

Suggested Problem Solutions
Investment Valuation – Damodaran

Lecture 1 – Introduction to Valuation

CHAPTER 1 - INTRODUCTION TO VALUATION

These problems were not assigned, but the answers may be of interest.

1. a. All of the above.
2. d. Value is determined by investor perceptions, but it is also determined by the underlying earnings and cash flows. Perceptions must be based upon reality.
3. d. All of the above.

CHAPTER 2- APPROACHES TO VALUATION

1.
 - a. False. The reverse is generally true.
 - b. True. The value of an asset is an increasing function of its cash flows.
 - c. True. The value of an asset is an increasing function of its life.
 - d. False. Generally, the greater the uncertainty, the lower is the value of an asset.
 - e. False. The present value effect will translate the value of an asset from infinite to finite terms.
2.
 - a. It might be difficult to estimate how much of the success of the private firm is due to the owner's special skills and contacts.
 - b. Since the firm has no history of earnings and cash flow growth and, in fact, no potential for either in the near future, estimating near term cash flows may be impossible.
 - c. The firm's current earnings and cash flows may be depressed due to the recession. Other measures, such as debt-equity ratios and return on assets may also be affected.
 - d. Since discounted cash flow valuation requires positive cash flows some time in the near term, valuing troubled firms, which are likely to have negative cash flows in the foreseeable future, is likely to be difficult.
 - e. Restructuring alters the asset and liability mix of the firm, making it difficult to use historical data on earnings growth and cash flows on the firm.
 - f. Unutilized assets do not produce cash flows and hence do not show up in discounted cash flow valuation, unless they are considered separately.

3. To answer these questions, we must discount cash flows at the appropriate discount rate.

- a. Value of Equity = \$ 3,224. Discount cash flows to equity at the cost of equity (12%):

$$EquityValue = \frac{250}{(1.12)^1} + \frac{262.5}{(1.12)^2} + \frac{275.63}{(1.12)^3} + \frac{289.41}{(1.12)^4} + \frac{303.88 + 3946.50}{(1.12)^5} = \$3224.37$$

- b. Value of Firm = \$ 5,149. Discount cash flows to the firm at the cost of capital (9.94%):

$$FirmValue = \frac{340}{(1.0994)^1} + \frac{357}{(1.0994)^2} + \frac{374.85}{(1.0994)^3} + \frac{393.59}{(1.0994)^4} + \frac{413.27 + 6000}{(1.0994)^5} = \$5149.14$$

CHAPTER 3 – UNDERSTANDING FINANCIAL STATEMENTS

You may not know the answers to all of the financial statement questions. Use the solutions as a way to review this information. We will discuss specific financial statement items in more detail throughout the semester.

Note: The balance sheet listed for Coca Cola contains an error. The marketable securities listed as 1049 should be listed as marketable securities of 159 and inventories of 890.

1.
 - a. Marketable securities can be classified in several different ways. In general, however, they are listed at either book value or market value - often the lower of the two. Hence marketable securities are probably assessed at close to market value. Cash and near-cash items are also listed at market value.
 - b. Fixed Assets are valued at historical cost. Hence they were probably purchased for the gross book value of fixed assets, i.e. $5486+199 = \$5685$. From the value of \$2016 for accumulated depreciation, we see that about 36.75% of the value of the depreciable fixed assets has been written off in depreciation. Hence, if we can assume that Coca-Cola uses straight-line depreciation, about two-fifths of the life of the estimated life of these assets is over. If we know the average life of assets in this industry, we can use that to estimate the age of these assets.
 - c. There are several reasons why current assets are more prominent in Coca-Cola's balance sheet than fixed assets. One, there is a large amount of cash and near-cash: this might be due to impending expansion, perhaps investment in bottling operations. Two, the Other Assets item includes investment in other Coca-Cola companies, which are primarily manufacturing operations, such as bottlers. Hence, if the fixed assets and current assets parts of these investments were included, the ratio of fixed to current assets would probably be larger.
 - d. Even though the companies were sold off, Coca-Cola presumably still has some ownership stake in these companies. To the extent that Coca-Cola does not have a majority stake in these companies, they would not be consolidated into Coca-Cola's balance sheet. If these companies were primarily manufacturing companies, their relatively large fixed-asset structure would not appear on Coca-Cola's balance sheet anymore.
2.
 - a. Total interest-bearing debt would equal short-term borrowings plus long-term borrowings, i.e. $4462+687 = 5149m$.
 - b. The paid-up capital represents the amount that Coca-Cola originally obtained for the equity that it issued. This amount equals \$3060m.
 - c. The larger the amount of time that has elapsed since the equity was originally issued, the greater the proportion of shareholder equity that would be represented by Retained Earnings, particularly for a firm that has plowed back a lot of its earnings into its operations.
 - d. The book value of equity is \$8.403 billion, which is much less than the market value of \$140 billion. This is because a large portion of Coca-Cola's market value is the present value of future growth and brand name value. This is not reflected in the book value.
3. Coca-Cola's brand name value does not appear in its balance sheet. Even though there is an item called "Non-depreciable Fixed Assets," it is too small, and cannot represent the brand name value; it's probably land. One way to adjust the balance sheet to reflect the value of this asset is for Coca-Cola to set up a separate subsidiary that would buy the rights to the brand name. The brand name value would then show up as an asset for the subsidiary, which would then be reflected in Coca-Cola's balance sheet as well, even if the financial statements were consolidated.

- 4.
- Again, note that the marketable securities of 1049 listed for Coca Cola, should actually include marketable securities of 159 and inventory of 890. The net working capital equals the difference between Current Assets and Current Liabilities, i.e. $(6380 - 8640) = -2260$. Non-cash working capital removes Cash and marketable securities from Current Assets and removes interest-bearing short-term borrowings from current liabilities. This gives: $((6380 - 1648 - 159) - (8640 - 4462)) = \395 million.
 - The current ratio equals $\text{Current Assets}/\text{Current Liabilities} = 6380/8640 = 73.84\%$
 - The firm's quick ratio equals $(1648+159)/8640 = 20.91\%$
 - It is possible to draw some preliminary conclusions about Coca Cola's riskiness to a supplier or a short-term lender from these numbers. The conclusions would be negative since the current and quick ratios are low. However, we should also look at the standard for the industry. Manufacturing firms tend to have high working capital requirements because of inventories. Since Coca-Cola has sold off many of its manufacturing operations, its working capital requirements would be lower than before, and this might explain the low current ratio.
5. The operating income is very similar in both years. The revenues were almost identical, and the drop in cost of goods sold in 1998 was offset by an increase in SG&A expenses.

Operating Income	<u>1997</u>	<u>1998</u>
Revenues	18868	18813
Less COGS	6105	5562
Less Selling, G&A expenses	<u>7852</u>	<u>8284</u>
equals Operating Earnings	5001	4967

6. We will discuss the amortization of expenses such as advertising and R&D later in the course. However, it is useful to see an example at this point in the course.

If advertising is used mainly to build up Coca-Cola's brand name, these expenses should be capitalized rather than included in operating expenses. To find the current capitalized value of past advertising expenses, we would add up the unamortized portions from past years. If we assume that these expenditures are to be amortized straight-line over a ten-year life, then one-tenth of each year's advertising expense would be amortized each year. The remaining unamortized portion of past advertising expenses would then be listed as an asset on the balance sheet. Let us assume that it is the end of 2000, and we wish to compute the capitalized value of Advertising for 2000

Year of Advertising Expenditure	Proportion included in Capitalized Advertising Asset in 2000	Amount amortized in 2000
1990	0%	10%
1991	10%	10%
1992	20%	10%
1993	30%	10%
1994	40%	10%
1995	50%	10%
1996	60%	10%
1997	70%	10%
1998	80%	10%
1999	90%	10%
2000	100%	0%

Note that in this example we do not begin amortizing the year 2000 advertising expense until 2001. We could instead start the amortization in the same year the expense is reported. In this case the total amortization reported in 2000 would include 10% of the 2000 advertising costs and none of the 1990 advertising costs (which would be fully amortized by 1999). The capitalized advertising asset would be adjusted similarly.

7. The effective tax rate in 1997 was $1926/(5001-258+1312) = 31.81\%$. The effective tax rate in 1998 was $1665/(4967-277+508) = 32.03\%$. The effective tax rate does not appear to have changed substantially over time.
8. The pre-tax operating margin for 1997 was $5001/18868$ or 26.51%, while the number for 1998 was $4967/18813$ or 26.40%. If we use the effective tax rate, then the net margin is $26.51(1-0.3181) = 18.08\%$ for 1997, and $26.4(1-0.3203) = 17.94\%$ for 1998. The margins look very similar in both years. There are no strong conclusions you can draw about profitability.

Note that if we subtracted actual taxes paid (rather than using the effective tax rate adjustment), the after-tax operating margin would be $(5001-1926)/18868 = 16.30\%$ for 1997, and $(4967-1665)/18813$ or 17.55% for 1998. This is incorrect, since the taxes paid include a portion related to non-operating activities.

9.
 - a. The return on equity is defined as Net Income/Book Value of Equity. Using beginning of 1998 value of equity, this was $3533/7274 = 48.57\%$
 - b. The pre-tax return on capital equals $EBIT/Total\ Capital = 4967/(7274+3875) = 44.55\%$
 - c. The after-tax return on capital equals $44.55(1-0.3203) = 30.28\%$

10.
 - a. The book value of equity at the end of 1999 would be, in millions:

Book Value of equity, end of 1998	1500
Less Share repurchase	400
Add Net Income for 1999	150
Less Dividends Paid	<u>50</u>
Book Value, end of 1999	<u>1200</u>

- b. The return on equity, using beginning book value equals $150/1500 = 10\%$
 - c. The return on equity, using average book value of equity = $150/((1500+1200)/2) = 11.11\%$