

### **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](#) and the [Boston Consulting Group](#). More specifically, this exercise is designed to have you learn how to:

- 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)
- Forecast and chart the life cycle of the firm using a fade window
- 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
- Do sensitivity analysis on the value of the firm using CFROI
- Use Holt's DualGrade Performance Measure to make investment decisions (buy/sell)
- See whether economic performance ala CFROI is related to stock market performance

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. A nice synopsis of the CFROI technique can be found on pages 31-44 in the *Journal of Investing*, Spring 1998 by Madden. The article is entitled "The CFROI valuation model." To obtain a copy of this article, visit the [Bobst Library](#) website and use ABI/Inform to locate the article.

**Company:** Kimberly-Clark (Ticker: KMB, <http://www.kimberly-clark.com/>) is the world's top maker of personal paper products including brand names such as Kleenex and Scott. Approximately 50% of its sales come from tissue products (facial tissue, bathroom tissue, and paper towels) and business papers. The company also makes personal care items and medical products.



On July 12, 2001, Kimberly-Clark announced that currency effects combined with the timing of their investments had slowed their growth in sales, reducing near-term earnings from operations. However, Wayne R. Sanders, chairman and CEO stated that "Looking further ahead, he (we) expect solid and sustainable growth in sales and earnings next year (2002), with sales up in line with our objective of 6 to 8 percent, again assuming no further deterioration in foreign currency rates."

In terms of its CFROI, Kimberly-Clark had a median 5-year CFROI on December 1997 of 8.4% with a forecast +1 year CFROI rank of B and a long-term future grade of C with 37% of its value forecasted to come from future investments. More recently, Holt Value Associates reported that KMB had a median 5-year CFROI of 11.7% (July 6, 2001) with a continued forecast +1 year CFROI rank of B. However, they downgraded its long-term future grade to D from C. Approximately 34% of KMB's value is expected to come from future investments in their revised estimate.

**Competitors:** Colgate-Palmolive (CL), Gillette (G), and Procter and Gamble (PG)

**Assignment:** Download the spreadsheet labeled ip\_KMB2001.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 on the next page. The assignment/questions can be found after the assumptions. 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.

Assumptions to Use in Calculations:

Item	Assumption
Past 5-Year Median CFROI	Use 11.7% (based on Holt's DualGrade performance as of July 6, 2001)
Forecasted CFROI	<p>Use the number that you calculated in question 5 for the year 2001 (t+1). Use 6.3% for the forecasted CFROI in year 2040. 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 fades up or down for the period from year 2002 to year 2005. After this, the CFROI declines in a linear fashion to its long-term average.</p> <p>For the period from 2002 to 2005, let CFROI = R and</p> <p style="text-align: center;"> <math display="block">\begin{array}{ll} \text{if } R_{2001} &gt; R_{2005} \text{ then} &amp; \text{if } R_{2001} &lt; R_{2005} \text{ then} \\ R_{2002} = R_{2001} - (R_{2001} - R_{2005})/4 &amp; R_{2002} = R_{2001} + (R_{2005} - R_{2001})/4 \\ \dots\dots\dots &amp; \dots\dots\dots \\ R_{2005} = R_{2004} - (R_{2001} - R_{2005})/4 &amp; R_{2005} = R_{2004} + (R_{2005} - R_{2001})/4 \end{array}</math> </p> <p>For the period from 2006 to 2041,</p> <p style="text-align: center;"> <math display="block">\begin{array}{l} CFROI_{2006} = CFROI_{2005} - (CFROI_{2005} - CFROI_{2040})/35 \\ CFROI_{2007} = CFROI_{2006} - (CFROI_{2005} - CFROI_{2040})/35 \\ \dots\dots\dots \\ CFROI_{2039} = CFROI_{2038} - (CFROI_{2005} - CFROI_{2040})/35 \end{array}</math> </p> <p>After 2040, CFROI on new projects = WACC = 6.3%.</p>
(Simple) Plowback Ratio	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.
Inflation Rate	3.5%
Percent Change in GDP Deflator	Assume that it's 1.5%. This is used in calculating the Gross Cash Flow (see question 4).
Tax Rate	Tax Rate = Provision for Income Taxes/Income Before Tax
Risk free Rate	Assume that the rate on a 10-year Treasury bond remains constant at 6%
Risk Premium	Assume that it is .055 or 5.5%

**Assumptions to Use in Calculations:** (continued)

Item	Assumption
Sustainable Growth Rate	<p>To calculate the approximate sustainable growth in year 2001 (t+1), assume that you can reinvest your money (the plowback) at the CFROI on new investment in 2001. See the worksheet labeled "7. Forecast Life Cycle". Use 7% for the sustainable growth rate in year 2005 (t+5). This is the midway point between 6%-8% which Sanders, the CEO announced as KMB's targeted growth. Use 2.5% for the year 2040 based on mean reversion to the average for all firms (refer to the article and book by Madden). Assume that for the period of the fade window from 2001 to 2005, we can reinvest our plowbacked money at the CFROI. After this, growth decays in a linear fashion to its long term average. This is equivalent to,</p> $\text{Growth}_{2001} = \text{Simple Plowback} * \text{CFROI}_{\text{New Investments in 2001}}$ <p>For the period from 2002 to 2005,</p> <p style="text-align: center;"> <u>if <math>G_{2001} &gt; G_{2005}</math> then</u>                      <u>if <math>G_{2001} &lt; G_{2005}</math> then</u>  <math>G_{2002} = G_{2001} - (G_{2001} - G_{2005})/4</math>      <math>G_{2002} = G_{2001} + (G_{2005} - G_{2001})/4</math>            .....  <math>G_{2005} = G_{2004} - (G_{2001} - G_{2005})/4</math>      <math>G_{2005} = G_{2004} + (G_{2005} - G_{2001})/4</math> </p> <p>For the period from 2006 to 2040,</p> $\text{Growth}_{2006} = \text{Growth}_{2005} - (\text{Growth}_{2005} - \text{Growth}_{2040})/35$ $\text{Growth}_{2007} = \text{Growth}_{2006} - (\text{Growth}_{2005} - \text{Growth}_{2040})/35$ <p style="text-align: center;">.....</p> $\text{Growth}_{2039} = \text{Growth}_{2038} - (\text{Growth}_{2005} - \text{Growth}_{2040})/35$ <p>No growth occurs after 2040 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 2001 up to and including year 2005 (t+1 until t+5). After this period, it decreases in a linear fashion to 6.3% (from article and book by Madden) in 2040 (t+40). It remains at 6.3% after year 2040.</p> $\text{WACC}_{2007} = \text{WACC}_{2006} - (\text{WACC}_{2006} - \text{WACC}_{2040})/35$ <p>Note that the CFROI methodology assumes that the CFROI on New Projects = WACC at in 40 years. Hence, no new investments are made after this period because no incremental relative wealth is created.</p>

**Assumptions to Use in Calculations:** (continued)

<b>Item</b>	<b>Assumption</b>
Amortization of Goodwill	The "Depreciation & Amortization" line item in the income statement consists entirely of goodwill amortization according to the 10K.
Depreciation and Amortization	Total depreciation and amortization (including goodwill amortization) is reported in the Statement of Cash Flows. The cost of goods sold includes depreciation but not goodwill 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	For the year ending 12/31/2000, KMB had an excess (deficiency) of plan assets over benefit obligation of \$239.4 million. The fair value of plan assets was \$4,086.5 million versus benefit obligations of \$3,847.1 million. As such pension intangibles are zero.
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> $\text{Cash Flows for Project}_T = \text{PMT}(\text{Project ROI}_{T+1}, \text{Project Life}, \text{Expenditures for New Property and Plant}_{T+1}, \text{Investment Net Working Capital}_{T+1})$ <p>Where</p> <ul style="list-style-type: none"> <li>Cash Flows for a Project are constant over its life</li> <li>Project <math>\text{ROI}_{T+1}</math> = CFROI on new investments in period T+1</li> <li>Project Life = answer you got from question 1</li> <li>Expenditures for <math>\text{PP\&amp;E}_{T+1}</math> = see below</li> <li>Investment Net Working Capital<math>_{T+1}</math> = see below</li> </ul> <p>Note: Use your answer in worksheet "4. Gross Cash Flows" for Project<sub>2000</sub> cash flows.</p>

**Assumptions to Use in Calculations:** (continued)

Item	Assumption
Project Life	<p>Project life is derived using the worksheet labeled "1. Asset Life". 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> <p style="text-align: center;">Life of Project<sub>2000</sub> = Life of Project<sub>2001</sub> = ... = Life of Project<sub>2040</sub></p> <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&amp;E (known also as capital spending or capital expenditures) grow at the sustainable growth rate.</p> <p style="text-align: center;">New PP&amp;E<sub>T+1</sub> = PP&amp;E<sub>T</sub> * (1 + Sustainable Growth Rate<sub>T+1</sub>)</p> <p>So</p> <p style="text-align: center;">New PP&amp;E<sub>2002</sub> = PP&amp;E<sub>2001</sub> * (1 + Sustainable Growth Rate<sub>2002</sub>)</p> <p>Capital spending occurs each year until the year 2040. After 2040, there are no capital expenditures since the firm is assumed to wind-down (ROIC=WACC).</p>
Depreciable Assets	<p>In template "8. Valuation and Partitioning",</p> <p>Depreciable Assets<sub>T</sub> = Expenditures for New Property and Plant<sub>T</sub> * (Ratio of Depreciable Assets/Gross Cash Investment).</p> <p>This ratio is the result/answer from question 3.</p>
Investment Net Working Capital (Non-depreciable Assets)	<p>In template "8. Valuation and Partitioning",</p> <p>Non-Depreciable Assets<sub>T</sub> = Expenditures for New Property and Plant<sub>T</sub> * (Ratio of Non-Depreciable Assets/Gross Cash Investment).</p> <p>This ratio is the result/answer from question 3. Thus,</p> <p style="text-align: center;">New PP&amp;E<sub>T</sub> = Depreciable Assets<sub>T</sub> + Non-Depreciable Assets<sub>T</sub></p>

**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 2000, the non-depreciable assets associated with the first project, Project <sub>2000</sub> , would be recaptured in 2010. The second project, Project <sub>2001</sub> , started a year later in 2001, would have its non-depreciable assets recaptured e.g. sold in 2011. The useful life is your answer to question 1.
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 "6. 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)`. If you are not familiar with the IF command, click on Help in Excel and then select Contents and Index.

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

1. Using the financial statement, operating lease, and risk factors as well as bond yields provided, calculate the estimated life of the project using the template provided in the worksheet labeled "1. Asset Life". The area to be completed is highlighted in **yellow**. To make sure that you understand where the Construction in Progress is located in the 10K, print out the appropriate page from Kimberly-Clark's 10K for the year ended March 23, 2001 and **highlight the relevant numbers in yellow**. One source of 10K reports is <http://www.wsrn.com>. Type in Kimberly-Clark's ticker (KMB). Click either on SEC Filings (SEC) or SEC Filings (Edgar-Online).

2. Calculate the inflation adjustment factor for KMB using the worksheet labeled "2. Inflation Adj (Gross Plant)" by filling out all the **highlighted** sections.

3. Using the Inflation Adjustment Factor that you calculated in question 2, derive the

- Depreciable Assets (stated in 2000 dollars) in dollars and percentage terms
- Non-depreciable Assets (stated in 2000 dollars) in dollars and percentage terms
- Gross Cash Investment in Year 2000 dollars (current dollars)

using the worksheet labeled "3. Gross Cash Investment". The gross cash investment can be thought of as the amount that the firm, in this case Kimberly-Clark, has invested in assets "as if" it just started the business from scratch in the Year 2000. In order to complete this question, you need to also calculate the present value of the operating leases. Information on operating leases is given in the worksheet "Operating Lease".

4. Calculate the gross cash flow using the template provided in the worksheet labeled "4. Gross Cash Flow". 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).

5. Complete the **highlighted** sections of the worksheet labeled "5. CFROI" 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**.

6. Compute the before-tax weighted average cost of capital (WACC) using the worksheet labeled "6. WACC". 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. In particular, we use all firms that Holt Associates (<http://www.holtvalue.com>) considers comparable to Kimberly-Clark in terms of size (we

use all firms in the KMB peer group that have a V=very large) and industrial classification. Next, we adjust for leverage via the debt-equity ratio. Observe that the CFROI methodology treats "Other Long Term Liabilities" and "Preferred Stock" as debt.

7. Construct the fade window given management expectations using the worksheet labeled "7. Forecast Life Cycle". In addition to this, construct a graph showing the CFROI, the sustainable growth rate, and the discount rate over time (please put all of these on one graph). The Y-axis should be in percent and the X-axis represents the number of years (1 through 40).

8. Find 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 using the worksheet labeled "8. Valuation and Partitioning". Based on the market price for KMB as of July 17, 2001 of \$56.39, would you recommend a buy, sell, or hold investment decision? What percent of the total value of the firm is due to expected future investments? Complete the sensitivity table for the justified price per share of Kimberly-Clark using the Data Table command in Excel.

9. Complete the DualGrade matrix for the year 1997 in the worksheet labeled "9. DualGrade Matrix 1997" using data located in the worksheet labeled "Peer Group-December 1997". Which firm's create economic wealth? Which firms have wealth dissipation? Is economic performance in 1997 a good predictor of future stock market performance (1998)? Why or why not? Complete the DualGrade matrix for the year 2001 in the "DualGrade Matrix 2001" worksheet using data in the worksheet labeled "Peer Group-July 2001".

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