

Cynic: A person who knows the price of everything but the value of nothing..

Oscar Wilde

FIRST PRINCIPLES



THREE APPROACHES TO VALUATION

- Intrinsic valuation: The value of an asset is a function of its fundamentals – cash flows, growth and risk. In general, discounted cash flow models are used to estimate intrinsic value.
- Pricing: The value of an asset is estimated based upon what investors are paying for similar assets. In general, this takes the form of value or price multiples and comparing firms within the same business.
- Contingent claim valuation: When the cash flows on an asset are contingent on an external event, the value can be estimated using option pricing models.

VALUE OR PRICE

- The end game in corporate finance is maximizing value, not price, and that should keep our focus on intrinsic value.
- If markets are efficient, the price will adjust to value, sooner or later, and companies that do the right thing (increasing value) should trade at higher prices, and its managers appropriately rewarded.
- If markets are not, things get messier, since managers can take actions that increase price, while
 - Doing nothing for value (as is the case with actions that do not affect fundamentals, like stock splits or company name chanes)
 - Decreasing value, in which case managers will have to decide whether they want to keep markets happy or do the right thing.

INTRINSIC VALUATION 101

 The value of a risky asset can be estimated by discounting the expected cash flows on the asset over its life at a risk-adjusted discount rate:

Value of asset =
$$\frac{E(CF_1)}{(1+r)} + \frac{E(CF_2)}{(1+r)^2} + \frac{E(CF_3)}{(1+r)^3} \dots + \frac{E(CF_n)}{(1+r)^n}$$

- The intrinsic value of a business or asset is determined by three fundamentals:
 - Its capacity to generate cash flows from existing assets
 - Its capacity to grow these cash flows in the future
 - The risk in these expected cash flows

DCF CHOICES: EQUITY VALUATION VERSUS FIRM VALUATION

Firm Valuation: Value the entire business



Equity valuation: Value just the equity claim in the business

EQUITY VALUATION

 The value of equity is obtained by discounting expected cashflows to equity, i.e., the residual cashflows after meeting all expenses, tax obligations and interest and principal payments, at the cost of equity, i.e., the rate of return required by equity investors in the firm.

Value of Equity=
$$\sum_{t=1}^{t=n} \frac{\text{CF to Equity}_{t}}{(1+k_{e})^{t}}$$

where,

CF to Equity t = Expected Cashflow to Equity in period t ke = Cost of Equity

 The dividend discount model is a specialized case of equity valuation, and the value of a stock is the present value of expected future dividends.

FIRM VALUATION

 The value of the firm is obtained by discounting expected cashflows to the firm, i.e., the residual cashflows after meeting all operating expenses and taxes, but prior to debt payments, at the weighted average cost of capital, which is the cost of the different components of financing used by the firm, weighted by their market value proportions.

Value of Firm=
$$\sum_{t=1}^{t=n} \frac{\text{CF to Firm}_{t}}{(1+\text{WACC})^{t}}$$

where,

CF to Firm t = Expected Cashflow to Firm in period t WACC = Weighted Average Cost of Capital

HOW FUNDAMENTALS PLAY OUT IN INTRINSIC VALUE...



STORIES + NUMBERS = VALUE



THE INGREDIENTS THAT DETERMINE VALUE.



I. ESTIMATING CASH FLOWS



DIVIDENDS FOR DEUTSCHE BANK & FCFE FOR TATA MOTORS

- In 2007, Deutsche Bank paid out dividends of 2,146 million Euros on net income of 6,510 million Euros.
 - In my 2008 valuation, I am assuming the dividends are not only reasonable but sustainable.
 - In my 2016 valuation, Deutsche had suspended paying dividends and was losing money.
- For Tata Motors, we can estimate FCFE by looking at its

| Year | Net Income | Cap Ex | Depreciation | Change in WC | Change in Debt | Equity Reinvestment | Equity Reinvestment Rate |
|-----------|------------|----------|------------------|------------------|-------------------|------------------------|--------------------------------|
| 2008-09 | -25,053₹ | 99,708₹ | 25 <i>,</i> 072₹ | 13,441₹ | 25 <i>,</i> 789₹ | 62,288₹ | -248.63% |
| 2009-10 | 29,151₹ | 84,754₹ | 39 <i>,</i> 602₹ | -26,009₹ | 5 <i>,</i> 605₹ | 13,538₹ | 46.44% |
| 2010-11 | 92,736₹ | 81,240₹ | 46,510₹ | 50 <i>,</i> 484₹ | 24,951₹ | 60,263₹ | 64.98% |
| 2011-12 | 135,165₹ | 138,756₹ | 56,209₹ | 22,801₹ | 30 <i>,</i> 846₹ | 74,502₹ | 55.12% |
| 2012-13 | 98,926₹ | 187,570₹ | 75 <i>,</i> 648₹ | 680₹ | 32,970₹ | 79,632₹ | 80.50% |
| Aggregate | 330,925₹ | 592,028₹ | 243,041₹ | 61,397₹ | 120,160₹ | 290,224₹ | 87.70% |

ESTIMATING FCFF: DISNEY

- In the fiscal year ended September 2013, Disney reported the following:
 - Operating income (adjusted for leases) = \$10,032 million
 - Effective tax rate = 31.02%
 - Capital Expenditures (including acquisitions) = \$5,239 million
 - Depreciation & Amortization = \$2,192 million
 - Change in non-cash working capital = \$103 million
- The free cash flow to the firm can be computed as follows:
 - After-tax Operating Income = 10,032 (1 -.3102) = \$6,920
 Net Cap Expenditures = \$5,239 \$2,192 = \$3,629
 - Change in Working Capital = = \$103
 - Free Cashflow to Firm (FCFF) = = \$3,188
- The reinvestment and reinvestment rate are as follows:
 - Reinvestment = \$3,629 + \$103 = \$3,732 million
 - Reinvestment Rate = \$3,732/ \$6,920 = 53.93%

II. DISCOUNT RATES

- They are key ingredients in discounted cashflow valuation.
 Errors in estimating the discount rate or mismatching cashflows and discount rates can lead to serious errors in valuation.
- At an intuitive level, the discount rate used should be consistent with both the riskiness and the type of cashflow being discounted.
- The cost of equity is the rate at which we discount cash flows to equity (dividends or free cash flows to equity). The cost of capital is the rate at which we discount free cash flows to the firm.

COST OF EQUITY: DEUTSCHE BANK IN 2008 & TATA MOTORS IN 2013

 In early 2008, we estimated a beta of 1.162 for Deutsche Bank, which used in conjunction with the Euro risk-free rate of 4% (in January 2008) and an equity risk premium of 4.50%, yielded a cost of equity of 9.23%.

Cost of Equity in Jan 2008

- = Riskfree Rate Jan 2008 + Beta* Mature Market Risk Premium
- = 4.00% + 1.162 (4.5%) = 9.23%
- With a nominal rupee risk-free rate of 6.57 percent and an equity risk premium of 7.19% for Tata Motors, we arrive at a cost of equity of 13.50%.
 - Cost of Equity = 6.57% + 0.964 (7.19%) = 13.50%

CURRENT COST OF CAPITAL: DISNEY

 The beta for Disney's stock in November 2013 was 1.0013. The T. bond rate at that time was 2.75%. Using an estimated equity risk premium of 5.76%, we estimated the cost of equity for Disney to be 8.52%:

Cost of Equity = 2.75% + 1.0013(5.76%) = 8.52%

 Disney's bond rating in May 2009 was A, and based on this rating, the estimated pretax cost of debt for Disney is 3.75%. Using a marginal tax rate of 36.1, the after-tax cost of debt for Disney is 2.40%.

After-Tax Cost of Debt = 3.75% (1 – 0.361) = 2.40%

 The cost of capital was calculated using these costs and the weights based on market values of equity (121,878) and debt (15.961):

Cost of capital = 8.52% $\frac{121,878}{(15,961+121,878)} + 2.40\% \frac{15,961}{(15,961+121,878)} = 7.81\%$

BUT COSTS OF EQUITY AND CAPITAL CAN AND SHOULD CHANGE OVER TIME...

| | | | After-tax | | |
|------|--------|---------|-----------|------------|-----------------|
| | | Cost of | Cost of | | |
| Year | Beta | Equity | Debt | Debt Ratio | Cost of capital |
| 1 | 1.0013 | 8.52% | 2.40% | 11.50% | 7.81% |
| 2 | 1.0013 | 8.52% | 2.40% | 11.50% | 7.81% |
| 3 | 1.0013 | 8.52% | 2.40% | 11.50% | 7.81% |
| 4 | 1.0013 | 8.52% | 2.40% | 11.50% | 7.81% |
| 5 | 1.0013 | 8.52% | 2.40% | 11.50% | 7.81% |
| 6 | 1.0010 | 8.52% | 2.40% | 13.20% | 7.71% |
| 7 | 1.0008 | 8.51% | 2.40% | 14.90% | 7.60% |
| 8 | 1.0005 | 8.51% | 2.40% | 16.60% | 7.50% |
| 9 | 1.0003 | 8.51% | 2.40% | 18.30% | 7.39% |
| 10 | 1.0000 | 8.51% | 2.40% | 20.00% | 7.29% |

III. EXPECTED GROWTH

- Value is driven by expected future growth, not past growth, and generically there are three approaches to estimating growth:
 - By looking at the past
 - **Outsourcing**: Ask management or look at other analysts
 - **Fundamentals**: By looking at how much a firm is reinvesting and how well it is reinvesting.
- At a generic level, to forecast cash flows for the future, you have to
 - Estimate revenues in future years (revenue growth)
 - Estimate operating profit margins in the future
 - Estimate reinvestment each year
- For a company with stable margins and returns on equity/capital, the expected growth becomes a product of how much the firm reinvests (as a percent of earnings) and how well it reinvests (a return on equity or capital).

THE GENERIC CASE: ESTIMATING EXPECTED FREE CASH FLOWS TO THE FIRM (FOR ANY FIRM)

- In general, when companies have changing margins and are growing, you have to start with the top line (revenues) and work your way down to free cash flows
- Specifically, you have to estimate cash flows in three steps:
 - Forecast revenue growth and revenues in future years, taking into account market potential and competition. That growth rate can be high, low, zero or even negative.
 - Forecast a "target" margin in the future and a pathway from current margins to the target. That target margin can be higher than today's margin, or lower, if the business is becoming more competitive.
 - Estimate reinvestment from revenues, using a sales to capital ratio (measuring the dollars of revenues you get from each dollar of investment).

1. REVENUE GROWTH

Revenue Growth and Magnitude

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Market Size and Growth

1. Current Market size: The size of the market for the company's products & services, given geography it is targeting and product type.

2. Expected Growth in Market: Gowth in total market, as technology and market conditions change.

Market Share

 Company's current market share: If company's current market share is low, potential for growth in market share at expense of competition.
 Industry economics: Nature of the business (a few big winners or splintered competition).
 Strength of company's competitive advantages: Stronger and more sustainable competitive advantages should allow for higher market share.

The potential for revenue growth is greater for companies with small revenues (and market share) in a big and growing market, especially if the company has strong competitive advantages in winner-take-all businesses.

2. TARGET MARGINS (AND PATH THERE)...

Operating Margin: Target and Pathway

Pathway to Profitability Target Operating Margin 1. Company's current operating margin: 1. Unit Economics: Profits on extra unit The lower a company's current margin, sold (Gross Margins), as percent of relative to the target, the steeper the price, with higher profitability going path to profitability. with higher operating margin. 2. Profitability versus Growth trade off: 2. Economies of scale: Costs growth Companies that put growth ahead of relative to revenue growth, with greater profitability will wait longer before economies of scale allowing for higher getting to target margin. margins. 3. Business model: The more well formed 3. Competition: Pricing behavior among a business model, the speedier the competitiors, with more aggressive pathway to the target margin. pricing leading to lower margins.

While all companies would like higher margins in steady state, the level of these margins will be determined by the sector in which a firm operates and its choice of business model, and the speed with which you move towards those target margins will be determined by a company's ambitions and business model choices.

3. SALES TO INVESTED CAPITAL: A PATHWAY TO ESTIMATING REINVESTMENT

| Current (Historical) Sales to Capital | | Future Sales to Capital |
|--|---------|--|
| The sales to invested capital ratio relates the revenues of the firm to its invested capital, with the latter defined the same way that you would in the return on invested capital calculation. Sales to Capital = Revenues/ (Book Equity + Book Debt – Cash) The ratio measures the efficiency with which a firm delivers its revenue growth, with higher values indicating more efficiency. You can look at: 1. The company's historical sales to capital ratio 2. The industry average sales to capital ratio | | <u>Scaling Effects</u>: As companies get bigger, the sales to invested capital ratio can rise or fall, depending on the sector being analyzed. (Looking at the peer group may give some guidance). <u>Excess Capacity</u>: If a company has excess capacity, created by past investments, it should be able to generate revenue growth with less investment, i.e., with higher sales to capital ratios. <u>Lag between investment and growth</u>: If reinvestment creates growth quickly (or instantaneously), the reinvestment in a year can be estimated based upon revenue change in that year. If there is a lag, the reinvestment may have to be tied to revenue change in a future year. |

Sales to Invested Capital: Reinvestment

A company with higher expected growth in revenues will need to reinvest more, though how much will be determined by the businesss that it operates in, with less reinvestment needed if it has excess capacity and a lag between reinvestment and growth.

HERE IS AN EXAMPLE: BAIDU'S EXPECTED FCFF

| Revenue Growth Baidu is the dominant search engine in China, one of the fastest-growing online markets in the world. That growth rate = overall market growth. | | jin other ina, hers, drop d by | | Baidu capita where R&D a the oc | Sales to Capi (Reinvestment operates in a l intensity busi investments a and technology ccassional act | tal nt) low iness, are in y, and quisition. | | | | |
|--|---------|--|-----------|---|--|---|-----------|---------------|--------------|-------------|
| | | | | | | | | | | |
| | Revenue | | Operating | | | | Chg in | | | |
| Year | growth | Revenues | Margin | EBIT | Tax rate | EBIT (1-t) | Revenues | Sales/Capital | Reinvestment | FCFF |
| Base year | | \$ 28,756 | 48.72% | \$ 14,009 | 16.31% | \$ 11,724 | | 2.64 | | |
| 1 | 25.00% | \$ 35,945 | 47.35% | \$ 17,019 | 16.31% | \$ 14,243 | \$ 7,189 | 2.64 | \$ 2,72 | 2 \$ 11,521 |
| 2 | 25.00% | \$ 44,931 | 45.97% | \$ 20,657 | 16.31% | \$ 17,288 | \$ 8,986 | 2.64 | \$ 3,40 | \$ 13,885 |
| 3 | 25.00% | \$ 56,164 | 44.60% | \$ 25,051 | 16.31% | \$ 20,965 | \$ 11,233 | 2.64 | \$ 4,25 | \$ 16,712 |
| 4 | 25.00% | \$ 70,205 | 43.23% | \$ 30,350 | 16.31% | \$ 25,400 | \$ 14,041 | 2.64 | \$ 5,31 | 5 \$ 20,084 |
| 5 | 25.00% | \$ 87,756 | 41.86% | \$ 36,734 | 16.31% | \$ 30,743 | \$ 17,551 | 2.64 | \$ 6,64 | 6 \$ 24,097 |
| 6 | 20.70% | \$ 105,922 | 40.49% | \$ 42,885 | 18.05% | \$ 35,145 | \$ 18,166 | 2.64 | \$ 6,87 | \$ 28,267 |
| 7 | 16.40% | \$ 123,293 | 39.12% | \$ 48,227 | 19.79% | \$ 38,685 | \$ 17,371 | 2.64 | \$ 6,57 | 7 \$ 32,107 |
| 8 | 12.10% | \$ 138,212 | 37.74% | \$ 52,166 | 21.52% | \$ 40,938 | \$ 14,918 | 2.64 | \$ 5,64 | \$ 35,289 |
| 9 | 7.80% | \$ 148,992 | 36.37% | \$ 54,191 | 23.26% | \$ 41,585 | \$ 10,781 | 2.64 | \$ 4,08 | 2 \$ 37,503 |
| 10 | 3.50% | \$ 154,207 | 35.00% | \$ 53,972 | 25.00% | \$ 40,479 | \$ 5,215 | 2.64 | \$ 1,97 | \$ 38,505 |

A SPECIAL CASE: WHEN A COMPANY HAS SETTLED MARGINS AND EARNING STABLE RETURNS

- There are some companies that have settled into steady state, at least when it comes to profit margins (net or operating0 and accounting returns (return on equity or capital).
- This is more likely to be the case when you have a more mature firm, but that mature firm may still be growing at a rate higher than a rate that can be sustained forever.
- In that case, the growth rate during the high growth period can be computed as the product of
 - How much of the earnings are being reinvested back into the business..
 - How much return those reinvestments are making as return on equity or invested capital...

REINVESTMENT AND RETURN: MEASURES

| Earnings Measure | Reinvestment Measure | Return Measure |
|-------------------------------------|---|--|
| Earnings per share | Retention Ratio = % of net income retained by the company = 1 – Payout ratio | Return on Equity = Net Income/ Book Value of Equity |
| Net Income from non- cash assets | Equity reinvestment Rate = (Net Cap Ex + Change in non-cash WC – Change in Debt)/ (Net Income) | Non-cash ROE = Net Income from non-cash assets/ (Book value of equity – Cash) |
| Operating Income | Reinvestment Rate = (Net Cap Ex + Change in non- cash WC)/ After-tax Operating Income | Return on Capital or ROIC = After-tax Operating Income/ (Book value of equity + Book value of debt – Cash) |

ESTIMATING GROWTH IN EQUITY EARNINGS: DEUTSCHE BANK IN JANUARY 2008

 In 2007, Deutsche Bank reported net income of 6.51 billion Euros on a book value of equity of 33.475 billion Euros at the start of the year (end of 2006), and paid out 2.146 billion Euros as dividends.

Return on Equity = $\frac{\text{Net Income}_{2007}}{\text{Book Value of Equity}_{2006}} = \frac{6,510}{33,475} = 19.45\%$

Retention Ratio = $1 \frac{\text{Dividends}}{\text{Net Income}} = 1 \frac{2,146}{6,510} = 67.03\%$

- If Deutsche Bank maintains the return on equity (ROE) and retention ratio that it delivered in 2007 for the long run: Expected Growth Rate Existing Fundamentals = 0.6703 * 0.1945 = 13.04%
- If we replace the net income in 2007 with average net income of \$3,954 million, from 2003 to 2007:

Normalized Return on Equity = $\frac{\text{Average Net Income}_{2003-07}}{\text{Book Value of Equity}_{2006}} = \frac{3,954}{33,475} = 11.81\%$ Normalized Retention Ratio = $1 - \frac{\text{Dividends}}{\text{Net Income}} = 1 - \frac{2,146}{3,954} = 45.72\%$

Expected Growth Rate _{Normalized Fundamentals} = 0.4572 * 0.1181 = 5.40%

ESTIMATING GROWTH IN NET INCOME: TATA MOTORS

| Year | Net Income | Cap Ex | Depreciation | Change in WC | Change in Debt | Equity Reinvestment | Equity Reinvestment Rate |
|-----------|------------|----------|------------------|-------------------|-------------------|------------------------|--------------------------------|
| 2008-09 | -25,053₹ | 99,708₹ | 25,072₹ | 13,441₹ | 25,789₹ | 62,288₹ | -248.63% |
| 2009-10 | 29,151₹ | 84,754₹ | 39,602₹ | -26 <i>,</i> 009₹ | 5 <i>,</i> 605₹ | 13,538₹ | 46.44% |
| 2010-11 | 92,736₹ | 81,240₹ | 46,510₹ | 50 <i>,</i> 484₹ | 24,951₹ | 60,263₹ | 64.98% |
| 2011-12 | 135,165₹ | 138,756₹ | 56,209₹ | 22,801₹ | 30,846₹ | 74,502₹ | 55.12% |
| 2012-13 | 98,926₹ | 187,570₹ | 75 <i>,</i> 648₹ | 680₹ | 32,970₹ | 79,632₹ | 80.50% |
| Aggregate | 330,925₹ | 592,028₹ | 243,041₹ | 61,397₹ | 120,160₹ | 290,224₹ | 87.70% |

| X 7 | Notincomo | BV of Equity at | DOF |
|------------|-------------------|-------------------|---------|
| Year | Net income | start of the year | KUE |
| 2008-09 | -25 <i>,</i> 053₹ | 91,658₹ | -27.33% |
| 2009-10 | 29,151₹ | 63,437₹ | 45.95% |
| 2010-11 | 92,736₹ | 84,200₹ | 110.14% |
| 2011-12 | 135,165₹ | 194,181₹ | 69.61% |
| 2012-13 | 98,926₹ | 330,056₹ | 29.97% |
| Aggregate | 330,925₹ | 763,532₹ | 43.34% |

| | | Average values: |
|-------------------|------------|--------------------|
| | 2013 value | 2008-2013 |
| Reinvestment rate | 80.50% | 87.70% |
| ROE | 29.97% | 43.34% |
| Expected growth | 24.13% | 38.01% |

ROE AND LEVERAGE

- A high ROE, other things remaining equal, should yield a higher expected growth rate in equity earnings.
- The ROE for a firm is a function of both the quality of its investments and how much debt it uses in funding these investments. In particular
 ROE = ROC + D/E (ROC – After-tax cost of Debt)
- Consider two firms with the same return on equity, with two different pathways there. Which one would you value more highly?

| | ROC | D/E | tax cost of | ROE |
|-----------|-----|---------|-------------|-------|
| Company A | 20% | 0.00% | 4.00% | 20.0% |
| Company B | 12% | 100.00% | 4.00% | 20.0% |

ESTIMATING GROWTH IN EBIT: DISNEY

• We started with the reinvestment rate that we computed from the 2013 financial statements:

Reinvestment rate =. $\frac{(3,629 + 103)}{10,032 (1-.3102)} = 53.93\%$

• We compute the return on capital, using operating income in 2013 and capital invested at the start of the year:

Return on Capital₂₀₁₃ = $\frac{\text{EBIT (1-t)}}{(\text{BV of Equity+ BV of Debt - Cash})} = \frac{10,032 (1-.361)}{(41,958+16,328-3,387)} = 12.61\%$

 If Disney maintains its 2013 reinvestment rate and return on capital for the next five years, its growth rate will be 6.80 percent.

Expected Growth Rate from Existing Fundamentals

IV. GETTING CLOSURE IN VALUATION

 Since we cannot estimate cash flows forever, we estimate cash flows for a "growth period" and then estimate a terminal value, to capture the value at the end of the period:

Value =
$$\sum_{t=1}^{t=N} \frac{CF_t}{(1+r)^t} + \frac{\text{Terminal Value}}{(1+r)^N}$$

• When a firm's cash flows grow at a "constant" rate forever, the present value of those cash flows can be written as:

Value = Expected Cash Flow Next Period / (r - g)

- This "constant" growth rate is called a stable growth rate and cannot be higher than the growth rate of the economy in which the firm operates.
- The firm, once put into this state, has to have stability in all of its parameters (risk, margins, accounting returns)

TERMINAL VALUE: MYTHS AND REALITIES



Valuing Vale in November 2013 (in US dollars)

Let's start with some history & estimate what a normalized year will look like

| Year | Operating Income (\$) | Effective tax rate | BV of Debt | BV of Equity | Cash | Invested capital | Return on capital |
|------------|-----------------------|--------------------|------------|--------------|----------|------------------|-------------------|
| 2009 | \$6 <i>,</i> 057 | 27.79% | \$18,168 | \$42,556 | \$12,639 | \$48,085 | 9.10% |
| 2010 | \$23,033 | 18.67% | \$23,613 | \$59,766 | \$11,040 | \$72,339 | 25.90% |
| 2011 | \$30,206 | 18.54% | \$27,668 | \$70,076 | \$9,913 | \$87,831 | 28.01% |
| 2012 | \$13,346 | 18.96% | \$23,116 | \$78,721 | \$3,538 | \$98,299 | 11.00% |
| 2013 (TTM) | \$15,487 | 20.65% | \$30,196 | \$75,974 | \$5,818 | \$100,352 | 12.25% |
| Normalized | \$17,626 | 20.92% | | | | | 17.25% |

Estimate the costs of equity & capital for Vale

| | | Unlevered | | | | |
|----------------|-------------|-----------|----------|------------|-----------|------------|
| | | beta of | | Peer Group | Value of | Proportion |
| Business | Sample size | business | Revenues | EV/Sales | Business | of Vale |
| Metals & Mir | 48 | 0.86 | \$9,013 | 1.97 | \$17,739 | 16.65% |
| Iron Ore | 78 | 0.83 | \$32,717 | 2.48 | \$81,188 | 76.20% |
| Fertilizers | 693 | 0.99 | \$3,777 | 1.52 | \$5,741 | 5.39% |
| Logistics | 223 | 0.75 | \$1,644 | 1.14 | \$1,874 | 1.76% |
| Vale Operation | ons | 0.8440 | \$47,151 | | \$106,543 | 100.00% |

Market D/E = 54.99%

Marginal tax rate = 34.00% (Brazil)

Levered Beta = 0.844 (1+(1-.34)(.5499)) = 1.15 Cost of equity = 2.75% + 1.15 (7.38%) = 10.87%

| | % of revenues | ERP |
|-----------------------|---------------|--------|
| US & Canada | 4.90% | 5.50% |
| Brazil | 16.90% | 8.50% |
| Rest of Latin America | 1.70% | 10.09% |
| China | 37.00% | 6.94% |
| Japan | 10.30% | 6.70% |
| Rest of Asia | 8.50% | 8.61% |
| Europe | 17.20% | 6.72% |
| Rest of World | 3.50% | 10.06% |
| Vale ERP | 100.00% | 7.38% |

Vale's rating: A-

Default spread based on rating = 1.30%Cost of debt (pre-tax) = 2.75% + 1.30% = 4.05%

Cost of capital = 11.23% (.6452) + 4.05% (1-.34) (.3548) = 8.20%

Assume that the company is in stable growth, growing 2% a year in perpetuity

| Painnestment Pate $-\frac{g}{2\%} - \frac{2\%}{1150\%}$ | Value of operating assets | = \$202,832 |
|---|--------------------------------|-------------|
| $\overline{ROC} = \frac{11.59\%}{17.25\%} = 11.59\%$ | + Cash & Marketable Securities | = \$ 7,133 |
| 17(2)((1 - 2002)(1 - 1150) | - Debt | = \$ 42,879 |
| Value of Operating Assets = $\frac{17,020(12092)(11159)}{}$ = \$202.832 | Value of equity | = \$167,086 |
| (.08202) | Value per share | =\$ 32.44 |
| Aswath Damodaran | Stock price (11/2013) | = \$ 13.57 |

DISNEY: INPUTS TO VALUATION

| | High Growth Phase | Transition Phase | Stable Growth Phase |
|------------------------|-------------------------------|-----------------------------|-----------------------------|
| Length of Period | 5 years | 5 years | Forever after 10 years |
| Tax Rate | 31.02% (Effective) | 31.02% (Effective) | 31.02% (Effective) |
| | 36.1% (Marginal) | 36.1% (Marginal) | 36.1% (Marginal) |
| Return on Capital | 12.61% | Declines linearly to 10% | Stable ROC of 10% |
| Reinvestment Rate | 53.93% (based on normalized | Declines gradually to 25% | 25% of after-tax operating |
| | acquisition costs) | as ROC and growth rates | income. |
| | | drop: | Reinvestment rate = g/ ROC |
| | | | = 2.5/10=25% |
| Expected Growth | ROC * Reinvestment Rate = | Linear decline to Stable | 2.5% |
| Rate in EBIT | 0.1261*.5393 = .068 or $6.8%$ | Growth Rate of 2.5% | |
| Debt/Capital Ratio | 11.5% | Rises linearly to 20.0% | 20% |
| Risk Parameters | Beta = 1.0013, $k_e = 8.52\%$ | Beta changes to 1.00; | Beta = 1.00; $k_e = 8.51\%$ |
| | Pre-tax Cost of Debt = 3.75% | Cost of debt stays at 3.75% | Cost of debt stays at 3.75% |
| | Cost of capital = 7.81% | Cost of capital declines | Cost of capital = 7.29% |
| | | gradually to 7.29% | |

ESTIMATING STABLE PERIOD INPUTS AFTER A HIGH GROWTH PERIOD: DISNEY

- **Respect the cap**: The growth rate forever is assumed to be 2.5%. This is set lower than the riskfree rate (2.75%).
- Stable period excess returns: The return on capital for Disney will drop from its high growth period level of 12.61% to a stable growth return of 10%. This is still higher than the cost of capital of 7.29% but the competitive advantages that Disney has are unlikely to dissipate completely by the end of the 10th year.
- Reinvest to grow: Based on the expected growth rate in perpetuity (2.5%) and expected return on capital forever after year 10 of 10%, we compute s a stable period reinvestment rate of 25%:

Reinvestment Rate = Growth Rate / Return on Capital = 2.5% / 10% = 25%

- Adjust risk and cost of capital: The beta for the stock will drop to one, reflecting Disney's status as a mature company.
 - Cost of Equity = Riskfree Rate + Beta * Risk Premium = 2.75% + 5.76% = 8.51%
 - The debt ratio for Disney will rise to 20%. Since we assume that the cost of debt remains unchanged at 3.75%, this will result in a cost of capital of 7.29%
 - Cost of capital = 8.51% (.80) + 3.75% (1-.361) (.20) = 7.29%

V. FROM FIRM VALUE TO EQUITY VALUE PER SHARE

| Approach used | To get to equity value per share |
|--|--|
| Discount dividends per share at the cost of equity | Present value is value of equity per share |
| Discount aggregate FCFE at the cost of equity | Present value is value of aggregate equity. Subtract the value of equity options given to managers and divide by number of shares. |
| Discount aggregate FCFF at the cost of capital | PV = Value of operating assets + Cash & Near Cash investments + Value of minority cross holdings -Debt outstanding = Value of equity -Value of equity options =Value of equity in common stock / Number of shares |



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Investment decision affects risk of assets being finance and financing decision affects hurdle rate



Disney: Corporate Financing Decisions and Firm Value

WAYS OF CHANGING VALUE...





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FIRST PRINCIPLES

