

Absolute Valuation: Cash Flow Return on Investment (CFROI)

Objective: The objective of this assignment is to help reinforce the concept of Cash Flow Return on Investment (CFROI), which is an alternative value added technique to Economic Value Added (EVA). Proponents of CFROI include Holt Value Associates (now a part of Credit Suisse First Boston (CSFB)) and the [Boston Consulting Group](#). More specifically, this exercise is designed to have you learn how to:

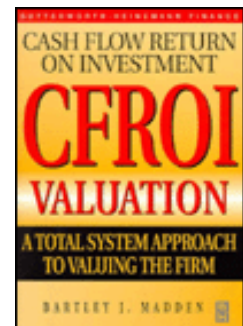
- Chart the Relative Wealth of our Firm
- Estimate the typical life of a project (project life) for our firm
- Convert historical cost to current values by calculating an inflation adjustment factor
- Derive Gross Cash Investment (as if the firm invested in all existing assets last year)
- Calculate Gross Cash Flows and Terminal Value of the Firm
- Calculate the CFROI given preceding inputs
- Calculate the Weighted Average Cost of Capital (WACC)
- Value the firm using assumptions about the life cycle of the firm and preceding inputs
- Partition the value of the firm into value from existing assets and future investments

Prior to doing this assignment, please read Madden, *CFROI Valuation: A Total System Approach to Valuing the Firm*. Be sure that you understand Chapter 3 and Chapter 7 thoroughly prior to undertaking this project. Also read the following articles:

The CFROI valuation model; Bartley J Madden; Journal of Investing, NY; Spring 1998; Vol. 7(1); pg. 31, 14 pgs

Analytical Tools: CSFB HOLT ValueSearch, Credit Suisse First Boston, May 29, 2002

Value Creators Report 2002: Succeed in Uncertain Times, Boston Consulting Group, 2002



These articles are located in the readings portion of my IP (Investment Principles) website (this is a password protected site): <http://pages.stern.nyu.edu/~cliu/ip.html>.

Company: Coventry Health Care Inc (Ticker: CVH, <http://www.cvty.com/>) provides managed health care services to nearly 2.5 million enrollees in about 15 states, primarily in the Midwest, Mid-Atlantic, and Southeast regions. Its plans include point of service, HMOs, and PPOs, as well as Medicare and Medicaid products. The company also administers self-insured health plans for large employers. Coventry's growth strategy consists of acquiring under performing health plans which operate in small to middle sized urban areas in the Midwest, Mid-Atlantic, and Southeast regions. Coventry then proceeds to improve the performance of these acquired health plans by integrating them into the company's much larger operations structure. Consequently, Coventry boosts the top line through acquisitions, aided by price increases and modest organic growth. The firm is also focused on being an HMO with low overhead costs, having an efficient claims processing operation which is one of the best in the industry due to its heavy investment in claims-processing technology¹, and getting the pricing right promising to not participate in price wars. According to Allen F. Wise, Coventry's 60-year-old CEO, "We do only one thing — we own and operate a health plan. We don't do disability. We don't do dental or pharmacy-benefit management or life insurance. It's not sexy but it really is a business of pennies and finding where that leaks."



That focus has helped Coventry to increase operating margins steadily over the past five years, to 7% from 2.5%. Currently, the company is growing its health-plan membership by 5% or more a year², and holding selling, general and administrative costs firmly in check by leveraging SGA savings from the one or two acquisitions it typically makes each year. The company continues to win accounts based on its superior service and technology. Management indicated that the trend of employers consolidating health plans is neutral for Coventry's membership growth.

On June 2, 2003, Barron's named Coventry as their top choice for the best performing company relative to the 500 biggest U.S. and Canadian companies analyzed based on their CFROI rankings, stock market performance, and the change in sales from the previous year³. SternStewart, has also given Coventry high marks with respect to its MVA and EVA. Coventry not only had a positive 2002 MVA (\$1,657 million) and EVA ((\$92 million) but also both its MVA and EVA increased from the 1999 period with

¹Coventry runs just one operating system, rather than the two or more systems some competitors use.

² Some of Coventry's recent success is a result of benefiting from a half-decade of low-double-digit price increases in the managed health-care industry.

³Four criteria were used to rank the companies, including 1) stock-market performance relative to the Standard & Poor's 500 for the 12 months ended May 9, 2) the median CFROI for the latest available 3 fiscal years, 3) forecasts for CFROI growth for the current year, and 4) the change in revenues for the previous year. The companies were ranked by each measure, and the rankings combined into a grade-point average, with 4.0 being the equivalent of straight A's. The winners were companies that not only had seen their stock prices rise significantly, but had generated strong and growing cash flow and revenue. The rankings don't constitute CSFB recommendations.

a 3 year increase of \$1,598 (million) and \$95 (million) respectively. For 2002, it had an return on average capital of 18.5%.

Wall Street is divided about Coventry's prospects, partly because the company isn't No. 1 in the majority of its markets making it vulnerable to bigger competitors. In particular, the fear is that as a relatively smaller player, it might not get big enough fast enough to continue its success. However, to get bigger, it must continue to make acquisitions, which can be risky.

Primary Competitors: Aetna Inc (AET), Blue Cross and Blue Shield Association (privately held), and UnitedHealth Group Inc (UNH). The industry that Coventry and its competitors are in is known as Healthcare Facilities.

Assignment: Download the spreadsheet labeled ip_cfroi_spr2005.xls from my website and do all your work on this spreadsheet. This is an *individual* assignment. Although you can discuss this case with your classmates, you are responsible for doing the case yourself. Students caught cheating will be given an F on this assignment. In doing this assignment, please use the assumptions given at the back of this case. Please do NOT wait until the last minute to do this assignment. Start this assignment as soon as it is assigned. It should take you at least a couple of days. Good luck.

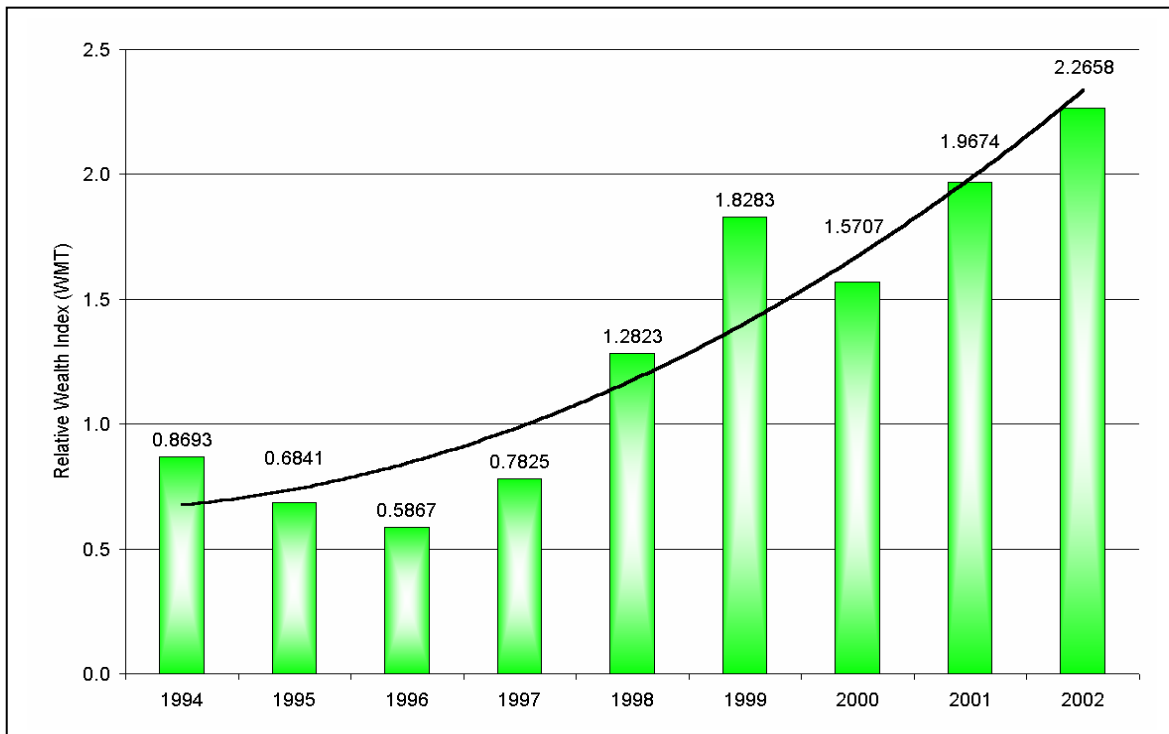
Please complete all **highlighted** sections of each worksheet.

1. Using the "Returns (CVH UNH)" worksheet,
 - a. Calculate and graph the relative wealth index for Coventry's using a Column graph. In constructing your Column graph, show the values of your Data Labels. Next, add a trendline to this Column graph. To add a trendline, right click on mouse after positioning the cursor over a bar in the bar chart and click on the Trend/Regression Type. Here we will use a polynomial regression.
 - b. Calculate and graph the relative wealth index for UnitedHealth Group. In constructing your Column graph, show the values of your Data Labels. Next, add a trendline to this Column graph. To add a trendline, right click on mouse after positioning the cursor over a bar in the bar chart and click on the Trend/Regression Type. Here we will use a polynomial regression.
 - c. What does the relative wealth graph for Coventry's suggest with respect to the trend in Coventry's CFROI? Is Coventry's CFROI increasing or decreasing over time? Use Lexis-Nexis to help you explain this trend in relative wealth (CFROI). Also read Coventry's 10Ks and Annual Reports for various years especially the "Letter to Shareholders" section. You can access Coventry's (LOW) 10K report using the URL <http://www.nyu.edu/library/bobst/vbl> and click either on Thomson's Research or EdgarScan. How does the relative wealth graph for Coventry's compare to the relative wealth graph of UnitedHealth Group? Please discuss. In your discussion, please look at UnitedHealth Group's annual reports, especially the "Letter to Shareholders" section.

Example: Calculating the relative wealth index for Wal-Mart (WMT)

DATE	WalMart	SP500	DATE	1+ r(WMT)	1+ r(SP500)	Cum(1+r(WMT))	Cum(1+r(SP500))	Ratio Cum(1+r(WMT))/ Cum(1+r(SP500))
19940131	0.06	0.0325	19940131	1.06	1.0325	1	1	1.0000
19940228	0.07075	-0.03005	19940228	1.07075	0.96995	1.134995	1.001473375	1.1333
19940331	-0.08661	-0.04575	19940331	0.91339	0.95425	1.036693083	0.955655968	1.0848
19940429	-0.02415	0.01153	19940429	0.97585	1.01153	1.011656945	0.966674681	1.0465
19940531	-0.06931	0.01242	19940531	0.93069	1.01242	0.941539002	0.978680781	0.9620
19940630	0.03372	-0.02681	19940630	1.03372	0.97319	0.973287697	0.952442349	1.0219
19940729	0.03093	0.03147	19940729	1.03093	1.03147	1.003391486	0.98241571	1.0214
19940831	-0.0133	0.03764	19940831	0.9867	1.03764	0.990046379	1.019393837	0.9712
19940930	-0.05076	-0.0269	19940930	0.94924	0.9731	0.939791625	0.991972143	0.9474
19941031	0.00535	0.02083	19941031	1.00535	1.02083	0.94481951	1.012634923	0.9330
19941130	-0.00883	-0.0395	19941130	0.99117	0.9605	0.936476754	0.972635843	0.9628
19941230	-0.08602	0.0123	19941230	0.91398	1.0123	0.855921023	0.984599264	0.8693
19950131	0.07647	0.02428	19950131	1.07647	1.02428	0.921373304	1.008505334	0.9136
19950228	0.03825	0.03607	19950228	1.03825	1.03607	0.956615833	1.044882122	0.9155
19950331	0.08105	0.02733	19950331	1.08105	1.02733	1.034149546	1.07343875	0.9634
19950428	-0.07317	0.02796	19950428	0.92683	1.02796	0.958480824	1.103452098	0.8686
19950531	0.04737	0.03631	19950531	1.04737	1.03631	1.003884061	1.143518443	0.8779
19950630	0.07739	0.02128	19950630	1.07739	1.02128	1.081574648	1.167852516	0.9261
19950731	-0.00467	0.03178	19950731	0.99533	1.03178	1.076523694	1.204966869	0.8934
19950831	-0.07793	-0.00032	19950831	0.92207	0.99968	0.992630203	1.204581279	0.8240
19950929	0.0102	0.0401	19950929	1.0102	1.0401	1.002755031	1.252884989	0.8004
19951031	-0.12626	-0.00498	19951031	0.87374	0.99502	0.876147181	1.246645621	0.7028
19951130	0.11214	0.04105	19951130	1.11214	1.04105	0.974398326	1.297820424	0.7508
19951229	-0.07292	0.01744	19951229	0.92708	1.01744	0.9033452	1.320454412	0.6841

Illustration of Relative Wealth Graph for Wal-Mart:



2. Using the information on the operating lease for Coventry's, calculate the present value of the Operating Lease for the fiscal year 2002. Round the number of years remaining on the operating lease to the nearest number using the Excel function = Round (,0). To obtain the number of years remaining on the operating lease, divide the Thereafter Amount by the last Operating Lease (year 2006's operating lease amount).

3. Using the information provided in various worksheets in your workbook, calculate the estimated life of the project using the template provided in the worksheet labeled "3. Asset Life (CVH)". The area to be completed is highlighted in yellow. To make sure that you understand where Land, Buildings, Machinery and Equipment, Leasehold Improvements, and Property, Plant, and Equipment (Gross) come from that I have provided in the "Coventry's 10K" worksheet at the bottom of the spreadsheet, print out the appropriate page from Coventry's 10K for the year ended December 31, 2003 and highlight the relevant numbers in yellow.

4. Calculate the:

a. Real historical growth rate in operating assets using the worksheet labeled "4a. Real OpAsset HistGrwth" by filling out all the highlighted sections.

b. Inflation adjustment factor for LOW using the worksheet labeled " 4b. Gross Plant Infl(CVH)" by filling out all the highlighted sections.

5. Using the Inflation Adjustment Factor that you calculated in question 4b in conjunction with the Present Value of Operating Leases that you computed in question 2, derive the

- Depreciable Assets (stated in 2003 dollars) in dollars and percentage terms
- Non-depreciable Assets (stated in 2003 dollars) in dollars and percentage terms
- Gross Cash Investment in Year 2003 dollars (current dollars)

using the worksheet labeled "5. Adj Gross Cash Invstmt (CVH)". The gross cash investment can be thought of as the amount that the firm, in this case Coventry, has invested in assets "as if" it just started the business from scratch in the Year 2003.

6. Calculate the gross cash flow using the template provided in the worksheet labeled "6. Gross Cash Flow (CVH)". Note: The gross cash flow is NOT the same as the free cash flow to the firm (FCFF). However, the gross cash flow is one component of the adjusted FCFF, which Madden refers to as Net Cash Receipts (NCR).

7. Complete the highlighted sections of the worksheet labeled "7. CFROI (CVH)" using your answers to the preceding questions as the necessary inputs. To calculate the CFROI, use the IRR () function in Excel. Be sure to enter the Gross Cash Investment as a negative number. Do NOT fill in the area shaded in Gray. In addition to calculating the CFROI, calculate the Cash Value Added = CFROI * Gross Cash Investment.

8. Compute the before-tax weighted average cost of capital (WACC) using the worksheet labeled "8. WACC (CVH)". Please note that the procedure that we use to calculate beta is NOT used in the CFROI methodology. The argument that Madden makes for not employing the CAPM in calculating the cost of equity is that for firms in financial distress, the historical beta for the firm is lower than for a healthy firm (which is counter-intuitive). Recall that the higher the risk, the higher the required return should be. Consequently, Madden argues that the cost of equity should start with a market return + differential adjustment for a company based on size and leverage. To address his concern, we use a built-up beta using one comparable, UnitedHealth Group. Observe that the CFROI methodology treats "Other Long Term Liabilities" and "Preferred Stock" as debt.

9. Calculate the simple plowback ratio for Coventry's using the worksheet labeled "9. Forecast Life Cycle (CVH)". The simple plowback ratio is used to calculate the sustainable growth rate (see the Assumptions page in this handout).

10. Find the Expected CFROI on New Investments in 2008 (t+5) using the worksheet labeled "10. Valuation & Partition (CVH)". Besides this, determine what percent of the total value of the firm (Coventry's) is due to expected future investments. To obtain the future CFROI implied by the current price for a share of stock (the closing market price of Coventry in December 2003 of \$64.49), put in an arbitrary value for Expected CFROI on New Investments in 2008 (t+5). Recall that the Approximate Sustainable Growth Rate in 2008 (t+5) = simple plowback ratio * Expected CFROI on New Investments in 2008. Calculate the total value of the firm, the value of the firm due to existing assets, and the value of the firm arising from expected future investments. Next, use the Solver command in Excel (Tools → Solver) to set your calculated price equal to the current market price (\$64.49) by changing the cell that your Expected CFROI on New Investments in 2008 is in.

Intuition for working backwards: Sometimes you want to test the assumptions that are imbedded in the stock price. For example, sometimes what management expects and the market expects (as implied by its stock price) differ.

Please turn in a **hard copy** of the spreadsheet together with your disk containing the spreadsheet with all the appropriate calculations.

Assumptions to Use in Calculations:

Item	Assumption
Forecasted CFROI	<p>Use the number that you calculated in question 7 for the year 2004 (t+1). Use 6.3% for the forecasted CFROI in year 2043. This figure is based on mean reversion e.g., reversion to the average for all firms (refer to the article and book by Madden).</p> <p>Assume that the CFROI will fade up or down for the period from year 2004 to year 2008. After this, the CFROI declines in a linear fashion to its long-term average.</p> <p>For the period from 2005 to 2008, let CFROI = R and</p> <p style="text-align: center;"> <u>if $R_{2004} > R_{2008}$ then</u> <u>if $R_{2004} < R_{2008}$ then</u> $R_{2005} = R_{2004} - (R_{2004} - R_{2008})/4$ $R_{2005} = R_{2004} + (R_{2008} - R_{2004})/4$ $R_{2008} = R_{2007} - (R_{2004} - R_{2008})/4$ $R_{2008} = R_{2007} + (R_{2008} - R_{2004})/4$ </p> <p>For the period from 2009 to 2043,</p> <p style="text-align: center;"> $CFROI_{2009} = CFROI_{2008} - (CFROI_{2008} - CFROI_{2043})/35$ $CFROI_{2010} = CFROI_{2009} - (CFROI_{2008} - CFROI_{2043})/35$ $CFROI_{2042} = CFROI_{2041} - (CFROI_{2008} - CFROI_{2043})/35$ </p> <p>After 2043, CFROI on new projects = WACC = 6.3%.</p>
(Simple) Plowback Ratio	<p>Plowback = (Net Income + Depreciation + Minority Interest - Dividends)/(Net Income + Depreciation + Minority Interest + Interest Expense + Implied Interest on Op Leases). This ratio differs from the traditional plowback definition used in finance.</p>
Tax Rate	<p>Tax Rate = Provision for Income Taxes/Income Before Tax</p>
Risk free Rate	<p>Assume that the rate on a 10-year Treasury bond remains constant at its (year) 2003 level</p>
Risk Premium	<p>Assume that it is .055 or 5.5%</p>

Assumptions to Use in Calculations: (continued)

Item	Assumption
Sustainable Growth Rate	<p>Approximate Sustainable Growth Rate in 2004 (t+1)</p> <p>= Simple Plowback Ratio * Current Year CFROI (2003)</p> <p>Approximate Sustainable Growth Rate in 2008 (t+5)</p> <p>= Simple Plowback Ratio * Expected CFROI on New Investments in 2008 (t+5)</p> <p>For the period from 2005 to 2008,</p> <p style="text-align: center;"> <u>if $G_{2004} > G_{2008}$ then</u> <u>if $G_{2004} < G_{2008}$ then</u> $G_{2005} = G_{2004} - (G_{2004} - G_{2008})/4$ $G_{2005} = G_{2004} + (G_{2008} - G_{2004})/4$ $G_{2008} = G_{2007} - (G_{2004} - G_{2008})/4$ $G_{2008} = G_{2007} + (G_{2008} - G_{2004})/4$ </p> <p>For the period from 2009 to 2043,</p> <p style="text-align: center;"> $Growth_{2009} = Growth_{2008} - (Growth_{2008} - Growth_{2043})/35$ $Growth_{2010} = Growth_{2009} - (Growth_{2008} - Growth_{2043})/35$ $Growth_{2042} = Growth_{2041} - (Growth_{2008} - Growth_{2043})/35$ </p> <p>Sustainable Growth Rate in 2043 (t+40) = 2.5%</p> <p>No growth occurs after 2043 since CFROI on new projects = WACC so there are no new investments.</p>
Real Discount Rate (WACC)	<p>Assume that the WACC that you calculated in question 6 remains constant from year 2004 up to and including year 2008 (t+1 until t+5). After this period, it increases in a linear fashion to 6.3% (from article and book by Madden) in 2043 (t+40). It remains at 6.3% after year 2043.</p> <p>$WACC_{2009} = WACC_{2008} + (WACC_{2043} - WACC_{2008})/35$</p> <p>where $WACC_{2043} = 6.3\%$</p> <p>Note that the CFROI methodology assumes that the CFROI on New Projects = WACC in 40 years. Hence, no new investments are made after this period because no incremental relative wealth is created since the return on new projects is equal to its borrowing cost.</p>

Assumptions to Use in Calculations: (continued)

Item	Assumption
Amortization of Goodwill	Goodwill, if any, can no longer be amortized in accordance with SFAS 42. However, impairments to goodwill can be deducted.
Depreciation and Amortization	If depreciation and amortization is reported in the income statement then this figure otherwise use the depreciation and amortization that is reported in the Statement of Cash Flows. Note: If the depreciation = "NA" in the income statement, then the cost of goods sold includes depreciation and amortization.
Monetary Holding Gain (Loss)	If Net Monetary Holdings are negative, inflation results in a real gain because the firm settles net obligations with dollars of reduced purchasing power. Such gains should be added to Net Income to derive Current Dollar Gross Cash Flow
Pension Intangibles	Pension intangibles are zero for Coventry.
Cash Flows on New Projects	<p>This is calculated using the payment function in Excel e.g.,</p> $\text{Cash Flow} = \text{PMT}(\text{rate}, \text{nper}, \text{pv}, \text{fv}, \text{type})$ <p>For our firm, this translates into</p> <p>Cash Flows for Project_T = $\text{PMT}(\text{Project ROI}_{T+1}, \text{Project Life}, \text{Expenditures for New Property and Plant}_{T+1}, \text{Investment Net Working Capital}_{T+1})$</p> <p>Where</p> <ul style="list-style-type: none"> Cash Flows for a Project are constant over its life Project ROI_{T+1} = CFROI on new investments in period T+1 Project Life = answer you got from question 1 Expenditures for PP&E_{T+1} = see below Investment Net Working Capital_{T+1} = see below <p>Note: Use your answer in worksheet "6. Gross Cash Flows" for Project₂₀₀₃ cash flows.</p>

Assumptions to Use in Calculations: (continued)

Item	Assumption
Project Life	<p>Project life is derived using the worksheet labeled "3. Asset Life (CVH)". The life of each project is identical. For example, if the first project has a life of 5 years, then the second project also has a life of 5 years.</p> $\text{Life of Project}_{2003} = \text{Life of Project}_{2004} = \dots = \text{Life of Project}_{2043}$ <p>To simplify our calculations, assume that capital spending each year is invested in only one "big" project even though it might be spent on several projects. In other words, all projects for a given year are assumed to have the same IRR and are added up to equal one big project.</p>
Expenditures for New Property and Plant	<p>Expenditures for new PP&E (known also as capital spending or capital expenditures) grow at the sustainable growth rate.</p> $\text{New PP\&E}_{T+1} = \text{PP\&E}_T * (1 + \text{Sustainable Growth Rate}_{T+1})$ <p>So</p> $\text{New PP\&E}_{2004} = \text{PP\&E}_{2003} * (1 + \text{Sustainable Growth Rate}_{2004})$ <p>Capital spending occurs each year until the year 2043. After 2043, there are no capital expenditures since the firm is assumed to wind-down (ROIC=WACC).</p>
Depreciable Assets	<p>In template "10. Valuation & Partition (CVH)",</p> $\text{Depreciable Assets}_T = \text{Expenditures for New Property and Plant}_T * (\text{Ratio of Depreciable Assets/Gross Cash Investment}).$ <p>This ratio is the result/answer from question 5.</p>
Investment Net Working Capital (Non-depreciable Assets)	<p>In template "10. Valuation & Partition (CVH)",</p> $\text{Non-Depreciable Assets}_T = \text{Expenditures for New Property and Plant}_T * (\text{Ratio of Non-Depreciable Assets/Gross Cash Investment}).$ <p>This ratio is the result/answer from question 5. Thus,</p> $\text{New PP\&E}_T = \text{Depreciable Assets}_T + \text{Non-Depreciable Assets}_T$

Assumptions to Use in Calculations: (continued)

Item	Assumption
Recaptured Net Working Capital	Net Working Capital (aka Non-depreciable assets) is recaptured at the end of the useful project life. For example, suppose that each project has a life of 10 years. Then if the first project began in 2003, the non-depreciable assets associated with the first project, Project ₂₀₀₃ , would be recaptured in 2013. The second project, Project ₂₀₀₄ , started a year later in 2004, would have its non-depreciable assets recaptured e.g. sold in 2014. The useful life is your answer to question 3.
Minority Interest	Please be careful. There is a minority interest in the income statement (a flow variable) and a minority interest in the balance sheet (a stock variable). The minority interest in the balance sheet is stated in terms of book value. To derive the minority interest in market value terms (balance sheet item), we use the price to book ratio (see the worksheet labeled "8. WACC"). Alternatively, we could have used the price to earnings ratio * minority interest income (in the income statement) to arrive at the market value for minority interest in the balance sheet.

Hint: In setting up your spreadsheet(s), some cells require that you use IF statements such as =IF(\$B\$6>\$B\$7,C20-(\$B\$6-\$B\$7)/4,C20+(\$B\$7-\$B\$6)/4) or nested IF statements such as in calculating the Recaptured Net Working Capital in the valuation worksheet

(IF(AverageScore>89,"A",IF(AverageScore>79,"B",IF(AverageScore>69,"C",IF(AverageScore>59,"D","F"))))).

If you are not familiar with the IF command, click on Help in Excel and then select Contents and Index.