Richard Friedman
Finance 500. Wed evening
Marriott Case Study

Problem Statement

Marriott relies heavily on using NPV to determine project selection and in determining NPV we must estimate cost of capital. Changes in cost of capital have a significant impact on the decision process, calculate Marriott's weighted average cost of capital and detail the assumptions.

Executive Summary

To compute the weighted average cost of capital for each division we were given some information about the companies target debt ratios, but there were other choices required to compute appropriate WACC.

- How to weight each division
  - By using the identifiable assets assigned to each division
- Interest rate for computing cost of Debt, per division was
  - Lodging : LT Debt(30yr) + Premium
  - Contract: ST Debt(1yr) + Premium
  - Restaurant: ST Debt(1yr) + Premium
  - Marriott: Weighted rates from lodging, contract and restaurant
- Risk Premium and Risk Free for computing CAPM
  - Risk free was computed by the average of the arithmetic and geometric means of the Long Term US Government Bond Returns between 1926 and 1987. Used across all divisions.
  - Risk premium was computed by the average of Arithmetic and Geometric spread between LT Gov Bonds and the S&P between years 1926-1987. This was used across all divisions.
- How to compute Betas for divisions
  - Lodging and Restaurant were done via weighted comparables, un-leveraging and re-leveraging appropriately
  - Marriott as whole was re-leveraged against target debt and equity ratios
  - Contract was deduced by using knowing Marriott and its lodging and restaurant weighted betas.

Each decision will impact the cost of capital and therefore directly impact if projects will be selected. Here is the summary of values used and WACC computed.

	Marriott	Lodging	Contract	Restaurant
Tax Rate	41.63%	41.63%	41.63%	41.63%
Target D/V	60%	74%	40%	42%
Cost of Debt (r_d)	0.0941	0.1005	0.083	0.087
Target E/V	40%	26%	60%	58%
Beta	1.29	1.4	0.98	1.42
Risk Premium	0.0653	0.0653	0.0653	0.0653
Risk Free Rate	0.04425	0.04425	0.04425	0.04425
WACC	**8.44%**	**7.87%**	**8.43%**	**10.08%**

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Analysis and Methodology

To determine if projects are worth undertaking we need to understand their cash flows and how much their cash flows are worth today. We take those cash flows and discount them by the cost of capital. Cost of capital is the combination of the cost of debt and the cost of equity. Each component has a different proportion about how it relates to the cost of capital, and hence we call the sum of the components the weighted average cost of capital (WACC).

In determining cost of debt in WACC we use three numbers: (a) percentage impact debt has on cost of capital (b) cost of debt, the risk free interest rate we would pay on borrowing money (c) the impact of taxes, as taxes reduce the impact of using debt referred to as tax shield.

In determining cost of capital in WACC we use two numbers: (a) percentage impact equity has on capital (b) return on equity. The return on equity is computed by Marriott via capital asset pricing model (CAPM). CAPM states that required return on equity is the risk free interest rate plus a risk factor called beta multiplied by the markets risk premium. Hence the return on equity is expected return on this stock relative to expectations of the market as a whole.

Summarized in formula form
WACC = debt to value ratio * cost of debt * tax shield + equity to value ratio * CAPM
Or written as

$$WACC = \frac{D}{V} r_d (1 - T) + \frac{E}{V} (r_{rf} + \beta_l (MRP))$$

For each division and the corporation we make certain decisions during these computations as detailed below.

Cost of debt is determined per division, as each division can borrow at different rates and has different premiums.

Lodging borrows at long term rates so we used the 30-year rate of 8.95% plus the premium of 1.10%, hence the cost of debt was 10.05%.

Contract services borrows at short term rate, so we used 1-year rate of 6.90% plus premium of 1.40%, hence the cost of debt was 8.30%.

Restaurant services also borrows at short term rate, so we used 1-year rate of 6.90% plus premium of 1.80%, hence cost of debt was 8.70%.

	Rate Premium
Marriott	1.30%
Lodging	1.10%
Contract Services	1.40%
Restaurants	1.80%

Marriott as a whole is made of up its divisions, to compute the overall cost of debt rate we average the rates above weighted by the identifiable assets

	Assets	Percentage	Cost of Debt	Weighted
Lodging	2777.4	60.61%	10.05%	0.06091
Contract	1237.7	27.01%	8.30%	0.02242
Restaurant	567.6	12.39%	8.70%	0.01078
				9.41%

Hence the cost of debt is the sum of the weighted information, 9.41%.

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Tax rate is computed as 41.36% and assumed across all divisions.

D/V ratio is given as information within the case and not repeated here.

Cost of equity is computed using CAPM and hence for each division we are going to need to compute beta, the risk of the division to a market portfolio as well as beta of the corporation.

Marriott's beta is given, however it is the existing 1987 beta which does not match our target Debt to Equity ratio. To recalculate our beta we need to 'un-leverage', in essence remove our D/E ratio and 'leverage' to our new D/E ratio. There is a specific set of formulas to calculate this.

Un-leverage beta $\beta_u = \frac{\beta_l}{\left[1+\left(\frac{D}{E}\right)(1-T)\right]}$ and re-leverage it back $\beta_l = \beta_u\left[1+\left(\frac{D_T}{E_T}\right)(1-T)\right]$

All the numbers are given to us in the case to compute this.

Lodging's beta is computed by using industry comparables. However, as all these companies are leveraged to different debt to equity ratio we must use a similar process as above to un-leverage everything so we can compare apples to apples. Once all betas are un-leveraged we can then weight them and add them together to compute the lodging division's beta. This number will not be leveraged to our debt to equity ratio, so we must use the formula above to re-leverage it. The case provides comparables and appropriate debt to equity ratios to use.

Restaurant's beta is computed the same as lodging, the case provides comparables and appropriate debt to equity ratios.

Contract's beta does not have comparables hence we must compute the beta somewhat differently. We do know that with weighting the sum of the weighted divisional betas must be equal the corporate beta.

	Beta	Percentage	Weighted
Marriott	1.29	100%	1.29
Lodging	1.4	60.61%	0.85
Contract		27.01%	
Restaurant	1.42	12.39%	0.18

Hence we use (1.29 - .85 - .18) / .2701 = .098, therefore the beta or Contract division 0.098.

The risk free rate used is the average of the geometric and arithmetic means for the government's long term bond returns between 1926 and 1987. This is (4.58% + 4.27%) / 2 = 4.425%. This was used across all divisions.

The risk premium is the average of the geometric and arithmetic means for the spread between the government's long term bond and S&P 500 composite returns. This is (7.43%+5.63%)/2 = 6.53%.

From all this data WACC can be computed as displayed in the executive summary.

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Summary of recommendations

Marriott's proposition of investing in projects which increase shareholder value fall inline with using weight average cost of capital and capital asset pricing model to compute net present value of projects. This insures that a shareholder receives a premium from the projects they expect and ensures Marriott does not invest in projects not aligned with this goal. All Marriott projects carried out within a given division should be evaluated via this criteria, this ensures it aligns with shareholder values and that projects are aligned with company goals. If projects were allowed to deviate from this methodology we could also encounter adverse selection issues and projects chosen for the wrong reasons. Last using these methods at the divisional levels enables each division to execute appropriately against its competitors rather than either being to cautious in investing or to leveraged risking financial distress.