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Financial Management

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Free Cash Flow to the Firm (FCFF) Valuation

Objective: The purpose of this project is to reinforce the concepts that you have been exposed to through readings, lectures, and mini-cases. In essence, you will learn how the following concepts are used in the context of valuing the equity of an actual firm:

- cost of debt
- present value of operating leases and imputed interest on this "debt"
- built-up beta and cost of equity (discount rate for cash flows to stockholders)
- weighted average cost of capital (discount rate to firm's cash flows)
- margin analysis
- free cash flow to the firm (FCFF) and the terminal value of the firm
- economic profit (EVA)

The data for this project can be downloaded from my website. The file is called fm_val_fall2005.xls. The data is current as of January 5, 2005.

The Company: Gillette (Ticker: G), The Gillette Company manufactures[1] and sells a variety of consumer products in over 200 countries and territories. The Company has five business segments: Blades and Razors, Duracell, Oral Care, Braun and Personal Care. It is a world leader in most of its major product categories. While Gillette is best known for its razors and blades (Sensor, Trac II, and the premium-priced Mach3 and M3Power), which is its primary business in terms of share of net sales (42%) and operating profit (68%), Gillette is also a leading producer of batteries (Duracell). The Company's largest customer is Wal-Mart Stores, Inc. which accounted for 13% of net sales in 2003. Warren Buffett's Berkshire Hathaway and FMR Corp. each own about 9% of Gillette.

Gillette's management in conference calls and news reports expects annual sales growth to be 3% to 5% long-term, excluding acquisitions and currency fluctuations. Management also expects capital expenditures to be about 5% of sales in the near term due to stronger sales performance and capital cost management. Gillette recently announced the introduction of two new women's razors in the first quarter of 2005. One is the women's version of M3 Power, Venus Vibrance, a battery power pulsating razor whose cartridges will retail at 15% premium to Venus Divine. The other is an extension of Venus Divine into the more price sensitive disposable segment. Venus Disposable will retail at 40% premium to Sensor3, the highest priced disposable razor.

Primary Publicly Traded Competitors: Colgate-Palmolive (CL), Energizer Holdings (ENR), Procter & Gamble (PG) and Rayovac (ROV).

[1] As of December 31, 2003, Gillette had manufacturing operations at 32 facilities in 14 countries.

Assignment/Tasks: Download the file fm_val_fall2005.xls and then given the assumptions on the last page of this mini-case, perform the following tasks using this spreadsheet. Assume that the date of analysis is ***January 3, 2005***.

1. Cost of debt (10 points): Calculate the pre-tax cost of debt and the after-tax cost of debt using the Altman EM Z-Score model and alternatively the interest coverage ratio model of Damodaran. In addition to this, calculate the pre-tax cost of debt and the after-tax cost of debt using Moody's bond rating for Gillette. Assume that Gillette's debt has a 10-year maturity. As such, you should use the 10-year Treasury bond for the risk free rate in your calculations. Is the cost of debt the same under all 3 models? Please explain.

2. PV of Operating Leases and Imputed Interest (10 points): Calculate the present value of the operating leases using the pre-tax cost of debt that you calculated in question #1 above as the discount rate. Assume that the year 2004 is the current period (time 0). Calculate the PV of operating leases using pre-tax cost of debt from the Altman EM Z-Score model, the Interest Coverage Model of Damodaran, and also Moody's bond rating. You are using the ***pre-tax*** cost of debt since operating leases are a form of financing and as such represent ***before-tax*** cash flow to debtholders. In addition to this, calculate the imputed interest on these operating leases for Year 2005 and onwards (years after 2005). Assume that all operating lease payments are due at the *end* of the fiscal year (Gillette has a fiscal year which ends on December 31^{st}).

3. Total value of debt and total value of equity (5 points): Calculate the total value of debt for the last twelve months (LTM) assuming that the book value of debt is equal to the market value of debt. Be sure to include the present value of operating leases (at the year 2005) as debt. Next, calculate the total market value of equity. Finally, compute the market value of total capital as well as the weights for debt and equity. Perform the calculations using the rating based on the Altman EM Z-score, the Interest Coverage Model of Damodaran, and also Moody's bond rating. Are the weights for debt and equity similar under all three approaches?

4. Built-up Beta and Cost of Equity (10 points): Compute the built-up beta as well as the historical beta for Gillette. To calculate the beta, you can use the SLOPE function in excel. Use the book value of debt (only debt as it appears on the balance sheet) and the market value of equity in calculating the debt-to-equity ratio for the comparable firms. For the ***comparable*** firms, we will **not** include the PV of Operating leases in the total value of their debt[2]. (However, we will include the PV of Operating leases with respect to Gillette). Please round your answer to two decimal places. Next, calculate the cost of equity using the built-up beta for Gillette. Also calculate Gillette's beta based on its historical returns in relation to the returns on the S&P500. Does using Gillette's historical beta make sense? Why or why not?

[2]Intuition: We are trying to find the unlevered beta. After the unlevered beta or beta with no debt is found, we will then include as debt the On Balance Sheet Debt as well as the PV of Operating Leases in calculating your debt to equity ratio for our subject firm, Gillette.

5. Cost of equity and weighted average cost of capital (10 points): Calculate the four after-tax weighted average cost of capital using

- Altman EM Z-score model for Cost of Debt and Built-up Beta for Gillette
- Moody's bond rating for Cost of Debt and Built-up Beta for Gillette
- Altman EM Z-score model for Cost of Debt and Historical Beta for Gillette
- Moody's bond rating for Cost of Debt and Historical Beta for Gillette

6. Margin analysis (10 points): Do a margin analysis for Gillette using the Margin Analysis worksheet in your fm_val_fall2005.xls workbook. This analysis is a prelude to forecasting the cash flows. For the Peer Group (CL, ENR, PG, ROV), use the information contained in the respective 10K's for these firms. For the S&P Personal and Household Products, use the "S&P Personal Products" workbook which I downloaded from Compustat.

7. Free cash flow to the firm, target stock price and sensitivity analysis (40 points):

a. **Terminal Value Based on Analyst Expectations of EBITDA Multiple**: Use the assumptions provided on the last 2 pages of this case together with the worksheet labeled "7a. Target Price-EBITDAMultiple" to calculate the FCFF, the value of the firm, and the target stock price for Gillette. The worksheet assumes that stable/normal growth occurs in year 6. In calculating the terminal value (enterprise value) at the beginning of year 6, use the TEV/EBITDA multiple applied to EBITDA (The EBITDA that you use is NOT adjusted for imputed interest from Operating Leases) in year 6.

How does your target stock price compare to target price for Gillette set by CS First Boston at $41 and Morgan Stanley at $39? Next, do a sensitivity analysis using the data table command in Excel by completing the 2 two-way tables in the worksheet. These sensitivity tables show how the target (justified) price per share for Gillette changes with a change in the assumption regarding the growth rate for revenues, the WACC, and the COGS/Sales multiple. For valuation purposes, the WACC in this scenario should be based on Moody's bond rating for the cost of debt and the built-up beta for the cost of equity. In the valuation scenario, assume that the number of shares outstanding remains at 993,000 shares (stated in 000s) over the valuation period.

In your sensitivity analysis, discuss how the target price changes if analysts use management expectations for growth which are lower rather than their (analysts') expectations.

b. **Terminal Value Based on Constant Growth Model**: Use the assumptions provided on the last 2 pages of this case together with the worksheet labeled "7b. Target Price-Constant Grwth" to calculate the FCFF, the value of the firm, and the target stock price for Gillette based on management expectations. This valuation worksheet is similar to the worksheet labeled "7a. Target Price-EBITDAMultiple" except that the terminal value is calculated using the constant growth model rather than the EBITDA multiple. Mathematically, the formula for the Terminal Value of the Firm is

$$\text{Terminal Value}_T = \frac{\text{EBITDA}_{T+1}}{\text{WACC}_{T+1} - \text{Growth in EBITDA}_{T+1}}$$

where we assume that the Growth in EBITDA_{T+1} = Sales Growth_{T+1}.

Note that this is the same formula as the constant dividend growth model used to obtain a stock price with expected dividends substituted for EBITDA, cost of equity used in lieu of WACC and expected growth rate in earnings replacing growth in EBITDA.

$$\text{Stock Price}_T = \frac{\text{Dividends}_{T+1}}{\text{Cost of Equity}_{T+1} - \text{Growth in Earnings}_{T+1}}$$

To calculate WACC in the stable growth period we assume that in the stable growth period:

- Gillette's beta reverts to the Industry beta for Personal Products
- Gillette's bond rating is BBB with 10 year maturity
- Industry beta for Personal Products is the average the "Household Products" beta and the "Toiletries/Cosmetics" beta. Both betas are reported in the "Industry Betas & Debt to Eqty" worksheet.
- Industry Equity to Total Capital Ratio (w_{Equity}) a.k.a. weight for equity is calculated using the Industry Debt-to-Equity Ratio for Personal Products. The Industry Debt-to-Equity Ratio for Personal Products is the average of the "Household Products" debt-to-equity ratio and the "Toiletries/Cosmetics" debt-to-equity ratio. Both ratios are reported in the "Industry Betas & Debt to Eqty" worksheet.

How does your target stock price compare to target price for Gillette set by CS First Boston at $41 and Morgan Stanley at $39? Next, do a sensitivity analysis using the data table command in Excel by completing the 2 two-way tables in the worksheet. These sensitivity tables show how the target (justified) price per share for Gillette changes with a change in the assumption regarding the growth rate for revenues, the WACC, and the COGS/Sales multiple. For valuation purposes, the WACC in this scenario should be based on Moody's bond rating for the cost of debt and the built-up beta for the cost of equity. In the valuation scenario, assume that the number of shares outstanding remains at 993,000 shares (stated in 000s) over the valuation period.

8. Economic Value Added (EVA) (5 points): Calculate the economic profit using the book value of equity and the book value of debt and assuming

a. After-tax WACC is computed using Moody's bond rating for cost of debt calculations and using built-up beta for the cost of equity calculations.

b. Marginal tax rate for last twelve months or trailing twelve months

c. NOPAT = EBIT(1-t) for the last twelve months or trailing twelve months

Is Gillette's management adding value to the firm?

Please turn in a hard copy of your solutions together with your disk showing all your spreadsheet calculations. This is an individual project. As such, anyone caught cheating will be given an F on this assignment.

Valuation Assumptions:

Item	Assumption
TTM or LTM (Trailing twelve months)	Use the last twelve months of data (LTM)/last 4 quarters of data in the 10Q. Remember that only "flow" items are added for the last 4 quarters while only the most current quarter is used for "stock" items.
Expected growth rate in sales per year	Forecast period[3]: 5.5% (Analysts expectations) 3%-5% (Management expectations) Stable growth period: 4% (Personal & Household Products)
Margin analysis (Percent of Sales)	
Cost of goods sold/Net sales	Forecast period: 34%; Stable growth period: 36.5% This ratio is based on COGs which *excludes* depreciation and amortization.
Selling, gen. & admin./Net sales	Forecast period: assume SGA is 35% of Sales based on past margins. Stable growth period: SGA/Sales = 41% (Personal & Household Products)
Depreciation and Amortization/Net sales	Forecast period: 6%; Stable growth period: 4% (Personal & Household Products)
Marginal tax rate (τ)	Forecast period: 29%; Stable growth period: 29%
Capital Expenditures[4]	CapEx /Revenues = $CapEx_T/Sales_T$ remains constant at 5% over the forecast period and becomes 3.5% in the stable growth period.
Non-cash Working capital (NWC)	NWC is defined as Current Assets (excluding cash and marketable securities) – Current Liabilities (excluding short term debt items). NWC/Net Sales remains constant at 4% over the forecast period and remains at 4% in the stable growth period.

[3]The forecast period is the period prior to normal or stable growth; stable growth is defined as the period in which the firm reverts to the mean of the industry (in this case Personal & Household Products).
[4]Capital Expenditures are increases (decreases) in property, plant, and equipment. It is found in the statement of cash flows under Cash Flow Provided by Investing Activity.

Valuation Assumptions: (continued)

Item	Assumption
Total Enterprise Value(TEV)/EBITDA	14.3x; EBITDA is not adjusted for Operating Leases (interest on OpLease isn't added back). This multiple is based on analyst estimates (see the "Analysts Target Price" worksheet) and is applied to EBITDA in year 6, stable growth period, to obtain the terminal value of the firm at the end of year 5.
Free Cash Flow to the Firm	FCFF = [(EBIT+ Imputed Interest on Operating Leases)*(1-τ)] + Depreciation – CapEx – Change in Non-cash Working Capital
PV of Operating Lease	In calculating the number of years in the annuity as part of your PV of Operating lease calculations, please round to the nearest whole number. For example, if the number of years is 5.7 then the number of years remaining on the operating lease is 6 years.
Market risk premium (R_M-r_F)	5.5%
Forecast period	5 years; Year 2004 is time 0 (current period). Stable growth (when growth reverts to the mean of the specialty retail industry) begins in year 2010.
Firm's Bond Rating	Moody's: Aa3 (equivalent to AA-)
Maturity of Long Term Debt	10 years
Market Value of Debt	Assume that the Market Value of Debt = Book Value of Debt[5]; Total debt includes the PV of Operating Leases.
Value of Equity Options (in 000s)	17,575; This is based on information contained in Gillette's 2004 Proxy Statement found in the "Options (G)" worksheet.
Shares Outstanding (stated in 000s)	993,000 shares. We assume that the firm will not repurchase any shares in the near future.
Industry Beta for Personal and Household Products	In the "Industry Betas & Debt to Eqty" worksheet obtained from www.damodaran.com, average the "Household Products" beta and the "Toiletries/Cosmetics" beta

[5] This isn't the case from a theoretical perspective although many analysts make this assumption.

Valuation Assumptions: (continued)

Item	Assumption
Industry Debt-to-Equity Ratio for Personal and Household Products	In the "Industry Betas & Debt to Eqty" worksheet obtained from www.damodaran.com, average the "Household Products" debt-to-equity ratio and the "Toiletries/Cosmetics" debt-to-equity ratio
Industry Debt-to-Equity Ratio for Personal and Household Products	In the "Industry Betas & Debt to Eqty" worksheet obtained from www.damodaran.com, average the "Household Products" debt-to-equity ratio and the "Toiletries/Cosmetics" debt-to-equity ratio
Industry Equity-to-Total Capital Ratio (This is the weight for equity, w_{EQUITY}, in calculating the WACC)	Calculate this ratio using the Industry Debt-to-Equity Ratio in the preceding row. Hint: What does [(Debt/Equity) + 1] equal? How would you use this hint to calculate w_{EQUITY}?
Industry Debt-to-Total Capital Ratio (This is the weight for debt, w_{DEBT}, in calculating the WACC)	Calculate this ratio using the Industry Equity-to-Total Capital Ratio in the preceding row. Recall that $w_{DEBT} + w_{EQUITY} = 1$.