CORPORATE FINANCE:
Practical Work 1
Midland Energy Resources, Inc.

Candidate Numbers:
1066415, 1089335,
1089335, 1089869

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1 Executive Summary

Midland Energy Resources (Midland hereafter) is multinational energy company of more than 80,000 employees with an operating revenue and operating income of of $248.5bn and $42.2bn in 2006, respectively. The company has three main operating divisions: Exploration and Production (E&P), Refining and Marketing (R&M), and Petrochemicals. Historically, it has used discounted cash flow methodology to evaluate prospective investment, using a hurdle rate derived from the weighted average cost of capital (WACC) for the project or division. (p3)

In the following, we provide the annual projected cost of capital (in the form of WACC) for the company as a whole and for each of its divisions in January 2007, as SVP for project finance Janet Mortensen has in previous years. We find that the cost of equity (r_E), debt (r_D), and WACC for each division and the company as a whole are:

Division	r_E	r_D	r_{WACC}
Exploration & Production	8.89%	6.26%	6.57%
Refining and Marketing	8.94%	6.46%	7.40%
Petrochemicals	12.40%	6.01%	8.92%
Midland Energy	9.41%	6.28%	6.28%

which result from an estimated effective tax rate (τ) of 38.58%, risk-free rate (r_F) of 4.66%, and equity market risk premium ($EMRP$) of 3.6%.

2 Valuation Methodology

Our method for valuation is as follows: to calculate the weighted average cost of capital for each division of Midland and the company as a whole (r_{WACC}), where:

$$r_{WACC} = (1-\tau)Lr_D + (1-L)r_E, \quad L = \frac{D}{V}, \quad V = D + E \tag{1}$$

requires estimates of paramaters including cost of debt and equity (r_D, r_E), as well as the tax rate (τ). Given Midland's constant target debt ratio for each division (p4), we can calculate the cost of equity from unlevelling the beta of comparable companies,

$$\beta_U = \beta_L(1 - L_{comp}) \tag{2}$$

given the significant assumption that the debt of comparable companies are riskless, which we justify in Section 3. The unlevered beta from comparables β_U can then be relevering using Midland and its divisions' respective leverage ratios using formula (3) [THIS IS WRONG, FIX THIS].:

$$\beta_E = \frac{\beta_U}{1 - L_{Midland}} = \frac{\beta_L\left(1 - L_{comp}\right)}{1 - L_{Midland}} \tag{3}$$

which then allows us to calculate r_E via the CAPM formula:

$$r_E = r_F + \beta_E\left(EMRP\right) \tag{4}$$

our rataionale for our chosen values of r_F and $EMRP$ are discussed in Section 3.

For the cost of debt, we follow Mortensen's method of adding a spread, derived from estimated corresponding debt rating, to the appropriate US Treasury bonds (p5). We deem this to be the 10-Year YTM for US Treasury bonds of 4.66% (also justified in section 3), which suggests that r_D is given by:

$$r_D = 0.0466 + STT \tag{5}$$

Resulting shortfalls of this method are discussed in Section 6.

3 Parameter Estimation

Tax rate (τ):

The rates of taxes that each division and Midland as a whole is subject to is not explicitly stated in the case. Given that

Further, given that for E&P, by far the largest division of Midland, the geographical composition is mentioned to be shifting in 2007 to operation in Middle East, Central Asia, and Russia, with different tax regimes, we have elected to only use the estimates from the most recent year (2016). This assumption is supported by a trending decrease in the

Risk-free rate (r_F):

The risk-free rate is estimated to be 4.66% based on the 10-year U.S. Treasury yield in January 2007.

Equity market risk premium ($EMRP$):

The equity market risk premium is estimated to be 3.6%.

Justification for market risk premium: all recent equity premium surveys for recent years around 2006 were between the 2-4 range, suggesting average from 1987-2006 period dragged up by high premia at the beginning of the period, also suggesting that rates have lowered since 4Q result is 3.3% from graham and harvey

Choose to use EMRP of 3.6% $\rightarrow$ average of 2.5-4.7% and also equivalent to welch's median

Leverage Ratios ($L_{E\&P}, L_{R\&M}, L_{Pet}, L_{Mid}$):

4 Divisional Cost of Capital

4.1 E&P

E&P Comparables	D/E	L_c	β_L	β_U
Jackson Energy, Inc.	11.19%	10.06%	0.89	0.80
Wide Palin Petroleum	85.43%	46.07%	1.21	0.65
Corsicana Energy Corp.	15.24%	13.23%	1.11	0.96
Worthington Petroleum	47.47%	32.19%	1.39	0.94
Average				0.84

Given our paramater estimates and equations (3) and (4), we can calculate the cost of equity for E&P:

β_U	$L_{E\&P}$	β_E	r_F	$EMRP$	r_E
0.84	59.28%	1.18	4.66%	3.60%	8.89%

Cost of debt is calculated using equation (5) a 1.60% spread (from Table 1):

$$r_D = 4.66\% + 1.60\%$$
$$= 6.26\%$$

Therefore, from (1) we know that the WACC for E&P is:

$$r_{WACC,\,E\&P} = (1 - L_{E\&P})r_E + (1 - \tau)L_{E\&P}\,r_D$$
$$= (1 - 0.5928)(8.89\%) + (1 - 0.3858)(0.5928)(6.26\%)$$
$$= 6.57\%$$

4.2 R&M

R&M Comparables	D/E	L_c	β_L	β_U
Bexar Energy, Inc.	10.3%	9.32%	1.70	1.54
Kirk Corp.	19.4%	16.23%	0.94	0.79
White Point Energy	20.9%	17.30%	1.78	1.47
Petrarch Fuel Services	-12.0%	-13.66%	0.24	0.27
Arkana Petroleum Corp.	32.3%	24.41%	1.25	0.94
Beaumont Energy, Inc.	20.6%	17.11%	1.04	0.86
Dameron Fuel Services	50.3%	33.45%	1.42	0.95
Average				0.98

Given our paramater estimates and equations (3) and (4), we can calculate the cost of equity for R&M:
[FIX THE VALUES OF THE TABLE]

β_U	$L_{R\&M}$	β_E	r_F	$EMRP$	r_E
0.98	59.28%	1.18	4.66%	3.60%	8.89%

4.3 Petrochemicals

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5 Overall Cost of Capital for Midland

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6 Further Considerations

This section is meant to serve the function of Janet Mortensen's "user's guide" to the calculations and assumptions made in the previous sections. It will provide a brief overview of the assumptions made, the data used, and the limitations of the analysis.