of 20%. Thus NoDebt would be better off by borrowing the $200. Assume that if NoDebt borrows $200 from

SellDebt it will use the proceeds to reduce equity (by buying back stock or by paying dividends); i.e., its total assets would remain the same.

For simplicity, assume that NoDebt's return on assets before taxes (Earnings before interest and taxes/ Total assets) will continue to be 20% forever, i.e., that it faces zero risk. Should it borrow at the given rate? Your answer should not exceed 200 words.

4. Nihouk's profit before interest and taxes is $500, its margin is 10%, and its asset turnover is 6. What will Nihouk's margin be if it increases its asset turnover to 10 and profit before interest and taxes to $600?

5. SlowMo and SpeedyJoe have identical businesses except that SlowMo has no debt while SpeedyJoe's debt-equity ratio is 1. Assume that the interest rate is 10%, the tax rate is 40% and both have $1000 in assets. At what level of profit before interest and taxes will SlowMo's after-tax return on equity be equal to SpeedyJoe's after-tax return on equity?

6. Drugs 'R Us sells $1,000 worth of medicine every month. It replenishes its inventory at the end of each week. The average inventory is $2000. The shelf life of the medicines it sells is 4 months.
   6.1. What is the store's inventory turnover per year?
   6.2. For how many days on average do the medicines stay on the store's shelf?

7. Big Automobile Corporation is having a strike in its major plant and production has come to a grinding halt. For simplicity assume that the company produces just one type of car. You are a financial analyst, and your boss has asked you to provide her with an estimate of the number of days it would take for the company's dealers to run out of cars. Historically the inventory turnover has been 6 per year. Assume 360 days in a year.

8. For simplicity assume that a year has 360 days. TurnCars, a car dealership, has 6 cars in its inventory at the beginning of the year. In addition, it purchases 10 cars at the beginning of each month (including the first month) and sells a car every 3 days. Assume that the cars are sold in the order in which they were purchased and each car costs the same.
   8.1. What is the inventory turnover per year?
   8.2. For how many days on average does a car stay in the dealer's warehouse?

9. If CardCo takes 40 days on average to collect cash from its customers, what will its receivable turnover per year be?

10. How many days does it take on average for Fotoshop to collect cash from the customers who buy on credit given the following data?
    Total sales = $1000
    Sales on credit = 75% of total sales
    Accounts receivable at beginning of year = $200
    Account receivable at the end of year = $300

11. FindROE: Tax rate = 40%. Annual market interest rate = 10%.

	A	B
EBIT	100	100
Equity	2000	2500
Debt outstanding	500	0

Given the above calculate:
11.1. ROE for each firm.
11.2. ROE for each firm if the EBIT for each firm is $500
11.3. Compare the ROE for the two companies for the two levels of operating activity. What is your conclusion regarding the effect on debt on ROE?

12. Invest and Divest both started their operations at the beginning of Year 1 with $300 in assets and no liabilities. Assume that both have identical businesses and ignore taxes. Both have 10 shares outstanding and reported earnings per share (EPS) of $6 in Year 1. Both have the option of pumping the profit back into the business. If they do so, the earnings per share in Year 2 will be $6.9. Invest chose to put the profits back into the business; Divest paid out the entire amount in dividends. In Year 2, Invest reported EPS of $6.9 per share, and Divest reported EPS of $6 per share.
12.1. If investors can make a 13% return elsewhere, i.e., the cost of capital is 13%, which firm do you think is acting in the interest of the shareholders? If you have cash today to buy shares, which of the two firms is a better deal? (Your answer should not exceed 200 words.)
12.2. What would your answer be if investors can make 17% elsewhere?

13. CashRich has no debt. For simplicity assume that its only accounting asset is $1,000 in cash, and it has 10 shares outstanding. Ignore taxes. The managers of CashRich are considering a project that will require an investment of $500 and is expected to yield a return of 15%. The managers of CashRich have no other project available for investment. CashRich's shareholders can make 20% return elsewhere for investments of comparable risk.
13.1. If CashRich's managers are rewarded on the basis of earnings per share, will they undertake this project? Give reasons for your answer.

Another firm, CashPoor, is also faced with a similar project, but it has no cash and will have to borrow the $500 needed for the project from a bank. Assume that the bank will charge interest commensurate with the project's risk.
13.2. If CashPoor's managers are rewarded on the basis of earnings per share, will they undertake this project? Give reasons for your answer.

14. Firms A and B are identical except that firm A follows LIFO and firm B follows FIFO. Assume that prices have been rising and there are no taxes.
14.1. Which firm will have a higher current ratio? Why?
14.2. Which firm will have a higher quick ratio? Why?

15. ComputeRatios: No journal entries are required.
    Cash = $100
    Marketable securities = $300
    Accounts payable = $400
    Inventories = $900
    Investment in securities = $400
    Accounts receivable = $700
    Allowance for bad debts = $400
    Acquisition cost of assets = $500
    Accumulated depreciation = $200
    Long-term liabilities = $700
    Contributed or paid-in capital = $600
    15.1. Retained earnings =
    15.2. Quick ratio =
    15.3. Current ratio =
    15.4. If the profit after taxes was $400 for the year, what is the after-tax return on equity?

16. MinInv is a car dealership and likes to maintain a minimum inventory of 10 cars. It had an inventory of 10 cars at the end of year 1. It buys 84 cars at the beginning of every week and sells them gradually over the week and has 10 cars left at the end of the week. For simplicity assume that it was able to sell 84 cars each week and there are 52 weeks in a year.
    16.1. What is the average number of cars in inventory? What is the turnover of the inventory of cars per year? For how long does a car stay on the dealership lot on average? MinInv sells the cars on a first-in-first-out basis.
    16.2. Suppose the average cost of a car is $30,000. MinInv's cost of borrowing (interest rate on loans) is 10% APR compounded annually. If MinInv decides to reduce the minimum inventory requirement to five cars, what will be the reduction in interest expense on a before tax basis. If the tax rate is 40%, what will be the increase in net income due to the reduction in interest expense. Assume MinInv's is profitable and therefore pays taxes.

17. SloppyCo had $1,000 in average inventory during year 1. Assume that the interest rate on loans used to finance the inventory is 10% APR compounded annually. SharpCo advises SloppyCo to implement a modern supply-chain-management system that would cut inventory by half while maintaining sales.

    17.1. If SloppyCo’s tax rate is 40% and it is profitable enough to pay taxes, what will be the AFTER-TAX SAVINGS from reducing inventory? Show your calculations.

    17.2. If SharpCo will charge $40 per year, should SloppyCo accept this proposal? State your assumptions. (No net present value or payback period computations are expected.)

18. PileUpCo: The current ratio, which is the ratio of current assets to current liabilities, is frequently used to evaluate the risk of a business. PileUpCo's balance sheet at the beginning of year 5 is as follows:

A	+dr	-cr	L	-dr	+cr
Cash	100		Accounts payable		900
Accounts receivable	100		Contributed capital		700
Inventory	700		Retained earnings		300
Long-term assets	1,000				

Suppose its balance sheet at the end of the year is as follows:

A	+dr	-cr	L	-dr	+cr
Cash	100		Accounts payable		900
Accounts receivable	900		Contributed capital		700
Inventory	200		Retained earnings		600
Long-term assets	1,000				

18.1. What is its current ratio at the beginning and at the end of the year?

18.2. Based on the above information, prepare an indirect statement of cash flows. Assume that no dividends were declared or paid during the year and there were no direct adjustments to retained earnings.

18.3. In the past, half of the firm's sales had been on credit. Is this year different?

18.4. What could be going on this year? The firm does not sell directly to its consumers. Instead, it uses distributors and wholesalers. Is the increase in current ratio unambiguously good news in this case? You must give reasons for your answer.

Advanced problems

19. MessedUp Duplicators has been in the photocopy business. To adjust for different sizes of branches, MessedUp Duplicators evaluates managers on the basis of return on net assets (ROA defined as accounting income divided by the net book value of the assets at the end of the year). Mr. Expense and Ms. Capitalize are the branch managers of two branches that have been operating for the last two years. For simplicity assume the following:

- Both branches use identical copiers.
- Both branches have been buying a copier every year.
- A copier costs $1,000 and lasts two years. It has a salvage value of zero.
- The only cost of doing business is the money spent on buying copiers.
- Both branches face identical market conditions. The sales for both branches have been $1,100 each in the first year, and $2,200 each in the second year.
- Both branches have had a constant level of cash, $200, for meeting the operating needs.
- They have no other assets.
- There are no taxes.

Ms. Capitalize attended the NearTheFalls School of Business. She was told that matching revenues and expenses made sense, so she depreciated the copiers using the straight-line method of depreciation. Mr. Expense was not interested in such "academic" things and expensed each copiers completely in the year it was purchased. The senior management did not care as long as the accounting policies of the branches were consistent from one year to the next.

Ms. Capitalize's training seemed to help her in the first year. Her income and ROA were higher than those of Mr. Expense, and she was slated for promotion. To her surprise, however, Mr. Expense's income caught up with her income in the second year. To add insult to injury, Mr. Expense's ROA was much higher than hers; in fact, it was one of the highest in MessedUp Photocopiers.

Mr. Expense was now slated for promotion, and the grapevine was full of rumors about MessedUp Photocopiers refusing to reimburse their employees' tuition expenses.

Mr. Somesense, a senior manager at MessedUp, is having second thoughts about promoting Mr. Expense and has hired you as an outside consultant.

Can you explain to Mr. Somesense why the income and ROA for Ms. Capitalize were higher in Year 1, but in Year 2 her income was the same as Mr. Expense's and her ROA was significantly lower? Who is doing better, Ms Capitalize or Mr. Expense? What suggestions would you have for the depreciation methods to be used by the two branches and their effect on incentives in the future?

20. Mr. FedUp, the finance manager of Patterns Inc., kept turning over in his bed. His assistant, Ms. Ambitious, had forgotten to fill in two critical numbers on the summary report about inventory management at three stores of Patterns Inc. Mr. FedUp had the following data about the stores. Assume that there are 360 days in a year.

    Store A started the year with 10 units in its inventory. It sold one unit each day and immediately bought one unit to replace the unit sold. Thus the store ended the year with 10 units in its inventory. The store had a first-in-first-out system of managing the inventory; i.e., the units were sold in the order in which they were bought.

    Store B also started the year with 10 units in its inventory. It also sold one unit each day, but it did not replace the unit as soon as it was sold. Instead, it bought 10 units as soon as it sold the last unit in its inventory. It also ended the year with 10 units in inventory as well.

    Store C also started the year with 10 units in its inventory. It sold two units each day. It did not replace the units as soon as they were sold. Instead, it bought 10 units as soon as it sold the last unit in its inventory. It also ended the year with 10 units in its inventory.

    Mr. FedUp knew that he would face questions about the average and maximum number of days a unit remained in a store's inventory. Could you help Mr. FedUp sleep peacefully by filling in the missing numbers in the following table? Mr. FedUp needs detailed calculations with explanations.

	Store A	Store B	Store C
Maximum number of days a unit stays in the store			
Average number of days a unit stays in the store			

21. FastCo and SlowCo are two trucking firms that are identical in every respect except their depreciation policies. FastCo depreciates its trucks fully in the year in which it buys them, while SlowCo depreciates assets on a straight-line basis over their useful life of 3 years. Both firms go through three phases: growth (lasting 4 years), maturity, and decline. During the growth phase, the number of trucks increases. During the maturity phase the number of trucks

stays constant because the number of new trucks purchased exactly offsets the number of trucks retired. During the decline phase the number of trucks declines.

21.1. Which firm will have a higher price-earnings ratio (PE ratio) during the growth phase? Give reasons for your answer.
21.2. Which firm will have a higher price-earnings ratio (PE ratio) during the maturity phase? Give reasons for your answer.
21.3. Which firm will have a higher price-earnings ratio (PE ratio) during the decline phase? Give reasons for your answer.

Market-to-book ratio is defined as the ratio of market price per share to book value per share. Book value per share equals book value of equity divided by the number of outstanding shares.

21.4. Which firm will have a higher market-to-book ratio during the growth phase? Give reasons for your answer.
21.5. Which firm will have a higher market-to-book ratio during the maturity phase? Give reasons for your answer.
21.6. Which firm will have a higher market-to-book ratio during the decline phase? Give reasons for your answer.

Answers to problems

1. GoodRed: Balance sheet

Assets		Liabilities	
Cash	4	Payables	4
Inventory	3	Long-term loan	7
Receivables 5 Less Allowance for bad debts 1	4	Equity	
Plant and equipment 45 Less Accumulated depreciation 12	33	Contributed capital	30
Goodwill	6	Retained earnings	9

Income Statement

Revenues	30
Cost of goods sold	(9)
Bad debts expense	(1)
Salespersons' salary expenses	(2)
Depreciation of selling equipment	(4)
Administrative expenses	(5)
Net income	=9

2. PBT = PBIT - interest 500 - 10%of 2000 = 300, PAT = PBT (1- tax rate) = 180, ROE = PAT/OE = 180/1000= 18%

3. NoDebt: Comparing a before-tax number with an after-tax number makes no sense. ROA before tax is 20%, and the interest rate is 25%, so they should not borrow.

4. Nihouk
Operating margin = operating income /sales
Asset turnover = sales/total assets
Sales = total assets * asset turnover
Total assets = 500/(0.1 * 6) = 833.3m
New sales = 833.3 * 10
New operating income = 600
New operating margin = 600/(833.3* 10) = 7.2%

5. SlowMo and SpeedyJoe
Short answer: Their ROE's will be equal when ROA = interest rate. Thus PBIT=10% of 1000= 100.
Long answer: SlowMo's equity = 1,000, SpeedyJoe's equity = 500, Debt = 500. ROE of SlowMoe = (1 - 0.4) PBIT / 1,000, ROE of SpeedyJoe = (1- 0.4) (PBIT - 10% of 500) / 500. Thus PBIT = 100

6. Drugs 'R Us
6.1. 12,000/2,000=6
6.2. 12 months/6 = 2 months

7. 360/6 = 60 days

8. TurnCars
   8.1. Number of cars sold in a year = 360/3 = 120, Average inventory = (16 + 6)/2 = 11, Inventory turnover = 120/11
   8.2. Number of days = 360/(120/11) = 33

9. CardCo: 360/40 = 9 per year.

10. Fotoshop:
Total sales = 1000
Sales on credit = 75% of 1,000 = 750
Accounts receivable at the beginning of the year = 200
Accounts receivable at the end of the year = 300
Average accounts receivable = (300 + 200)/2= $250
Turnover = Sales on credit/ average accounts receivable = 750/250 = 3
Average collection period for credit sales = Number of days of receivables = 360/Turnover = 360/3 = 120

11. FindROE
11.1.

	A	B
EBIT	100	100
Equity	2,000	2,500
Debt outstanding	500	0
Net income	(100- (500*0.1))(1-0.4)=30	100(1-0.4)=60
ROE	30/2000 = 1.5%	60/2500 = 2.4%

11.2.

	A	B
EBIT	500	500
Equity	2,000	2,500
Debt outstanding	500	0
Net income	(500- (500*0.1))(1-0.4)=270	500(1-0.4)=300
ROE	270/2000 = 13.5%	300/2500 = 12%

11.3. The firm with more debt is riskier. The changes in return on equity (depending on operating profit) are larger for riskier firms.

12. Invest and Divest: Both firms are doing well in the first year. The key is to look at the new investment that Invest makes in the second year. Invest puts in $60 in Year 2 and makes $9 on the new investment, a return of 15%.

12.1. Since the investors can make only 13% elsewhere, Invest is doing the right thing. The prices in an efficient market will reflect all available information. If Invest is using investors' money well, then its stock price will be higher. A priori, neither is a better deal; they will be trading at different prices.

12.2. If the investors can make 17%, which is more than the 15% that Invest makes, Divest is doing the right thing.

13. CashRich: If managers invest in the project that yields 15%, they will increase their EPS. They WILL invest in the project.
CashPoor: The managers will have to pay 20% interest to the bank and will actually make a net loss if they borrow and invest in the project, so they WILL NOT invest in the project.

14. LIFO- FIFO
14.1. Firm B. LIFO reports lower inventory than FIFO.
14.2. Both will have the same quick ratio since it does not include inventories.

15. ComputeRatios
15.1. Cash + Marketable securities + Accounts receivable – Allowance for bad debts+ Inventories + Investment in securities + Acquisition cost of assets – Accumulated depreciation = Accounts payable + Long-term liabilities + Contributed capital + Retained earnings
Plug in the numbers and solve for retained earnings. The answer is $600.
15.2. Quick ratio = Highly liquid assets/ current liabilities = (Cash + Marketable securities)/Accounts payable = 1
15.3. Current ratio = Current assets / Current liabilities = (Cash + Marketable securities + Accounts receivable – Allowance for bad debts+ Inventories) / Accounts payable = 4
15.4. After-tax return on equity = profit after tax / equity = 400/ (Contributed capital + Retained earnings) = 400/1200 = 1/3 or 33%

16. MinInv
16.1. Average inventory = (94 + 10)/2 = 52
Turnover = Sales/ average inventory = (84*52)/52 = 84,
Days/turnover = 52 x 7/84
16.2. Reduction in inventory = 5 cars.
Dollar reduction in inventory = 5 x 30,000 = 150,000
Reduction in interest expense = 150,000 x 0.1 = 15,000
Increase in after tax income = 15,000 x (1-0.4) = 9,000

17. SloppyCo
17.1. If the turnover doubles for the same level of sales, it means that average inventory is half of the original. Thus, the decline in inventory is $500. At 10% interest rate, this means a saving of $50 in interest costs per year. (There may be other savings and expenses that are ignored here.) A saving of $50 before tax results in a saving of $50 x (1- 0.4) = $30 after tax.

17.2. The key thing here is that the SharpCo's fees ($40) should be compared with the before tax savings per year ($50) because the fees will also be tax deductible. Thus, SloppyCo should accept the consulting proposal.

18. PileUpCo:

18.1. Beginning = (100 + 100 + 700)/900 = 1, Ending = (100 + 900 + 200)/900 = 1.33

18.2.

Income	300
Adjustment due to	
Decrease in inventory	500
Increase in receivables	(800)
Operating cash flow	=0
Investing cash flow	=0
Financing cash flow	=0

18.3. Yes, all of the sales are on credit or the firm has been unable to collect from customers who had purchased on credit in the past.

18.4. There are two obvious problems: poor collection, or trade loading. These possible problems suggest that the increase in current ratio is not necessarily good news.

Answers to advanced problems

19. MessedUp Duplicators

Ms. Capitalize	Year 1	Year 2
Revenue	1,100	2,200
Expense	500	1,000 (500+500)
Net income	600	1,200
Assets	200+500 = 700	200+500 = 700
ROA	600/700 = 0.857	1200/700 = 1.714

Mr. Expense	Year 1	Year 2
Revenue	1,100	2,200
Expense	1,000	1,000
Net income	100	1,200
Assets	200	200
ROA	100/200 = 0.5	1200/200 = 6

In Year 2, faster depreciation leads to lower net book value of assets but the same depreciation expense. Therefore, the net income, which is the numerator of ROA is the same for both firms but the assets, which are the denominator of ROA, are higher for firm A than firm B. Thus, even in steady state, the depreciation method affects ROA and thereby incentives.

20. FedUp: Those who tried to use formulae were probably lost.

	Store A	Store B	Store C
Maximum number of days	10	10	5
Average number of days	10	5	2.5

You can also get 5.5 for the average number of days for Store B or 3 for the average number of days for Store C. Store A: Since the store uses FIFO, a unit bought today will be sold after approximately 10 days, so the answers are 10 and 10. Store B: 10 units bought today will be sold over the next 10 days, so the maximum number of days is 10. The average number of days could be roughly 5 if the units are sold any time during the day, or would be 5.5 if the units are sold at the end of day. Store C: Halve the answers for store B because store C sells units at twice the rate.

21. FastCo: During the growth phase, FastCo (with faster depreciation) will have lower earnings than SlowCo. During steady state both will have the same earnings. During decline FastCo will have higher earnings. The book value of FastCo will always be lower than the book value of SlowCo.
    PE-Ratio: Growth: FastCo, Maturity: Both will have the same PE ratio, Decline: SlowCo will have a higher PE ratio.
    Market-to-book ratio: In all three cases FastCo will have the higher market-to-book ratio.