Key Valuation Inputs- Their Estimation

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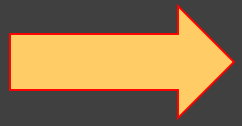

Valuation Inputs

- Value always from Investor Perspective – Current & Potential

- Value a function of
  - Investor Opportunity Cost
    - Risk => Rate of Return
  - Growth
  - Expected Future Benefits
    - Cash Flows
    - Earnings

Investors and Risk!

- Two broad categories of risks
  - Firm-Specific
  - Risks that affect all firms (systematic risk)
- Risk from perspective of investors
  - Equity Investors
  - Controlling/Managing Investors
- Risk assessment not necessarily same for all investors
  - If the investors profile is very wide spread and diverse then … ?
  - Risk from point of view of “Marginal Investor”
- We assume that the Marginal investor is well diversified

Risk & Investor Opportunity Cost

- Equity Investors
  - Cost of Equity
- Controlling/Managing Investors
  - Weighted Average Cost of Capital
- Cost of Equity
  - Requires estimation
  - CAPM
  - Market Model
  - Unlisted Companies?
- Cost of Debt
  - Listed Debt
  - Unlisted Debt

Cost of Equity

- The Capital Asset Pricing Model
- Cost of Equity = R_f + Equity Beta ($E(R_m) - R_f$)
  - Beta a measure of systematic risk relative to index
  - In other words, risk premium relative to index
  - Choice of Risk Free Rate??
- If, 360D T-bill rate is 6.99% and 10-year T-bond rate is 7.24% … what should we take?
  - Government Securities in Domestic Currency as risk free assets
  - In India, Scheduled Commercial Bank FD's also as risk free assets
  - Risk-Free Rate in same currency as expected benefits
  - Same maturity as planned investment horizon

Cost of Equity

- The Market Model
  - Cost of Equity = α + Equity Beta ($E(R_m)$)
  - More widely used in Practice to estimate CAPM Beta
  - Computationally less intensive

- Some further considerations
  - Estimating Expected Market Return
    - Long Run Historical Average?
    - Long Run Nominal GDP Growth rate as Maximum? (Piketty)
  - Significant changes in firm characteristics (e.g. Tata Steel)
    - Use shorter period for estimating betas
    - Review betas on a periodic basis
  - Unlisted Companies
    - Bottom-up Approach
    - Compute Betas for similar listed firms
    - Adjust for Financial Leverage (if using CAPM)
    - Adjust for Financial Leverage and Operating Leverage (if using Market Model)

Cost of Equity

- Adjusting for Financial Leverage
  - Use of Debt-Equity Ratio
  - $B_L = B_U(1 + (1 – t)(D/E)$
  - Debt-Equity Ratio in Book Value or Market Value
  - Use marginal tax rate

- Adjusting for Operating Leverage
  - Not widely done
  - Relevant if significant differences in asset intensiveness in industry
    - Asset intensiveness measured by Fixed Asset Turnover Ratio or Total Asset Turnover Ratio
    - Higher asset intensiveness and higher proportion of fixed costs
    - Fluctuations in profit margins magnified with volume changes
  - Degree of Operating Leverage (DOL) = Percentage Change in Operating Profit / Percentage Change in Revenue
  - $B_{OL} = B_{ZOL} * DOL$

Cost of Equity

- Steps to adjust for Leverage
  - First compute unlevered Beta adjusted for financial leverage
  - Use unlevered Beta value for B_{OL}
  - Compute Zero DOL Beta (B_{ZOL})

- Computing Beta for unlisted firms
  - Identify Target DOL and Target Financial Leverage
  - Target DOL from Earnings/Cash Flow Forecasts
  - Adjust Zero DOL Beta (B_{ZOL}) for Target DOL to compute B_U
  - Adjust for Financial Leverage to compute B_L
  - Use as input for CAPM
  - Why this approach??

Cost of Equity

- Using Dividend Discount Model
  - $V_0 = D_1/(K_e-g)$
  - $V_0 = E_1/(K_e-g)$
  - $K_e = (D_1/V_0) + g$
  - $K_e = (E_1/V_0) + g$
  - Use Dividends based version when dividend payout ratio is high

- Other approaches to computing cost of equity/betas
  - Arbitrage Pricing Model, Fundamental Factors Model
  - Additional benefits vs Additional efforts?
  - Estimation for all methods based on historical data

Cost of Debt & WACC

- WACC more relevant for Controlling/Managing Investors
  - New Entities
  - Mergers & Acquisitions
  - Stake Sale
- Inputs for WACC
  - Cost of Equity
  - Cost of Debt
- Cost of Debt
  - If debt securities listed, use most recent yield
  - If debt securities not listed
    - Use interest rate contracted on most recent borrowing
    - Use average interest cost (Interest paid/Total Debt)
  - Post-Tax Cost of Debt = Pre-Tax Cost of Debt *(1-tax rate)
- WACC = Cost of Equity * (Equity/Total Capital) + Cost of Debt *(Debt/Total Capital)
  - Should we use market values or book values of Debt & Equity?

Estimating Growth Rate

- The most difficult problem in valuation
  - Value usually most sensitive to growth rate forecasts
  - Growth rate must be grounded in firm, industry, and macroeconomic trends
- Use of Historical Growth Rate?
  - Size of firm
  - Financial & Operating Characteristics of firm
  - Arithmetic Mean or Geometric Mean of Growth Rate
- Sources of Information for Growth Rate Estimation
  - Financial Statements
  - Management forecasts
  - Analyst Forecasts
  - Public & Private Information
- Confidence on Analyst Forecasts
  - Number & Quality of Analysts Following
  - Extent of Disagreement between Analysts
  - Frequency of Information updates
  - Use average growth rate forecast

Estimating Growth Rate

- Growth rate using Dividend Discount Model (DDM)
  - Dividend Discount Model an extremely flexible tool
  - $V_0 = D_1/(K_e-g)$
  - $V_0 = E_1/(K_e-g)$
  - Underlying assumption of constant dividend payout ratio
  - Growth Rate (g) = Retention Ratio * ROE
  - Underlying assumption??
- Computation of Market Implied Growth Rate
  - Using D_1 & E_1
  - Analyst or Management Forecasts of D_1 & E_1
  - Growth Rate (g) = $K_e – (E_1/V_0)$
  - If forecasts unavailable, then derive using most recent earnings/dividends
  - Growth Rate (g) = $\{K_e-(E_0/V_0)\}/\{1+ (E_0/V_0)\}$

Estimating Growth Rate

- Drivers of Growth Rate in DDM
  - Retention Ratio
  - Return on Equity
  - Return on Equity Drivers through Du-Pont Analysis
  - Useful in validating feasibility of external growth estimates
- Shortcomings of DDM
  - Cannot be used if zero dividends or earnings negative
  - Only a short-term to medium-term growth rate
  - Long-term growth rate for valuation = Long-term nominal GDP growth rate

Estimating Growth Rate

- Other methods to arrive at growth rate forecast
  - Top-Down approach
    - Macroeconomic Forecast =>Industry Forecast=>Competitive Position Analysis => Growth Forecast
    - Useful for short-term to medium term forecasts
    - Maturity Stage of Industry
      - Declining – Long-Term Growth Rate < Nominal GDP growth rate
      - Mature - Long-Term Growth Rate > Nominal GDP growth rate
      - Problems with Introduction and Growing stages
  - Introduction and Growing Stages
    - Use 3-stage and 2- stage growth models
    - Two Stage Growth: High Growth Rate -> Stable Growth
    - Three Stage Growth: High Growth Rate -> Declining Growth Rate ->Stable Growth
- Next step to identify risk factors for growth
  - Develop a range of growth rate scenarios

Estimating Future Benefits

- Future Benefits
  - Cash Flows
  - Earnings
- Cash Flows
  - Dividends
  - Cash Flows to Equity / Cash Flows to Firm
  - Free Cash Flows to Equity (FCFE)
  - Free Cash Flows to the Firm (FCFF)
- When to use?
  - Dividends => Where dividend payout ratio is high, Valuation of Equity
  - Earnings => Constant, Low, or Zero Dividends, Valuation of Equity
  - FCFE => Low Dividends or Negative Earnings, Stable Leverage, Valuation of Equity
  - FCFF => Negative FCFE, Valuation of Firm, Changes in Leverage over time
  - Earnings most frequently used

Estimating Future Benefits

- FCFF = Cash Flow from Operating Activities before tax *(1-tax rate) – Depreciation
  - Assumption
- FCFE = FCFF – Interest Payments (1-tax rate) - Debt Repayment + Proceeds from Fresh Debt
- Tax Rate = Marginal Tax Rate
- Cash Flow from Operating Activities before Tax = Operating Profit + Depreciation & Amortization – (Increase in Non-Cash Net Working Capital)
- Most books prefer to use capex spending instead of depreciation

- FCFE the maximum cash flow that can theoretically be paid out to shareholders or reinvested for growth
- FCFF the maximum cash flow that can theoretically be paid out to all providers of capital or reinvested for growth

Estimating Future Benefits

- Increase in Non-Cash Net Working Capital
  - Required Non-Cash Net Working Capital = Sales / Net Working Capital Turnover Ratio
  - Non-Cash Net Working Capital at end of each year during forecast horizon
  - Net Working Capital Turnover Ratio from Industry Average, Management Targets, Historical Average
- Depreciation to be adjusted for planned capex
  - Use Fixed Asset Turnover Ratio
  - Result in constant fixed asset growth rate (same growth rate as sales)
- Problems with using Earnings
  - Quality of Earnings
  - Corrections for Earnings Management

Estimating Future Benefits

- Computing Free Cash Flows
  - Start with Sales Forecast
  - Compute Depreciation
  - Calculate Operating Profit using Target Operating Profit Margin
  - Calculate Non-Cash Net Working Capital Requirement using

Some Formulae

- Two Stage DDM

$$\frac{d[1+g_1]}{k-g_1}\left\{1-\left[\frac{1+g_1}{1+k}\right]^n\right\}+\frac{d[1+g_1]^n[1+g_2]}{\frac{k-g_2}{[1+k]^n}}$$

Here,g1= Growth rate during high growth phase.g2= Growth in constant growth phase after n. n = Length of high growth phase.Assume g1<>k and g2< k,d=dividend for the next year.

- Three Stage DDM

$$\frac{d}{k-g_2}+\left[1+g_2+\frac{n_1+n_2}{2}\right]\left[g_1-g_2\right]$$

here,n1= Length of high growth phase.n2= Periods until constant growth phase. n2= n1+ length of transition phase.g1= Growth rate during high growth phase. g2= Growth in constant growth phase after n.d=dividend for the next year.