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A comparison of the weighted average cost of capital for multinational corporations: the case of the automobile industry versus the soft drink industry

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Abstract

The object of this paper is to determine to what extent the cost of capital differs across comparisons in different countries. In this paper, wecompare and contract the cost of capital for five countries in the soft drink industry and seven companies in the automobile industry. We find that the weighted average cost of capital for the four largest companies in the soft drink industry are similar and the weighted cost of capital for seven companies in the automobile industry are less similar. Since the companies in this study are all large, multinational companies in a single industry, numerous confounding variables are controlled.

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A COMPARISON OF THE WEIGHTED AVERAGE COST OF CAPITAL FOR MULTINATIONAL CORPORATIONS: THE CASE OF THE AUTOMOBILE INDSUTRY VERSUS THE SOFT DRINK INDUSTRY

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The objective of this paper is to determine to what extend the cost of capital differs across companies in different countries. In this paper, we compare and contrast the cost of capital for five companies in the soft drink industry and seven companies in the automobile industry. We find that the weighted average cost of capital for the four largest companies in the soft drink industry are more similar and the weighted cost of capital for the seven companies in the automobile industry are less similar. Since the companies in this study are all large, multinational companies in a single industry, numerous confounding variables are controlled.

Introduction

In the capital asset pricing model, CAPM, only market wide risk is priced which is systematic or non-diversifiable risk. Systematic risk reflects the covariance between returns on the investment and the return on the market. Markowitz (1953) shows the gains from portfolio diversification. Grubel (1968) shows the gains from international diversification in an environment with two countries and two assets. The effect of portfolio diversification increases as the covariance between the investment and the market decreases, that is, the gains from international diversification are greater between countries that have less correlated stock markets. Thus, since segmented stock markets have lower covariances with respect to external stock markets, market segmentation leads to greater gains from international diversification. The types of barriers that lead to market segmentation would include differences in trading costs, information availability, generally accepted accounting principles, legal and political systems, taxes rates, investor expectations and preferences, and government restrictions on stock ownership, Errunza and Losq (1985), Errunza, Losq, and Padmanabhan (1992), and Bekaert and Harvey (1995).

Goldberg, Godwin, and Duchac (2001) list three types of factors affecting the cost of capital – firm specific factors, liquidity factors, and market segmentation factors. Firm specific factors are factors such as the risk characteristics of the domestic stock market, the firm's industry, and the firm's capital structure. Liquidity factors relate to the liquidity of both the domestic stock market and the international market for the stock. Market segmentation reflects to barriers that separate the domestic stock market from the global stock market.

He and Ng (1998) and Reeb, Kwok, and Baek (1998) argue that multinational companies face greater political risk and foreign exchange rate risk. Armstrong and Riddick (1998) argue that multinational companies have greater risk because of increased stakeholder heterogeneity and information asymmetry. Lee and Kwok (1988) argues that multinational companies incur greater agency costs. Burgman (1996) argues for greater monitoring costs because of geographical constraints and differences in culture, language, and legal systems. Bartov, Bodnar, and Kaul (1996) find that firms with more multinational exposure have greater foreign exchange rate risk and a greater cost of common stock equity capital.

Arshanapalli and Nelson (1999) studies the risk reduction available through international diversification and the impact that globalization has had on international capital markets. DeSantis and Gerard (1997) argue that a

domestic capital asset pricing model does not incorporate differences across countries such as differential tax treatment and other institutional barriers to arbitrage. Both of these papers argue for a risk reduction effect of foreign direct investment.

A number of studies find that US base multinational companies use less financial leverage that domestic firms. Lee and Kwok (1988) find that multinational companies have lower levels of financial leverage. This result is confirmed in Burgman (1996). However, Rajan and Zingales (1995) find no systematic differences in debt ratios across the major industrialized countries.

Alternatively, literature such as Errunza and Senbet (1981) finds that multinational companies have greater value that domestic firms, which implies either a lower cost of common stock equity capital or higher returns on a risk adjusted basis. Errunza and Senbet show that after adjusting for risk, multinational firms have higher value than domestic firms. Hughes, Logue and Sweeneey (1975), Agmon and Lessard (1977), and Fatemi (1984) show that multinational firms have lower levels of systematic risk than domestic firms. Doukas and Travlos (1988) find the gains from international diversification increase when foreign direct investment is in countries with lower covariance. Gupta, McGowan, Misra, and Missarian (1991) finds than investing in a developing country is value enhancing.

The cost of capital decision is complicated for foreign direct investment decisions because the impact of multinational investments on the overall riskiness of the firm is not clearly defined. On the one hand, international investing is perceived to be more risky because international markets are more risky. However, foreign economies are less than perfectly positively correlated with the US economy, and emerging markets are the least correlated. Foreign direct investment should reduce overall riskiness because of the portfolio effect of investing in economies with low correlation. Block (2000) reports for a survey of Fortune 1000 firms, that 68.7 percent of the 146 respondents indicate that foreign investment increases the risk exposure of the firm and 31.3 percent indicate that foreign direct investment decreases the risk exposure of the firm. Myera (1998) finds that companies use higher cost of capital rates for foreign investment relative to domestic investment.

Standard and Poor's Emerging Stock Market Factbook 2001 indicates that US equity markets represented 36% of total world stock market capitalization in 1991, they represented 49.6% of world equity markets in 2001. However, the market capitalization of non-US equity markets rose from $7.26 trillion in 1991 to $14.0 trillion in 2001. Clearly, globalization of international common stock equity markets exists already. However, there is still substantial segmentation in international equity markets.

Computing the Weighted Average Cost of Capital

The goal of corporate financial management is to maximize the value of the firm as measured by the total market capitalization of the firm. When making long-term investment decisions, wealth maximization is achieved when the firm invests in all available projects that have a positive net present value (NPV). To compute the NPV, the firm needs to know the appropriate discount rate to use to discount the future cash flows from the project. This discount rate is the cost of capital, which is the minimum required rate of return on investment. It represents the opportunity cost of funds for the firm, that is, the minimum rate of return that the firm or investors could achieve in another investment.

Modigliani and Miller (1958) suggest that the overall cost of capital for the firm is computed as a market value weighted average of the costs of each of the components of capital used by the firm. The components of capital used in M&M are debt and common stock equity. The weights used in the computation of the weighted average cost of capital are the proportion of the capital structure represented by each of the cost of capital components. The component cost of each of the components of the weighted average cost of capital are the marginal costs of capital for each of the capital components.

$$k_o = w_d k_d(1-t) + w_c(k_{cs})$$

where,

k_o – the firms overage weighted average cost of capital
w_d – the proportion of debt in the capital structure
w_c – the weight for common stock in the capital structure

k_d – marginal cost of debt
t - marginal tax rate
k_{cs} – marginal cost of new common stock equity

The cost of debt is adjusted for taxes since debt is a tax deductible expense while the cost of common stock is paid with after tax dollars.

The component weights are determined from the total market value of the components of the capital structure. The market value of the debt is equal to the current market price of the bonds times the number of bonds outstanding. The total market capitalization of the common stock equity is the current market price of a share of common stock times the number of shares outstanding. The total market value of the firm is equal to the sum of the total market value of the bonds plus the total market value of the common stock equity. The weight for the debt component of the capital structure is the total market value of the debt divided by the total market value of the firm. The weight for the common stock equity component of the capital structure is the total market value of the common stock equity divided by the total market value of the firm. The weight of the debt component plus the weight of the common stock equity component equal one.

The component cost of debt is the yield to maturity for the firm's outstanding bonds. This value of the component cost of debt is computed by equating the current price of the bonds with the expected future coupon payments and the return of the face value of the bond at maturity.

$$P_o = \Sigma CP_t/(1+ k_d)^t + FV/(1+ k_d)^T$$

where,

Po – the current price of outstanding bond
CPt – the coupon payment of the bond
FV – the maturity value of the bond
T - the time to maturity

The discount rate that makes these two values equal is the yield to maturity.

The component cost of common stock equity is derived from the Capital Asset Pricing Model of Sharpe (1964), Lintner (1965), and Mossin (1966). The required rate of return for an investment is equal to the risk free rate of return plus a risk premium. The risk premium is the amount of risk, beta, times the market price of risk, which is the market risk premium, the expected rate of return on the market minus the risk free rate of return.

$$k_{cs} = k_f + \beta(k_m - k_f)$$

where,

k_{cs} – the component cost of common stock equity
k_m - the expected rate of return on the market
k_f – the risk free rate of return
β - the beta of the common stock equity

Beta measures the systematic component of risk for the common stock equity. Graham and Harvey (2001) indicate that 73.5 percent of respondents to their survey indicate that the company uses the capital asset pricing model to determine the component cost of common stock equity capital.

Total risk for an investment has two components. The unsystematic component is firm specific and can be diversified away in a properly diversified portfolio. The systematic component of risk is the result of market specific factors and cannot be diversified away. The systematic risk component is measured by beta and is a measure of the securities covariance with the market. The problem with measuring the component cost of capital for the common stock equity for multinational corporations from different countries results from international capital market segmentation. That is, international capital markets are not fully integrated. Various impediments reduce the ability of investors to arbitrage between markets.

The Cost of Capital for Companies in the Soft Drink Industry

For the year 2001, total sales in the soft drink industry were $84.5illion dollars and net income was $8.1 billion or 9.6%. Return on equity averaged 25.7% and dividend payout was 40%, Value Line, 2001, pp. 1546. The four largest producers in the soft drink industry accounted for 94.7% of sales. Coca-Cola (43.7% market share) and Pepsico (31.6 % market share) are both United States based corporations. Cadbury (15.6% market share) is a United Kingdom based corporation. Cott (3.8% market share) is a Canadian based corporation. The market share data are taken from the web site of the Beverage Digest – http://www.beverage-digest.com/editorial/020228s.php. Thus, the four corporations discussed in this paper account for virtually all of the production in the industry.

Table 1
WACOC Computations Soft Drink Industry
Source - Value Line

Company	Equity (w)	Debt (w)	Debt (k)	Equity (k)	WACOC	Beta	Tax Rate
Cadbury	89%	11%	4.66%	9.9%	9.32%	0.60	0.34
Coca-Cola	80%	20%	4.96%	11.3%	10.03%	0.80	0.30
Cott	34%	66%	4.47%	11.0%	6.67%	0.75	0.37
National	83%	17%	4.38%	8.8%	8.04%	0.44	0.38
Pepsico	82%	18%	4.81%	10.3%	9.27%	0.65	0.32

The data needed to calculate the weighted average cost of capital for the four multinational soft drink companies in this case study are listed in Table 1. The data for beta, long-term debt, long-term interest, and total market capitalization are taken from Value Line (2002). The values used for the risk-free rate of return is the long-term government bond rate of 5.7% and the market rate of return used is 12.7%, both taken from Stocks, Bonds, Bills, and Inflation (2002) and cover the period from 1926 to 2001.

Cadbury has an equity ratio of 89%, a cost of debt of 7.1%, and a cost of equity of 9.9%. Coca-Cola has an equity ratio of 80%, a cost of debt of 3.6%, and a cost of equity of 11.3%. Cott has an equity ratio of 34%, a cost of debt of 7.9%, and a cost of equity of 11.0%. Pepsico has an equity ratio of 82%, a cost of debt of 8.0%, and a cost of equity of 10.3%.

Table 1 provides the computed weighted average cost of capital for the soft drink companies. The weighted average cost of capital for Cadbury is 9.59%. The weighted average cost of capital for Coca-Cola is 9.76%. The weighted average cost of capital for Cott is 11.0%. Te weighted average cost of capital for Pepsico is 9.84. The maximum difference in the weighted average costs of capital across the companies is only 0.9% with Pepsico having the highest weighted average of capital and with Cott having the lowest weighted average cost of capital.

The Cost of Capital for Companies in the Automobile Industry

The data needed to calculate the weighted average cost of capital for the six multinational automobile manufacturing companies in this case study are listed in Table 2. The data for beta, long-term debt, long-term interest, and total market capitalization are taken from Value Line (2002). The values used for the risk-free rate of return is the long-term government bond rate of 5.7% and the market rate of return used is 12.7%, both taken from Stocks, Bonds, Bills, and Inflation (2002) and cover the period from 1926 to 2001.

Honda, Nissan, and Toyota have cost of debt of 3.58%, 6.62%, and 0.93% and tax rates of 46%, 30% and 47%, respectively. Ford and GM have cost of debt of 6.36% and 4.80%, respectively and the tax rates are 33%. DaimlerChrysler and Volkswagen have cost of debt of 3.09% and 3.42%, respectively and tax rates of 45%. The beta coefficients for the six automobile manufacturing companies range from a low of 0.80 for Honda to a high of 1.25 for DaimlerChrysler.

Table 2 provides the computed weighted average cost of capital for the automobile companies. The cost of capital for GM and Ford are 4.22% and 4.62%. The cost of capital for Daimler and Volkswagen are 5.91% and 3.76%. The weighted average cost of capital for Toyota, Nissan, and Honda are 8.92%, 7.51%, and 8.48%, respectively. The US based firms have the greatest amount of financial leverage and the Japanese have the least amount of financial leverage. The cost of equity is the highest for the US based automobile companies and the lowest for the Japanese based automobile companies. The beta coefficient for the German automobile company, Daimler-Chrysler, is the highest and the beta coefficients for the Japanese firms are the lowest.

Table 2
WACOC Computations Automobile Industry
Source - Value Line

Country	Equity (w)	Debt (w)	Debt (k)	Equity (k)	WACOC	Beta	Tax Rate
GM	10%	90%	3.20%	13.4%	4.22%	1.10	0.33
Ford	4%	96%	4.26%	13.1%	4.62%	1.05	0.33
DC	33%	67%	1.70%	14.5%	5.91%	1.25	0.45
VW	36%	64%	3.42%	12.9%	3.76%	1.03	0.45
Toyota	70%	30%	1.89%	11.3%	8.48%	0.80	0.47
Nissan	41%	59%	4.63%	11.7%	7.51%	0.85	0.30
Honda	78%	22%	0.50%	11.3%	8.92%	0.80	0.46

Conclusions

The costs of capital differ across countries for companies in the same industry. In this case study of the automobile industry, we find substantial differences for firms across countries for the capital structure makeup, the cost of debt, the cost of equity, the tax rate and the beta coefficients. Frankel (1991) found a 4.5% difference between the cost of capital between Japanese and US firms for the period 1989/1990. Frankel argues that Japan had lower real interest rates and higher expected growth rates. These two factors would explain much of the cost of capital difference. Our results show a three percent difference between the Japanese and US cost of capita for firms in the automobile industry and less than one percent cost of capital difference for German automobile companies. One might conclude that financial market segmentation is still exists even between these large countries and large companies. However, the segmentation in the automobile industry appears to be related to country more than firm.

Although the cost of capital differs across countries for companies in automobile industry, for the soft drink industry this is not the case. In this case study of the soft drink industry, we find substantially the same weighted average cost of capital for firms across countries. The capital structure makeup is similar for four of the five corporations, Cott being the exception. The cost of debt is similar for four of the five corporations, with Coca-Cola being the exception. The cost of equity was similar across all five corporations as was the beta coefficient., and the beta coefficients. One might conclude that financial market segmentation does not still exist even between these large countries and large companies.

The weighted average cost of capital has four components that may differ across both industries and countries: the component cost of debt, the component cost of equity, the tax rate, and the capital structure. All four of the components are affected by the Generally Accepted Accounting Principles of the reporting country. The soft drink industry is dominated by five companies: Cadbury, Coca-Cola, Cott, National Beverage Corporation, and Pepsico. Coke, Pepsi, and NBC are American based corporations while Cadbury is a British corporation and Cott is a Canadian corporation. Thus, all five companies in the soft drink industry are from countries with similar GAAP, legal systems, and financial systems. Mueller, Gernon, and Meek (1994, page 9) include the United States, the United Kingdom and Canada in the British-American Accounting Model group. Both Germany and Japan are included in the Continental Accounting Mode group according to Mueller, Gernon, and Meek (1994, page 9). The Canadian tax rate is 40% while the UK-US tax rate is 30%. The automobile industry is more diverse than the soft drink industry. The seven companies

analyzed in this study are from three different countries (United States, Germany, and Japan) that reflect differences in the financial structures, the beta coefficients, the tax rates, and the GAAP.

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