

Calculating the weighted average cost of capital for the telephone industry in Russia

John Gardner
University of New Orleans

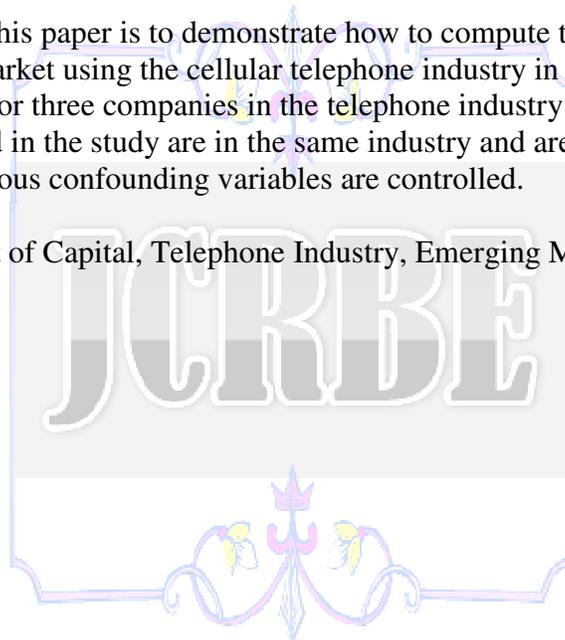
Carl McGowan, Jr.
Norfolk State University

Susan Moeller
Eastern Michigan University

Abstract:

The objective of this paper is to demonstrate how to compute the weighed cost of capital in an emerging market using the cellular telephone industry in Russia. We compute the weighted cost of capital for three companies in the telephone industry which average 12.74%. Since the companies used in the study are in the same industry and are all large companies in the same industry, numerous confounding variables are controlled.

Keywords: WACC, Cost of Capital, Telephone Industry, Emerging Market



Introduction

The goal of this paper is to demonstrate how to compute the weighted average cost of capital for companies in an emerging market, specifically, firms in the telephone and oil industries in Russia which is an emerging market. Only systematic risk is priced in the capital asset pricing model. Systematic risk reflects the covariation between returns on the investment and returns on the market portfolio. Markowitz (1952) demonstrates the advantage of portfolio diversification by showing that a portfolio of assets that have less than perfect, positive correlation will have a variance that is less than the average variance of the assets in the portfolio. In fact, if two assets have perfect negative correlation, a portfolio can be constructed that has zero variance. Later, Grubel (1968) shows the gains from international diversification in a two country and two asset environment. An investor can purchase assets in each of the two countries to construct a portfolio in order to create a portfolio that has lower variance. The total effect of portfolio diversification increases as the covariation between returns on an investment and returns on the market decreases, that is, the gains from international diversification are greater when the stock markets between two countries are less correlated. Stock market segmentation leads to increased gains from international diversification because segmented stock markets have lower covariances with respect to each other. 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 create barriers to the free flow of capital that cause stock market segmentation for examples see Errunza and Losq (1985), Errunza, Losq, and Padmanabhan (1992), and Bekaert and Harvey (1998).

Butler and Joaquin (1998) develop a model of political risk that shows the impact of political risk on the cost of capital for an investment. In the Butler-Joaquin model, the impact of a political risk shock on the cost of capital of the investment depends on the impact of the political risk shock on the expected return of the investment and the covariance of the return on the investment and the return on the market. If the expected impact of a change in the political environment has a negative impact on expected future cash flows and the covariance between the cash flows from the investment and the return on the market is negative (positive), the effect of a political risk shock is to increase (decrease) the cost of capital for the investment. If the expected impact of a change in the political environment has a positive impact on expected future cash flows and the covariance between the cash flows from the investment and the return on the market is positive (negative), the effect of a political risk shock is to increase (decrease) the cost of capital for the investment. The impact of a political risk shock is dependent on the impact that shock has on the expected rate of return and the covariance of the return on the investment and the return on the market.

Standard and Poor's Emerging Stock Market Factbook 2007 shows that US equity markets represented 48.9% of total world stock market capitalization in 1997 and 35.8% of total world stock market capitalization in 2006. However, the market capitalization of non-US equity markets rose from \$11.3 trillion in 1997 to \$19.5 trillion in 2006. Although segmentation of global stock markets still exists, globalization has increased over the last twenty years.

Computing the Weighted Average Cost of Capital

Maximizing the value of the firm is accomplished by investing in projects that have a positive net present value (NPV). The NPV is the discounted present value of the cash flows from the project using the required rate of return. The required rate of return is the weighted average cost of capital and is the opportunity cost of funds for the investor.

Modigliani and Miller (1958) show that the required rate of return is the market value weighted average of the costs of each of the forms of capital in the capital structure. The capital structure includes long-term debt and common stock. The weights are determined using the market value of the long-term debt and the common stock. The cost of long-term debt is the yield to maturity of outstanding long-term debt the cost of equity is the rate of return on outstanding common stock.

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

where,

k_o – the firms average 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

Modigliani and Miller (1958) assume that there that taxes do no exist. In the current world, the cost of long-term debt is adjusted for taxes and the cost of common stock is not adjusted for taxes.

The weights for long-term debt and common stock are based on total market values of long-term debt and common stock. 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 cost of the long-term debt is the yield to maturity of outstanding bonds and is equal to interest rate that equates the current price and the expected future cash flows from the coupon payments and the maturity value of the bonds.

$$P_o = \sum CP_t / (1 + k_d)^t + FV / (1 + k_d)^T \quad (2)$$

where,

P_o – the current price of the outstanding bond

CP_t – the coupon payment of the bond

FV – the maturity value of the bond

T – the time to maturity

The yield to maturity is the discount rate that equates the current price and the expected values of the coupon payments and the maturity value of the bonds.

The cost of common stock equity is computed using security market line Sharpe (1964). The cost of common stock is the risk free rate of return plus the risk premium. The risk premium is beta for the stock times the market price of risk, the expected return for the market minus the risk free rate.

$$k_{cs} = k_f + \beta(k_m - k_f) \quad (3)$$

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 risk of the common stock. Graham and Harvey (2002) survey results indicate that 73.5 percent of respondents, who are corporate financial managers, calculate the cost of common stock with the capital asset pricing model.

The Cost of Capital for Companies in the Telephone Industry in Russia

The data needed to calculate the weighted average cost of capital for the three multinational Russian telecommunications companies in this study are shown in Table 1. The data for beta, long-term debt, long-term interest, and total market capitalization are taken from Yahoo! Finance for November 10, 2008. The values used for the risk-free rate of return is the long-term government bond rate of 5.8% and the market rate of return used is 12.3%, both taken from Stocks, Bonds, Bills, and Inflation (2007) and cover the period from 1926 to 2006.

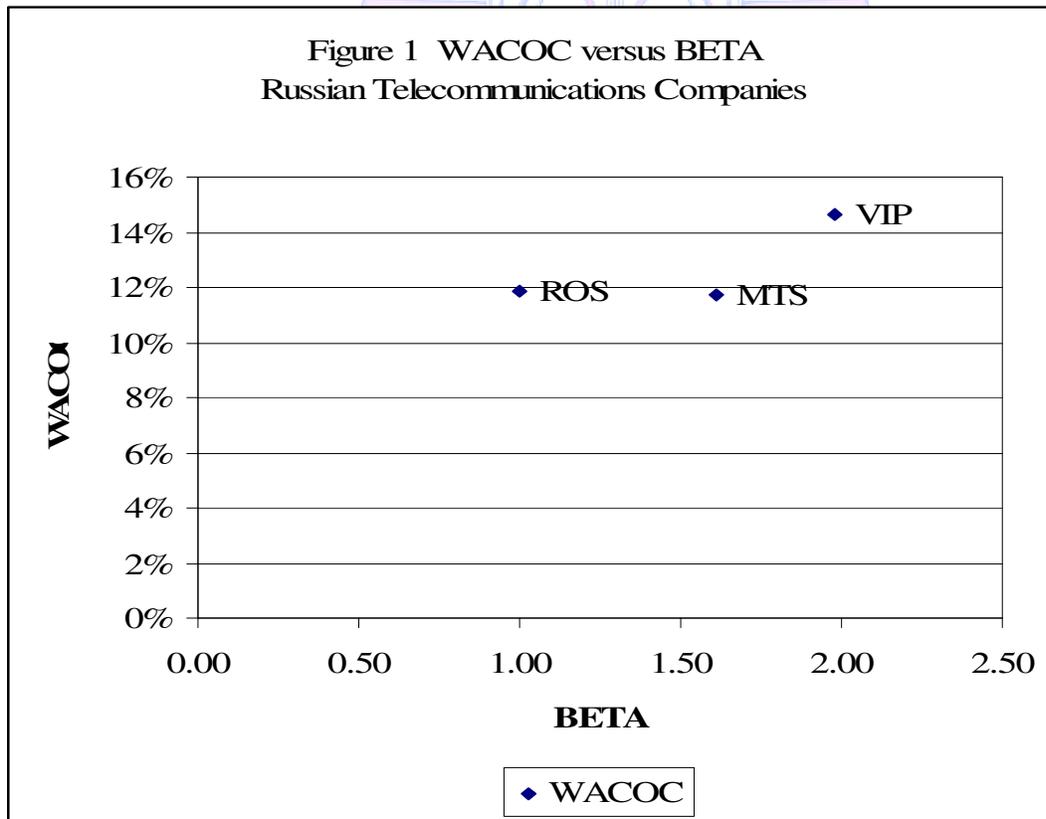
MTS has an equity ratio of 46.1%, a debt ratio of 53.9%, a cost of debt of 7.8% and a cost of equity of 16.3%. MTS has a beta of 1.61 and a marginal tax rate of 24%. The weighted average cost of capital for MTS is 11.71%. VIP has an equity ratio of 47.8%, a debt ratio of 52.2%, a cost of debt of 11.0%, and a cost of equity of 18.7%. VIP has a beta of 1.98 and a marginal tax rate of 24%. The weighted average cost of capital for VIP is 14.65%. ROS has an equity ratio of 76.1%, a debt ratio of 23.9%, a cost of debt of 10.4%, and a cost of equity of 12.3%. ROS has a beta of 1.00 and a marginal tax rate of 24%. The weighted average cost of capital for ROS is 11.85%.

Conclusions

Although the cost of capital differs across companies in some industries, for the telecommunications industry in Russia this is the case. In this case study of the telecommunications industry in Russia, we find that the weighted average costs of capital for MTS (11.71%) and ROS (11.85%) are similar and the WACC for VIP is 14.65%. ROS has a lower debt ratio (24%) while MTS (54%) and VIP (52%) have higher debt ratios. The cost of debt is lowest for MTS (7.8%) while the cost of debt for VIP is 11% and for ROS is 10.4%. Beta for ROS is 1.00 and for MTS is 1.561 and for VIP is 1.98. With the highest WACC, VIP has a high debt ratio, the highest cost of debt, and the highest cost of equity. MTS has the lowest cost of debt and a high debt ratio with a middle cost of equity while ROS has the lowest cost of equity and a middle cost of debt, and the lowest debt ratio. MTS and ROS have similar WACC.

Table 1
WACOC Computations Russian
Telecommunications Companies
 Source - Yahoo! Finance

Company	Equity (w)	Debt (w)	Debt (k)	Equity (k)	WACOC	Beta	Tax Rate
MTS	46.1%	53.9%	7.8%	16.3%	11.71%	1.61	0.24
VIP	47.8%	52.2%	11.0%	18.7%	14.65%	1.98	0.24
ROS	76.1%	23.9%	10.4%	12.3%	11.85%	1.00	0.24



REFERENCES

- Bekaert, Geert and Harvey Campbell. "Foreign Speculators and Emerging Equity Markets," Fuqua School of Business, Duke University, Working Paper, June 1998.
- Butler, Kirt C. "A Note on Political Risk and the Required Rate of Return on Foreign Direct Investment," *Journal of International Business Studies*, 1998, pp. 599-607.
- Errunza, Vihang and E. Losq. "International Asset Pricing Under Mild Segmentation: Theory and Test," *Journal of Finance*, V 40, 1985, pp. 105-124.
- Errunza, Vihang and E. Losq, and P. Padmanabhan. "Tests of Integration, Mild Segmentation, and Segmentation Hypothesis," *Journal of Banking and Finance*, V 15, N 5, 1992, pp. 949-962.
- Graham, John R. and Campbell R. Harvey. "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics*, 2002, pp. 187-243.
- Grubel, Herbert. "Internationally Diversified Portfolios: Welfare Gains and Capital Flows," *American Economic Review*, December 1968, pp. 1299-1314.
- Markowitz, Harry. "Portfolio Selection," *Journal of Finance*, March 1952, pp. 77-91.
- Modigliani, Franco and Merton H. Miller. "The Cost of Capital, Corporation Finance, and the Theory of Investment," *American Economic Review*, June 1958, pp. 261-296.
- Sharpe, William F. "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," *Journal of Finance*, September 1964, pp. 425-552.
- Standard and Poor's Emerging Markets Factbook*, Standard and Poor's, New York, 2007.
- Stocks, Bonds, Bills, and Inflation, 2002 Yearbook*, Morningstar, 2007.

