Midland Energy Resources, Inc.

Brief Case 4129
Midland Energy Resources, Inc.: Cost of Capital
by Harvard Business School

2007
ANNUAL COST OF CAPITAL & ANALYSIS

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Case Abstract

The senior vice president of project finance for a global oil and gas company must determine the weighted average cost of capital for the company as a whole and each of its divisions as part of the annual capital budgeting process. The case uses comparable companies to estimate asset betas for each operating division, and employs the Capital Asset Pricing Model to determine the cost of equity. Students are required to un-lever and re-lever betas and, choose an appropriate risk-free rate, and compute costs of debt and equity.

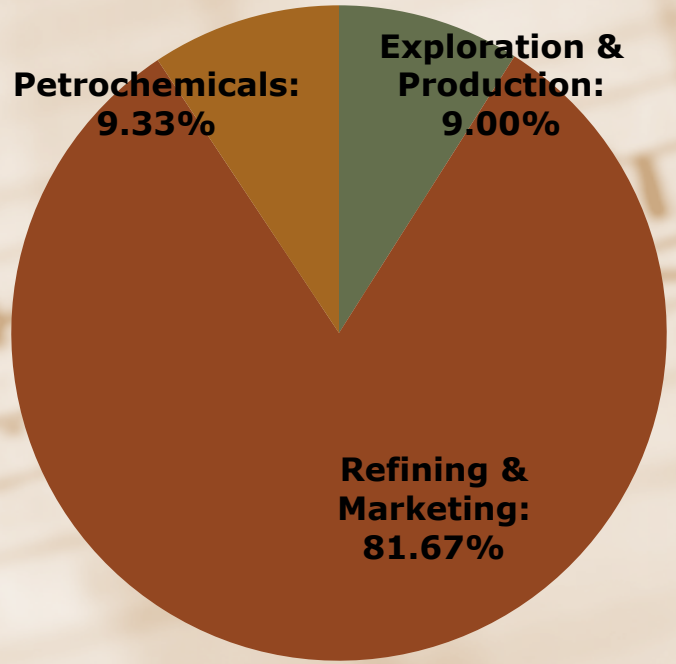
Cost of Capital Analysis @ Midland

- Asset Appraisals for both Capital Budgeting and Financial Accounting
- Performance Assessments
- M&A Proposals
- Stock Repurchase Decisions

Division Level

Corporate Level

Midland Business Segments and Operating Revenue 2006

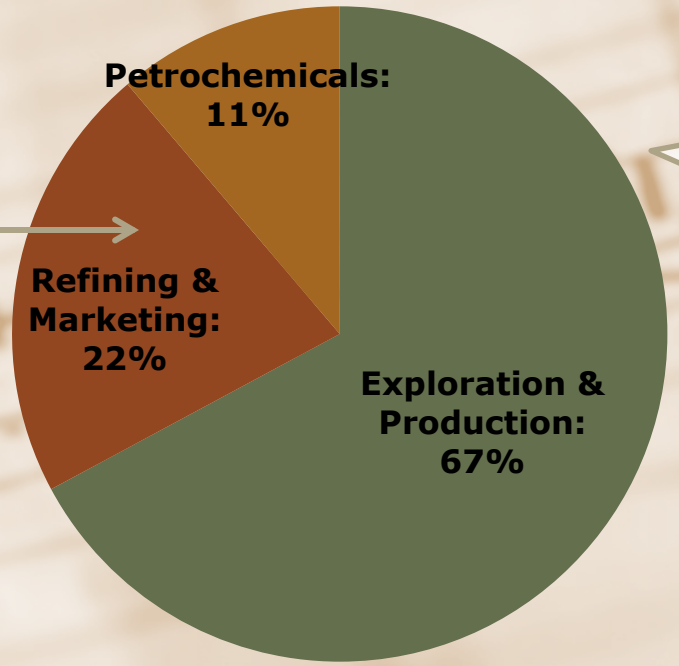


Incorporated 120+ years

80,000 employees

2006 Operating Revenue	
Exploration & Production	22,357
Refining & Marketing	202,971
Petrochemicals	23,189
	$248,518M

After-Tax Earnings/Net Income



R&M's Profit Margin is Relatively LOW

2006 After-Tax Earnings	
Exploration & Production	12,556
Refining & Marketing	4,047
Petrochemicals	2,097
	$18,700M

Divisional Operations

1) R&M: Refining and Marketing

2) E&P: Exploration, Development, and Production

3) Petrochemicals

R&M

- Largest segment (rev. $202,971M[2006])

Slight Decrease (1.8%↘) in 2005

- 40 Refineries Globally
- Distill 5.0M barrels/day

but

Highly Commoditized & Stiff Competition

$$\text{Profit Margin} = \frac{4{,}047}{202{,}971} = \mathbf{1.99\%}$$

Declining over 20 years

E&P

- Most profitable and highest net margin in industry

$$\text{Profit Margin} = \frac{12{,}556}{22{,}357} = \mathbf{56.16\%}$$

- Extracted 2.1M barrels/day (oil)
  7.28B ft^3/day (natural gas)

6.3% Increase↗ in Production over 2005

Slightly (<1%) Increased ↗ in 2005

Petrochemicals

- Smallest but Substantial

- 25 manufacturing facilities
- 5 research centers

In 8 Countries

Polyethylene, Polypropylene, Styrene, Polystyrene, Olefins, 1-Hexene, Aromatics, Fuel & Lubricant Additives

$$\text{Profit Margin} = \frac{2{,}097}{23{,}189} = \mathbf{9.04\%}$$

Financial Strategy

1) Overseas Growth
2) Value-creating Investments
3) Optimal Capital Structure
4) Stock Repurchases

And also by divisions;

E&P *R&M* *Petrochemicals*

Overseas Growth

- Overseas investments are the main engine of growth
- ML usually invests in foreign government or local business as a partner
- Management fee from project
- 50+% equity interest + preferred return from foreign partner
- 2006 earnings from equity partners: $4.75B
  - **of which 77% ($3,658M) is from non-US investment**

Value-Creating Investments

- DCF to evaluate prospective investments
- Future equity CF for interests in overseas projects and discounted at a K_E rate
  - ➢WACC
- 2 measurements:
  1. Performance against plan over 1-, 3-, and 5-year periods, and
  2. EVA (Economic Value Added)

$$= \underline{\text{Debt-free CF}} - r_{WACC} * \text{Invested Capital}$$

=NOPAT
=EBIT(1-t)

Optimal Capital Structure

- Long-lived productive refining facilities and energy reserves are large part of capital structure
- Energy Price levels are correlated with ΔML Stock Price

  →**2007 remarks historic high in both**

  →ML Borrowing Capacity↗ (additional profit)
- In-house Traders that manage currency, interest rate, and commodity risks

Stock Repurchases

- Whenever attractive opportunities arise
- Intrinsic Value

$$= \frac{\text{Fundamental Value} - \text{Market Value of Debt}}{\text{\# of Shares outstanding}}$$

- No large repurchases since 2002, no plans

E&P

- Oil prices are at historic highs in early 2007 → continued heavy investment in;
  - *acquisitions of promising properties,
  - *development of undeveloped reserves
  - *expanding production

- Capital spending is expected to exceed $8B in 2007 and 2008

R&M

- Capital spending would remain stable

Historical low margin
→ **Difficulties in expansion approval process**

- Long-term global shortage of refining capacity would eventually spur investment??

- Technology advancement in producing 120K barrels of base-stock lubricants/day
  →made ML a market leader?

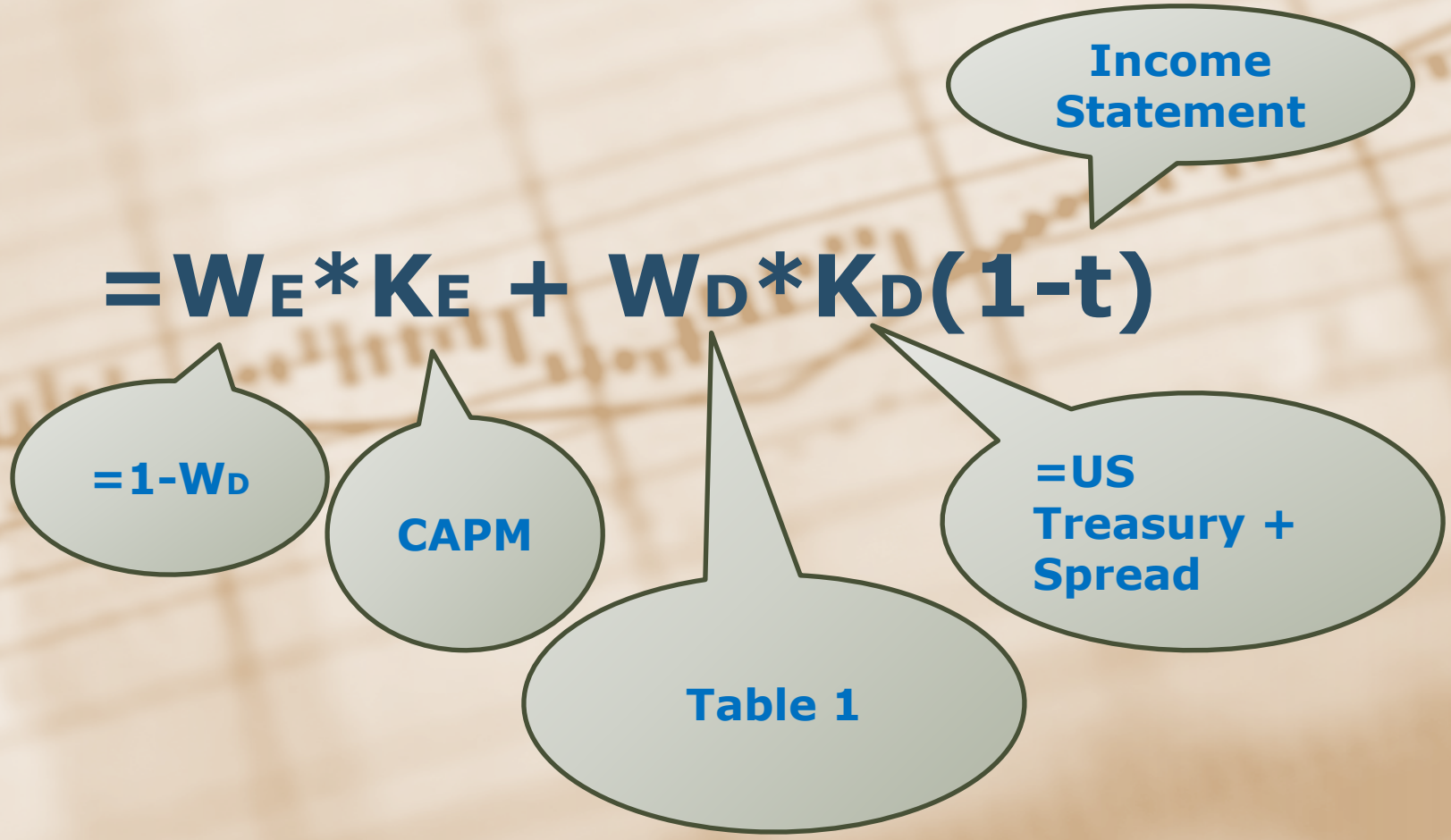
Petrochemicals

- Capital spending is expected to **grow** as the facilities are in transition period from old to new
- New investment would be undertaken by joint ventures outside US

Capital Structure and Cost of Capital Approach

- β_L to β_{UL}
- CAPM
- Cost of Debt (K_D)
- WACC

WACC


Income Statement
$=W_E*K_E + W_D*K_D(1-t)$
$=1-W_D$
CAPM
Table 1
=US Treasury + Spread

Tax Rate

2006 Tax Rate from Income Statement

= Taxes / Income before Taxes

= 11,747 / 30,447 = **39%**

Operating Results:	2006	
Operating Revenues	**248,518**	
Plus: Other Income	3,524	
Total Revenue & Other Income	**252,042**	
Less: Crude Oil & Product Purchases	124,131	
Less: Production & Manufacturing	20,079	
Less: Selling, General & Administrative	9,706	
Less: Depreciation & Depletion	7,763	
Less: Exploration Expense	803	
Less: Sales Based Taxes	20,659	
Less: Other Taxes & Duties	26,658	
Operating Income	**42,243**	
Less: Interest Expense	11,081	
Less: Other Non-Operating Expenses	715	
Income Before Taxes	**30,447**	
Less: Taxes	11,747	**39%** <- Tax Rate
Net Income	**18,701**	<-After-tax Earnings

Unlever Equity Beta (β_L to β_{UL})

$$= \beta_L * \left[\frac{E}{E+D(1-t)}\right]$$

$$=1.25*\left[\frac{E}{D(1-t)}\right]$$

$$=1.25*\left[\frac{134{,}114}{134{,}114+79{,}508(1-.39)}\right]$$

$$=1.25*.73$$

$$=.92$$

$$= \beta_{UL}$$

	Equity Market Value	Net Debt	Equity Beta
Midland Energy Resources	134,114	79,508	1.25

Relever β for Each Segments (β_{UL} to $_{(R)}\beta_L$)

$$= \beta_{UL} * \left[\frac{E+D(1-t)}{E}\right]$$

$_{(R)}\beta_L$ for **E&P**

$$=.92* \left[\frac{54+46(1-.39)}{54}\right] = \mathbf{1.23}$$

R&M

$$=.92* \left[\frac{69+31(1-.39)}{69}\right] = \mathbf{1.08}$$

Petrochemicals

$$=.92* \left[\frac{60+40(1-.39)}{60}\right] = \mathbf{1.16}$$

Business Segment:	Debt/ D+E
Consolidated	42.2%
Exploration & Production	46.0%
Refining & Marketing	31.0%
Petrochemicals	40.0%

CAPM for Cost of Equity

In 2006 Midland used an equity market risk premium of 5.0%.

$$K_E = r_f + (R)\beta_L * \textit{Risk Premium}$$

E&P

= 4.66% + 1.23* 5% =10.79%

R&M

= 4.98% + 1.08* 5% =10.39%

Petrochemicals

= 4.54% + 1.16* 5% =10.34%

Maturity:	Rate:
1-Year	4.54%
10-Year	4.66%
30-Year	4.98%

Cost of Debt

K_D = US Treasury + Spread

Business Segment:	Spread		*YTM		Cost of Debt
Consolidated	1.62%				
E&P	1.60%	+	4.66%	=	**6.26%**
R&M	1.80%	+	4.98%	=	**6.78%**
Petrochemicals	1.35%	+	4.54%	=	**5.89%**

This is my alternate estimate

Maturity:	Rate:
1-Year	4.54%
10-Year	4.66%
30-Year	4.98%

WACCs by Divisions

$$=W_E*K_E + W_D*K_D(1-t)$$

E&P

=54%* .1079+ 46%* .0626(1-.39)=**7.58%**

R&M

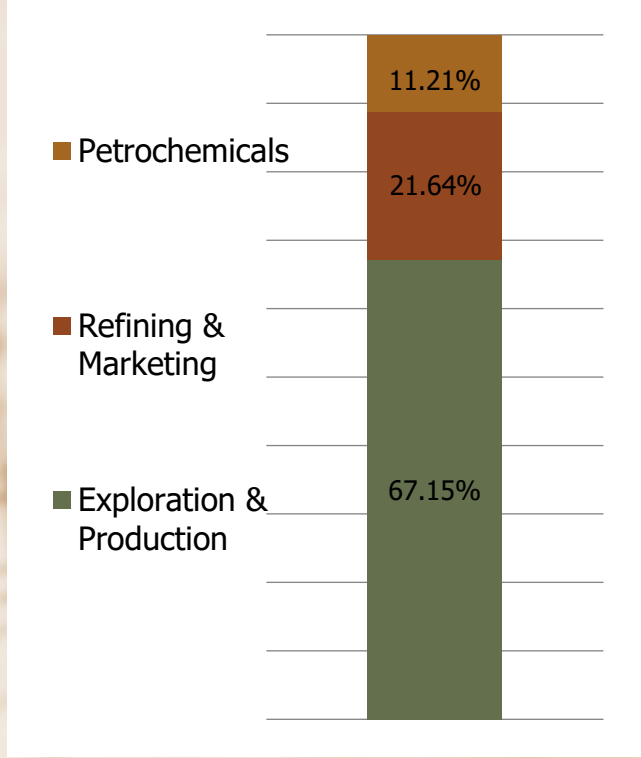
=69%* .1039+ 31%* .0678(1-.39)=**8.45%**

Petrochemicals

=60%* .1034+ 40%* .0589(1-.39)=**7.64%**

cf. Consolidated WACC for Midland

Weighting by Earnings



W_{PChem}*$WACC_{PChem}$
=11.21%*.0764=**0.86%**

$W_{R\&M}$*$WACC_{R\&M}$
=21.64%*.0854=**1.83%**

$W_{E\&P}$*$WACC_{E\&P}$
=67.15%*.0758=**5.09%**

=>7.78%

*Similar business holdings demonstrate WACC of 9.5% to 16%

Analysis Method

- Each division operates in different industry and has different credit ratings
- WACCs differ significantly for each division

→ Midland should not use a single hurdle rate as a whole to evaluate the opportunity

Validation of the Cost of Capital Analysis

- Using different measures for each division (i.e., yields to maturity rate) made it reasonably approximated
- The tax rate and risk premium remain constant the entire time which can be applied to the entire corporate value

- Overall, the calculated WACC (for each division or even the consolidated) are all lower than industry average, and the estimate from this method can be considered equitable

References

Case: https://www.hbs.edu/faculty/Pages/item.aspx?num=41848

*https://finbox.com/LSE:OGDC/models/wacc

*https://www.gurufocus.com/term/wacc/ODVCI/Weighted%252BAverage%252BCost%252BOf%252BCapital%252B%252528WACC%252529/Oil+%2526+Gas+Development+Co+Ltd