Using Coke and Pepsi to Demonstrate Optimal Capital Structure Theory

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Abstract: In this paper, we apply the trade-off theory of capital structure to Coca-Cola and Pepsico. We use data for bond ratings, bond risk premiums, and levered CAPM betas to compute the cost of equity and the weighted average cost of capital for Coca-Cola and Pepsico at different debt levels. This study shows the impact of increasing financial leverage on WACC. As financial leverage increases, the WACC decreases until the optimal debt ratio is reached, after which, the WACC begins to rise. At this debt ratio, the value of Coke and Pepsi will be maximized. Our results indicate the optimal debt ratio for both Coke and Pepsi is the level at which both companies are currently leveraged.

INTRODUCTION

Gardner, McGowan, Moeller (2010) demonstrate how to apply the trade-off theory of capital structure to an existing firm, Microsoft, to help students understand how theoretical concepts can be applied in practice. The authors' empirical results indicated that Microsoft is not at its optimal capital structure and is, therefore, not maximizing its value as an all equity firm. The optimal debt ratio for Microsoft based on the empirical analysis should be 37.5%. To extend the Gardner, McGowan, Moeller (2010) empirical results, in this paper, we have apply the trade-off theory methodology to two firms within the same industry, Coca-Cola and Pepsico. The empirical results of this paper indicate that the debt ratios of Coke and Pepsiso are both optimal which is in the range of 28.3% (AA bond rating) to 37.5% (A bond rating) total debt ratio which is less that the firms' current bond ratings of A+. Theory would indicate that these two firms are maximizing their values at this debt level.

Background

Modigliani and Miller (1958) show that with a simple set of assumptions the value of a firm is independent of the capital structure. M&M (1958) assume that capital markets are certain and that there are no taxes or trading cost. Investors are able to borrow and lend at the same rate. The value of the firm defined in M&M (1958) is the discounted present value of the future cash flows assuming that the cash flows are a no-growth perpetuity. The value of the firm is a function of the future cash flows generated by the investment opportunities available to the company. The financial structure of the company determines the proportion of future cash flows allocated to debt and the proportion of future cash flows allocated to equity. M&M (1958) assume that the weighted average cost of capital and the cost of debt remain constant. Consequently, as the proportion of debt financing used by the company increases, the cost of equity increases to keep the weighted average cost of capital equal.

Modigliani and Miller (1963) show that total net cash flow from the company increases by the amount of the tax shield and the total value of the firm increases proportionately. M&M (1963) show that the value of the company will increase by the present value of the tax shield which is equal to the total value of debt issued by the company multiplied by the marginal tax rate for the company. If the company increases the level of debt in the financial structure, the cost of equity increases because of the additional risk associated with the increased financial leverage. If the amount of debt issued by the company increases, the theoretical value of the company increases, too.

Including financial distress costs in the valuation of the company, causes the probability of bankruptcy to increase as the company increases the amount of debt in the financial structure, Miller (1977). Initially, with incremental increases in total debt, the WACC decreases which causes the value of the company to rise. However, the probability of bankruptcy increases with increases in total debt. The increase in the value of the company caused by increased financial leverage is reduced by the additional bankruptcy costs. Bankruptcy costs are the probability of incurring bankruptcy costs multiplied by the value of the bankruptcy costs. As financial leverage increases, the additional value of the company from increased use of debt is equal to the increase in the total expected value of bankruptcy costs. At the optimal leverage level, the total value of the company reaches a maximum value after which the value of the company decreases. This model is referred to as the tradeoff theory of financial leverage. Krause and Litzenberger (1973) are credited with first using the term ‘The Trade-off Theory’.

Table 1 and Figure 1 show the impact of the M&M (1958) model, called the net operating income approach. The cost of debt remains constant at 4% and the WACC is held constant at 10%. The cost of equity increases with increases in financial leverage from 10% to 15.4% at a total debt ratio of 90%. If debt is greater than 100%, the equity of the company is negative implying that the company is *de facto*, bankrupt.

A second approach is the net income approach. Under the net income approach model, the cost of equity and the cost of debt are assumed to be constant. Therefore, as financial leverage increases, the WACC decreases. Table 2 and Figure 2 demonstrate the effects of this model. We assume that the total debt ratio can range from 0% to 100% percent and that the cost of debt is 4% and the cost of equity is 10%. The WACC is a weighted average of the costs of the two components of the capital structure, debt and equity and ranges from 10% when the total debt ratio is 0% to 4% when the total debt ratio is 100%. The maximum amount of debt is 100%. Beyond that point, the equity of the company is negative implying that the company is *de facto*, bankrupt.

A third approach, called the traditional approach in Solomon (1963), assumes that the cost of debt and the cost of equity are constant initially but that both component costs increase beyond a certain range. That is, some proportion of debt does not increase the cost of debt. The cost of equity rises slightly initially and more rapidly beyond a certain range as the total debt ratio increases. In the example, debt is fixed up to 30% and equity rises only slightly, so that the WACC decreases up to 40% and is constant up to 50%. Beginning at a 60% debt ratio, the cost of equity increases by 0.60% and the cost of debt increases by 0.20% for each 10% increase in the debt ratio. Thus, the WACC decreases to a debt ratio of 40%, is constant to a debt ratio of 50%, and rises after the debt ratio of 60%.

The implications of the traditional approach are straightforward. For small increases in financial leverage as measured by the total debt ratio WACC decreases. Beyond a certain point, the cost of debt begins to increase and the cost of equity increase more rapidly. Beyond this point, WACC begins to increase. In the middle area, the increased cost of debt and equity offset and the WACC remains constant. This area is the optimal range. For the example, WACC remains constant when the total debt ratio is between 40% and 50%.

THE TRADE-OFF THEORY OF FINANCIAL LEVERAGE

The trade-off theory of financial leverage shows the impact of increases in financial leverage on the company's weighted average cost of capital (WACC). Increases in debt in the company's capital structure increase the tax benefit since the interest payments on the debt is a tax deductible expense. At the same time, the company's cost of equity increases because the additional debt in the company's capital structure increases the riskiness of the equity. WACC will decline as long as the positive impact of the tax shelter is greater than the negative effect of the increase in the cost of equity resulting from the added risk. Eventually, the tax shelter benefit will be less that the additional cost of equity. At this point, investors will require a higher cost of debt and an even higher cost of equity because investors believe that the risk level of the company's risk from the financial leverage has increased beyond the optimal point for the company. A company's market capitalization is maximized at the point where the WACC is minimized because the trade-off theory assumes that the company incurs additional bankruptcy risk and bankruptcy cost resulting from the additional financial leverage. The company's WACC starts to rise beyond the optimal level of financial leverage. The minimum WACC, is the point at which the market value of the company is maximized because this is the total debt level at which the of capital structure is optimized.

In this study, we apply the trade-off theory of capital structure to Coca-Cola and Pepsico. To apply the trade-off theory of financial leverage requires calculating the weighted average cost of capital (WACC) under different total debt ratio levels using actual market values for the cost of debt and the cost of equity using actual financial data for Coke and Pepsi and simulated data for alternative levels of debt. We derive the data used in this study from various sources of online information.

THE WEIGHTED AVERAGE COST OF CAPITAL

The weighted average cost of capital (WACC) is calculated by multiplying the proportion of each component of the capital structure by the cost of that component, M&M (1958). The component cost of debt is adjusted for taxes by multiplying the yield to maturity on debt by one minus the marginal tax rate. The proportion of both debt and equity are market based proportions where the market value of debt is the number of bonds outstanding times the number of bonds. The market value of equity is the number of shares outstanding times the market price per share. The cost of debt is the yield to maturity on outstanding debt and the cost of equity is the CAPM determined cost of equity. Graham and Harvey (2001) report, in a survey, that 73.5 percent of corporate financial decision makers use the Capital Asset Pricing Model to calculate the cost of equity. Therefore,

$$\mathbf{WACC = w_d R_d (1\text{-}tax) + w_s (R_s)}$$

where, WACC is the weighted average cost of capital, w_d is the proportion of debt, w_s is the proportion of equity, R_d is the marginal cost of debt, tax is the marginal tax rate, and R_s is the marginal cost of common stock equity. The component cost of debt is reduced by the amount of the tax shield.

The yield to maturity on outstanding bonds is the discount rate that equates the market price of the bonds to the coupon payments and the face value of the bond.

$$P_o = \Sigma CP_t/(1+R_d)^t + MV/(1+R_d)^T$$

where, Po is the market price of the bond, CP_t is the coupon payment of the bond, MV is the face value of the bond, and T is the time to maturity. The yield to maturity is the discount rate that equates the market price of the bond to the present value of the coupon payments plus the face value of the bond.

The cost of equity is calculated with the CAPM, Sharpe (1964). Using CAPM, the return on investment is the risk free rate of return plus a risk premium. The risk premium is beta, the amount of risk, times the market price of risk ($R_m - R_f$). This risk premium calculated with expected return in the market minus the risk free rate of return. The cost of equity is

$$R_s = R_f + \beta_s(R_m - R_f)$$

where, R_s is the return on equity, R_m is the return on the market, R_f ,is the risk free rate, and β_s is the beta for the equity. Beta is the slope coefficient of the characteristic line and measures the systematic risk of the equity.

EMPIRICAL RESULTS

Table 4 shows the calculations needed to determine the simulated cost of debt for Coke/Pepsico for a range of bond ratings are from AAA to B and are taken from Standard and Poor (2006, page 54). Line 1 shows the total debt ratio for the average company at each bond rating level. Damodaran (2012) provides the risk premium above the Treasury bond rate for each bond rating. The simulated yield to maturity for each bond rating is equal to the bond yield risk premium from Damodaran (2012)[1] plus the average Treasury bond rate (4.14%) taken from *Stocks, Bonds, Bills and Inflation* (2011). The yield for bonds range from 4.64% for a bond with a AAA rating to 9.05% for a bond with a B rating. As a manufacturing corporation increases the amount of financial leverage in the capital structure, the bond rating deteriorates and the cost of debt increases. The results in Table 1 are used for both Coke and Pepsi since the yield to maturity is market determined.

Table 4
Debt Ratios and Interest Rates
for S&P Debt Ratings
Coca-Cola

	Bond Rating		AAA	AA	A	BBB	BB	B
1	TD/(TD+E)		0.124	0.283	0.375	0.425	0.537	0.758
2	Yield (%)		4.64%	4.79%	5.14%	5.74%	7.49%	9.14%

Table 5KO shows the computations to calculate the CAPM beta for Coke at different levels of financial leverage. Currently, KO's beta is 0.57 and is taken from Yahoo Finance for the end of December 2010. Similar Tables for Pepsi are in Appendix A. The empirical results for Pepsi are similar. KO's total assets (book value) are $72,921 million for 12/31/2010, owners' equity (book value) is $31,317 million, and debt (book value) is $41,604 million. KO's market premium for outstanding debt from Morningstar (December 2010) is 9.785829%. Thus, the market value of KO's outstanding bonds for 12/31/2010 is $45,675 million which is equal to the

[1] Damodaran (2012) http://pages.stern.nyu.edu/~adamodar/

book value of $41,604 times one plus the market premium of 9.785829%. KO's market capitalization for 12/31/2010 was $150.56 billon. KO's market based debt to equity ratio is 0.29 and KO's total debt ratio is 0.2264.

KO's unlevered beta, using Hamada (1969) is 0.4789

$$\beta_{levered} = [1+(1-Tc)(D/E)] * \beta_{unlevered}$$

$$\beta_{KO} = 0.57 = [1+(1-.35)(0.2264)] = 0.4789$$

The results in Table 5KO show that the beta coefficient for KO at 0% debt would be 0.4789 and beta would rise as the bond rating declined and the debt ratio increased. At a bond rating of B, the beta coefficient for KO would be 1.9790.

	Table 5KO Relevered Betas Coca-Cola							
1	Unlevered Beta	0.4789						
2	Bond Rating	No Debt	AAA	AA	A	BBB	BB	B
3	Debt/Equity	0.0000	0.1416	0.3947	0.6000	0.7391	1.1598	3.1322
4	Re-Levered Beta	0.4789	0.5230	0.6679	0.7663	0.8329	1.0344	1.9790

Table 6KO shows the computations required to calculate the CAPM required rate of return for KO at various bond ratings. These computations assume a risk free rate of 4.14% which is the Treasury bond yield for the month of December 2010[2] and an equity risk premium of 6.0% taken from *Stocks, Bonds, Bills, and Inflation, Market Results for 1926 -2010, 2011 Yearbook*, published by Morningstar (2011) which is the difference between the long-term equity market return of 11.9% and the Treasury bond rate of 5.9%. A beta of .57 Coca-Cola is from *Yahoo! Finance* at the end of December 2010. The unlevered beta is 0.4789 and the CAPM required rate of return for KO is 7.01% with no debt and increases to 17.16% at a bond rating of B and a debt ratio of 3.13.

$$k_s = 4.14 + 0.4789\ (6.00\%) = 7.01\%$$

	Table 6KO Computing Require Rate of Return for Equity Coca-Cola							
	Bond Rating	No Debt	AAA	AA	A	BBB	BB	B
1	Rf	4.14%	4.14%	4.14%	4.14%	4.14%	4.14%	4.14%
2	Rm-Rf	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
3	Beta	0.4789	0.5230	0.6679	0.7663	0.8329	1.0344	1.9790
4	CAPM Required ROR	7.01%	7.28%	8.15%	8.74%	9.14%	10.35%	16.01%

[2] http://www.federalreserve.gov/releases/h15/data/Monthly/H15_TCMNOM_Y30.txt

Table 7KO combines the results from the first three tables to calculate the WACC for KO at various levels of financial leverage and the resulting bond ratings. The cost of debt in Line 1 is taken from Table 4KO and the tax rate in Line 2 is assumed the marginal tax rate of 35%. Line 3 is the after tax cost of debt and is Line 2 multiplied by line 3. The total debt ratio is Line 4 is from Table 4KO. The weighted component cost of debt (W_d*R_d) in Line 5 is Line 3, the after tax cost of debt multiplied by the total debt ratio, multiplied by Line 4, the total debt ratio. Line 6 is the CAPM required rate of return for equity from Line 4 of Table 6KO and Line 7 is the total equity ratio which is one minus the total debt ratio in Line 4 of Table 7KO. Line 8 is the weighted component cost of equity and is Line 6 multiplied by Line 7. The WACC, Line 9, is Line 5 added to Line 8.

Table 7KO
Computing WACC
Coca-Cola

	Bond Rating	No Debt	AAA	AA	A	BBB	BB	B
1	Cost of Debt	0.00%	4.64%	4.79%	5.14%	5.74%	7.49%	9.14%
2	Tax Rate (%)	35%	35%	35%	35%	35%	35%	35%
3	Cost of Debt times (1-tax)	0.00%	3.02%	3.11%	3.34%	3.73%	4.87%	5.94%
4	Total Debt/(TD + TE) (%)	0.0000	0.1240	0.2830	0.3750	0.4250	0.5370	0.7580
5	Wd*Kd	0.00%	0.37%	0.88%	1.25%	1.59%	2.61%	4.50%
6	CAPM Required ROR	7.01%	7.28%	8.15%	8.74%	9.14%	10.35%	16.01%
7	Total Equity/(TD+TE) (%)	1.0000	0.8760	0.7170	0.6250	0.5750	0.4630	0.2420
8	Ws*Ks	7.01%	6.38%	5.84%	5.46%	5.25%	4.79%	3.88%
9	WACC	7.01%	6.75%	6.72%	6.71%	6.84%	7.40%	8.38%

SUMMARY AND CONCLUSIONS

Currently, KO's S&P bond rating is A+ and this implies a WACC between 6.99 % and 7.00%. That is, KO's current debt ratio appears to be optimal. Additionally, the empirical results of the simulation show support for Solomon's (1963) traditional approach to determining the optimal capital structure. There is a range over which the WACC for KO is the same, 7.02% to 6.99%. The same analysis was done for Pepsi with similar results.

In this paper, we have demonstrated how the trade off theory of capital structure can be applied to two actual firms, Coke and Pepsi. This analysis supports our results found in Gardner, McGowan, and Moeller (2010) for Microsoft although Coke and Pepsi are at their optimal debt structures where Microsoft is not. More work needs to be done to explain why our results indicate that all three companies should be at the same optimal capital structures. It may be a function of the range of debt ratios imbedded in the bond ratings.

Table 1
Capital Structure
Net Operating Income Approach

Wd	Rd	Ws	Rs	WdRd	WsRs	Ro	Wd/Ws	Ro	Rd	Rs
0.0	4	1.0	10.00	0.00	10.00	10.00	0.00	10.00	4.00	10.00
0.1	4	0.9	10.60	0.40	9.54	10.00	0.10	10.00	4.00	10.60
0.2	4	0.8	11.20	0.80	8.96	10.00	0.20	10.00	4.00	11.20
0.3	4	0.7	11.80	1.20	8.26	10.00	0.30	10.00	4.00	11.80
0.4	4	0.6	12.40	1.60	7.44	10.00	0.40	10.00	4.00	12.40
0.5	4	0.5	13.00	2.00	6.50	10.00	0.50	10.00	4.00	13.00
0.6	4	0.4	13.60	2.40	5.44	10.00	0.60	10.00	4.00	13.60
0.7	4	0.3	14.20	2.80	4.26	10.00	0.70	10.00	4.00	14.20
0.8	4	0.2	14.80	3.20	2.96	10.00	0.80	10.00	4.00	14.80
0.9	4	0.1	15.40	3.60	1.54	10.00	0.90	10.00	4.00	15.40
1.0	4	0.0	10.00	4.00	0.00	10.00				

Figure 1
Capital Structure
Net Operating Income Approach

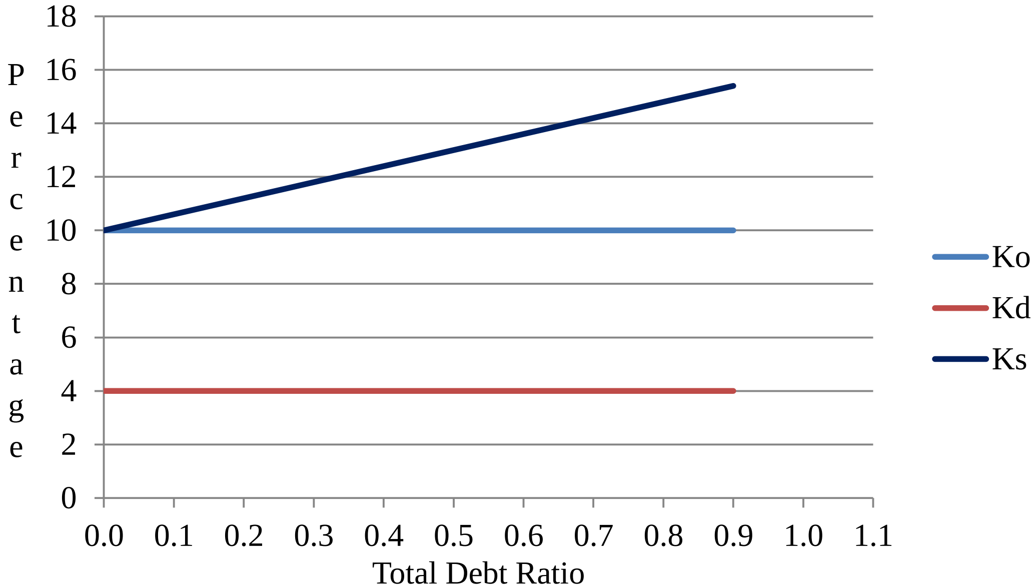


Table 2 Capital Structure Net Income Approach										
Wd	Rd	Ws	Rs	WdRd	WsRKs	Ro	Wd/Ws	Ro	Rd	Rs
0.00	4.00	1.00	10.00	0.00	10.00	10.00	0.00	10.00	4.00	10.00
0.10	4.00	0.90	10.00	0.40	9.00	9.40	0.10	9.40	4.00	10.00
0.20	4.00	0.80	10.00	0.80	8.00	8.80	0.20	8.80	4.00	10.00
0.30	4.00	0.70	10.00	1.20	7.00	8.20	0.30	8.20	4.00	10.00
0.40	4.00	0.60	10.00	1.60	6.00	7.60	0.40	7.60	4.00	10.00
0.50	4.00	0.50	10.00	2.00	5.00	7.00	0.50	7.00	4.00	10.00
0.60	4.00	0.40	10.00	2.40	4.00	6.40	0.60	6.40	4.00	10.00
0.70	4.00	0.30	10.00	2.80	3.00	5.80	0.70	5.80	4.00	10.00
0.80	4.00	0.20	10.00	3.20	2.00	5.20	0.80	5.20	4.00	10.00
0.90	4.00	0.10	10.00	3.60	1.00	4.60	0.90	4.60	4.00	10.00
1.00	4.00	0.00	10.00	4.00	0.00	4.00	1.00	4.00	4.00	10.00

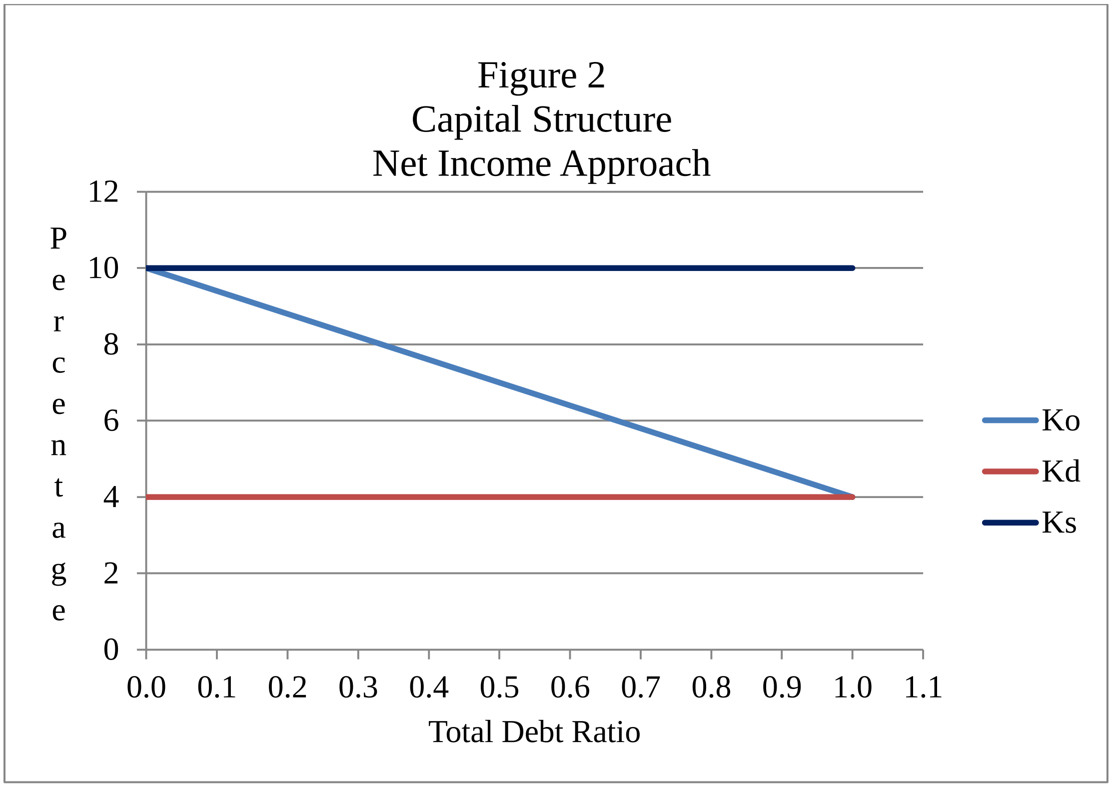
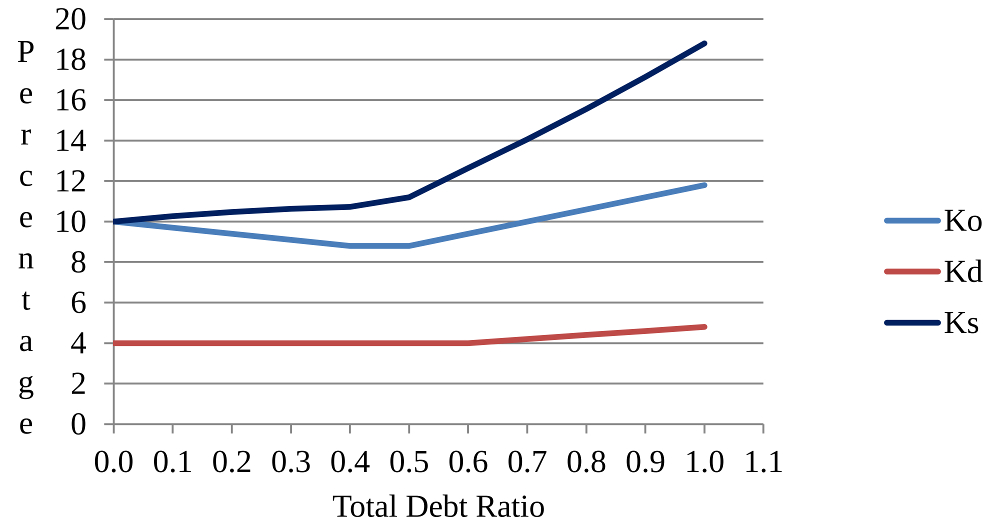
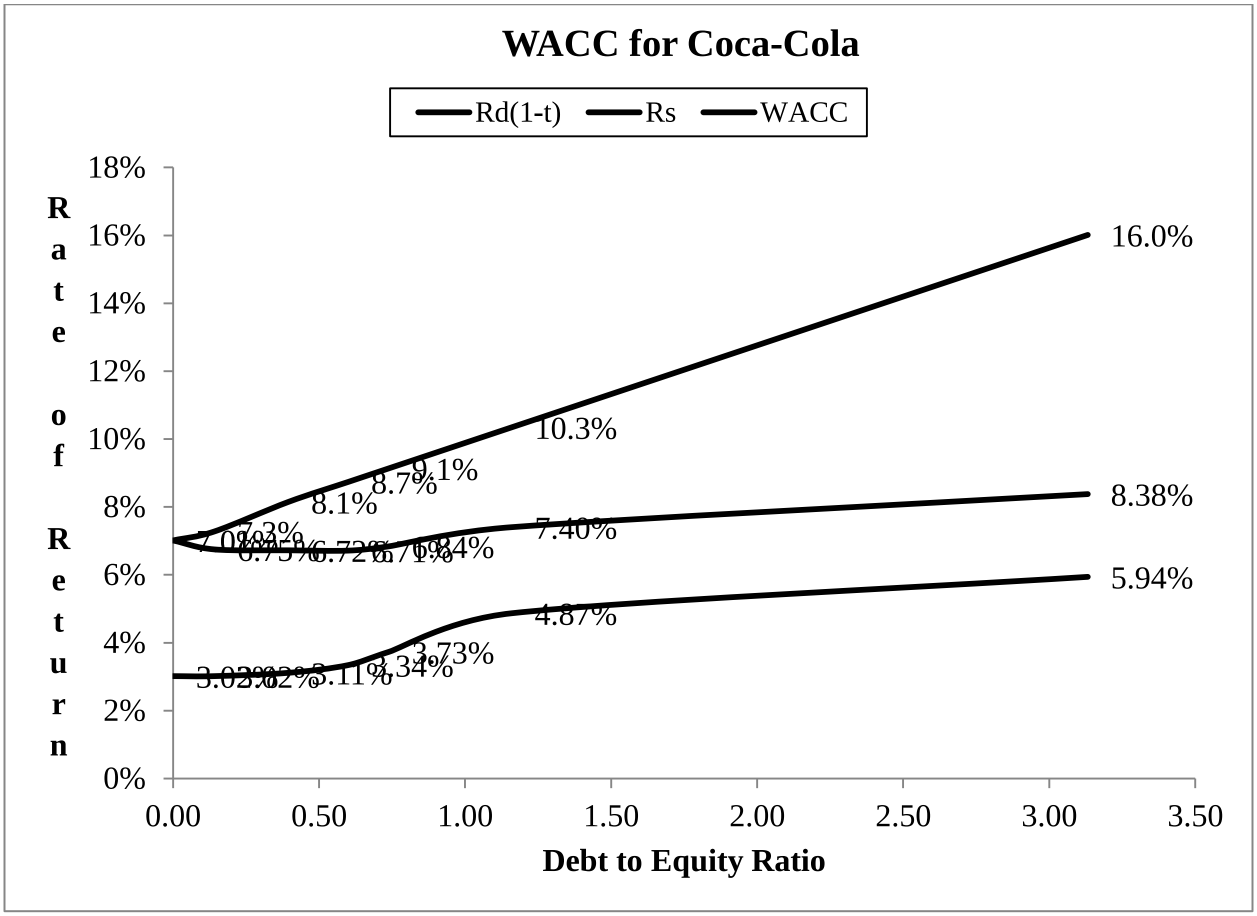


Table 3 Capital Structure Traditional Approach										
Wd	Rd	Ws	Rs	WdRd	WsRs	Ro	Wd/Ws	Ro	Rd	Rs
0.00	4.00	1.00	10.00	0.00	10.00	10.00	0.00	10.00	4.00	10.00
0.10	4.00	0.90	10.27	0.40	9.24	9.70	0.10	9.70	4.00	10.27
0.20	4.00	0.80	10.48	0.80	8.38	9.40	0.20	9.40	4.00	10.48
0.30	4.00	0.70	10.63	1.20	7.44	9.10	0.30	9.10	4.00	10.63
0.40	4.00	0.60	10.72	1.60	6.43	8.80	0.40	8.80	4.00	10.72
0.50	4.00	0.50	11.20	2.00	5.60	8.80	0.50	8.80	4.00	11.20
0.60	4.00	0.40	12.64	2.40	5.06	9.40	0.60	9.40	4.00	12.64
0.70	4.20	0.30	14.06	2.94	4.22	10.00	0.70	10.00	4.20	14.06
0.80	4.40	0.20	15.56	3.52	3.11	10.60	0.80	10.60	4.40	15.56
0.90	4.60	0.10	17.14	4.14	1.71	11.20	0.90	11.20	4.60	17.14
1.00	4.80	0.00	18.80	4.80	0.00	11.80	1.00	11.80	4.80	18.80

Figure 3
Capital Structure
Traditional Approach




WACC for Coca-Cola
Rd(1-t)
Rs
WACC
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Rate of Return
16.0%
10.3%
9.1%
8.7%
8.1%
7.2%
7.40%
6.84%
8.38%
5.94%
4.87%
3.73%
3.34%
3.11%
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
Debt to Equity Ratio

Appendix A
Empirical Results for Pepsico

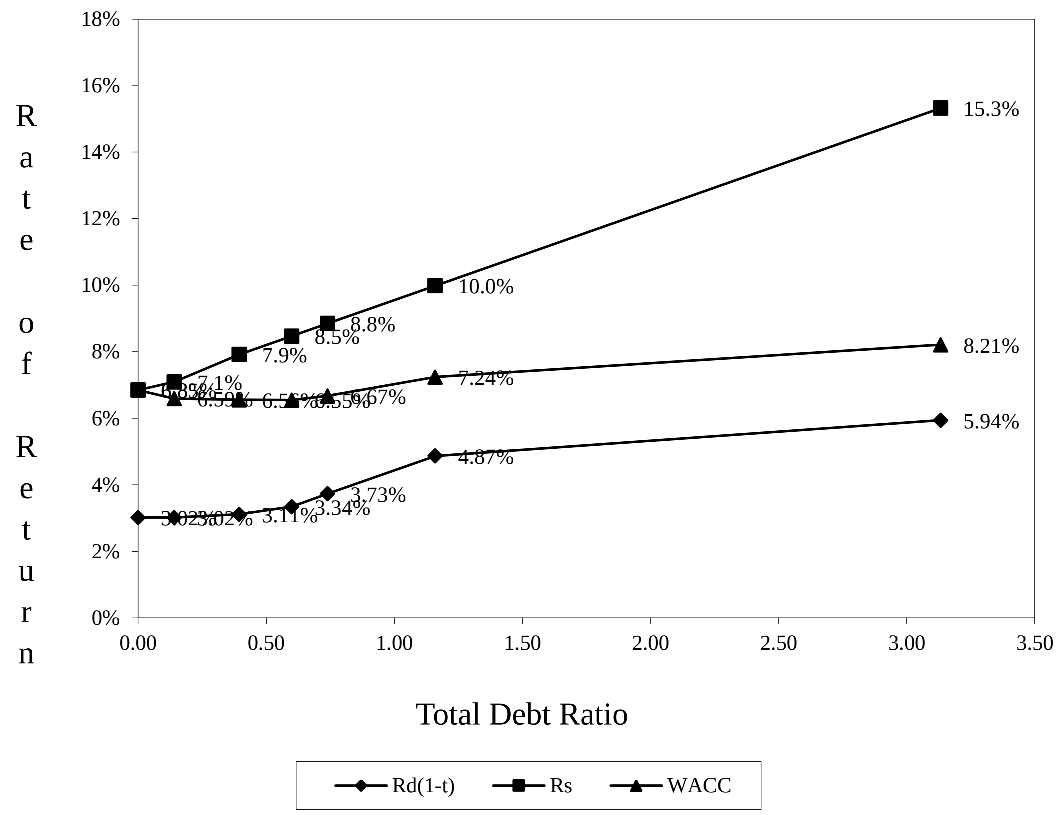
	Table 5PEP Relevered Betas Pepsico							
1	Unlevered Beta	0.4114						
2	Bond Rating	No Debt	AAA	AA	A	BBB	BB	B
3	Debt/Equity	0.000	0.142	0.395	0.600	0.739	1.160	3.132
4	Re-Levered Beta	0.4114	0.449	0.574	0.658	0.716	0.889	1.700

	Table 6PEP Computing Require Rate of Return for Equity Pepsico							
	Bond Rating	No Debt	AAA	AA	A	BBB	BB	B
1	Rf	4.14%	4.14%	4.14%	4.14%	4.14%	4.14%	4.14%
2	Rm-Rf	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
3	Beta	0.4114	0.4493	0.5738	0.6583	0.7155	0.8886	1.7001
4	CAPM Required ROR	6.61%	6.84%	7.58%	8.09%	8.43%	9.47%	14.34%

	Table 7PEP Computing WACC Pepsico							
	Bond Rating	No Debt	AAA	AA	A	BBB	BB	B
1	Cost of Debt	0.00%	4.64%	4.79%	5.14%	5.74%	7.49%	9.14%
2	Tax Rate (%)	35%	35%	35%	35%	35%	35%	35%
3	Cost of Debt times (1-tax)	0.00%	3.02%	3.11%	3.34%	3.73%	4.87%	5.94%
4	Total Debt/(TD + TE) (%)	0.0000	0.1240	0.2830	0.3750	0.4250	0.5370	0.7580
5	Wd*Kd	0.00%	0.37%	0.88%	1.25%	1.59%	2.61%	4.50%
6	CAPM Required ROR	6.61%	6.84%	7.58%	8.09%	8.43%	9.47%	14.34%
7	Total Equity/(TD+TE) (%)	1.0000	0.8760	0.7170	0.6250	0.5750	0.4630	0.2420
8	Ws*Ks	6.61%	5.99%	5.44%	5.06%	4.85%	4.39%	3.47%
9	WACC	6.61%	6.36%	6.32%	6.31%	6.43%	7.00%	7.97%

Appendix A
Empirical Results for Pepsico

Figure 5
WACC for Pepsico



REFERENCES

Brigham, Eugene F. and Michael C. Ehrhardt. *Financial Management, Theory and Practice*, Twelth Edition, Thomson/Southwestern, Mason, OH, 2008.

Damodaran, Aswath. *Applied Corporate Finance, Second Edition,* John Wiley& Sons, Inc., 2006.

Gardner, John C., Carl B. McGowan, Jr., and Susan E. Moeller. “Using Microsoft Corporation to Demonstrate the Optimal Capital Structure Trade-off Theory,” *Journal of Economic and Financial Education*, Winter 2010, Volume 9, Number 2, pp. 29-37.

Graham, John R. and Campbell R. Harvey. “The Theory and Practice of Corporate Finance: Evidence form the Field,” *Journal of Financial Economics*, 2002, pp. 187-243.

http://nobelprize.org/nobel_prizes/economics/laureates/1990/press.html

Hamada, Robert S. “Portfolio Analysis, Market Equilibrium, and Corporation Finance,” *Journal of Finance*, Volume 24, March 1969, pp. 13-31.

Kraus, A. and R.H. Litzenberger, "A State-Preference Model of Optimal Financial Leverage", *Journal of Finance*, September 1973, pp. 911-922.

Miller, Merton H. “Debt and Taxes,” *Journal of Finance,* May 1977, pp.

Miller, Merton H. and Franco Modigliani. “Dividend Policy, Growth, and the Valuation of Shares,” *The Journal of Business,* Volume 36, Number 4, October 1961, pp. 414-436.

Modigliani, Franco and Merton H. Miller. “The Cost of Capital, Corporation Finance, and the Theory of Investment,” *American Economic Review*, Volume 48, Number 3, June 1958, pp. 261-296.

Modigliani, Franco and Merton H. Miller. “Corporate Income Taxes and the The Cost of Capital: A Correction,” *American Economic Review*, Volume 48, Number 3, June 1963, pp.

Ross, Stephen A., Randolph W. Westerfield, and Bradford D. Jordan. *Fundamentals of Corporate Finance, Eighth Edition*, McGraw-Hill Irwin, New York, 2008.

Sharpe, William R. “Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk”, *Journal of Finance*, September 1964, pp. 425-552.

Ratings and Ratios, Standard and Poor’s, 2006, page 54.

Stocks, Bonds, Bills, and Inflation, Market Results for 1926 -2006, 2007 Yearbook, Classic Edition, Morningstar, 2011.