Advanced Corporate Finance
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Case: Midland Energy
Due Date: March 13, 2018 (midnight)

1. For what types of decisions are Mortensen's estimates of Midland's cost of capital used?
2. a. What is Midland's current Net Debt and market leverage? (you can assume all cash is excess except "restricted cash")
   b. Calculate Midland's current cost of equity, cost of debt, and corporate (firm-level) WACC. Note: To calculate the cost of debt capital you can assume that the firm's β_D=0.05, and that this debt beta stays constant in a reasonable range around the Midland's target leverage (*i.e.*, *ignore* the yield spreads given in Table 1 in the case and the discussion on the bottom of page 5).
   c. What would Midland's corporate cost of equity and WACC be if Midland reaches its "target" leverage of 42.2% (net)debt/value?
3. Should Midland use a single corporate WACC for evaluating investment opportunities in all of its divisions? Why or why not?
4. a. Using the data provided in Exhibit 5, compute a separate cost of capital for the E&P and R&M divisions.[1] Assume the E&P division has a 46% D/V and the R&M division has a 31% D/V. Also assume (following Table 12.3 in the textbook) that at these debt levels, the E&P division's $\beta_{D,E\&P}$=0.05 and the R&M division's $\beta_{D,R\&M}$=0.1.
   b. What are the drivers that causes these WACCs to differ from one another?
5. a. Collect data on comparables (*i.e.*, at least three companies with businesses related to the Petrochemicals industry) from your favorite source of financial information (e.g., CapitalIQ, Bloomberg, Yahoo Finance), and use this data to compute a cost of capital for the Petrochemical division (you would ideally get this data from around the same time in 2007, although that's not required). Assume the Petrochemicals division has a 40% D/V ratio and β_D=0.05.
   b. How would the equity beta and WACC vary for different levels of leverage for this division? Plot i) equity beta on D/V, and ii) WACC on D/V (for each D/V between 0%-100% in 10% increments). *Hint:* You will need to "guesstimate" how β_D will change with leverage, but you nevertheless know that $\beta_{E \text{ at } D/V=0\%} = \beta_{D \text{ at } D/V=100\%} = \beta_A$.
6. Bonus question (somewhat difficult): How could you use only data from the case to estimate a WACC for the Petrochemical division? What are potential shortfalls of this method?
   Hint: The beta of a portfolio is a value-weighted average of the betas of the individual assets; to get estimates of the "stand-alone" divisional enterprise values of the E&P and R&M divisions you may, for example, use revenue multiples with their comps.

Assume throughout that Midland's corporate tax rate is 40% and that the market premium is 5%. You may use the 30-year treasury mentioned in the case as the risk-free rate.

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[1] Note: averaging the equity betas and the leverages ratios, as the case does on page 6 and Exhibit 5, is an *incorrect* way to get asset betas! What you should do instead is to average asset betas. Bonus exercise: show that it matters whether you first take the average of equity and debt betas and then de-lever using the average D/E vs. first de-levering each equity beta and averaging the resulting asset betas (either using an example, or a more formal general proof).