Midland Energy Resources, Inc.

Midland Energy Resources, Inc. is a global energy company that operates in oil and gas exploration and production (E&P), refining and marketing (R&M), and petrochemicals. Midland’s most profitable segment is its E&P division which produces 67% of the company’s net income (Exhibit 3). Its largest division is R&M with the Petrochemical division being the smallest. The primary goals of Midland’s financial strategy are to fund substantial overseas growth, invest in value-creating projects, achieve an optimal capital structure, and repurchase undervalued shares.

To accomplish these goals, Midland must calculate an appropriate cost of capital that will allow reasonable valuations of their strategies. In funding overseas growth, Midland must use its cost of capital to analyze, evaluate, and convert foreign cash flows. In evaluating value-adding projects, the cost of capital must be used to discount project cash flows. To optimize its capital structure, the company must continuously evaluate its ideal borrowing based on its inherent cost. Lastly, when deciding when and how to repurchase shares, Midland’s management has to determine the intrinsic value of its shares. This requires determining the value of the company using DCF techniques and an appropriate discount rate.

Cost of Capital

Estimates of Midland’s cost of capital are used in analyses within the company and its three divisions. These analyses include asset appraisals in capital and financial accounting, performance assessments often used to determine compensation, merger and acquisition proposals, and stock repurchase decisions. These anticipated uses of Midland’s cost of capital should not affect the calculations if the projects being evaluated are of the same average risk of all company projects. If the projects are of greater or less risk, the calculations of WACC may be affected. As an example, for a riskier M&A proposal, the company may need to adjust the cost of capital by including a higher risk premium. Conversely, in appraisals for certain long-lived assets, cash inflows or outflows may be of lower risk than the company average and the numbers contributing to the cost of capital should be adjusted accordingly.

Calculating Midland’s WACC

In calculating Midland’s company WACC, a 40% tax rate is assumed based on an average, of taxes paid divided by income before taxes, over the last three years (Exhibit 1). The cost of debt of 6.28% is calculated as the 10-year rate (Table 2) on U.S. Treasury bonds plus the spread to Treasury calculated by Mortensen for the consolidated company (Table 1). The 10-year risk-free rate seems more appropriate because Midland’s borrowing capacity is based primarily on its energy reserves and long-lived assets. As such, the short-term 1-year rate would not be appropriate and the 30-year rate might be more applicable for a real estate company, but not appropriate based on the potential changes inherent in the production business.
The cost of equity, calculated as 10.91%, uses the same risk-free rate of 4.66%, a beta of 1.33, and an EMRP of 5.0% used by management. The new beta was calculated by un-levering the old beta of 1.25 (which was based on a D/E ratio of 59.3% seen in exhibit 5) and relevering based on the target capital structure of 57.8% equity which corresponds to a D/E ratio of 73%. The unlevered beta for Midland is calculated as .922. In calculating the asset beta for relevering, the beta of debt is assumed to be zero based on Midland’s consolidated A+ credit rating (Table 1). This assumes that the company as a whole has little or no risk of default. The ratios of debt and equity are the target ratios for the consolidated company as set by management. Midland’s WACC is calculated at 8.18% and is as follows:

\[
B_A = \frac{1.25}{(1+.6*.593)} = .922 \\
\text{new } B_E = .922(1+.6*.73) = 1.33 \\
r_D = 4.66 + 1.62 = 6.28% \\
r_E = 4.66 + 1.33(5) = 11.31% \\
\]

\[
\text{WACC}_{\text{Midland}} = (1-t)r_D(D/V) + r_E(E/V) \\
= (1-.40)*.0628*.422+.1131*.578 \\
= .08183 = 8.18% \\
\]

The EMRP of 5% used by Midland is not unreasonable, but appears to be slightly low based on historical data. Midland is giving certain weight to survey results (exhibit 6B) from finance managers and professors, however giving more weight to historical data would be more appropriate. An average of the historical data time-periods (exhibit 6A) would produce an EMRP closer to 6% and would be less influenced by individual opinions and viewpoints. Also, as the economy has gotten more uncertain, investors seem to require higher returns to compensate for the additional risks inherent in equities. Over the most recent time period of 1987-2006, average excess returns are notably higher than Midland’s 5% projection. As a result, I would recommend an EMRP of 5.5 to 6%.

**Company-wide Versus Divisional Hurdle Rates**

Using a single cost of capital or hurdle rate for every division, within a consolidated company, which operates across different industries assumes that every division within the company is similar. The single hurdle rate does not take into consideration the different debt structures within divisions and the different nature of assets that may exist in each division. For example, Midland’s E&P division has assets of oil reserves and higher demand for capital expenditures for development (Exhibit 3). Also, Midland’s target debt ratio for each division varies which would change the cost of capital across divisions.

Across divisions, there may also be higher business risks as a result of the specific industry that the division operates in. Midland’s R&M division is its largest, yet it operates on smaller margins that are steadily decreasing (Exhibit 3). This makes division profits less certain and more risky, but being a more mature sector may offset some of this risk. Additionally, the R&M division has less need for increased capital and operates in a more mature and competitive market. This could influence the amount and cost of debt financing.
Similarly, Midland’s Petrochemical division operates as a smaller division with projections for more overseas investment. The global market has different risks such as exchange rate risk, political risk, and interest rate risk. Also, for Midland, investment in other parts of the world often requires specialized financing arrangements and this would have an effect on the risk and necessary cost of capital.

When attempting to determine the best hurdle rate for investments that will add value to a company, it is more advantageous to use different rates within different divisions. This will more accurately reflect the risk and benefits of the investment and will allow the company to make like comparisons based on the factors within different industries.

*Calculation of E&P and R&M Divisions Cost of Capital*

**Exploration & Production Division:**

\[ r_D = 4.66 + 1.60 = 6.26\% \]

\[ B_E = .933(1+.6*.852) = 1.41 \]

\[ r_E = 4.66 + 1.41(5) = 11.71\% \]

\[ WACC_{E&P} = (.6)(.0626)(.46)+(.1171)(.54) = .0805 = 8.05\% \]

**Refining & Marketing Division:**

\[ r_D = 4.66 + 1.80 = 6.46\% \]

\[ B_E = 1.05(1+.6*.449) = 1.33 \]

\[ r_E = 4.66 + 1.33(5) = 11.31\% \]

\[ WACC_{R&M} = (.6)(.0646)(.31)+(.1131)(.69) = .09005 = 9.01\% \]

The hurdle rates differ between divisions because the betas of each division vary and the target capital structures vary for each division. For the E&P division, the average industry unlevered beta is .933 which produced an equity beta of 1.41. Unlevering reduces the variation within the E&P industry by removing the influence of individual company debt. Using the unlevered average produces a cost of equity of 11.71% for the E&P division. The cost of debt for E&P is 6.26%, based on a risk free rate of 4.66% and its spread to Treasury (Table 1). The Refining & Marketing division has a slightly higher cost of debt of 6.46% and a higher average industry unlevered beta, but has a lower debt ratio which produces an R&M levered beta of 1.33 and an R&M cost of equity of 11.31%. A 40% tax rate is assumed in unlevering each company’s beta. See spreadsheet 1 below.

<table>
<thead>
<tr>
<th>Exploration &amp; Production:</th>
<th>Equity Market Value</th>
<th>Net Debt</th>
<th>D/E</th>
<th>Equity Beta (Using a 40% tax rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>
### Table: Midland Energy Resources

<table>
<thead>
<tr>
<th>Division</th>
<th>Assets 2006</th>
<th>Equity 2006</th>
<th>Equity %</th>
<th>ROE 2006</th>
<th>Beta 2006</th>
<th>Cost of Equity</th>
<th>Cost of Debt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E&amp;P Division</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midland Energy Resources</td>
<td>134,114</td>
<td>79,508</td>
<td>59.3%</td>
<td>1.25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R&amp;M Division</strong></td>
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### Refining & Marketing

<table>
<thead>
<tr>
<th>Company</th>
<th>Assets 2006</th>
<th>Equity 2006</th>
<th>Equity %</th>
<th>ROE 2006</th>
<th>Beta 2006</th>
<th>Cost of Equity</th>
<th>Cost of Debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bexar Energy, Inc.</td>
<td>60,356</td>
<td>6,200</td>
<td>10.3%</td>
<td>1.70</td>
<td>1.601</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kirk Corp.</td>
<td>15,567</td>
<td>3,017</td>
<td>19.4%</td>
<td>0.94</td>
<td>0.842</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Point Energy</td>
<td>9,204</td>
<td>1,925</td>
<td>19.4%</td>
<td>1.78</td>
<td>1.582</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petrarch Fuel Services</td>
<td>2,460</td>
<td>(296)</td>
<td>-12.0%</td>
<td>0.24</td>
<td>0.259</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arkana Petroleum Corp.</td>
<td>18,363</td>
<td>5,931</td>
<td>32.3%</td>
<td>1.25</td>
<td>1.047</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beaumont Energy, Inc.</td>
<td>32,662</td>
<td>6,743</td>
<td>20.6%</td>
<td>1.04</td>
<td>0.925</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dameron Fuel Services</td>
<td>48,796</td>
<td>24,525</td>
<td>50.3%</td>
<td>1.42</td>
<td>1.091</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td></td>
<td></td>
<td>20.3%</td>
<td>1.20</td>
<td>1.05</td>
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</tr>
</tbody>
</table>

#### Petrochemical Division Cost of Capital

To compute the cost of capital for the Petrochemical division, an appropriate weight for each division can be calculated using total assets for 2006 as the variable (Exhibit 3). Based on this variable, the weight of the E&P division is .534, the R&M division is .358, and the Petrochemical division is .108. The next step involves multiplying the unlevered beta of each division times the respective weight of that division and setting the sum of them equal to the asset beta of the consolidated company. Then, solve for the unknown asset beta of the Petrochemical division:

\[
\text{Asset beta}_{\text{Midland}} = \text{Asset beta}_{\text{E&P}} \times 0.534 + \text{Asset beta}_{\text{R&M}} \times 0.358 + \text{Asset beta}_{\text{Petro}} \times 0.108
\]

\[
0.922 = (0.933)(0.534) + (1.05)(0.358) + \text{Asset beta}_{\text{Petro}} \times 0.108
\]

\[
0.922 = 0.4982 + 0.3759 + \text{Asset beta}_{\text{Petro}} \times 0.108
\]

\[
\text{Asset beta}_{\text{Petro}} = 0.4435
\]

We can then calculate the equity beta, cost of equity, and cost of debt of the Petrochemical division as:

\[
\text{Equity beta}_{\text{Petro}} = 0.4435 \times (1 + 0.6 \times 0.667) = 0.6209
\]

\[
\text{Cost of equity}_{\text{Petro}} = 4.66 + 0.6209 \times 5 = 7.76\%
\]
Cost of debt\(_{\text{petro}}\) = 4.66 + 1.35 = 6.01% => (Using the spread to Treasury for the division in Table 1 and the 10-year Treasury rate in Table 2 as the risk-free rate.)

\[ WACC_{\text{petro}} = 0.6 \times 0.0601 \times 0.4 + 0.0776 \times 0.6 = 0.061 = 6.1\% \]

The resulting WACC of 6.1% for the Petrochemical division represents the discount rate that can be used to value specific projects of average risk within the division.

**Summary**

Midland Energy Resources, Inc., as a global energy company, must constantly insure that it uses sound financial strategies to accomplish its goal of increasing overall company value. Specifically, the company must continue to expand globally while incorporating value-adding projects and utilizing optimal leverage to build equity value. Accomplishing these goals requires strategies that rely on appropriate analysis and project valuations in order to make intelligent financial decisions. These decisions require determining the appropriate cost of capital for the company as a whole and within divisions.

Calculating separate hurdle rates for each division allows Midland to more accurately reflect the specific risks and benefits of projects as they pertain to their different industries. Differences can clearly be seen in the lower cost of capital for the Petrochemical division which represents a large, untapped growth opportunity for the company. Also, the cost of capital for E&P, the company’s most profitable division, is below the company hurdle rate, while the cost of capital for the R&M division is slightly higher. These variations can be attributed to the better use of leverage under the target structure for E&P as well as the lower risk of the division’s assets. Attention to these nuances of benefit and risk can allow a company to operate successfully across industries while continuing to maximize growth and build company value.