Estimating Discount Rates

Ram Kumar Kakani
SPJCM Singapore

Perceiving Risk!

- Risk in an investment has to be perceived through the eyes of the investors of the firm
- If the investors profile is very wide spread and diverse then … ?
- Then, risk has to be measured from the perspective of the ***marginal investor***, defined as the investor most likely to be trading in the stock at any given point in time.
- Risks can range from being firm specific to risks that affect all firms [project risk, competitive risk, sector risk, market risk].
- We assume that the Marginal investor is well diversified

Cost of Equity

- Start with cost of equity and then shift to the complications in computation due to (a) estimating risk free rate (b) betas (c) country risk premium (d) cost of equity for a unlisted entity etc.
- The Capital Asset Pricing Model
- Cost of Equity = R_f + Equity Beta ($E(R_m) – R_f$)
- If, 360D T-bill rate is 6.99% and 10-year T-bond rate is 7.63% … what should we take?
- Suggested adjustments:
- The risk free rate has to be in the same currency in which the cash flows are estimated.

Computing Risk Free Rates ...

- Risk free rates when there is no default free entity?
  - Look at the largest & safest firms and use their long term borrowings rate in the local currency. Adjust for default risk.
  - Long-term $ denominated forward contracts on the currency
  - Adjust the local currency government borrowing rate by the estimated default spread on the bond to arrive at a riskless local current rate (say, by using the local currency ratings)
- R_f = Local Government Bond Rate – Default Spread
- Risk Premium depends on
  - Risk aversion of investors
  - Riskiness of the average risk investment

Cost of Equity

- The risk premium is generally computed using historical data (can also be done using survey premiums)
- Prefer using longer time-span data, geometric returns, t-bonds
- Ibbotson Associates, Bloomberg, etc. provide relevant data
- Equity risk premium = Base premium for mature equity market + Country premium
- Country risk premium is dependant on:
  - Variance in the underlying economy
  - Political risk
  - Structure of the market

Cost of Equity

- Country premium can be computed:
  - Country default bond spreads
  - Relative standard deviations
  - Default spread plus relative standard deviation
- Implied equity risk premiums (using present market data)
  - Use the current level of the market
  - Use the expected dividend yield on the index for the next period
  - Use the expected long term growth rate in the earnings & dividends
- Emerging markets (i.e., most Asian markets) usually carry a premium of 6-7% over the Government bond rate.

Cost of Equity

- Beta is equal to [Covariance of asset with market portfolio] / [Variance of the market portfolio]
- Beta's can be very different based on the data used for computation.
- Estimating betas using regressions:
  - Length of the estimation period
  - Length of the return interval
  - Choice of the market index to use
    - Decide by the holdings of marginal investor in the firm
  - Likelihood of estimation errors & adjustments
    - Beta's are also adjusted for statistical errors (using statistical estimates / confident intervals)

Cost of Equity

- Determinants of Beta
  - Type of business
  - Degree of operating leverage
  - Degree of financial leverage
- Financial Leverage $B_L = B_U(1 + (1 – t)(D/E)$
- Caution: When the asset's characteristics (i.e., a firm) have changed significantly over time, the historical estimates may not be good measures of risk. [for example, Tata Steel]
- Other approaches to estimating betas:
  - Using comparable firms
  - Using fundamental factors

Bottom Up Beta

- Using comparable firms
- For say, a firm with multiple divisions (or any other enterprise) should opt for the following steps:
- Identify the businesses that make up the firm
- Estimate the average betas of other publicly traded firms: Comparable firms ➔ beta estimation ➔ Unlever last ➔ Use simple averaging approach ➔ Adjustment for Cash
- Take a weighted average of unlevered beta of the businesses the firm operates in (i.e., estimate market values or use revenues or operating income as weights)
- Calculate the current debt to equity ratio
- Estimate the levered beta of the firm

Cost of Equity

- Using fundamental factors
- Accounting betas (based on volatility in earnings data)
- Identifying quantifiable factors and then regressing:
- Beta = 0.983 + 0.08 CV in operating income – 0.126 Dividend yield + D/E ratio + 0.034 Growth in EPS – 0.00001 Total asset
  - Using in conjunction with historical betas
  - The Arbitrage Pricing Model
- Dividend Growth Model
- Other issues: (a) small firm premiums (b) privately and closely held businesses
- Illustration on Wockhardt and Dhandapani Finance

Companies with country risk exposure

- Three methods
- $K_e = R_f$ + Country risk premium + Beta X Mature market equity risk premium
- $K_e = R_f$ + Beta X (Mature market equity risk premium + Country risk premium)
- $K_e = R_f$ + Beta X Mature market equity risk premium + Lambda X Country risk premium
- Illustration on Moser Baer

Weighted Average Cost of Capital

- Calculating the cost of debt
  - The current level of interest rates
  - The default risk of the company
  - The tax advantage associated with debt
  - After cost of debt = pretax cost of debt (1 – taxrate)
- Measuring Default Spread
  - Use ratings and then estimate the default risk and default spread of a firm
  - Use recent borrowing history
  - Estimate a synthetic rating and default spread (say, using *Interest Coverage Ratio*)

Weighted Average Cost of Capital

- Include all interest bearing liabilities while estimating debt
- Debt Funding: Estimating the tax advantage
- In case of loss making entities make appropriate adjustment
- Cost of preferred stock
- Include the cost of special features (say, convertibles)
- Calculating the weights
  - We need to measure the cost of issuing securities
  - Lenders do lend on the basis of market value [always use market values while computing the cost of capital]
- Market value of debt could be estimated by treating all the debt as a coupon bond with a maturity averaging the life

More finer points ...

- While computing MVE include [a] multiple classes of shares; and [b] equity options
- While computing MVD include present value of all lease commitments

Magnitiudes of the Risk Premium			
Historical Period		Date: 23-11-2007	
1992-2007 (15 years)	2926	18860	13.23%
1979-2007 (28+ years)	128	18800	19.06%
1989-2007 (18 years)	780	18800	18.66%
Risk Free Rate of Return ~ T Bond Rate			
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