

Applications: Discount rates, and predictions



Today's outline

- Cost of equity private firms
- Cost of equity for listed firms



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The cost of equity of private firms



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Estimating discount rates when market prices unobservable

1. Use sector averages

$$\text{Unlevered Beta for sector} = \frac{\text{Average Regression Beta for publicly traded firms}}{(1 + (1 - \text{Tax Rate}) \text{ Average Market D/E Ratio for sector})}$$

2. Use ROA

$$\text{WACC} = R_A = (E/V)R_E + (D/V)R_D$$

– Rearranging the above gives

$$R_E = R_A + (R_A - R_D)(D/E)$$



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Unlevered vs levered beta

- Step1: Pick firm in similar industry that is listed.
- Step2: Compute unleveraged industry beta of listed firm chosen.
- Step3: Compute levered beta, using the client's firm debt/equity ratio.
- Here's the formula:

$$\beta_L = \beta_U (1 + (1 - t)(D / E))$$

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Example 1: Computing beta of non-listed firm

- Company A and B are in the same business. The first is listed, the second is not. Com A has a beta of 1.40 and market value of average debt to equity of 14%. Com B has debt to equity ratio of 25%. Compute the appropriate beta for Com B. Assume tax = 36%.

Step1: Compute unlevered beta of A from,
 Unlevered beta = Current beta/[1+(1-tax rate)(debt/equity)]
 = 1.4/[1+(1-0.36)(0.14)] = 1.289

Step 2: Compute levered beta of B from,
 Levered beta = 1.289*[1+(1-0.36)(0.25)] = 1.49

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Using ROA

- Finding comparable betas of listed firms can be difficult if nature of firm is unique.
- Here is an alternative: But this equation assumes that firms are investing optimally to the point that marginal cost = marginal return.

$$WACC = R_A = (E/V)R_E + (D/V)(1-t)R_D$$

Rearranging the above gives

$$R_E = R_A + (R_A - R_D)(D/E)$$

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Example 2: Using ROA

- The firm had return on assets of 12.82 %, a pre-tax interest rate of 7.7%, a debt-equity ratio of 36.59% and a retention ratio of 91% in 1992 (The tax rate was 36%). Assume the firm is operating at optimal capital budget constraint.
- $R_E = R_A + (R_A - R_D)(D/E)(1-T)$
- $R_E = 12.82\% + (12.82\% - 7.7\%)(36.59\%)(1-0.36)$

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THE COST OF EQUITY FOR LISTED FIRMS



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Estimation of cost of equity when prices are observable

- Dividend discount model
- CAPM



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Dividend Growth Model

$$r_e = D_1 / P_0 + g = D_0 (1 + g) / P_0 + g$$

- Dividends grow at expected rate g in perpetuity
- We will discuss ways to determine growth later on.



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Choosing the risk-free rate

- Characteristics of a risk-free asset
 - No default risk
 - No reinvestment risk
 - Thus, the key is to use government security with maturity that matches life of project.
- Picking the right risk free means you already have an adjustment for macro (sovereign risk).
- What to use when R_f asset not available (Sovereign bankruptcy)
 - Look at rate of largest and safest firm and use their rate of borrowing adjusted by default spread



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How long or short the estimation period

- Researchers prefer 60 months estimation window.
- In emerging markets, structural breaks occur so often that using shorter and more recent data is likely to be a better basis.



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What if market risk premium is negative?

- Pick a longer history such that risk premium reflects long run market expectation.

	Rm-Rf
Last year avg	-5%
Last 3 year average	8%

- Pick a period in history that matches your expectation of near future. Ex. If you expect a bullish year next year, then pick period in history that resembles your expectations for next year.
- Needs risk free instrument that is liquid.



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The Bloomberg adjustment

- Adjusted beta = Regression beta * 0.67 + 1.0 * 0.33
- Why adjust betas towards one? The rationale can be traced to studies that indicate that, over time, there is a tendency on the part of betas of all companies to move towards one. Intuitively, this should not be surprising. Firms that survive in the market tend to increase in size over time, become more diversified and have more assets in place



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Computer exercise

Use **euronxt100.xls** data file to compute security beta for the following stocks:

Compute individual stock beta of DANONE, BNP Paribas, Michelin, and Carrefour using monthly data between 2007-2012.

Use the historical data 2007-2012 as an estimate of expected market premium for 2012.

Obtain the cost of equity for 2012 based on your beta estimates



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Predicting quantity of sales

- Use the data in file regression_data.xls to determine relationship between quantity sold (dependent variable) with price and income.
- Interpret your results.



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Homework: Due next class

- Use sheet titled: Thai property
- Compute individual stock beta of LH, MBK, NOBLE, QH, SIRI, and SPALI using **weekly** data between 2002-2004. Use risk free rate from file given.
- Use the historical data 2002-2004 as an estimate of expected market premium for 2005.
- Obtain the cost of equity for 2005 based on your beta estimates.
- Comment on the cost of equity you have just computed.
- **Be careful:** Data frequency is at weekly frequency. You must annualize your cost.



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