

Practice for Lecture 1: Basic Financial Analysis
See Lecture 1 – Practice Questions.xls

Question 1. Consider the following financial statements for SubMart Corp contained in the company’s most recent annual report filed with the OSC.

SubMart Corp
 Balance Sheet, December 31, 2012

Assets	2010	2011	2012
Cash	20,000	35,000	52,000
Accounts receivable	70,000	85,000	114,260
Inventories	65,000	90,000	130,000
Property, plant & equipment	160,000	180,000	195,000
Less accumulated depreciation	40,000	56,250	74,250
Total assets	275,000	333,750	417,010
Liabilities & Equity	2010	2011	2012
Accounts payable	40,000	45,350	50,000
Accrued expenses payable	10,000	8,450	5,000
Long-term debt	25,000	30,000	37,000
Common stock	25,000	25,000	25,000
Retained earnings	175,000	224,950	300,010
Total liabilities and equity	275,000	333,750	417,010

SubMart Corporation
 Income Statement, December 31, 2010-2012

	2010	2011	2012
Net sales	-	630,000	918,000
COGS (75% of sales)	-	472,500	688,500
Depreciation	-	16,250	18,000
EBIT	-	141,250	211,500
Interest @ 10%	-	2,500	3,000
Taxable income	-	138,750	208,500
Taxes @ 40%	-	55,500	83,400
Net income	-	83,250	125,100
Dividends (40% of NI)	-	33,300	50,040
Addition to retained earnings	-	49,950	75,060

a) Use this information to assess SubMart’s financial condition. As part of your answer, calculate the relevant leverage, liquidity, profitability, and efficiency ratios. Also calculate Altman’s Z-score (assume the market value of equity is 50,000) and use them to assess the likelihood of distress. Discuss and interpret the data you produce and state any recommendations you may have for the firm’s management.

b) Construct a *sources and uses of cash* statement for 2011 and 2012, and derive the change in the firm's cash position. Then rewrite the sources and uses of cash as a *statement of cash flows*. Briefly interpret the results of your analysis.

Solution to a).

	2010	2011	2012
Leverage Ratios			
Book Leverage	0.27	0.25	0.22
Book Debt-Equity Ratio	0.38	0.34	0.28
Interest Coverage	-	63.00	76.50
Fraction of Debt that is Long Term	0.33	0.36	0.40
Liquidity Ratios			
NWC/Assets	0.38	0.47	0.58
Current Ratio	3.10	3.90	5.39
Quick Ratio	1.80	2.23	3.02
Cash Ratio	0.40	0.65	0.95
Profitability Ratios			
Net Profit Margin	-	0.13	0.14
ROA	-	0.25	0.30
ROE	-	0.33	0.38
Payout Ratio	-	0.40	0.40
Efficiency Ratios			
Inventory Turnover	-	6.10	6.26
Inventory Period	-	59.87	58.32
Receivables Turnover	-	8.13	9.21
Collection Period	-	44.90	39.61
Payables Turnover	-	11.07	14.44
Payables Period	-	32.97	25.27
Cash Cycle	-	71.80	72.65
Sales/Assets	-	1.89	2.20

We can also calculate the Z-score

Ratios for Dec 2012	Values	Weights	Product
NWC/TA	0.58	1.2	0.69
RE/TA	0.72	1.4	1.01
EBIT/TA	0.51	3.3	1.67
MVE/BVL	0.54	0.6	0.33
SALES/TA	2.20	1.0	2.20
Z-Score			5.90

This company is incredibly solid! Its leverage is low (about 22% of assets) and its interest coverage ratio is very high and growing over time. Most of the company’s debt is long-term, so not pressing obligations in the short run (and again, the fraction of long-term debt is growing). All liquidity ratios are very high and improving over time. The firm’s payout ratio of 40% is quite high, but the firm could cut dividends if it wanted to retain cash to finance investment instead of borrowing.

The inventory period is roughly constant over time, but the collection period is shortening a bit – the firm seems to be slightly tightening the terms of credit to customers, but without hurting its sales which still grow about 46% in the last year. The payables period gets a bit shorter – the firm is repaying its suppliers faster, meaning it is relying less on expensive trade credit. But the cash cycle remains roughly the same over time.

Last, the sales/assets ratio is increasing, suggesting that assets are being more efficiently used, and possibly that the firm needs to invest more in the next few years.

All of this success is obviously driven by the dramatic sales growth the firm is experiencing (again 46%) and the high profit margins. Although we don’t have the information to do it, ideally we would like to compare these ratios and their trends to those of other similar firms in the industry. This is useful to figure out to what extent what we see is something peculiar of this firm versus an industry-wide phenomenon that affects all firms equally. But in any case, for 2012 we get a Z-score well inside the “safe” region.

Solution to b).

Sources and Uses of Cash*	2011		2012	
Sources:				
Increase in payables	5,350	4.9%	4,650	3.0%
Long-term debt issuance	5,000	4.6%	7,000	4.5%
Operating cash flow (NI + Dep)	99,500	90.6%	143,100	92.5%
Total sources	109,850	100.0%	154,750	100.0%
Uses:				
Increase in receivables	15,000	15.8%	29,260	21.2%
Increase in inventory	25,000	26.4%	40,000	29.0%
Increase in gross PPE	20,000	21.1%	15,000	10.9%
Decrease in accrued expenses	1,550	1.6%	3,450	2.5%
Dividend payments	33,300	35.1%	50,040	36.3%
Total uses	94,850	100.0%	137,750	100.0%
Chg in Cash = sources – uses	15,000		17,000	

* Here the list of sources and uses is the same for both years, but this is not true in general.

In short, the sources and uses of funds show the same thing for both 2011 and 2012. The main source of cash is the firm’s strong operating cash flow (about 90% of total sources), which is driven by the firm’s spectacular sales growth. The firm is investing in receivables and inventory – both of which are directly related to sales growth – and also investing in fixed assets needed to expand the production or distribution network of the product it sells. Lastly, after doing all of this, the firm can still maintain a high payout ratio.

The statement of cash flows, which is the financial statement that firms are required to file with the regulator, contains really the same information as the sources and uses of cash statement (not a mandated disclosure). However, it is, in general, easier to visualize what is going on with the company by looking at the sources and uses of cash statement. Note that the sources and uses statement can be easily recovered from the statement of cash flows or derived directly from the balance sheet and income statement.

Statement of Cash Flows	2011	2012
Operating cash flow (NI + Dep.)	99,500	143,100
+ Change in current liabilities:		
Increase in payables	5,350	4,650
Decrease in accrued expenses	-1,550	-3,450
- Change in current assets:		
Increase in receivables	-15,000	-29,260
Increase in inventories	-25,000	-40,000
(1) Total cash flow from operating activities	63,300	75,040
- Change in gross PPE	-20,000	-15,000
(2) Total cash flow from investing activities	-20,000	-15,000
+ Changes in long-term debt	5,000	7,000
+ Changes in common stock	0	0
- Dividend payments	-33,300	-50,040
(3) Total cash flow form financing activities	-28,300	-43,040
Change in cash = (1) + (2) + (3)	15,000	17,000

Question 2. On Eastern Printing Machines Co.'s income statement of 2012, the cost of goods sold and the credit sales are \$220 million and \$260 million, respectively. Here is an extract from the balance sheet:

	Dec. 31, 2012	Dec. 31, 2011
Inventory	40	60
Accounts receivable	30	50
Accounts payable	10	30

- a) How many days in EPM's operating cycle?
- b) How many days in EPM's cash cycle?

Solution:

Operating cycle = inventory period + accounts receivable period

Cash cycle = operating cycle – accounts payable period

Inventory period = $365 \times [(40+60)/2] / 220 = 82.95$ days

Receivables period = $365 \times [(30+50)/2] / 260 = 56.15$ days

(note that to calculate the receivables turnover we really need the sales on credit, but since we usually ignore how much is sold on credit we typically assume that all sales are on credit)

Payables period = $365 \times [(10+30)/2] / 220 = 33.18$ days

Operating cycle = 139.1 days

Cash cycle = 105.92 days

Question 3. Consider the actual statement of cash flows reported by EnCana Corp for the fiscal year ending in December 2008 shown below. I downloaded this statement from Yahoo Finance sometime ago. EnCana, engages in the exploration, production, and marketing of natural gas, crude oil, and natural gas liquids.

EnCana Corp: Statement of Cash Flows for the period ending 31-Dec-08 (\$ thousands)

Operating Activities, Cash Flows Provided By or Used In	
Net Income	4,810,000
Depreciation	6,057,000
Adjustments To Net Income	-1,509,000
Changes In Accounts Receivables	452,000
Changes In Liabilities	-943,000
Changes In Inventories	222,000
Changes In Other Operating Activities	-259,000
Total Cash Flow From Operating Activities	8,830,000
Investing Activities, Cash Flows Provided By or Used In	
Capital Expenditures	-8,254,000
Investments	-178,000
Other Cash flows from Investing Activities	904,000
Total Cash Flows From Investing Activities	-7,528,000
Financing Activities, Cash Flows Provided By or Used In	
Dividends Paid	-1,199,000
Sale Purchase of Stock	-246,000
Net Borrowings	6,000
Other Cash Flows from Financing Activities	-
Total Cash Flows From Financing Activities	-1,439,000
Effect Of Exchange Rate Changes	-33,000
Change In Cash and Cash Equivalent	-\$170,000

Recover the Sources and Uses of Funds from this statement of cash flows!

Given the lack of some useful information in the table, use the following suggestions:

- 1) Treat the “Change in other operating activities” for -\$259,000 as an increase in current assets.
- 2) Treat the “Other cash flows from investing activities” for \$904,000 as an asset sale.
- 3) Treat the “Effect of exchange rate changes” for -\$33,000 as a use of funds.

Solution to Question 3.

**EnCana Corp
Sources and Uses of Cash (\$thousands)**

PERIOD ENDING	31-Dec-08	
Sources:		
Operating cash flow	9,358,000	85.5%
Decrease in receivables	452,000	4.1%
Decrease in inventories	222,000	2.0%
Other cash flow from investing (asset sale)	904,000	8.3%
New borrowing	6,000	0.1%
Total sources	10,942,000	100.0%
Uses:		
Decrease in current liabilities	943,000	8.5%
Changes in other operating activities (increase in CA)	259,000	2.3%
Capital expenditures	8,254,000	74.3%
Investments	178,000	1.6%
Dividends	1,199,000	10.8%
Stock repurchase	246,000	2.2%
Effect of exchange rate changes (assume a use)	33,000	0.3%
Total uses	11,112,000	100.0%
Chg in cash = sources - uses	-170,000	

Question 4. Consider the actual statement of cash flows reported by Imperial Oil for the fiscal year ending in December 2006 shown below. I downloaded this statement from Yahoo Finance sometime ago. Imperial Oil engages in the exploration, production, and marketing of natural gas, crude oil, and natural gas liquids.

Imperial Oil - Statement of cash flows for period ending on 31-Dec-06 (\$ thousands)

Operating Activities, Cash Flows Provided By or Used In	
Net Income	2,612,056
Depreciation	713,081
Adjustments To Net Income	135,580
Changes In Accounts Receivables	174,194
Changes In Liabilities	-266,869
Changes In Inventories	-83,236
Changes In Other Operating Activities	-206,802
Total Cash Flow From Operating Activities	3,078,004
 Investing Activities, Cash Flows Provided By or Used In	
Capital Expenditures	-1,009,984
Other Cashflows from Investing Activities	181,917
Total Cash Flows From Investing Activities	-828,067
 Financing Activities, Cash Flows Provided By or Used In	
Dividends Paid	-270,302
Sale Purchase of Stock	-1,551,445
Net Borrowings	-1,716
Total Cash Flows From Financing Activities	-1,823,463
 Change In Cash and Cash Equivalentents	 \$426,474

Recover the Sources and Uses of Funds from this statement of cash flows!

Given the lack of some useful information in the table, use the following suggestions:

- 1) Treat the “Adjustments to Net Income” as something to be added to Net Income.
- 2) Treat the “Changes in Other Operating Activities” for -\$206,802 as a use of funds.
- 3) Treat the “Other Cashflows from Investing activities” for \$181,917 as an asset sale.

Question 5. Provide short answers to the following questions. These questions are intended to stimulate your thinking, but there is no clear cut answer to most of them unless we know a bit more about the firm’s situation:

- a) Suppose you observe that a firm’s cash cycle is lengthening over time. What is the obvious financial implication of this?
- b) Suppose you observe that a firm’s collection period is lengthening over time. What are some possible reasons for this?
- c) Suppose you observe that a firm’s inventory period is lengthening over time. What are some possible reasons for this?
- d) Suppose you observe that a firm’s payables period is lengthening over time. What are some possible reasons for this?
- e) Suppose you observe a firm which currently maintains a debt to assets ratio of 50%. How do you know if this is too high or too low?
- f) Suppose you observe that a firm with a ROA of 15%. How do you know whether the company is likely to be well managed?
- g) What can you infer from observing that a firm pays no dividends?
- h) What can you infer from observing a firm whose sales per employee are decreasing over time?
- i) What can you infer from observing a firm whose sales / assets are increasing over time?
- j) What can you infer from observing a firm whose book leverage is roughly constant over time but the fraction of total debt that is short term is increasing?
- k) What can you infer from observing a firm with a large cash-to-assets ratio?
- l) What can you infer from observing a firm whose current ratio is decreasing over time?
- m) What can you say about a firm’s operating and cash cycles if you observe that inventory turnover is not changing over time but the receivables turnover is decreasing and the payables turnover is increasing?

Solutions to Question 5.

a) With a lengthening cash cycle the firm's short-term financial needs are increasing over time, and the firm needs to plan how these funds can be obtained.

b) The collection period may be longer simply because the firm is offering better terms of credit to its customers (for example, giving them two months to pay instead of one). Or it could be that the firm itself is being less efficient in the collection, say because with a larger volume of sales the firm's staff cannot follow its customers easily. But the more interesting case is when the firm's credit policy and its efficiency in collecting its receivables remain unchanged. In this case, it is possible that customers are being unable to repay on time because they are facing financial trouble.

c) A longer inventory period may be associated with a reduction in demand. When demand falls, firms accumulate inventory until they realize they need to cut production.

d) The payables period can be longer if the firm obtains better terms of credit in its purchases from suppliers. But more generally, when firms in need of money but are constrained in the amount they can borrow from banks usually try to free up some cash by stretching their payables beyond their contractual agreements with the suppliers: delaying payment to suppliers is the same as borrowing from them. Alternatively, firms that usually paid cash for their purchases but now lack enough cash (possible because banks refuse to lend) may decide to take trade credit from suppliers, thus extending the payables period. Bottom line, a longer payables period may indicate that the firm is facing economic adversity and is no longer to borrow from banks, and thus is forced to rely on the more expensive trade credit offered by suppliers.

e) The amount of debt that is reasonable depends a lot on the type of business. The key is to compare a firm's debt ratio to that of other similar firms in the industry. If the firm has the highest leverage in the industry, it means it has abnormally high financial risk, and one should wonder why: is it a symptom of financial trouble or perhaps the firm has borrowed aggressively to expand its operations?

f) Again, compare a firm's ROA to that of other firms in the industry. For example, you can calculate $ROA - \text{Avg}(ROA \text{ other firms in the industry})$, the industry-adjusted ROA. Then firms with higher industry-adjusted ROA are likely to be better managed.

g) One possibility is that the firm has no free cash flow. If after firms make all necessary investments there is some cash left that is not needed, they should pay it out to shareholders. So if they don't do it, it means there is no free cash. Usually, firms that are unable to pay dividends are thought to be financially constrained.

h) If the productivity of labor is decreasing, it could be due to technological reasons. But more commonly, one would think that sales are falling but the number of workers is not. In bad times that are only temporary, you often see this because firms tend to retain some skilled workers. But over long periods of time, firms should lay off workers. If they can't

– say because labor unions are very strong (e.g., in the US auto industry), then productivity of labor goes down, and ultimately hurts profits.

i) If the productivity of assets is increasing, and this is not due technological improvement, it probably means that the firm is operating the assets more efficiently (e.g., closer to full capacity). This suggests that most likely the firm will need to invest in new productive capacity in future years, as it will soon reach its full capacity and the risk of production disruptions arises if the machinery is pressed too much.

j) A larger fraction of short-term debt could be a firm's choice if long-term borrowing is too expensive relative to short-term borrowing, or if long-term interest rates are expected to fall in the near future. Or it could be that lenders refuse to lend long term to the firm because it is too risky, and thus the firm is forced to borrow using short-term instruments. This last possibility is a classical symptom of financial trouble as lenders see it too risky to lend to a firm that most likely will not be able to repay the loan.

k) Carrying cash is costly, because you forgo the interest you could make. Firms holding abnormally high cash often do this because they are financially constrained, that is, they cannot easily raise outside capital with debt or equity issues. Thus, they keep high cash to be able to fund new investment opportunities that may arise. Other firms have lots of cash simply because they are very profitable and managers, due to agency reasons, do not disburse the cash to shareholders.

l) It means that a firm's short-term financial solvency is deteriorating. The firm is having more short term obligations and less easily cashable assets to cover those obligations.

m) If the receivables turnover is decreasing then the collection period is increasing. With no change in inventory turnover there is no change in the inventory period. Thus, the operating cycle is becoming longer. If the payables turnover is increasing then the payables period is decreasing. These two effects lead to a longer cash cycle and a larger need for short-term financing.

Question 6. RAM’s CEO is considering the complete elimination of trade credit from the firm’s operations, and switching to an “all cash transactions policy”: the firm would not give any credit to its customers and it would not take any credit from its suppliers. Assume that RAM’s inventory turnover and sales will not be affected by the change in trade credit policy.

a) Write an equation for the change in RAM’s *operating cycle* as a result of the new policy and enclose it in a box. Then carefully explain whether the operating cycle will become shorter or longer and why.

b) Write an equation for the change in RAM’s *cash cycle* as a result of the new policy and enclose it in a box. Then carefully explain whether the cash cycle will become shorter or longer and why.

Hint: denote variables measured before the change in the policy with a subscript “0” and variables measured after the change in the policy with a subscript “1”.

Solution

$OC = IP + ARP$ and $CC = IP + ARP - APP$; let sub “0” denote before and sub “1” after.

a) $Chg \text{ in } OC = OC_1 - OC_0 = IP_1 + ARP_1 - IP_0 - ARP_0$

The average inventory turnover does not change, so the inventory period does not change, and so $IP_1 = IP_0$. Also, if the firm ceases to give credit to customers, then $ARP_1=0$. Thus:

$Chg \text{ in } OC = IP_0 - IP_0 - ARP_0 = - ARP_0$

Hence, the operating cycle will be *unambiguously* shorter by a number of days equal to the prior accounts receivable period. Note in passing that $OC_1 = IP_0$.

b) $Chg \text{ in } CC = CC_1 - CC_0 = IP_1 + ARP_1 - APP_1 - IP_0 - ARP_0 + APP_0$

But note that (i) $IP_1 = IP_0$ (inventory turnover does not change); (ii) $ARP_1=0$ (firm ceases to give credit to customers); and iii) $APP_1 = 0$ (the firm now always pays cash for its purchases). So:

$Chg \text{ in } CC = IP_0 - IP_0 - ARP_0 + APP_0 = APP_0 - ARP_0$

Whether the cash cycle is shorter or longer is *uncertain*. Specifically,

- if $APP_0 < ARP_0$ it will be shorter
- if $APP_0 > ARP_0$ it will be longer
- if $APP_0 = ARP_0$ it will not change

Question 7. The Alma Group is considering the acquisition of Sitca, a private company which reported earnings of \$10 million in 2010. Sitca operates in the chemical products industry, where there are two publicly traded firms of similar size. These are Telex, which has a market value of equity of \$500 million and reported earnings of \$8 million in 2010 and Rarex, which has a market value of equity of \$600 million and reported earnings of \$12 million in the same year.

Provide the Alma Group's management with a quick estimate of the market value of Sitca's equity. Carefully explain.

Solution

Use price-earnings (PE) ratios from similar publicly-traded firms to estimate the market value of Sitca's equity, under the assumption that the stock market correctly prices existing public firms and that those firms are similar to Sitca. Specifically, let E^S be Sitca's equity value which we want to estimate. We could write its (unknown) PE ratio as: $PE^S = E^S / NI^S = E^S / 10M$. So we get $E^S = PE^S \times 10M$. If we knew PE^S then we can estimate E^S . We estimate PE^S as the average of the PEs of similar publicly-traded firms: Telex's $PE = 500M/8M = 62.5$ and Rarex's $PE = 600M/12M = 50$. The average PE of similar traded firms is 56.25 and thus $E^S = 56.25 \times 10M = \$562.5M$.

Note: $PE = \text{equity value} / NI = [\text{equity value} / \#\text{shrs}] / [NI / \$\text{shrs}] = \text{share price} / \text{EPS}$.

Question 8. Write down the expressions for the following financial ratios and explain what they measure:

- a) Book leverage, market leverage, interest coverage, and fraction of debt which is long term (maturity more than 1 year).
- b) Current ratio and quick ratio.
- c) Net profit margin, ROA, and ROE.
- d) Payout ratio and retention ratio.
- e) Price-earnings ratio, market to book equity ratio, and dividend yield.
- f) Productivity of fixed assets and productivity of labor.

Solution to question 8.

a) Book leverage, market leverage, interest coverage, and fraction of debt which is long term (maturity more than 1 year).

Book leverage = Book Value of Debt / Book Value of Assets

Market leverage = Book Value of Debt / (Book Value of Debt + Market Value of Equity)

Interest Coverage = (EBIT + Depreciation) / Interest Payments

% of Debt that is Long Term = Book Value of Long Term Debt / Book Value of Debt

The two leverage measures capture the amount of debt financing in the firm's capital structure. The book measure is not affected by stock prices and the market measure is affected by stock prices. High leverage is associated with more financial risk.

Interest coverage is really another measure of financial leverage, but it literally captures the # of times the firm could pay its current interest expenses using its current cash flow.

The % of debt that is long term measures the debt's maturity structure. When most debt is long term, there is little risk of immediate default, but when most debt is due within one year financial risk is higher as these payments are coming up soon.

b) Current ratio and quick ratio.

Current Ratio = Current Assets / Current Liabilities

Quick Ratio = (Cash & Equivalents + Accounts Receivable) / Current Liabilities

Both measures short-term solvency, i.e., the firm's ability to repay its current liability by liquidating its current assets. The quick ratio ignores inventory, as it is typically hard to convert it into cash fast.

c) Net profit margin, ROA, and ROE.

Net Profit Margin = Net Income / Revenues

Return on Assets (ROA) = Net Income / Assets

Return on Equity (ROE) = Net Income / Equity

They are all measures of profitability, but capture slightly different things. The net profit margin gives the dollars in net income generated per dollar of revenues (i.e., the rate at which a dollar in revenue generates net income). ROA measures the firm's profitability

and ROE really measures the return on the firm's equity (accounting return to equity-holders).

d) Payout ratio and retention ratio.

Payout Ratio = Dividends / Net Income

Retention Ratio = 1 - Payout Ratio

They capture the fraction of net income paid out to shareholders or retained in the firm as addition to retain earnings.

e) Price-earnings ratio, market to book equity ratio, and dividend yield.

Price-Earnings Ratio (PE) = Stock Price / EPS

Dividend Yield = Dividend per share / Stock Price

Market-to-Book Equity Ratio (M/B) = Market Equity / Book Equity

The PE and M/B are multiples, which capture a firm's equity value relative to a benchmark. The PE gives the market value of the stock per dollar of earnings the firm generates. The M/B gives the market value of equity per dollar of book value of equity.

f) Productivity of fixed assets and productivity of labor.

Sales-to-Assets Ratio = Sales / Assets

Sales per employee = Sales / Employees

The first captures the dollars in sales generated by each dollar of firm's assets and the second captures the dollars in sales generate by each worker (everything else equal in both cases!). These are rough measures, but easy to calculate and very useful.