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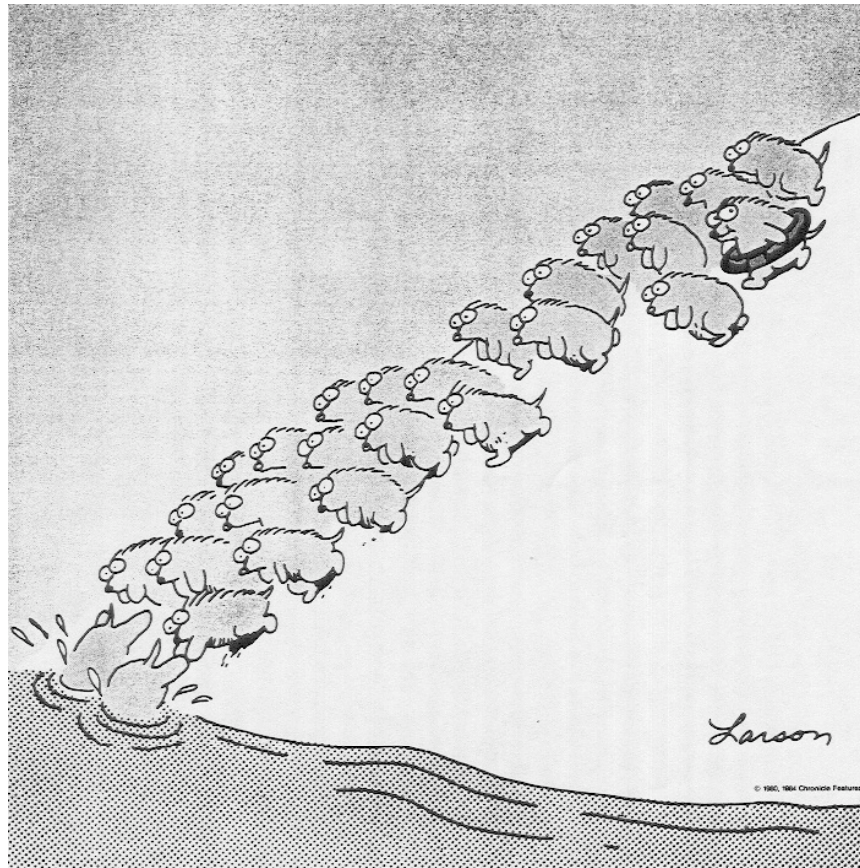
# Valuation

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## Some Initial Thoughts

" One hundred thousand lemmings cannot be wrong"

*Graffiti*



# Misconceptions about Valuation

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- Myth 1: A valuation is an objective search for “true” value
  - Truth 1.1: All valuations are biased. The only questions are how much and in which direction.
  - Truth 1.2: The direction and magnitude of the bias in your valuation is directly proportional to who pays you and how much you are paid.
- Myth 2.: A good valuation provides a precise estimate of value
  - Truth 2.1: There are no precise valuations
  - Truth 2.2: The payoff to valuation is greatest when valuation is least precise.
- Myth 3: . The more quantitative a model, the better the valuation
  - Truth 3.1: One’s understanding of a valuation model is inversely proportional to the number of inputs required for the model.
  - Truth 3.2: Simpler valuation models do much better than complex ones.

# Approaches to Valuation

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- **Discounted cashflow valuation**, relates the value of an asset to the present value of expected future cashflows on that asset.
- **Relative valuation**, estimates the value of an asset by looking at the pricing of 'comparable' assets relative to a common variable like earnings, cashflows, book value or sales.
- **Contingent claim valuation**, uses option pricing models to measure the value of assets that share option characteristics.

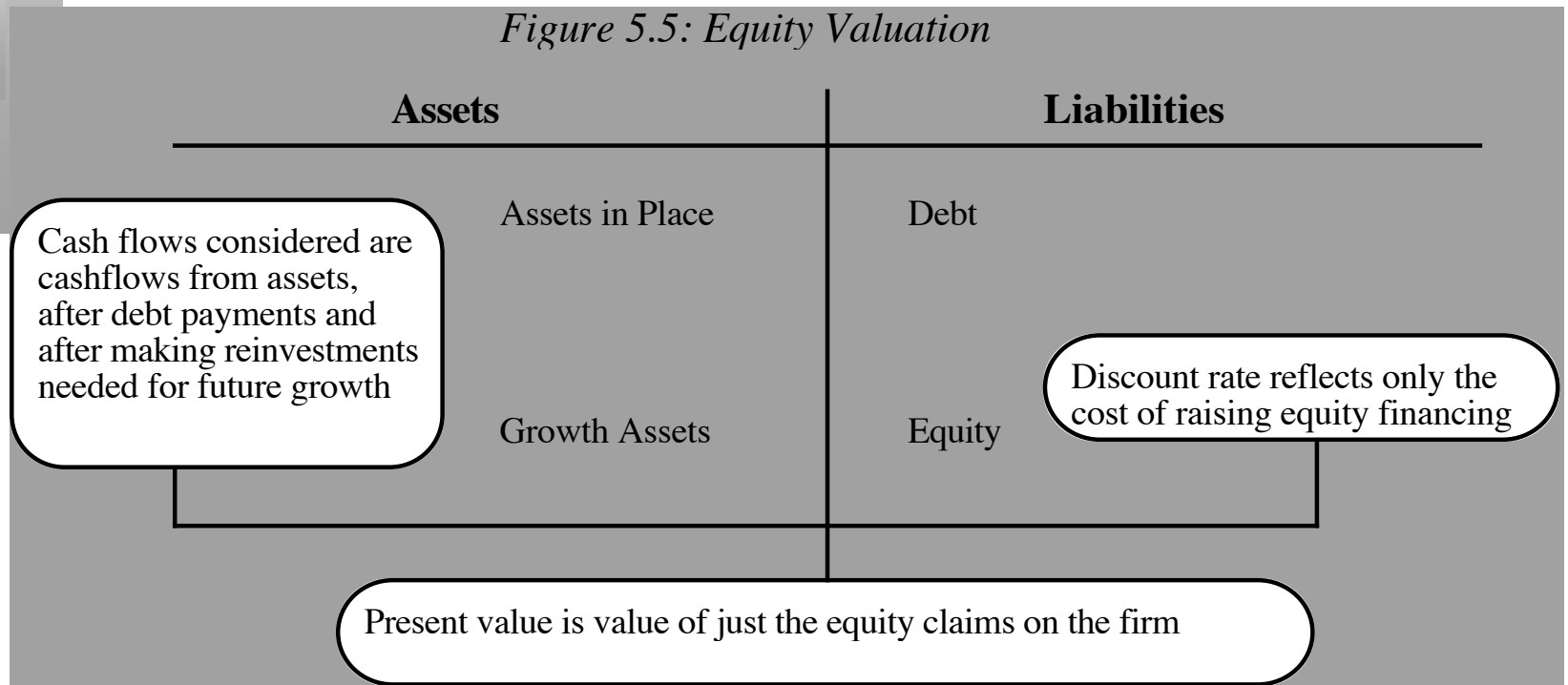
# Discounted Cash Flow Valuation

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- **What is it:** In discounted cash flow valuation, the value of an asset is the present value of the expected cash flows on the asset.
- **Philosophical Basis:** Every asset has an intrinsic value that can be estimated, based upon its characteristics in terms of cash flows, growth and risk.
- **Information Needed:** To use discounted cash flow valuation, you need
  - to estimate the life of the asset
  - to estimate the cash flows during the life of the asset
  - to estimate the discount rate to apply to these cash flows to get present value
- **Market Inefficiency:** Markets are assumed to make mistakes in pricing assets across time, and are assumed to correct themselves over time, as new information comes out about assets.

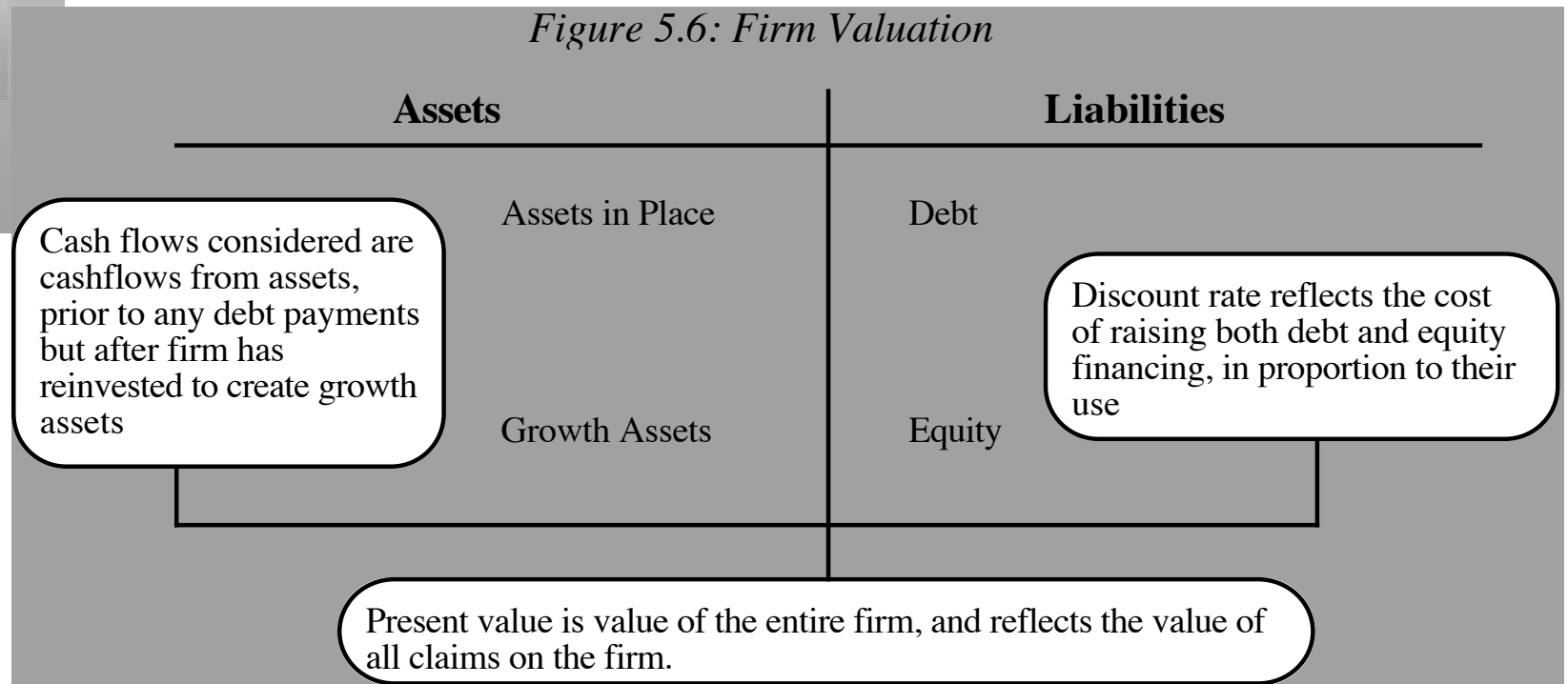
# Equity Valuation

*Figure 5.5: Equity Valuation*

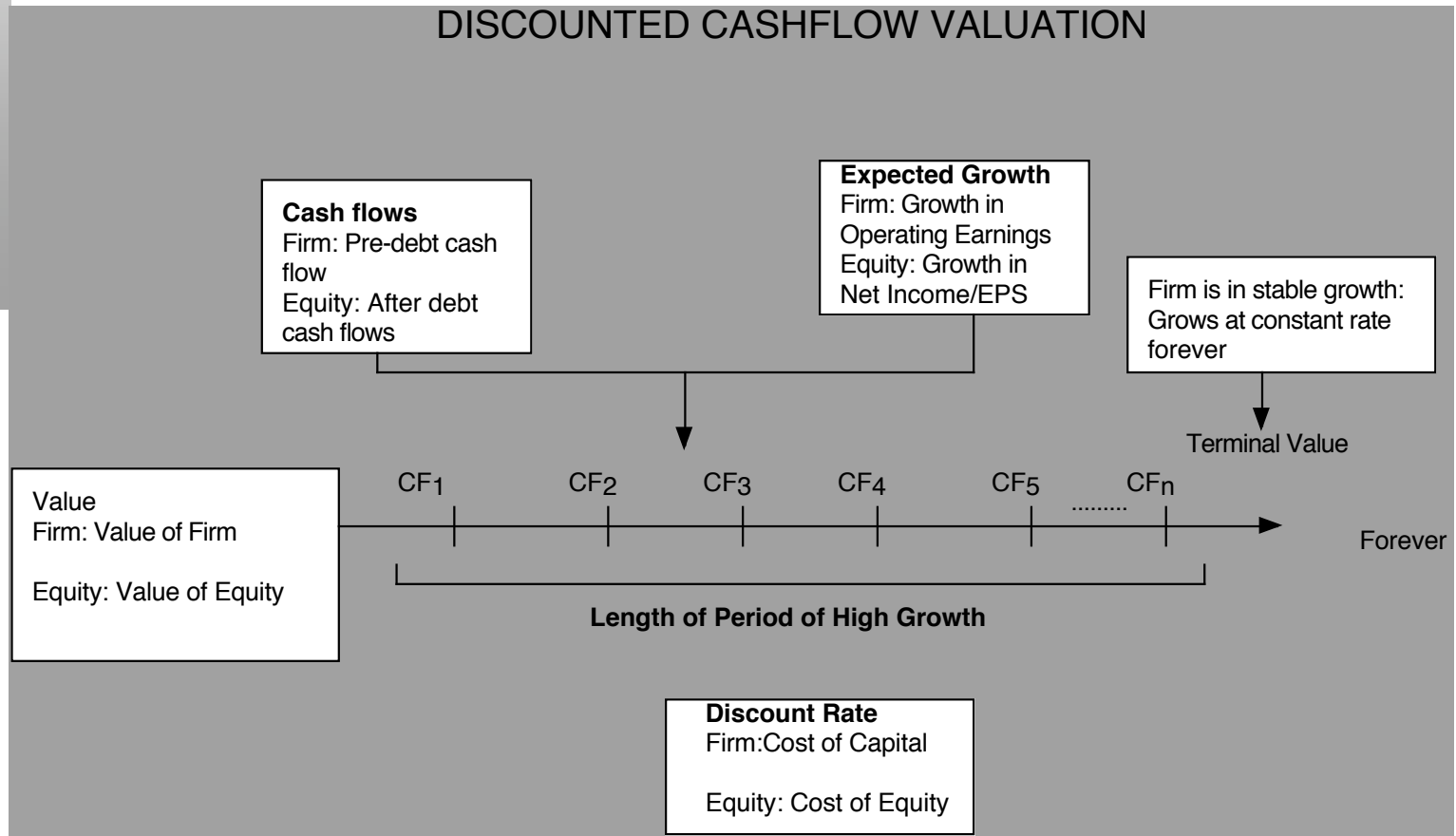


# Firm Valuation

Figure 5.6: Firm Valuation

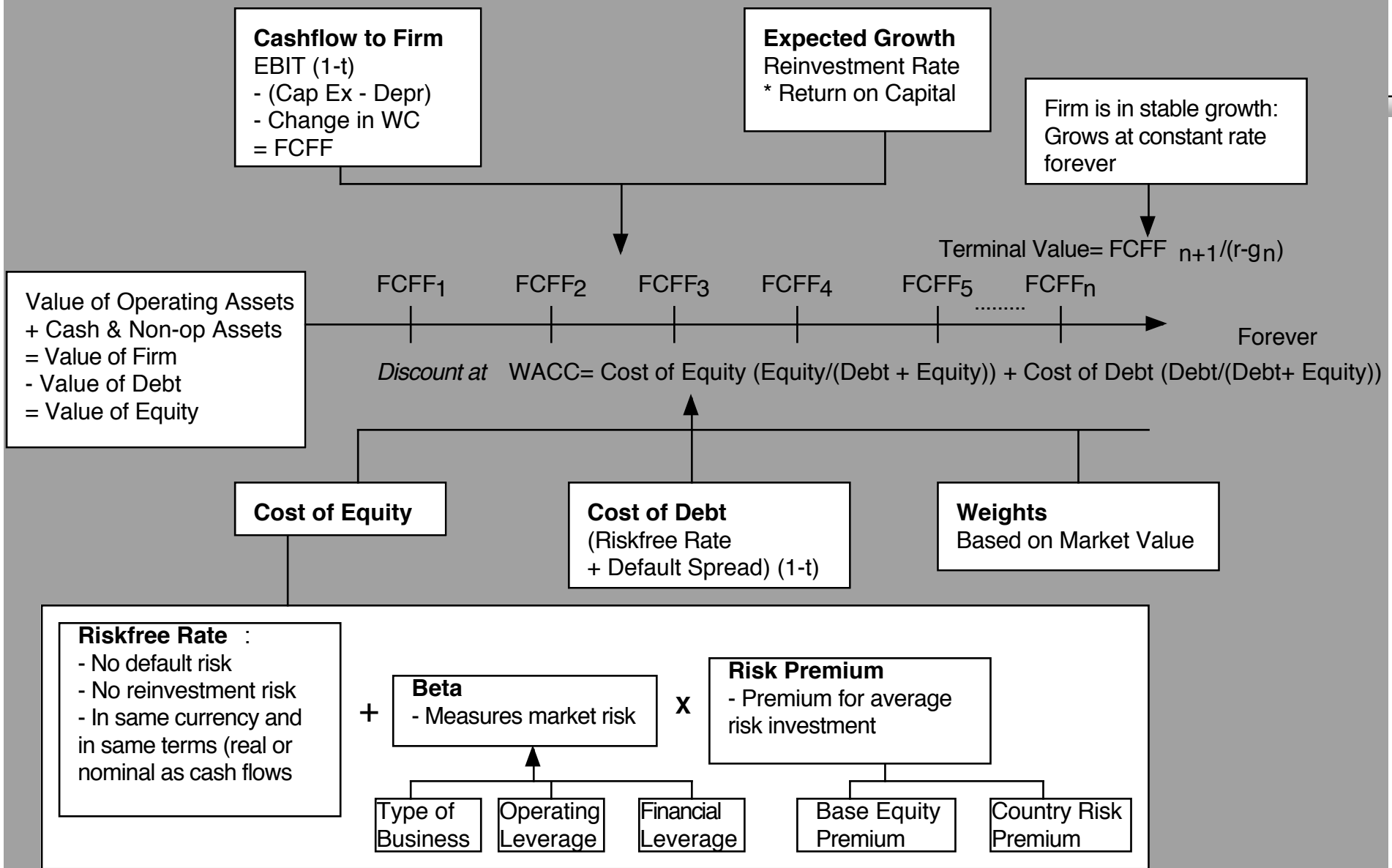


# Valuation with Infinite Life





# DISCOUNTED CASHFLOW VALUATION



# Tata Chemicals: Status Quo

Average Reinvestment Rate (1999-2003) = 41%

Return on Capital 9.01%

Stable Growth  
 $g = 3\%$ ;  $\text{Beta} = 0.9$ ;  
 Country Premium = 1.3%  
 Debt Ratio = 23.7%  
 Cost of capital = 9.19%  
 $\text{ROC} = 9.19\%$ ; Tax rate = 30%  
 $\text{Reinvestment Rate} = g/\text{ROC} = 3/9.19 = 32.63\%$

**Current Cashflow to Firm**  
 EBIT(1-t) : 2210  
 - Nt CpX 366  
 - Chg WC 155  
 = FCFF 1689  
 Reinvestment Rate =  $521/1689 = 23.58\%$

Reinvestment Rate 41%

**Expected Growth in EBIT (1-t)**  
 $.41 * .0901 = .0369$   
**3.69%**

Terminal Value<sub>5</sub> =  $1826 / (.0919 - .03) = 29,676$

Op. Assets 23,524  
 + Cash: 2,904  
 - Debt 7,660  
 = Equity 18,768  
 - Options 0  
 Equity 18,768  
 Value/Sh Rs 104/sh

Year	1	2	3	4	5
EBIT (1-t)	2291	2376	2464	2555	2649
- Reinvestment	939	974	1010	1047	1086
FCFF	1352	1402	1454	1507	1563

Term Yr  
 2,728  
 - 890  
 = 1838

Discount at Cost of Capital (WACC) =  $12.25\% (.763) + 4.45\% (0.237) = 10.39\%$

**Cost of Equity 12.25%**

**Cost of Debt**  
 $(5.50\% + 0.85\%)(1 - .30) = 4.45\%$

**Weights**  
 E = 76.3% D = 23.7%

On June 15, 2004  
 Tata Chem = Rs 136.2

**Riskfree Rate:**  
 Rs Riskfree Rate = 5.50%

+ **Beta 0.90**  
 ↑  
 Unlevered Beta for Sectors: 0.74

x **Mature market premium 4%**  
 ↑  
 Firm's D/E Ratio: 31.13%

+ **Lambda 1.21**

x **Country Equity Risk Premium 2.60%**

Country Default Spread 1.30%

x Rel Equity Mkt Vol 2.00

Average Reinvestment Rate (1999-2003) = 75.47%

**Current Cashflow to Firm**

EBIT(1-t) : 9485  
 - Nt CpX 2594  
 - Chg WC 341  
 = FCFF 6550  
 Reinvestment Rate = 2935/9485 = 30.95%

Reinvestment Rate 75.47%

**Expected Growth in EBIT (1-t)**  
 $.7547 * .2682 = .2024$   
**20.24%**

Return on Capital 26.82%

**Wipro: Status Quo**

Stable Growth  
 $g = 5\%$ ; Beta = 1.0;  
 Country Premium = 1.3%  
 Debt Ratio = 20%  
 Cost of capital = 8.83%  
 ROC = 8.83%; Tax rate = 25%  
 Reinvestment Rate =  $g/ROC = 5/8.83 = 56.60\%$

First 5 years

Terminal Value<sub>5</sub> =  $16163 / (.0883 - .05) = 421,583$

Op. Assets 196,704  
 + Cash: 28792  
 - Debt 1054  
 - Minority Int. 524  
 = Equity 223,917  
 - Options 1,971  
 Equity 221,946  
 Value/Sh Rs 960/sh

Year	1	2	3	4	5	6	7	8	9	10
EBIT	13418	16134	19400	23327	28048	32871	37521	41684	45039	47291
EBIT (1-t)	11405	13714	16490	19828	23841	27940	31893	35432	38283	40198
- Reinvestment	8608	10350	12445	14964	17993	20033	21663	22729	23114	22752
FCFF	2797	3364	4045	4863	5848	7908	10230	12703	15170	17446

Adjust beta to 1, debt ratio to 20% in years 6-10

Discount at Cost of Capital (WACC) =  $11.33\% (.997) + 5.10\% (0.003) = 11.31\%$

Term Yr 49656  
 37242  
 21079  
 =16163

**Cost of Equity 11.33%**

**Cost of Debt**  
 $(5.50\% + 0.50\%)(1 - .15) = 5.10\%$

**Weights**  
 E = 99.7% D = 0.3%

On June 15, 2004  
 Wipro price = Rs 1523

**Riskfree Rate:**  
 Rs Riskfree Rate = 5.50%

+ **Beta 1.2480**

X **Mature market premium 4%**

+ **Lambda 0.32**

X **Country Equity Risk Premium 2.60%**

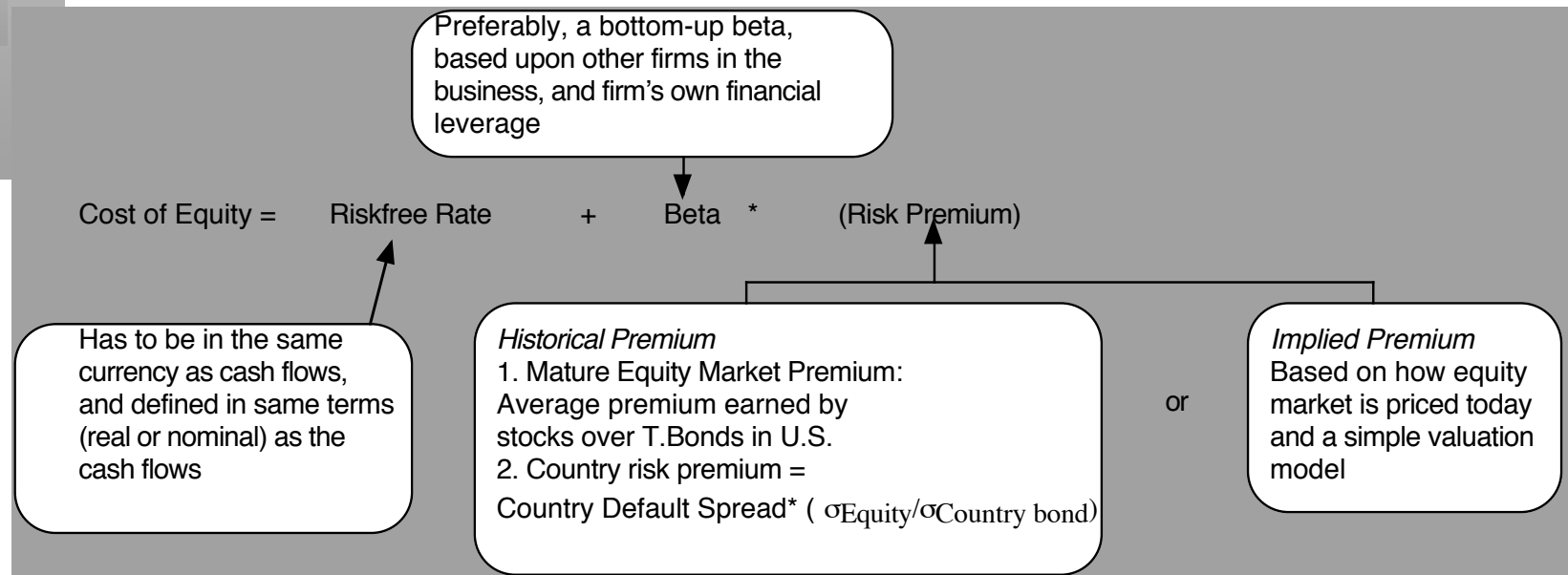
Unlevered Beta for Sectors: 1.2446

Firm's D/E Ratio: 0.30%

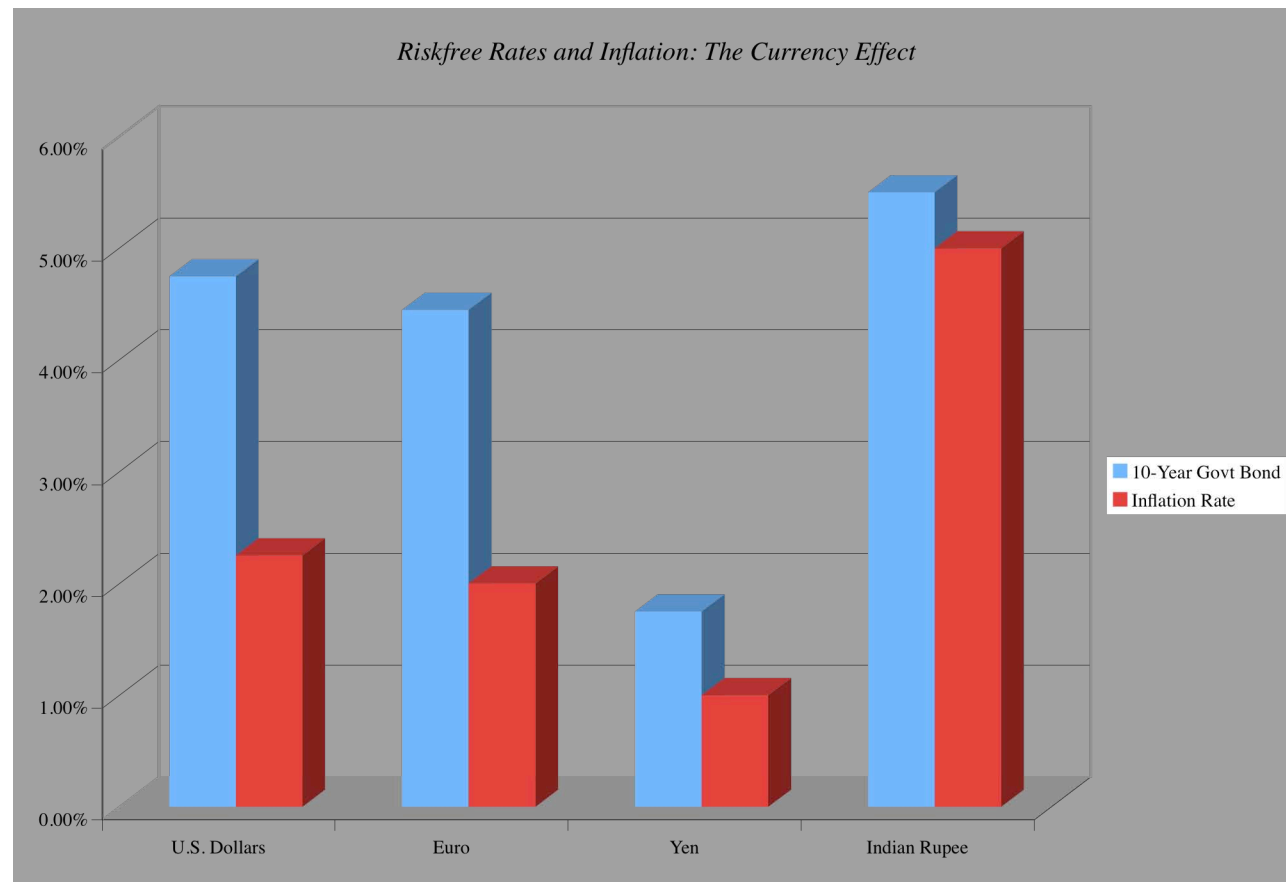
Country Default Spread 1.30%

X Rel Equity Mkt Vol 2.00

# I. Discount Rates: Cost of Equity



## Riskfree Rates: Some Perspective



# Equity Risk Premium

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- The equity risk premium is the premium you (as an investor) would demand to invest in equity as a class (or in the average risk stock) instead of a riskless investment. It will depend upon your risk aversion as an investor and should be different for different investors.
- There are three ways to estimate the equity risk premium.
  - *The Survey approach*: Survey investors to find out what they would demand as a premium for investing in stocks.
  - *Look at the past*: Estimate what you would have made investing in stocks as opposed to the riskless investment over a long period of history.
  - *Back it out of market prices*: Using the current level of the equity index and expected dividends on the index to back out an implied equity risk premium.

## Everyone uses historical premiums, but..

- The historical risk premium is easiest to estimate in the United States, because there is unbroken market data going back to 1870.

Historical Period	<i>Arithmetic average</i>		<i>Geometric Average</i>	
	Stocks - T.Bills	Stocks - T.Bonds	Stocks - T.Bills	Stocks - T.Bonds
1928-2003	7.92%	6.54%	5.99%	4.82%
1963-2003	6.09%	4.70%	4.85%	3.82%
1993-2003	8.43%	4.87%	6.68%	3.57%

- Can you estimate a “reliable” historical risk premium for India?

## Assessing Country Risk Using Country Ratings

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<i>Country</i>	<i>Rating</i>	<i>Typical Default Spread</i>
China	A2	90
Hong Kong	A1	80
<b>India</b>	<b>Baa2</b>	<b>130</b>
Indonesia	B2	550
Malaysia	A3	95
Pakistan	B2	550
Singapore	Aaa	0
Taiwan	Aa3	70
Thailand	Baa1	120
Vietnam	B1	450
Vietnam	B1	450



## Using Country Ratings to Estimate Equity Spreads

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- Country ratings measure default risk. While default risk premiums and equity risk premiums are highly correlated, one would expect equity spreads to be higher than debt spreads.
  - One way to adjust the country spread upwards is to use information from the US market. In the US, the equity risk premium has been roughly twice the default spread on junk bonds.
  - Another is to multiply the bond spread by the relative volatility of stock and bond prices in that market. For example,
    - Standard Deviation in BSE = 32%
    - Standard Deviation in Indian Government Bond = 16%
    - Adjusted Equity Spread = 1.30%  $(32/16) = 2.60\%$

## Country Risk and Company Risk: Three points of view

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- Approach 1: Assume that every company in the country is equally exposed to country risk. In this case,  
 $E(\text{Return}) = \text{Riskfree Rate} + \text{Country premium} + \text{Beta (Mature market premium)}$
- Approach 2: Assume that a company's exposure to country risk is similar to its exposure to other market risk.  
 $E(\text{Return}) = \text{Riskfree Rate} + \text{Beta (Mature market premium} + \text{Country premium)}$
- Approach 3: Treat country risk as a separate risk factor and allow firms to have different exposures to country risk (perhaps based upon the proportion of their revenues come from non-domestic sales)  
 $E(\text{Return}) = \text{Riskfree Rate} + \beta (\text{Mature market premium}) + \lambda (\text{Country premium})$

## Estimating Company Exposure to Country Risk: Determinants

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- Source of revenues: Other things remaining equal, a company should be more exposed to risk in a country if it generates more of its revenues from that country. An Indian firm that generates the bulk of its revenues in India should be more exposed to country risk than one that generates a smaller percent of its business within India.
- Manufacturing facilities: Other things remaining equal, a firm that has all of its production facilities in India should be more exposed to country risk than one which has production facilities spread over multiple countries. The problem will be accentuated for companies that cannot move their production facilities (mining and petroleum companies, for instance).
- Use of risk management products: Companies can use both options/futures markets and insurance to hedge some or a significant portion of country risk.

## Estimating Lambdas: The Revenue Approach

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- The easiest and most accessible data is on revenues. Most companies break their revenues down by region. One simplistic solution would be to do the following:  
$$\lambda = \% \text{ of revenues domestically}_{\text{firm}} / \% \text{ of revenues domestically}_{\text{avg firm}}$$
- Consider, for instance, Tata Chemicals and Wipro. Tata Chemicals gets 98% of its revenues in India whereas Wipro gets only 26% of its revenues in India. The average Indian company gets about 81% of its revenues in India:
  - $\text{Lambda}_{\text{Wipro}} = 26\% / 81\% = .32$
  - $\text{Lambda}_{\text{Tata Chemicals}} = 98\% / 81\% = 1.21$
- There are two implications
  - A company's risk exposure is determined by where it does business and not by where it is located
  - Firms might be able to actively manage their country risk exposures

# Implied Equity Premium for the S&P 500: January 1, 2004

- We can use the information in stock prices to back out how risk averse the market is and how much of a risk premium it is demanding.

In 2003, dividends & stock buybacks were 2.81% of the index, generating 31.29 in cashflows

Analysts expect earnings to grow 9.5% a year for the next 5 years as the economy comes out of a recession.

After year 5, we will assume that earnings on the index will grow at 4.25%, the same rate as the entire economy

34.26                      37.52                      41.08                      44.98                      49.26

January 1, 2004  
S&P 500 is at 1111.91

- If you pay the current level of the index, you can expect to make a return of 7.94% on stocks (which is obtained by solving for  $r$  in the following equation)

$$1111.91 = \frac{34.26}{(1+r)} + \frac{37.52}{(1+r)^2} + \frac{41.08}{(1+r)^3} + \frac{44.98}{(1+r)^4} + \frac{49.26}{(1+r)^5} + \frac{49.26(1.0425)}{(r - .0425)(1+r)^5}$$

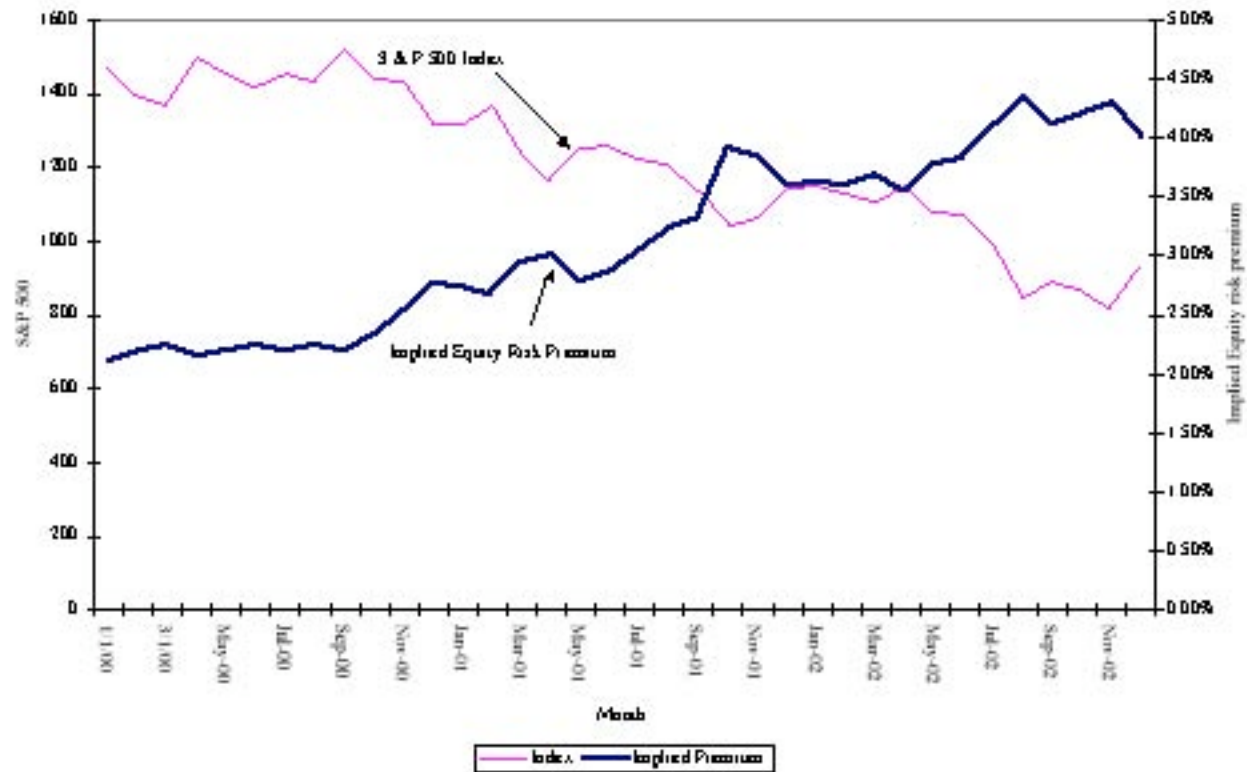
- Implied Equity risk premium = Expected return on stocks - Treasury bond rate = 7.94% - 4.25% = 3.69%

## U.S. Equity Risk Premiums - 1960 - 2003



# Monthly Premiums: 2000 - 2002

*Implied Equity Risk Premiums: Monthly - January 2000 to January 2003*



## An Intermediate Solution

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- The historical risk premium of 4.82% for the United States is too high a premium to use in valuation. It is much higher than the actual implied equity risk premium in the market
- The current implied equity risk premium requires us to assume that the market is correctly priced today. (If I were required to be market neutral, this is the premium I would use)
- The average implied equity risk premium between 1960-2003 in the United States is about 4%. We will use this as the premium for a mature equity market.



## Implied Premium for the Indian Market: June 15, 2004

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- Level of the Index (S&P CNX Index) = 1219
  - This is a market cap weighted index of the 500 largest companies in India and represents 90% of the market value of Indian companies
- Dividends on the Index = 3.51% of 1219 (Simple average is 2.75%)
- Other parameters
  - Riskfree Rate = 5.50%
  - Expected Growth (in Rs)
    - Next 5 years = 18% (Used expected growth rate in Earnings)
    - After year 5 = 5.5%
- Solving for the expected return:
  - Expected return on Equity = 11.76%
  - Implied Equity premium =  $11.76 - 5.5\% = 6.16\%$
- A Comparison to historical premiums
  - Adjusted historical risk premium =  $4\% + 2.6\% = 6.6\%$

## Estimating Beta

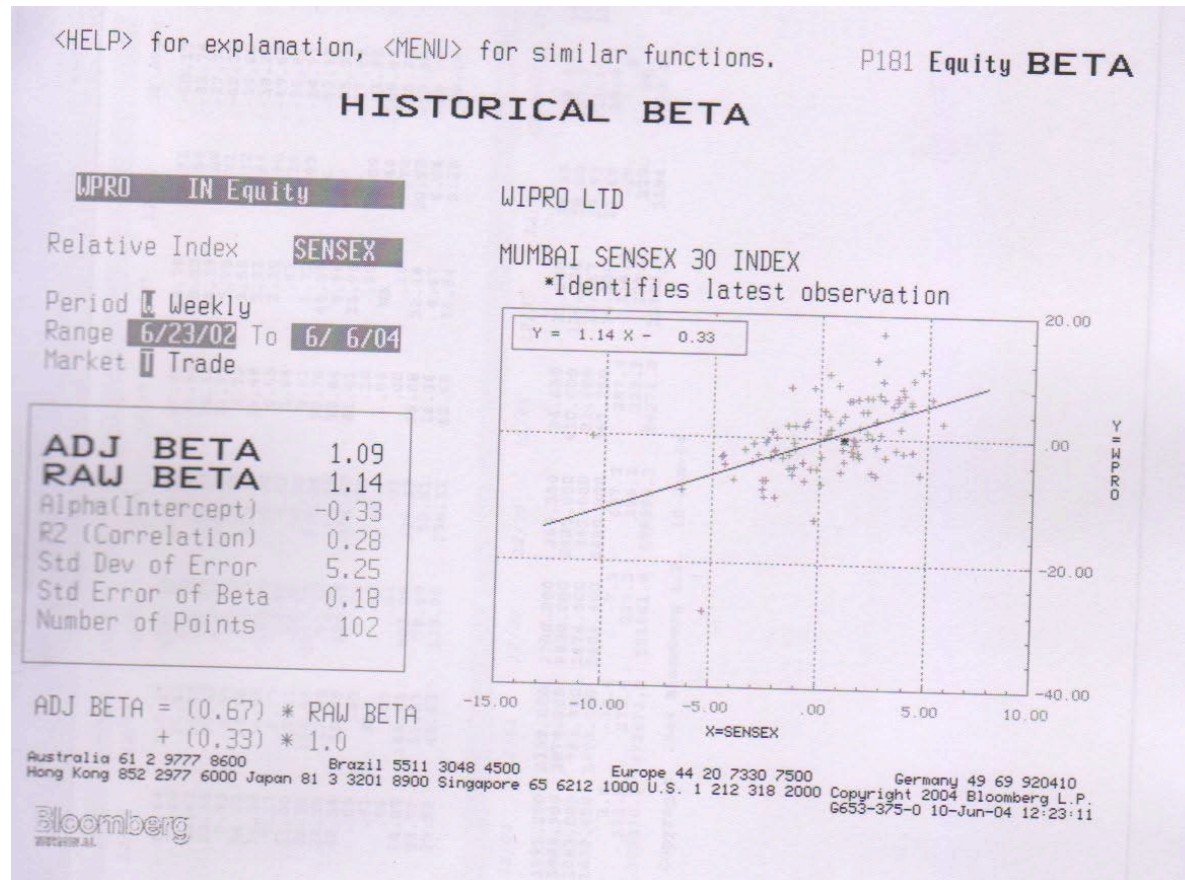
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- The standard procedure for estimating betas is to regress stock returns ( $R_j$ ) against market returns ( $R_m$ ) -

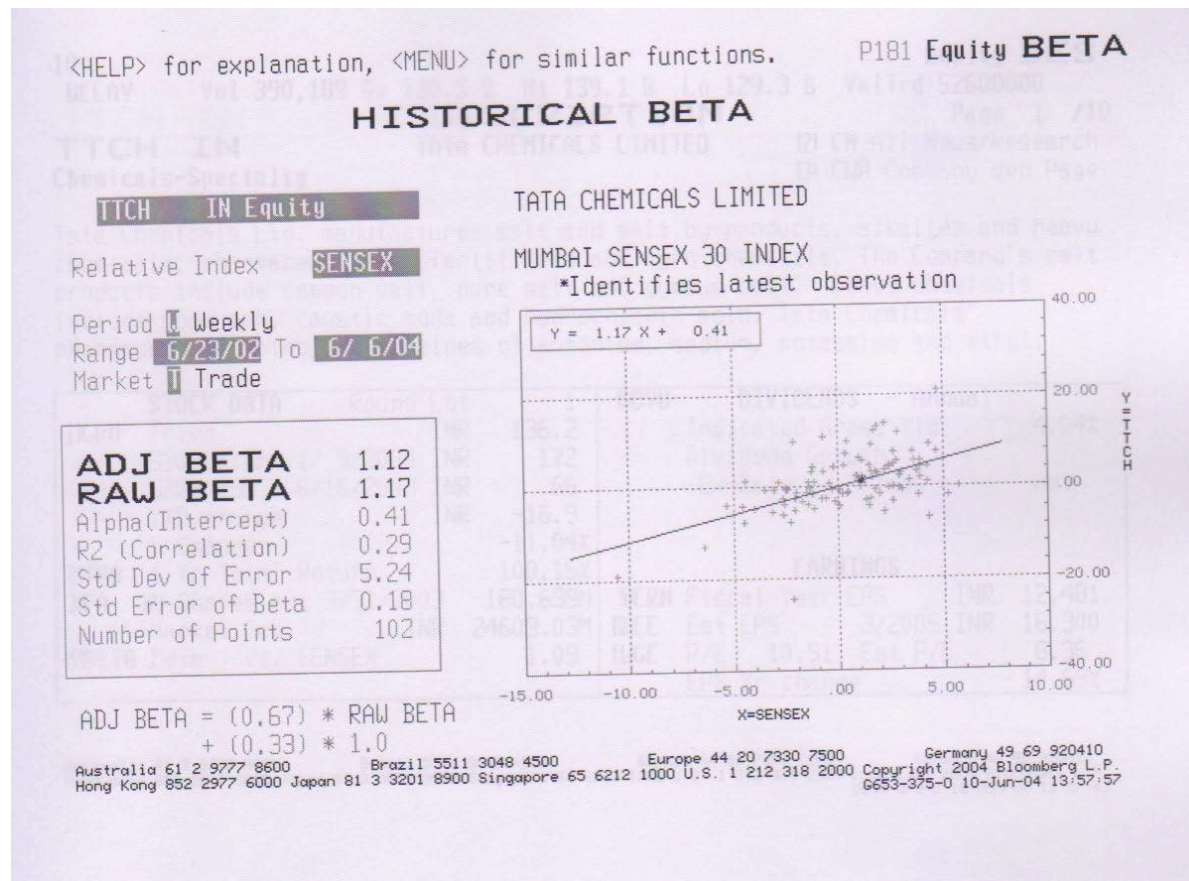
$$R_j = a + b R_m$$

- where  $a$  is the intercept and  $b$  is the slope of the regression.
- The slope of the regression corresponds to the beta of the stock, and measures the riskiness of the stock.
- This beta has three problems:
  - It has high standard error
  - It reflects the firm's business mix over the period of the regression, not the current mix
  - It reflects the firm's average financial leverage over the period rather than the current leverage.

# Beta Estimation: Wipro



# Beta Estimation for Tata Chemicals



# Determinants of Betas

- **Product or Service:** The beta value for a firm depends upon the sensitivity of the demand for its products and services and of its costs to macroeconomic factors that affect the overall market.
  - Cyclical companies have higher betas than non-cyclical firms
  - Firms which sell more discretionary products will have higher betas than firms that sell less discretionary products
- **Operating Leverage:** The greater the proportion of fixed costs in the cost structure of a business, the higher the beta will be of that business. Higher fixed costs increase your exposure to all risk, including market risk.
- **Financial Leverage:** The more debt a firm takes on, the higher the beta will be of the equity in that business. Debt creates a fixed cost, interest expenses, that increases exposure to market risk. The beta of equity alone can be written as a function of the unlevered beta and the debt-equity ratio

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

$\beta_L$  = Levered or Equity Beta

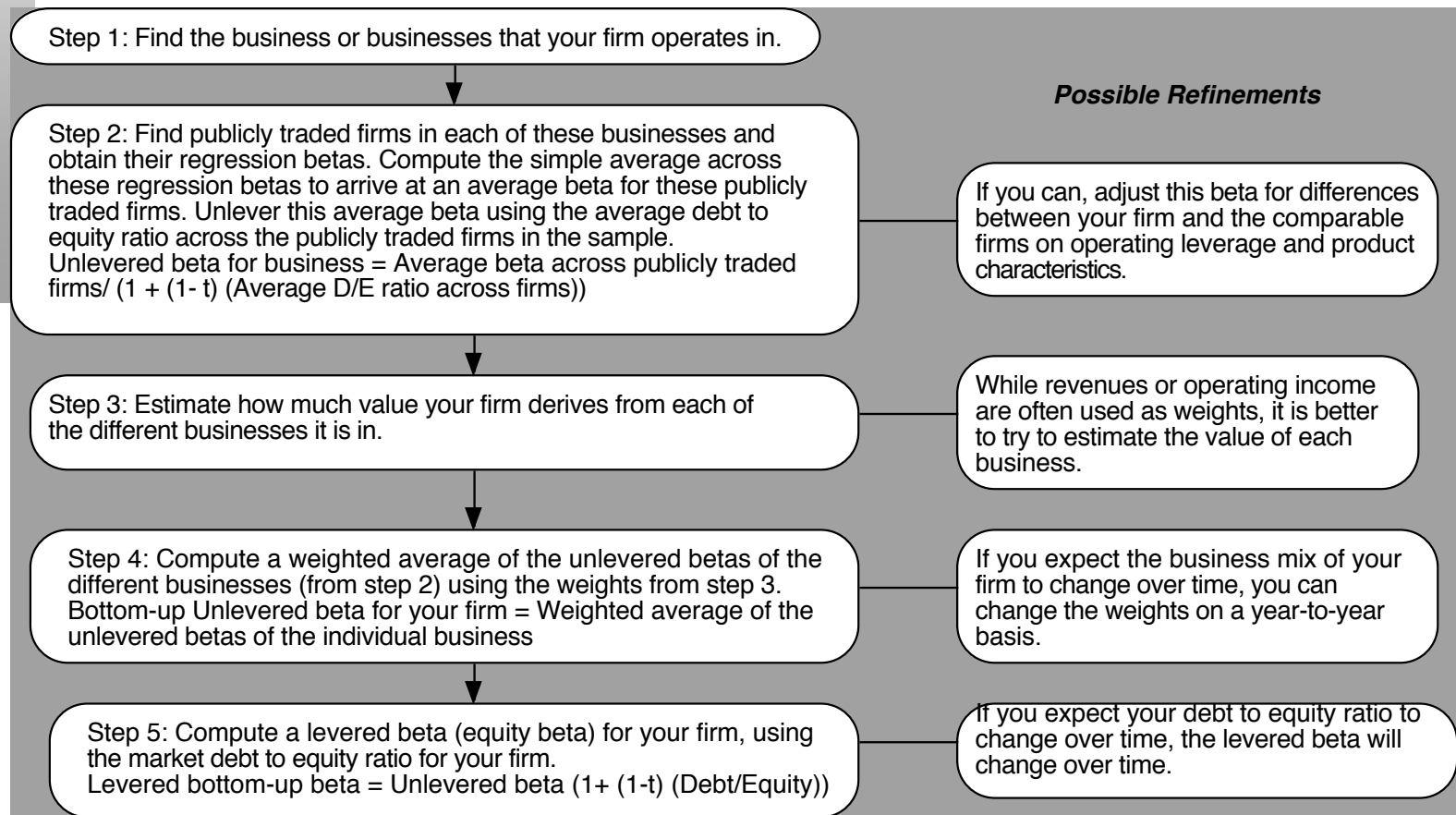
$\beta_u$  = Unlevered Beta

t = Corporate marginal tax rate

D = Market Value of Debt

E = Market Value of Equity

# The Solution: Bottom-up Betas

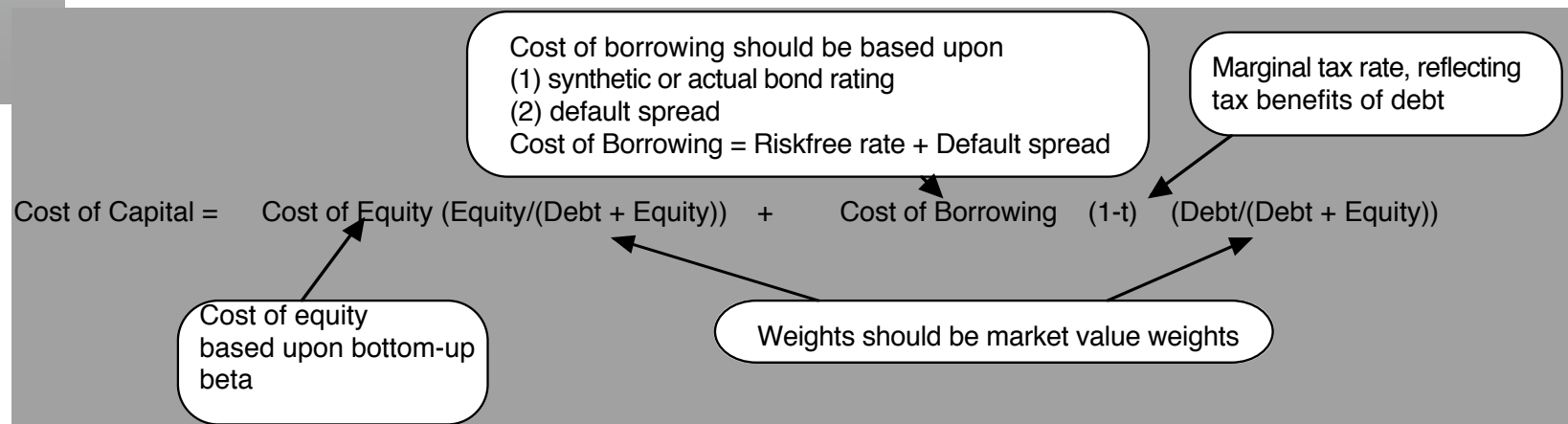


## Estimating Bottom-up Betas

- Tata Chemicals is in only one business chemicals. To estimate its beta, we used the unlevered beta for chemical companies in emerging markets (0.74), Tata Chemical's debt to equity ratio (31.13%) and a tax rate of 30%.
  - Levered beta =  $0.74 (1 + (1 - .30) (.3113)) = 0.90$
- Wipro is in multiple businesses and has paid only 15% of its income in taxes in recent years.

Business Mix	Revenues	Operating Income	Weights	Unlevered beta	Debt/Equity	Levered Beta
Consulting and Service	36803	7128	63.88%	0.98	0.30%	0.98
Software	16534	3203	28.70%	1.97	0.30%	1.98
Consumer products	5475	828	7.42%	0.72	0.30%	0.72
		11159		1.24	0.30%	1.25

# From Cost of Equity to Cost of Capital





## Estimating Synthetic Ratings

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- The rating for a firm can be estimated using the financial characteristics of the firm. In its simplest form, the rating can be estimated from the interest coverage ratio

$$\text{Interest Coverage Ratio} = \text{EBIT} / \text{Interest Expenses}$$

- For Tata Chemicals, the interest coverage ratio is computed using operating income and interest expenses from 2003:

$$\text{Interest coverage ratio} = 3,156.5/509.1 = 6.20$$

- For Wipro, the interest coverage ratio is computed using operating income and interest expenses from 2003:

$$\text{Interest coverage ratio} = 11,159/35.1 = 317.92$$

## Interest Coverage Ratios, Ratings and Default Spreads

If Interest Coverage Ratio is	Estimated Bond Rating	Default Spread(2004)
<b>&gt;12.50</b>	<b>AAA</b>	<b>0.35%</b> ← <b>Wipro: 317.92</b>
9.5-12.5	AA	0.50%
7.5-9.5	A+	0.70%
<b>6-7.5</b>	<b>A</b>	<b>0.85%</b> ← <b>Tata Chemicals: 6.20</b>
4.5-6	A-	1.00%
4-4.5	BBB	1.50%
3.5-4	BB+	2.00%
3-3.5	BB	2.50%
2.5-3	B+	3.25%
2-2.5	B	4.00%
1.5-2	B-	6.00%
1.25-1.5	CCC	8.00%
0.8-1.25	CC	10.00%
0.5-0.8	C	12.00%
<0.5	D	20.00%

## Estimating the cost of debt for a firm

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- The synthetic rating for Tata Chemicals is A. Using the 2004 default spread of 0.85%, we estimate a cost of debt of 6.35% (using a riskfree rate of 5.50%):

$$\begin{aligned}\text{Cost of debt} &= \text{Riskfree rate} + \text{Company default spread} \\ &= 5.50\% + 0.85\% = 6.35\%\end{aligned}$$

- The synthetic rating for Wipro is AAA. The default spread for AAA rated bond of 0.35% is added to the riskfree rate of 5.50%.

$$\begin{aligned}\text{Pre-tax cost of debt} &= \text{Riskfree Rate} + \text{Default spread} \\ &= 5.50\% + 0.35\% = 5.85\%\end{aligned}$$

## Estimating Cost of Capital: Tata Chemicals

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### ■ Equity

- Cost of Equity = Riskfree Rate + Beta \* ERP + Lambda\* CRP  
= 5.50% + 0.90 (4.00%) + 1.21 (2.60%) = 12.25%
- Market Value of Equity = Rs 136.2\*180.64 = Rs. 24,603 lakhs (76.3%)

### ■ Debt

- Cost of debt = 5.50% + 0.85 = 6.35%
- Tax rate used = 30%
- Market Value of Debt = Rs 7,660 lakhs (23.7%)

### ■ Cost of Capital

$$\text{Cost of Capital} = 12.25 \% (.763) + 6.35\% (1 - .30) (.237) = 10.39\%$$

## Estimating Cost of Capital: Wipro

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### ■ Equity

- Cost of Equity = Riskfree Rate + Beta \* ERP + Lambda\* CRP  
= 5.50% + 1.25 (4.00%) + 0.32 (2.60%) = 11.33 %
- Market Value of Equity = Rs 1532\*231.29 = Rs. 352,312 lakhs (99.7%)

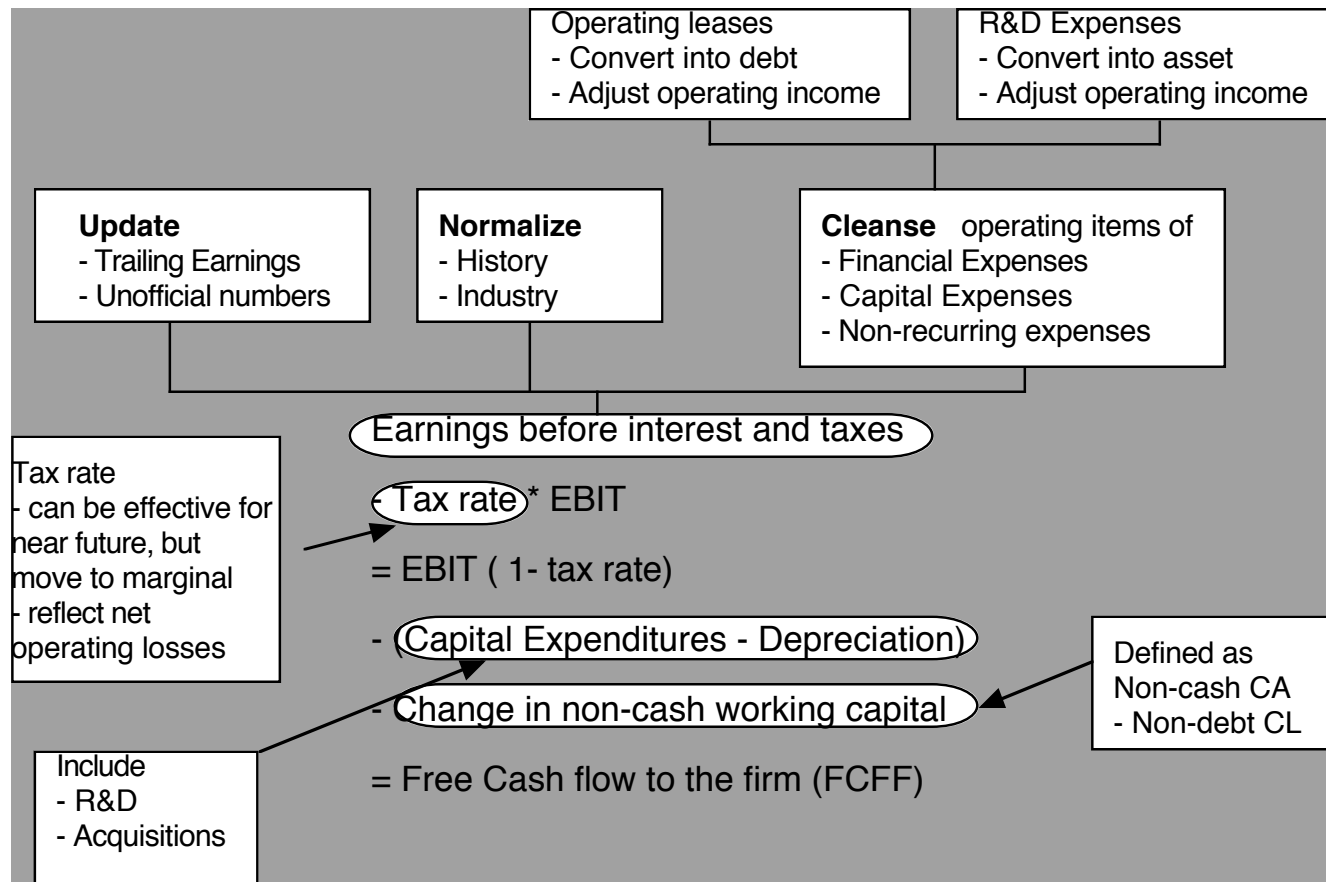
### ■ Debt

- Cost of debt = 5.50% + 0.35% = 5.85%
- Tax rate used = 15%
- Market Value of Debt = Rs 1,054 lakhs (0.3%)

### ■ Cost of Capital

$$\text{Cost of Capital} = 11.33 \% (.997) + 5.85\% (1 - .15) (0.003) = 11.31 \%$$

## II. Estimating Cash Flows to Firm

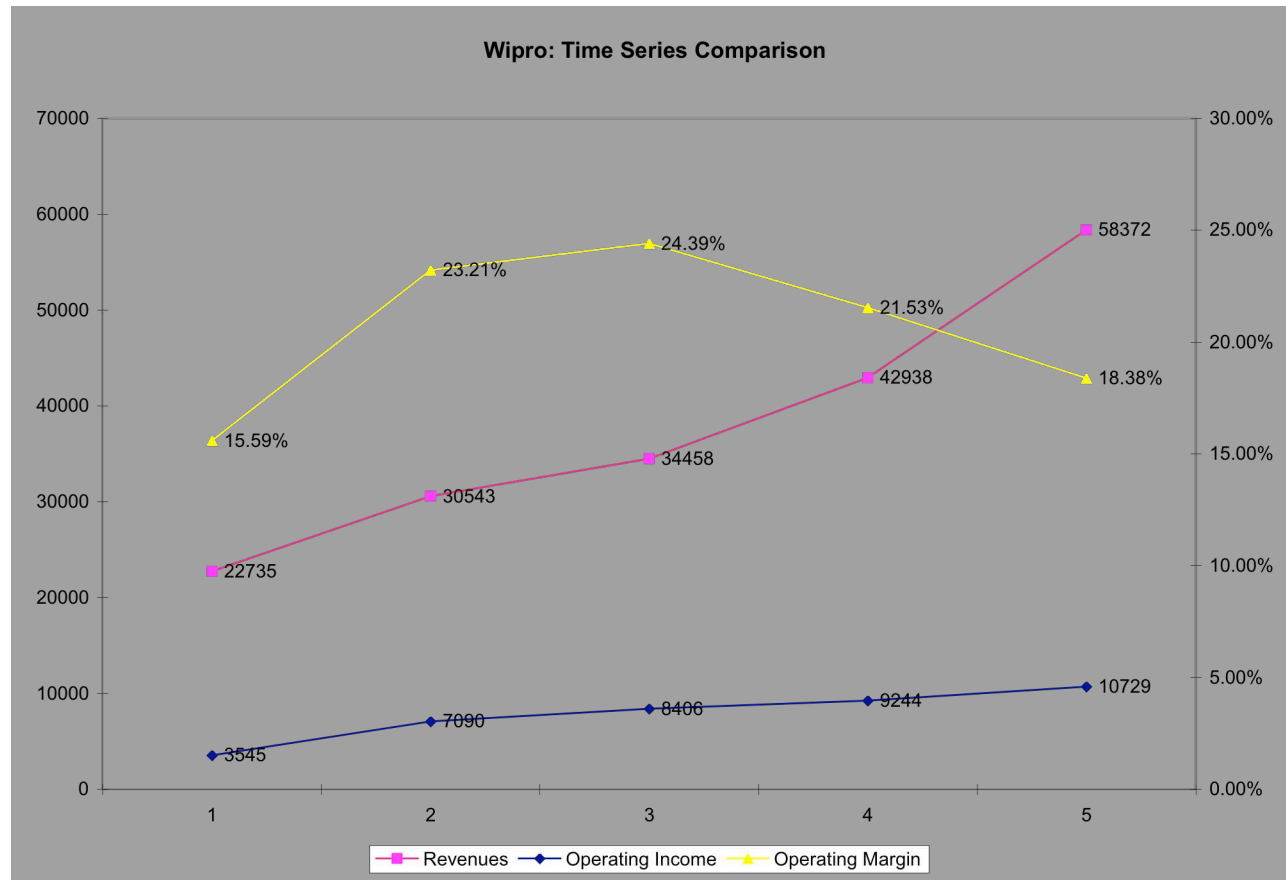


## The Importance of Updating

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- The operating income and revenue that we use in valuation should be updated numbers. One of the problems with using annual reports is that they can become dated the further away one gets from the end of the fiscal year.
- As a general rule, it is better to use 12-month trailing estimates for earnings and revenues than numbers for the most recent financial year. This rule becomes even more critical when valuing companies that are evolving and growing rapidly.
- For Wipro, the annual report for 2003-04 is available and was used for the information. It is the most updated information on the company. Tata Chemicals provides partial information for 2003-04 but not a full annual report. We took the information we could find (revenues, operating income, depreciation) and estimated those that we could not.

# Wipro's History





## Operating Leases and other Commitments

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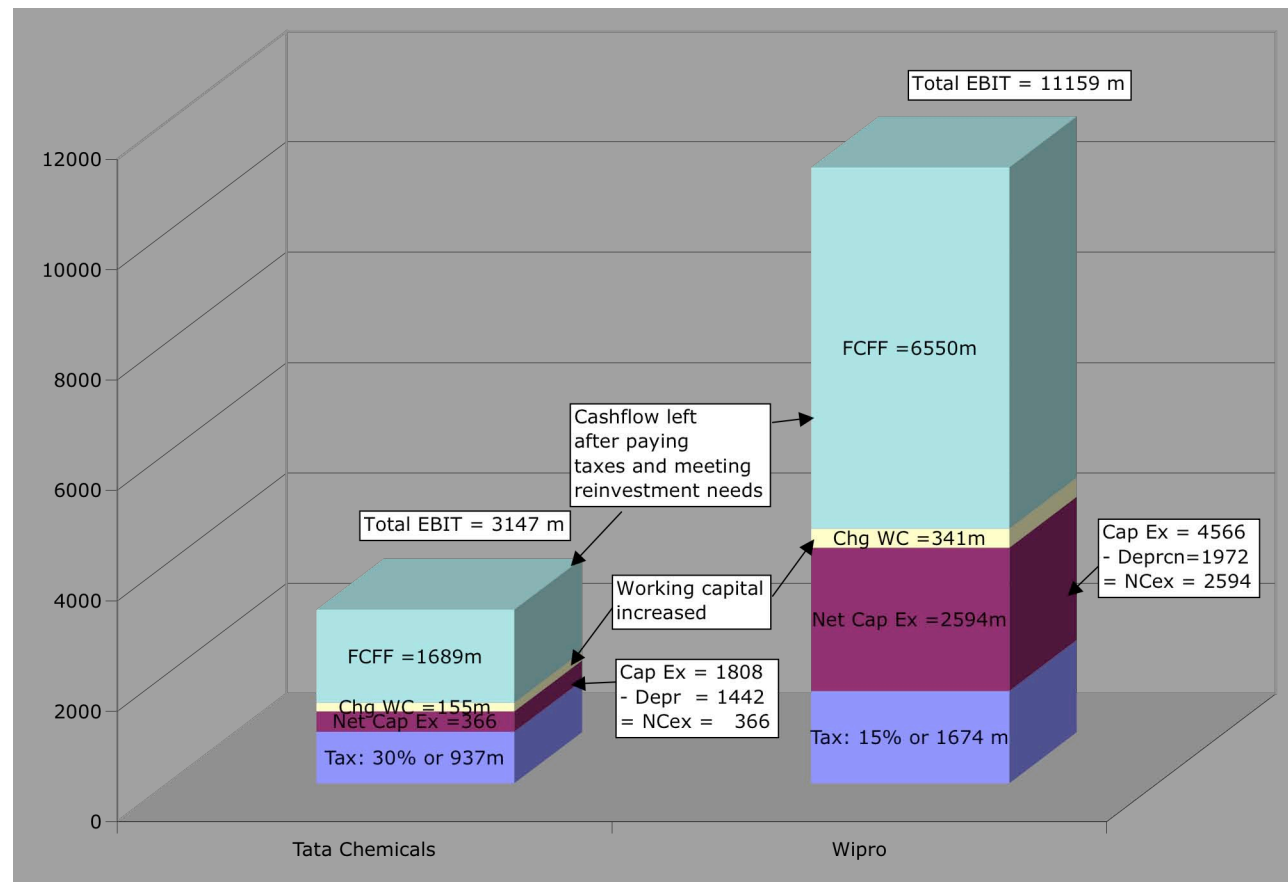
- Accounting rules treat leases differently from conventional debt. A firm that leases assets is often allowed to treat the lease expense as an operating expense and show no debt on its books even when the lease is a long term commitment.
- We should be consistent in the way we deal with leases and debt. A commitment to make lease payments in the future is the equivalent of taking out a loan.
- The simplest way to convert lease commitments into debt is to take the present value of lease commitments at the pre-tax cost of debt and show this present value as debt wherever we use debt in valuation.

## Capitalizing R&D Expenses

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- According to basic accounting principles, expenses designed to generate benefits over many years are capital expenditures. Hence, investment in land or buildings or equipment is capital expenditures. Using the same rationale, investments made by pharmaceutical or technology firms in R&D should also be capital expenditures.
- To capitalize R&D,
  - Specify an amortizable life for R&D (2 - 10 years)
  - Collect past R&D expenses for as long as the amortizable life
  - Sum up the unamortized R&D over the period. (Thus, if the amortizable life is 5 years, the research asset can be obtained by adding up 1/5th of the R&D expense from five years ago, 2/5th of the R&D expense from four years ago...:
- We considered capitalizing Wipro's R&D expenses but decided not to simply because the amortizable life of R&D in this sector is so short (1-2 years) that it does not make much of a difference.

# Estimating Actual FCFF: Tata Chemicals and Wipro in 2003



## IV. Expected Growth in EBIT and Fundamentals

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- The Determinants of Growth

- Reinvestment Rate =  $(\text{Net Capital Expenditures} + \text{Change in WC}) / \text{EBIT} (1-t)$
- Return on Capital =  $\text{EBIT} (1-t) / (\text{BV of Debt} + \text{BV of Equity})_{\text{End of previous year}}$

- Expected Growth Rate is a product of these two numbers

$$g_{\text{EBIT}} = \text{Reinvestment Rate} * \text{ROC}$$

- **The “No pain, no growth” Proposition:** No firm can expect its operating income to grow over the long term without reinvesting some of the operating income in net capital expenditures and/or working capital.
- **The “Quality of Growth” Proposition:** The net capital expenditure needs of a firm, for a given growth rate, should be inversely proportional to the quality of its investments.

## Measuring the Quality of Growth at Tata Chemicals and Wipro

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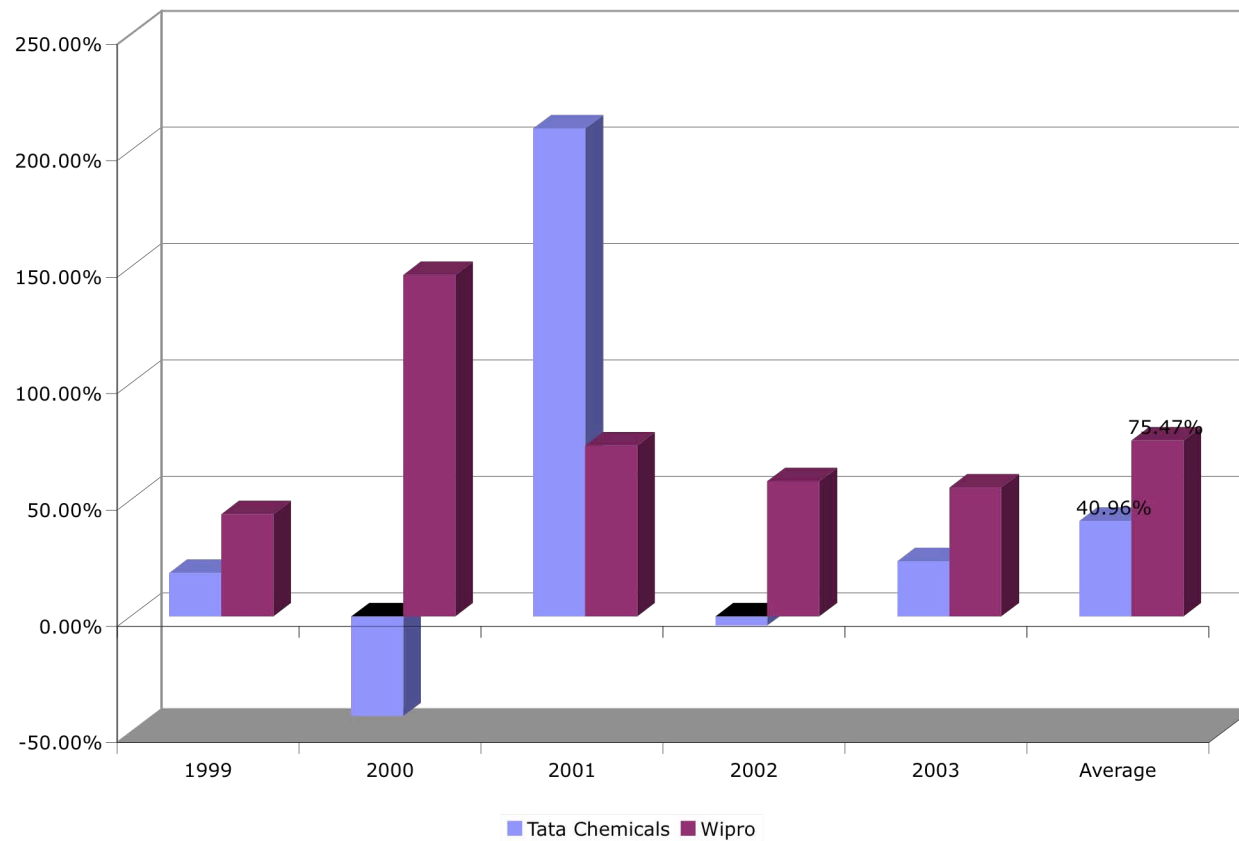
	<b>Tata Chemicals</b>	<b>Wipro</b>	
<i>EBIT (1-tax rate)</i>	2210	9485	<i>From 03-04 reports</i>
<i>Book Capital Calculation</i>			
Book Debt	8162	591	<i>From end of 02-03</i>
Book Equity	16359	34774	
<i>Book Capital</i>	<i>24521</i>	<i>35365</i>	
Return on capital	9.01%	26.82%	EBIT(1-t)/ Bk Cap
Cost of capital	10.39%	11.31%	
Excess Return	-1.38%	15.51%	

## Measuring Reinvestment

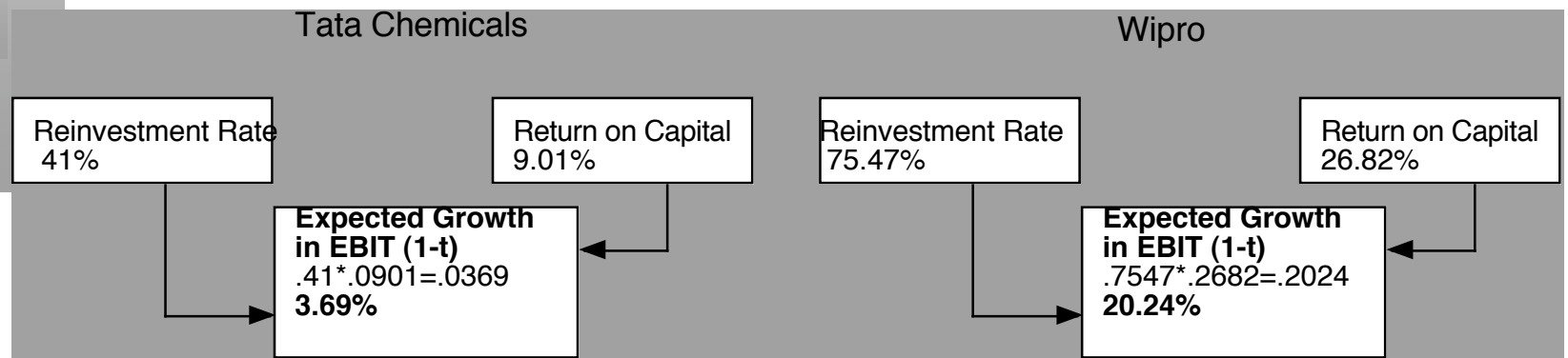
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	<i>Tata Chemicals</i>	<i>Wipro</i>
Net Capital Expenditures	366	2594
+ Change in WC	155	341
= Reinvestment	521	2935
/ EBIT (1-t)	2210	9485
= Reinvestment Rate in latest year	23.57%	30.94%

## Normalizing Reinvestment: Tata Chemicals and Wipro



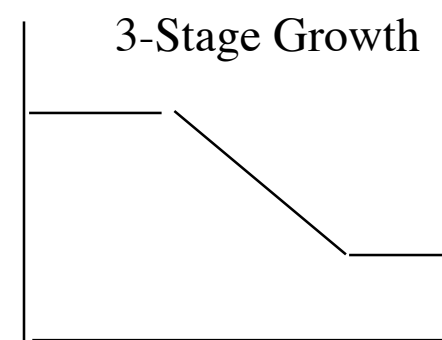
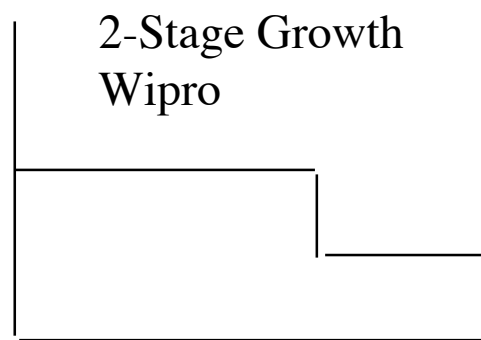
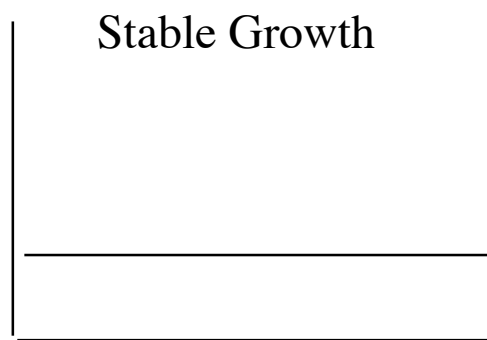
# Expected Growth Estimate





## V. Growth Patterns

- A key assumption in all discounted cash flow models is the period of high growth, and the pattern of growth during that period. In general, we can make one of three assumptions:
  - there is no high growth, in which case the firm is already in stable growth
  - there will be high growth for a period, at the end of which the growth rate will drop to the stable growth rate (2-stage)
  - there will be high growth for a period, at the end of which the growth rate will decline gradually to a stable growth rate(3-stage)

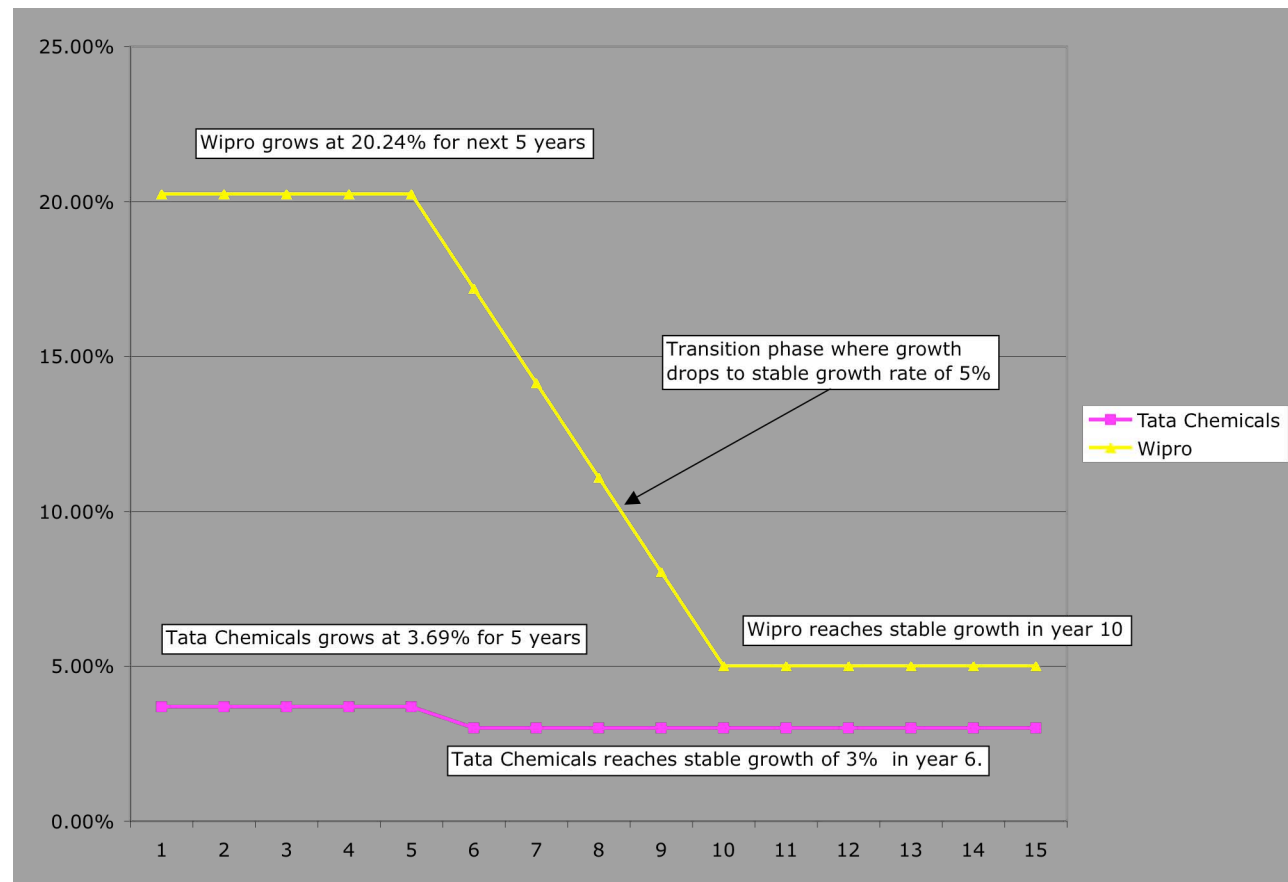


# Determinants of Growth Patterns

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- Size of the firm
  - Success usually makes a firm larger. As firms become larger, it becomes much more difficult for them to maintain high growth rates
- Current growth rate
  - While past growth is not always a reliable indicator of future growth, there is a correlation between current growth and future growth. Thus, a firm growing at 30% currently probably has higher growth and a longer expected growth period than one growing 10% a year now.
- Barriers to entry and differential advantages
  - Ultimately, high growth comes from high project returns, which, in turn, comes from barriers to entry and differential advantages.
  - The question of how long growth will last and how high it will be can therefore be framed as a question about what the barriers to entry are, how long they will stay up and how strong they will remain.

# Moving to Stable Growth: Tata Chemicals versus Wipro



## Stable Growth Characteristics

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- In stable growth, firms should have the characteristics of other stable growth firms. In particular,
  - The risk of the firm, as measured by beta and ratings, should reflect that of a stable growth firm.
    - Beta should move towards one
    - The cost of debt should reflect the safety of stable firms (BBB or higher)
  - The debt ratio of the firm might increase to reflect the larger and more stable earnings of these firms.
    - The debt ratio of the firm might moved to the optimal or an industry average
    - If the managers of the firm are deeply averse to debt, this may never happen
  - The reinvestment rate of the firm should reflect the expected growth rate and the firm's return on capital
    - $\text{Reinvestment Rate} = \text{Expected Growth Rate} / \text{Return on Capital}$

## Transitioning to Stable Growth: Beyond the growth rate

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	<i>High Growth</i>	<i>Stable Growth</i>
■ Tata Chemicals		
• Beta	0.90	0.90
• Debt Ratio	23.74%	23.74%
• Lambda`	1.211	1.21
• Return on Capital	9.01%	9.19%
• Cost of Capital	7.10%	9.19%
• Expected Growth Rate	3.69%	3.00%
• Reinvestment Rate	41.00%	$3/9.19 = 32.63\%$
■ Wipro		
• Beta	1.25	1.00
• Debt Ratio	0.30%	20%
• Lambda	0.32	0.32
• Return on Capital	26.82%	8.83%
• Cost of Capital	11.31%	8.83%
• Expected Growth Rate	20.24%	5%
• Reinvestment Rate	75.47%	$5/8.83 = 56.60\%$

## Dealing with Cash and Marketable Securities

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- The simplest and most direct way of dealing with cash and marketable securities is to keep them out of the valuation - the cash flows should be before interest income from cash and securities, and the discount rate should not be contaminated by the inclusion of cash. (Use betas of the operating assets alone to estimate the cost of equity).
- Once the firm has been valued, add back the value of cash and marketable securities.
  - If you have a particularly incompetent management, with a history of overpaying on acquisitions, markets may discount the value of this cash.

## Dealing with Cross Holdings

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- When the holding is a majority, active stake, the value that we obtain from the cash flows includes the share held by outsiders. While their holding is measured in the balance sheet as a minority interest, it is at book value. To get the correct value, we need to subtract out the estimated market value of the minority interests from the firm value.
- When the holding is a minority, passive interest, the problem is a different one. The firm shows on its income statement only the share of dividends it receives on the holding. Using only this income will understate the value of the holdings. In fact, we have to value the subsidiary as a separate entity to get a measure of the market value of this holding.
- **Proposition 1:** It is almost impossible to correctly value firms with minority, passive interests in a large number of private subsidiaries.

## Valuing Minority Interests, Cross Holdings and Cash

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### ■ Tata Chemicals

- Has no significant cross holdings. Nor does it show minority interests on its balance sheet.
- It does have a cash balance of Rs 2,904 lakhs.

### ■ Wipro

- Wipro shows minority interests in other firms that are consolidated (100%) into their firms. The book value of these minority interests is Rs 163.80 lakhs and the average price to book ratio in this sector is 3.20. The estimated market value of the minority interests is as follows:
  - Estimated market value of minority interests =  $163.80 * 3.20 = \text{Rs } 524.16$  lakhs
- Wipro also shows investments in other companies but does not provide enough information to value these holdings. The book value of these holdings which is Rs 7,032 lakhs is assumed to be the market value of these holdings. Adding this to the cash and marketable securities which amounted to Rs 21,760 lakhs in March 2004 yields a value for cash and non-operating assets of Rs 28,792 lakhs (21,760 + 7032)



## Wipro: Estimating the Value of Equity Options

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- Details of options outstanding
  - Average strike price of options outstanding = Rs 1540
  - Current Stock Price = Rs 1523
  - Average maturity of options outstanding = 2.87 years
  - Standard deviation in  $\ln(\text{stock price})$  = 40.20%
  - Annualized dividend yield on stock = 0.26%
  - Riskfree rate = 5.50%
  - Number of options outstanding = 4.8 lakhs
  - Number of shares outstanding = 231.29 lakhs
- Value of options outstanding (using dilution-adjusted Black-Scholes model)
  - Value of equity options = Rs 1,971 Lakhs

# Tata Chemicals: Status Quo

Average Reinvestment Rate (1999-2003) = 41%

Return on Capital 9.01%

## Current Cashflow to Firm

EBIT(1-t) : 2210  
 - Nt CpX 366  
 - Chg WC 155  
 = FCFF 1689  
 Reinvestment Rate = 521/1689 = 23.58%

Reinvestment Rate 41%

## Expected Growth in EBIT (1-t)

$.41 * .0901 = .0369$   
**3.69%**

## Stable Growth

$g = 3\%$ ; Beta = 0.9;  
 Country Premium = 1.3%  
 Debt Ratio = 23.7%  
 Cost of capital = 9.19%  
 ROC = 9.19%; Tax rate = 30%  
 Reinvestment Rate =  $g/ROC = 3/9.19 = 32.63\%$

Terminal Value<sub>5</sub> =  $1826 / (.0919 - .03) = 29,676$

Op. Assets 23,524  
 + Cash: 2,904  
 - Debt 7,660  
 = Equity 18,768  
 - Options 0  
 Equity 18,768  
 Value/Sh Rs 104/sh

Year	1	2	3	4	5
EBIT (1-t)	2291	2376	2464	2555	2649
- Reinvestment	939	974	1010	1047	1086
FCFF	1352	1402	1454	1507	1563

Term Yr  
 2,728  
 - 890  
 = 1838

Discount at Cost of Capital (WACC) =  $12.25\% (.763) + 4.45\% (0.237) = 10.39\%$

**Cost of Equity 12.25%**

**Cost of Debt**  
 $(5.50\% + 0.85\%)(1 - .30) = 4.45\%$

**Weights**  
 E = 76.3% D = 23.7%

On June 15, 2004  
 Tata Chem = Rs 136.2

**Riskfree Rate:**  
 Rs Riskfree Rate = 5.50%

+

**Beta**  
 0.90

X

**Mature market premium**  
 4%

+

**Lambda**  
 1.21

X

**Country Equity Risk Premium**  
 2.60%

Unlevered Beta for Sectors: 0.74

Firm's D/E Ratio: 31.13%

Country Default Spread 1.30%

X

Rel Equity Mkt Vol 2.00

Average Reinvestment Rate (1999-2003) = 75.47%

**Current Cashflow to Firm**  
 EBIT(1-t) : 9485  
 - Nt CpX 2594  
 - Chg WC 341  
 = FCFF 6550  
 Reinvestment Rate = 2935/9485 = 30.95%

Reinvestment Rate 75.47%

**Expected Growth in EBIT (1-t)**  
 $.7547 * .2682 = .2024$   
**20.24%**

Return on Capital 26.82%

**Wipro: Status Quo**

Stable Growth  
 $g = 5\%$ ; Beta = 1.0;  
 Country Premium = 1.3%  
 Debt Ratio = 20%  
 Cost of capital = 8.83%  
 ROC = 8.83%; Tax rate = 25%  
 Reinvestment Rate =  $g/ROC = 5/8.83 = 56.60\%$

First 5 years

Terminal Value<sub>5</sub> =  $16163 / (.0883 - .05) = 421,583$

Op. Assets 196,704  
 + Cash: 28792  
 - Debt 1054  
 - Minority Int. 524  
 = Equity 223,917  
 - Options 1,971  
 Equity 221,946  
 Value/Sh Rs 960/sh

Year	1	2	3	4	5	6	7	8	9	10
EBIT	13418	16134	19400	23327	28048	32871	37521	41684	45039	47291
EBIT (1-t)	11405	13714	16490	19828	23841	27940	31893	35432	38283	40198
- Reinvestment	8608	10350	12445	14964	17993	20033	21663	22729	23114	22752
FCFF	2797	3364	4045	4863	5848	7908	10230	12703	15170	17446

Adjust beta to 1, debt ratio to 20% in years 6-10

Term Yr  
 49656  
 37242  
 21079  
 =16163

Discount at Cost of Capital (WACC) = 11.33% (.997) + 5.10% (0.003) = 11.31%

**Cost of Equity 11.33%**

**Cost of Debt**  
 $(5.50\% + 0.50\%)(1 - .15) = 5.10\%$

**Weights**  
 E = 99.7% D = 0.3%

On June 15, 2004  
 Wipro price = Rs 1523

**Riskfree Rate:**  
 Rs Riskfree Rate = 5.50%

+ **Beta 1.2480**

X

**Mature market premium 4%**

+

**Lambda 0.32**

X

**Country Equity Risk Premium 2.60%**

Unlevered Beta for Sectors: 1.2446

Firm's D/E Ratio: 0.30%

Country Spread 1.30%

Default

X

Rel Equity Mkt Vol 2.00

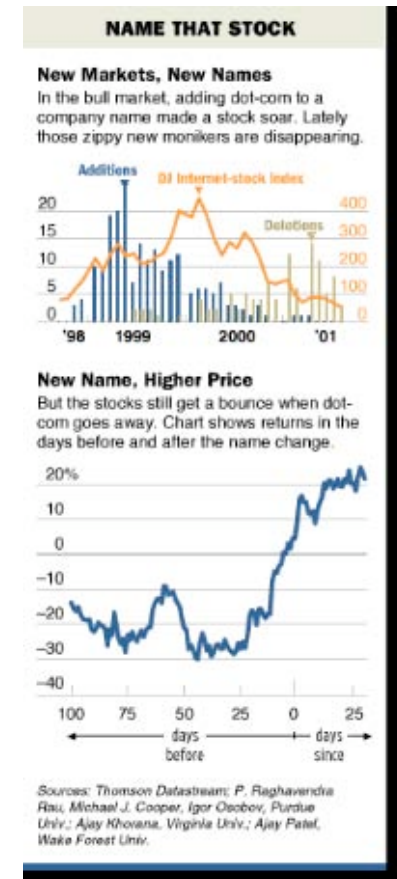
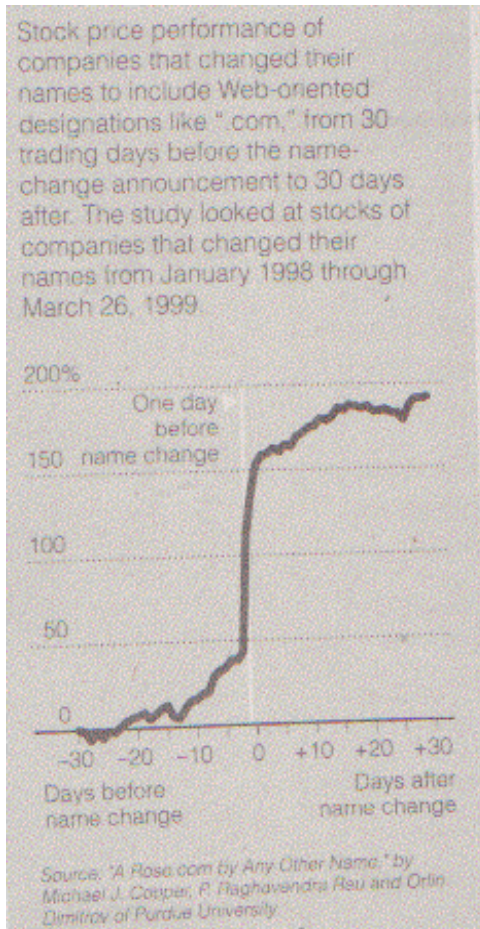


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# Value Enhancement: Back to Basics

Aswath Damodaran  
<http://www.damodaran.com>

# Price Enhancement versus Value Enhancement

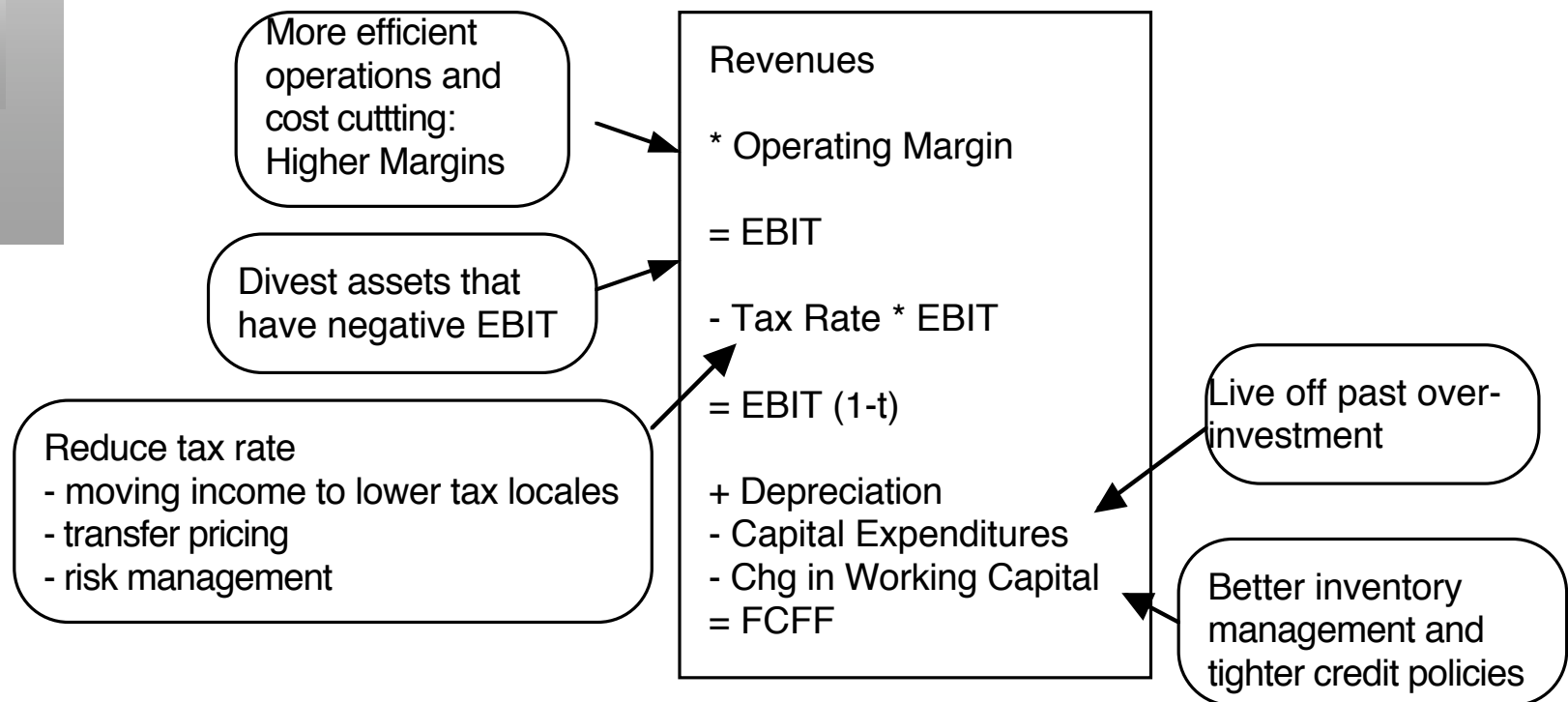


# The Paths to Value Creation

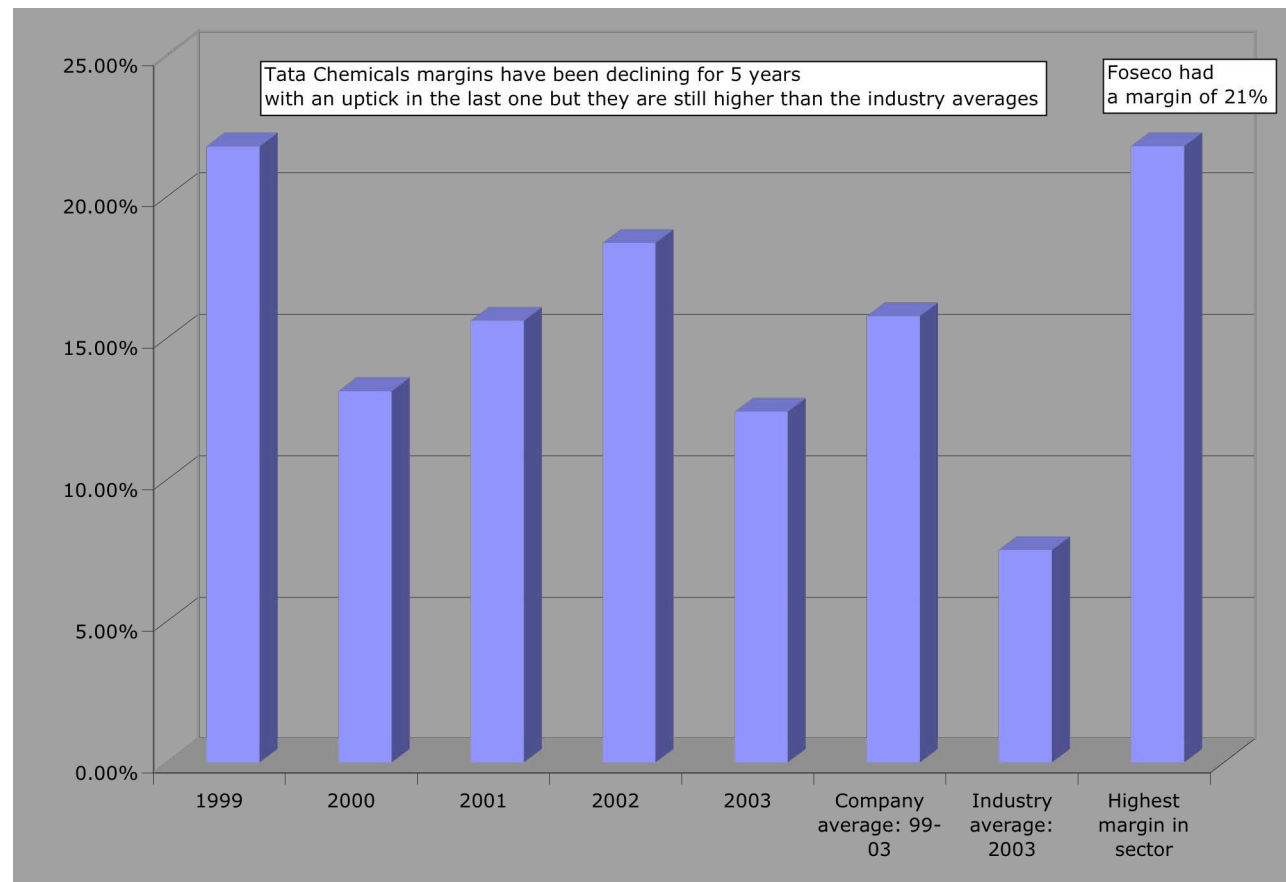
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- Using the DCF framework, there are four basic ways in which the value of a firm can be enhanced:
  - The cash flows from existing assets to the firm can be increased, by either
    - increasing after-tax earnings from assets in place or
    - reducing reinvestment needs (net capital expenditures or working capital)
  - The expected growth rate in these cash flows can be increased by either
    - Increasing the rate of reinvestment in the firm
    - Improving the return on capital on those reinvestments
  - The length of the high growth period can be extended to allow for more years of high growth.
  - The cost of capital can be reduced by
    - Reducing the operating risk in investments/assets
    - Changing the financial mix
    - Changing the financing composition

# I. Ways of Increasing Cash Flows from Assets in Place

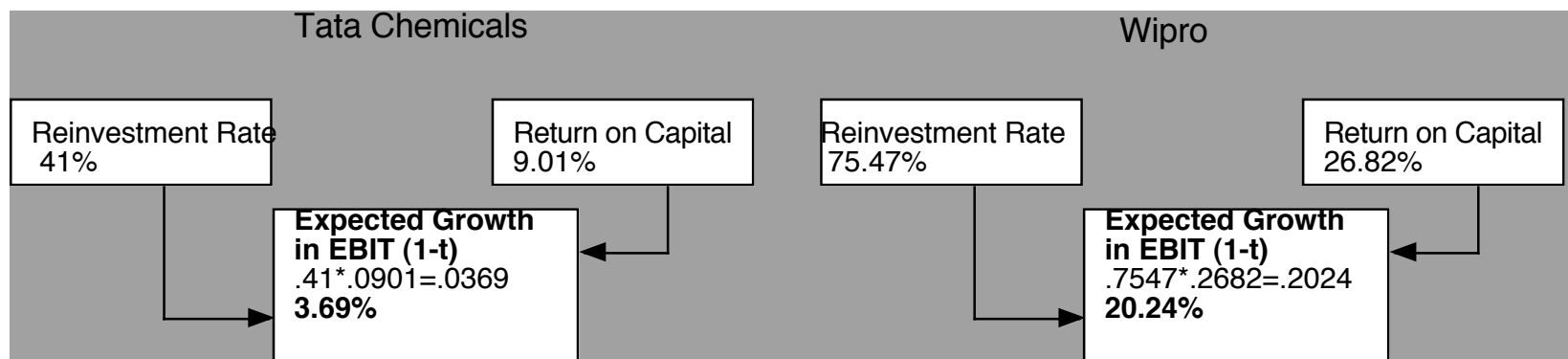
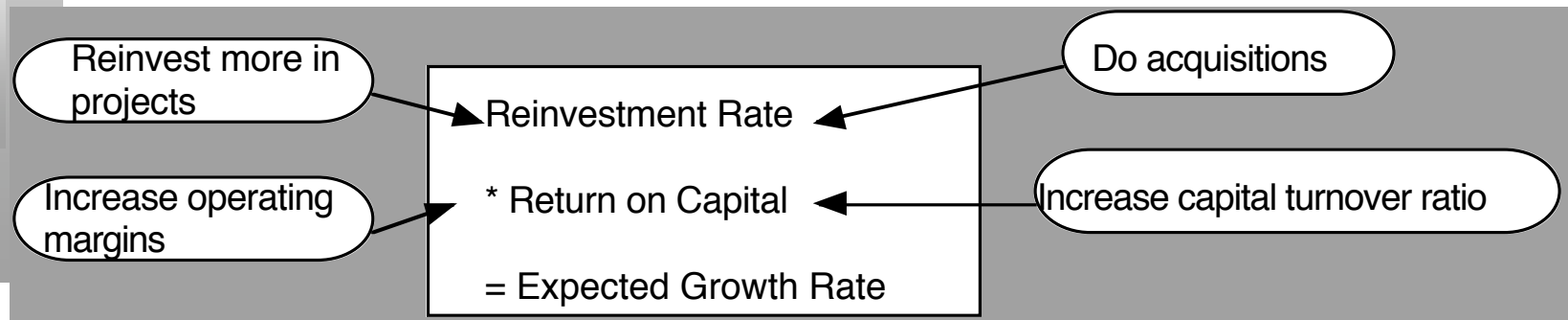


## Room for improvement?

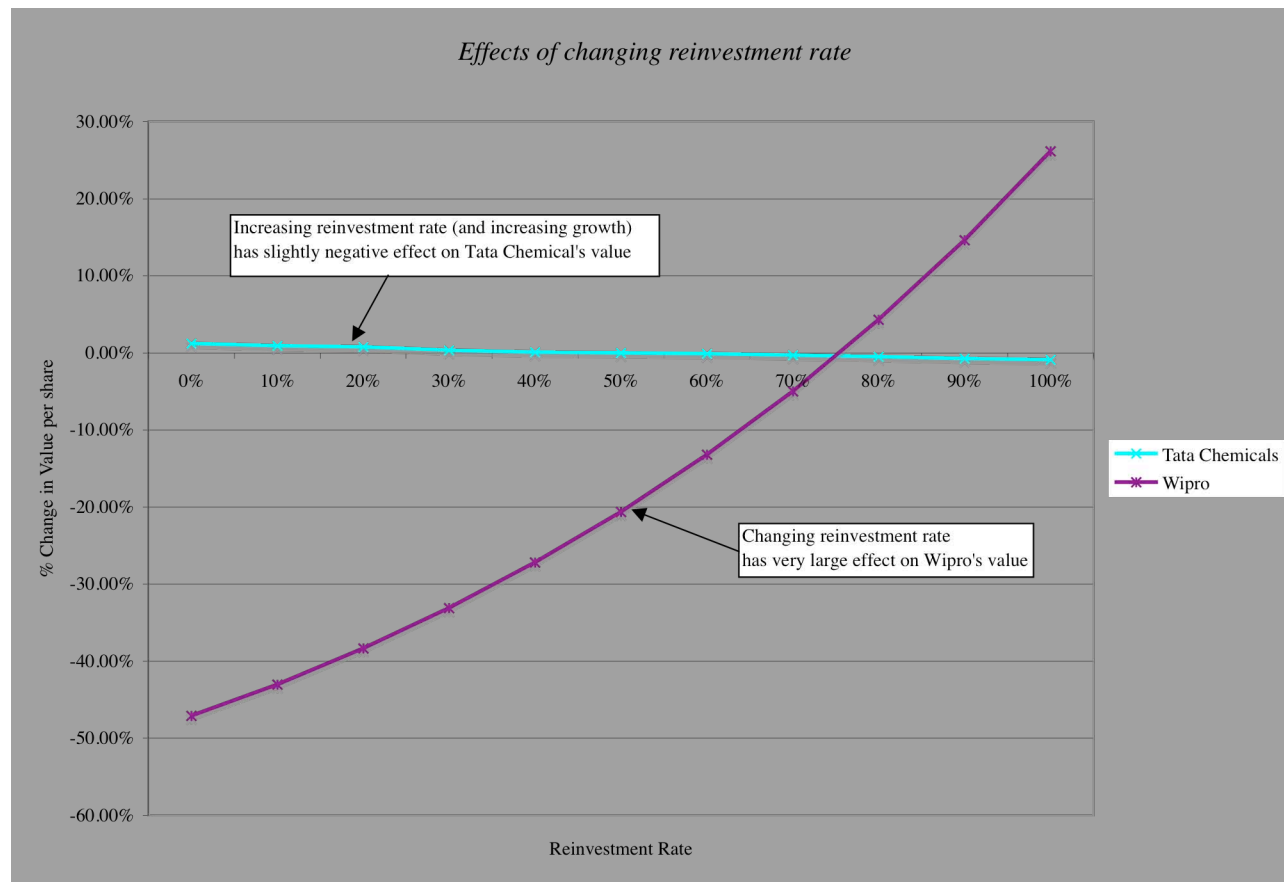




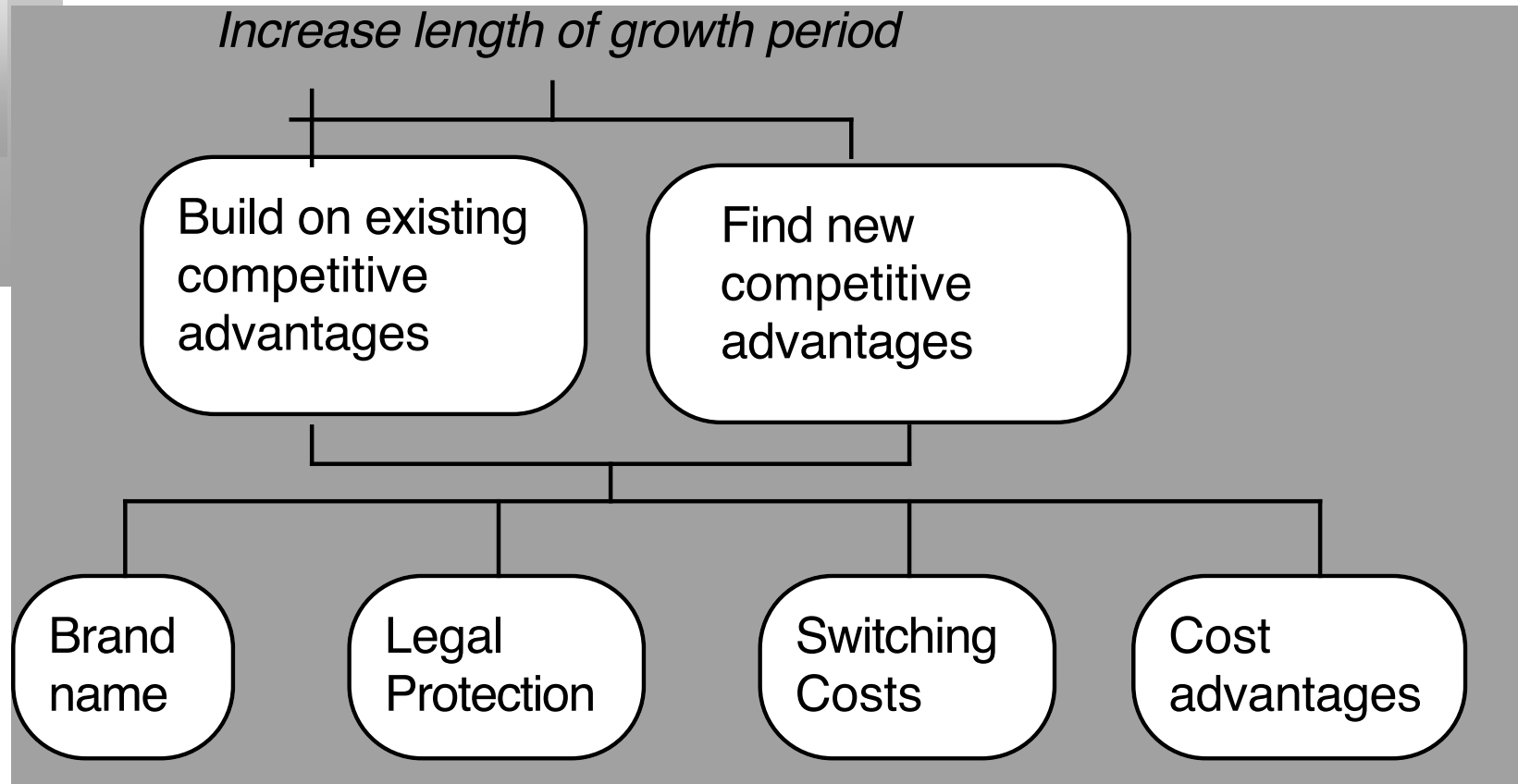
## II. Value Enhancement through Growth



# Growth Potential?



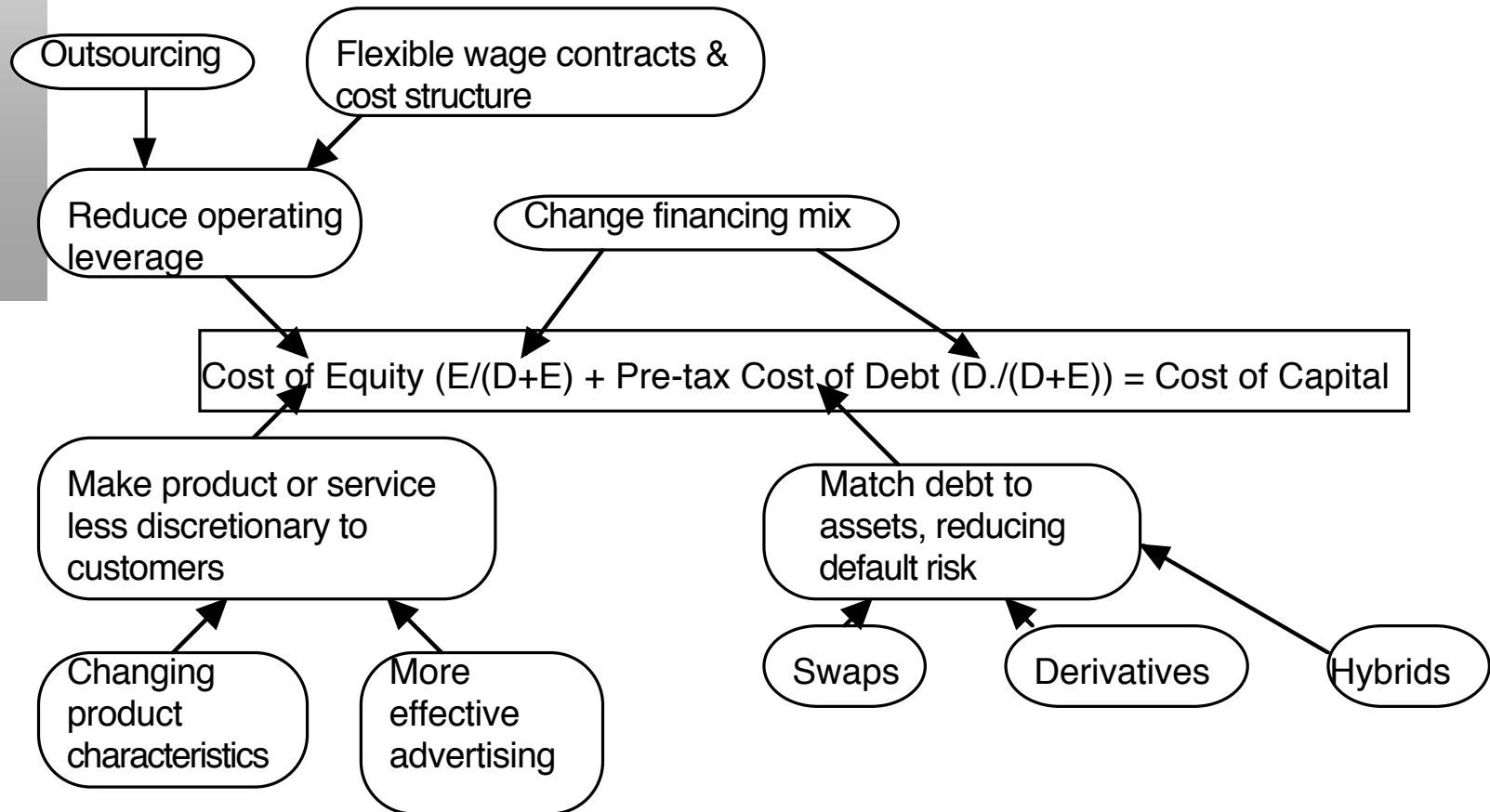
### III. Building Competitive Advantages: Increase length of the growth period



## Illustration: Valuing a brand name: Coca Cola

	Coca Cola	Generic Cola Company
<b>AT Operating Margin</b>	<b>18.56%</b>	<b>7.50%</b>
Sales/BV of Capital	1.67	1.67
ROC	31.02%	12.53%
Reinvestment Rate	65.00% (19.35%)	65.00% (47.90%)
Expected Growth	20.16%	8.15%
Length	10 years	10 yea
Cost of Equity	12.33%	12.33%
E/(D+E)	97.65%	97.65%
AT Cost of Debt	4.16%	4.16%
D/(D+E)	2.35%	2.35%
Cost of Capital	12.13%	12.13%
<b>Value</b>	<b>\$115</b>	<b>\$13</b>

## IV. Reducing Cost of Capital



## Tata Chemicals: Optimal Debt Ratio

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Firm Value (G)
0%	0.74	11.60%	AAA	6.00%	30.00%	4.20%	11.60%	\$26,591
10%	0.80	11.83%	AA	6.00%	30.00%	4.20%	11.07%	\$28,841
20%	0.87	12.12%	A+	6.20%	30.00%	4.34%	10.56%	\$31,333
30%	0.96	12.49%	A-	6.50%	30.00%	4.55%	10.11%	\$33,964
40%	1.08	12.98%	BB	8.00%	30.00%	5.60%	10.03%	\$34,459
50%	1.26	13.67%	B-	11.50%	30.00%	8.05%	10.86%	\$29,819
60%	1.51	14.71%	CC	15.50%	30.00%	10.85%	12.39%	\$23,810
70%	2.00	16.63%	CC	15.50%	27.05%	11.31%	12.90%	\$22,284
80%	3.08	20.95%	C	17.50%	20.96%	13.83%	15.25%	\$17,139
90%	6.54	34.80%	D	25.50%	12.79%	22.24%	23.50%	\$9,115

Tata Chemical's Existing Debt Ratio

Equity = 76.3% Debt = 23.7%

Cost of Capital = 10.39%

## Wipro : Optimal Capital Structure

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Firm Value (G)
0%	1.24	11.31%	AAA	6.00%	15.00%	5.10%	11.31%	\$352,963
10%	1.36	11.78%	A-	6.50%	15.00%	5.53%	11.16%	\$363,207
20%	1.51	12.37%	CC	15.50%	15.00%	13.18%	12.53%	\$288,429
30%	1.73	13.26%	C	17.50%	9.02%	15.92%	14.06%	\$233,642
40%	2.04	14.48%	D	25.50%	4.64%	24.32%	18.41%	\$148,221
50%	2.44	16.11%	D	25.50%	3.72%	24.55%	20.33%	\$126,554
60%	3.05	18.55%	D	25.50%	3.10%	24.71%	22.25%	\$109,847
70%	4.07	22.62%	D	25.50%	2.65%	24.82%	24.16%	\$96,571
80%	6.11	30.77%	D	25.50%	2.32%	24.91%	26.08%	\$85,768
90%	12.22	55.20%	D	25.50%	2.06%	24.97%	28.00%	\$76,805

Wipro's Existing Debt Ratio  
 Equity = 99.7% Debt = 0.3%  
 Cost of capital = 11.31%

# Tata Chemicals: Restructured

**Current Cashflow to Firm**

EBIT(1-t) :	2210
- Nt CpX	366
- Chg WC	155
= FCFF	1689
Reinvestment Rate = 521/1689=	23.58%

Reinvestment Rate  
40%

**Expected Growth  
in EBIT (1-t)**  
.40\*.12=.048  
**4.80%**

Return on Capital  
12%

**Stable Growth**  
g = 3%; Beta = 1.0  
Country Premium= 1.3%  
Debt Ratio = 40%  
Cost of capital = 8.30%  
ROC= 8.30%; Tax rate=30%  
Reinvestment Rate=g/ROC  
=3/8.30 = 36.14%

Terminal Value<sub>5</sub>= 1837/ (.083-.03) = 34,663

Op. Assets	27,620
+ Cash:	2,904
- Debt	7,660
=Equity	22,864
-Options	0
Equity	22,864
Value/Sh Rs	127/sh

Year	1	2	3	4	5
EBIT (1-t)	2316	2427	2543	2665	2793
- Reinvestment	926	971	1017	1066	1117
FCFF	1389	1456	1526	1599	1676

Term Yr  
2,877  
1,040  
=1837

Discount at Cost of Capital (WACC) = 12.42% (.763) + 5.60% (0.237) = 10.03%

**Cost of Equity**  
12.42%

**Cost of Debt**  
(5.50%+2.50%)(1-.30)  
= 5.60%

**Weights**  
E = 60% D = 40%

On June 15, 2004  
Tata Chem= Rs 136.2

**Riskfree Rate:**  
Rs Riskfree Rate= 5.50%

+ **Beta**  
1.08

Unlevered Beta for Sectors: 0.74

X **Mature market premium**  
4 %

Firm's D/E Ratio: 31.13%

+ **Lambda**  
1.00

X **Country Equity Risk Premium**  
2.60%

Country Default Spread  
1.30%

X **Rel Equity Mkt Vol**  
2.00



## The Value of Control?

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- If the value of a firm run optimally is significantly higher than the value of the firm with the status quo (or incumbent management), you can write the value that you should be willing to pay as:
  - Value of control = Value of firm optimally run - Value of firm with status quo
  - Value of control at Tata Chemicals =  $127 - 104 = \text{Rs } 23$  per share or roughly 22%
- Implications:
  - The value of control is greatest at poorly run firms.
  - As the likelihood of changing management at badly run firms increases (hostile acquisitions, proxy fights etc.), the value per share will move towards the optimal value.
  - Voting shares in poorly run firms should trade at a premium on non-voting shares if the votes associated with the shares will give you a chance to have a say in a hostile acquisition.



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# Relative Valuation

Aswath Damodaran

## The Essence of relative valuation?

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- In relative valuation, the value of an asset is compared to the values assessed by the market for similar or comparable assets.
- To do relative valuation then,
  - we need to identify comparable assets and obtain market values for these assets
  - convert these market values into standardized values, since the absolute prices cannot be compared This process of standardizing creates price multiples.
  - compare the standardized value or multiple for the asset being analyzed to the standardized values for comparable asset, controlling for any differences between the firms that might affect the multiple, to judge whether the asset is under or over valued

## Assessing Tata Chemicals and Wipro on a Relative Valuation Basis: Pick a story....

	Tata Chemicals	Sector	Wipro	Sector
PE	10.92	13.99	34.95	29.21
P/BV	1.31	1.29	9.66	6.01
EV/Sales	1.16	1.06	6.17	5.06
EV/EBITDA	7.07	8.04	28.37	20.95

## The Reasons for the allure...

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“You can always look good if you compare yourself to the right person”

“ A little inaccuracy sometimes saves tons of explanation”

H.H. Munro

“ If you are going to screw up, make sure that you have lots of company”

Ex-portfolio manager

# The Four Steps to Deconstructing Multiples

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- Define the multiple
  - In use, the same multiple can be defined in different ways by different users. When comparing and using multiples, estimated by someone else, it is critical that we understand how the multiples have been estimated
- Describe the multiple
  - Too many people who use a multiple have no idea what its cross sectional distribution is. If you do not know what the cross sectional distribution of a multiple is, it is difficult to look at a number and pass judgment on whether it is too high or low.
- Analyze the multiple
  - It is critical that we understand the fundamentals that drive each multiple, and the nature of the relationship between the multiple and each variable.
- Apply the multiple
  - Defining the comparable universe and controlling for differences is far more difficult in practice than it is in theory.

# Definitional Tests

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- Is the multiple consistently defined?
  - **Proposition 1: Both the value (the numerator) and the standardizing variable (the denominator) should be to the same claimholders in the firm. In other words, the value of equity should be divided by equity earnings or equity book value, and firm value should be divided by firm earnings or book value.**
- Is the multiple uniformly estimated?
  - The variables used in defining the multiple should be estimated uniformly across assets in the “comparable firm” list.
  - If earnings-based multiples are used, the accounting rules to measure earnings should be applied consistently across assets. The same rule applies with book-value based multiples.

## An Example: Price Earnings Ratio: Definition

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$$\text{PE} = \text{Market Price per Share} / \text{Earnings per Share}$$

- There are a number of variants on the basic PE ratio in use. They are based upon how the price and the earnings are defined.
- Price: is usually the current price
  - is sometimes the average price for the year
- EPS:
  - earnings per share in most recent financial year
  - earnings per share in trailing 12 months (Trailing PE)
  - forecasted earnings per share next year (Forward PE)
  - forecasted earnings per share in future year

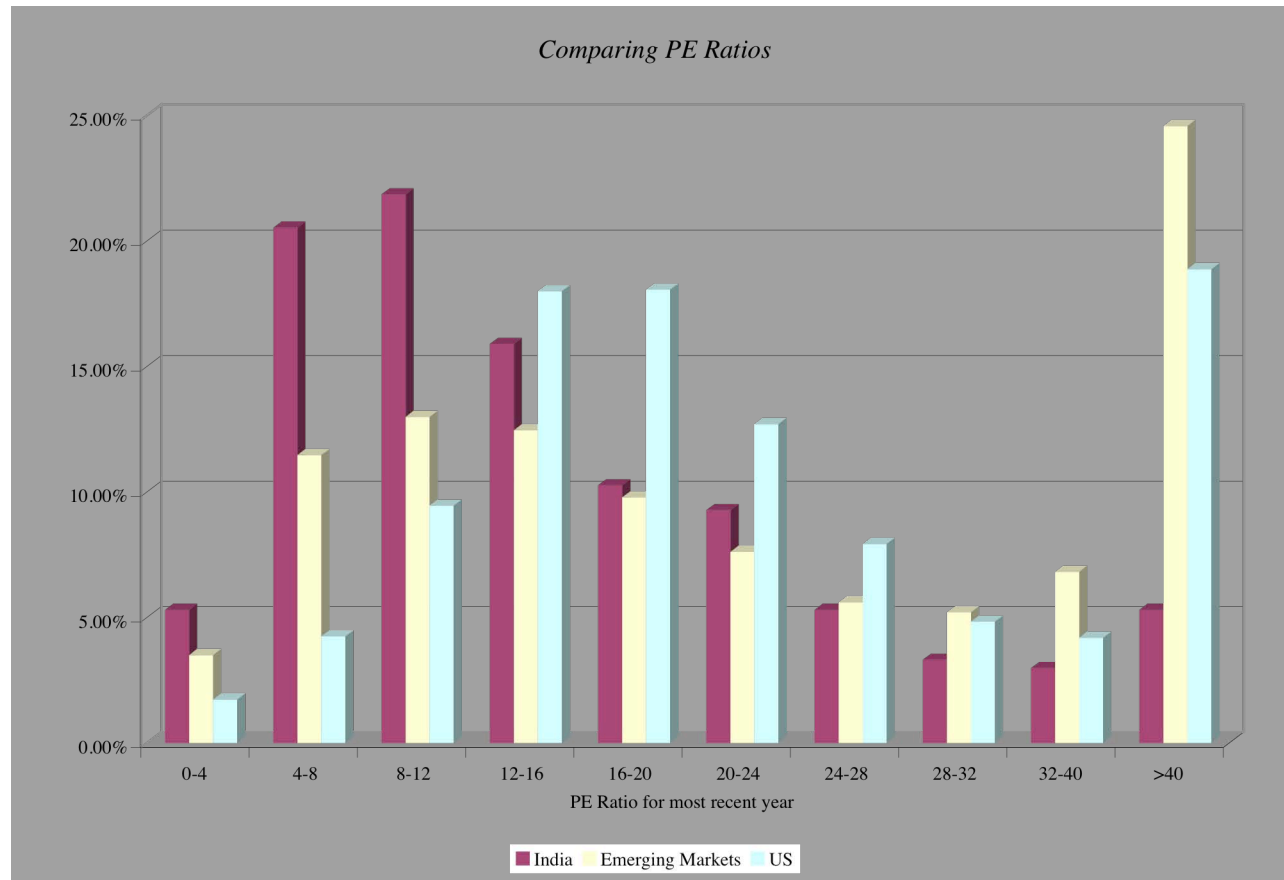


# Descriptive Tests

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- What is the average and standard deviation for this multiple, across the universe (market)?
- What is the median for this multiple?
  - The median for this multiple is often a more reliable comparison point.
- How large are the outliers to the distribution, and how do we deal with the outliers?
  - Throwing out the outliers may seem like an obvious solution, but if the outliers all lie on one side of the distribution (they usually are large positive numbers), this can lead to a biased estimate.
- Are there cases where the multiple cannot be estimated? Will ignoring these cases lead to a biased estimate of the multiple?
- How has this multiple changed over time?

# PE Ratio: Descriptive Statistics for India versus Other Emerging Markets



# Analytical Tests

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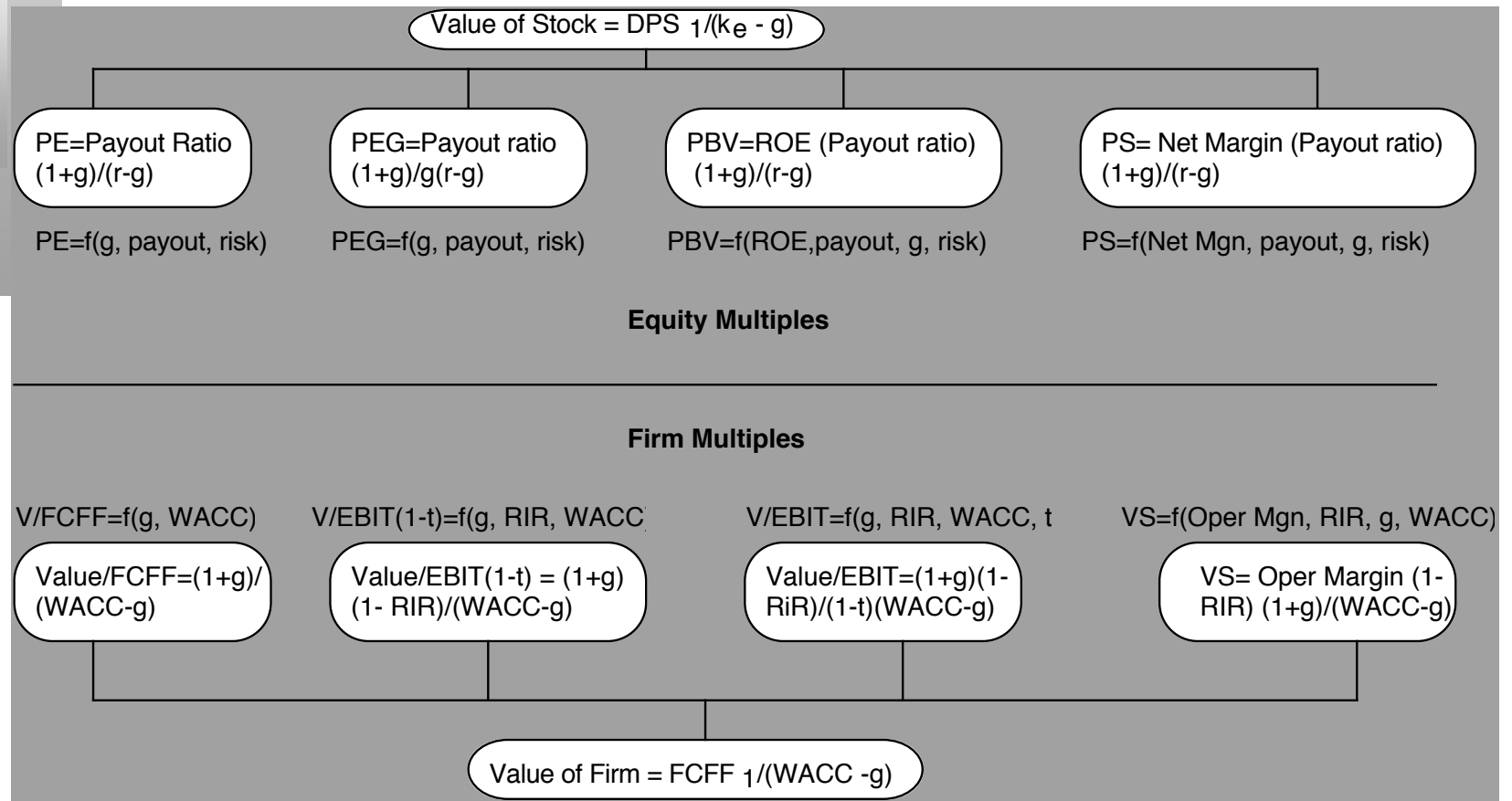
- What are the fundamentals that determine and drive these multiples?
  - Proposition 2: Embedded in every multiple are all of the variables that drive every discounted cash flow valuation - growth, risk and cash flow patterns.
  - In fact, using a simple discounted cash flow model and basic algebra should yield the fundamentals that drive a multiple
- How do changes in these fundamentals change the multiple?
  - The relationship between a fundamental (like growth) and a multiple (such as PE) is seldom linear. For example, if firm A has twice the growth rate of firm B, it will generally not trade at twice its PE ratio
  - **Proposition 3: It is impossible to properly compare firms on a multiple, if we do not know the nature of the relationship between fundamentals and the multiple.**

## Relative Value and Fundamentals: Equity Multiples

- Gordon Growth Model: 
$$P_0 = \frac{DPS_1}{r - g_n}$$
- Dividing both sides by the earnings, 
$$\frac{P_0}{EPS_0} = PE = \frac{\text{Payout Ratio} * (1 + g_n)}{r - g_n}$$
- Dividing both sides by the book value of equity, 
$$\frac{P_0}{BV_0} = PBV = \frac{ROE * \text{Payout Ratio} * (1 + g_n)}{r - g_n}$$
- If the return on equity is written in terms of the retention ratio and the expected growth rate 
$$\frac{P_0}{BV_0} = PBV = \frac{ROE - g_n}{r - g_n}$$
- Dividing by the Sales per share,

$$\frac{P_0}{Sales_0} = PS = \frac{\text{Profit Margin} * \text{Payout Ratio} * (1 + g_n)}{r - g_n}$$

# The Determinants of Multiples...



## Extending to a High Growth Scenario.... Determinants of PE Ratios

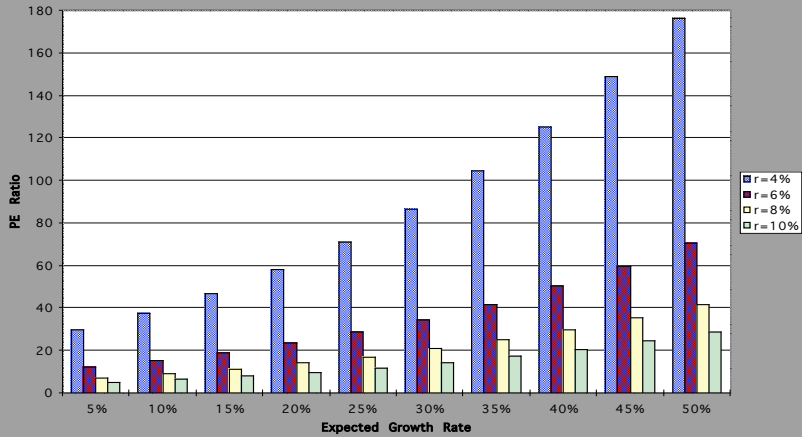
- The price-earnings ratio for a high growth firm can also be related to fundamentals. In the special case of the two-stage dividend discount model, this relationship can be made explicit fairly simply:

$$P_0 = \frac{\text{EPS}_0 * \text{Payout Ratio} * (1+g) * \left(1 - \frac{(1+g)^n}{(1+r)^n}\right)}{r-g} + \frac{\text{EPS}_0 * \text{Payout Ratio}_n * (1+g)^n * (1+g_n)}{(r-g_n)(1+r)^n}$$

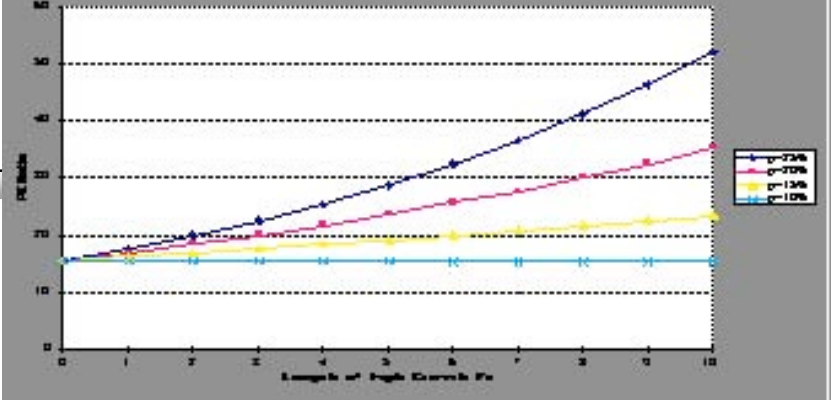
- For a firm that does not pay what it can afford to in dividends, substitute FCFE/Earnings for the payout ratio.
- Dividing both sides by the earnings per share:

$$\frac{P_0}{\text{EPS}_0} = \frac{\text{Payout Ratio} * (1+g) * \left(1 - \frac{(1+g)^n}{(1+r)^n}\right)}{r-g} + \frac{\text{Payout Ratio}_n * (1+g)^n * (1+g_n)}{(r-g_n)(1+r)^n}$$

PE Ratios and Expected Growth: Interest Rate Scenarios



PE Ratios and Length of High Growth Part



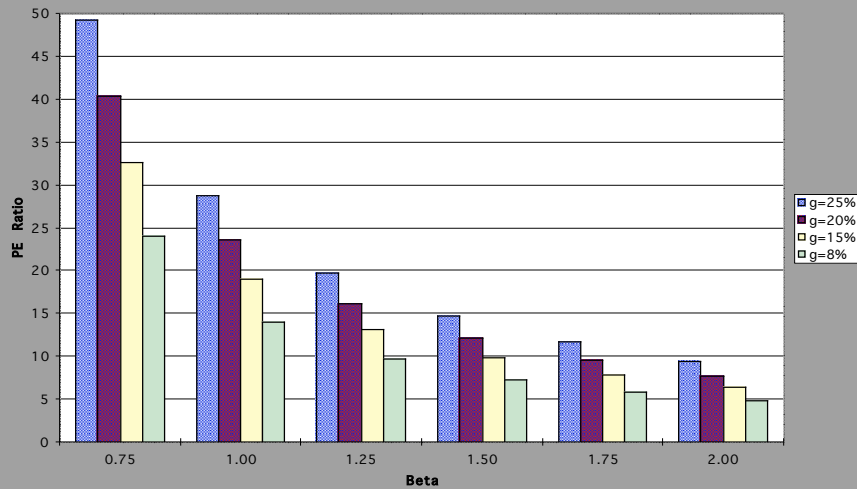
Beta is 1, riskfree rate is 6% and risk premium is 5.5%

Firm expected to grow 25% a year for 5 years and 5% thereafter

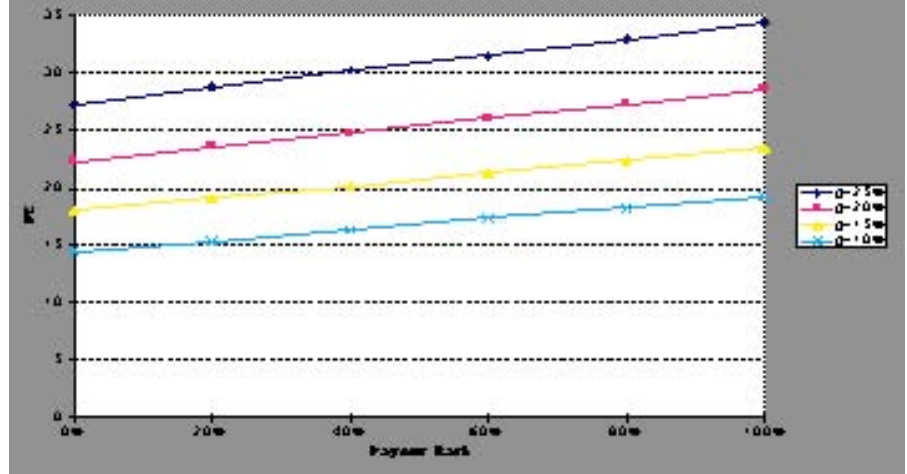
Payout ratio is 20% for next years and 50% thereafter

$$PE = \frac{0.2 * (1.25) * \left(1 - \frac{(1.25)^5}{(1.115)^5}\right)}{(.115 - .25)} + \frac{0.5 * (1.25)^5 * (1.08)}{(.115 - .08) (1.115)^5} = 28.75$$

PE Ratios and Beta: Growth Scenarios



PE Ratios and Payout Ratios: Growth Scenarios



# Application Tests

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- Given the firm that we are valuing, what is a “comparable” firm?
  - While traditional analysis is built on the premise that firms in the same sector are comparable firms, valuation theory would suggest that a comparable firm is one which is similar to the one being analyzed in terms of fundamentals.
  - **Proposition 4: There is no reason why a firm cannot be compared with another firm in a very different business, if the two firms have the same risk, growth and cash flow characteristics.**
- Given the comparable firms, how do we adjust for differences across firms on the fundamentals?
  - **Proposition 5: It is impossible to find an exactly identical firm to the one you are valuing.**



## Comparing PE Ratios : Wipro versus Infosys

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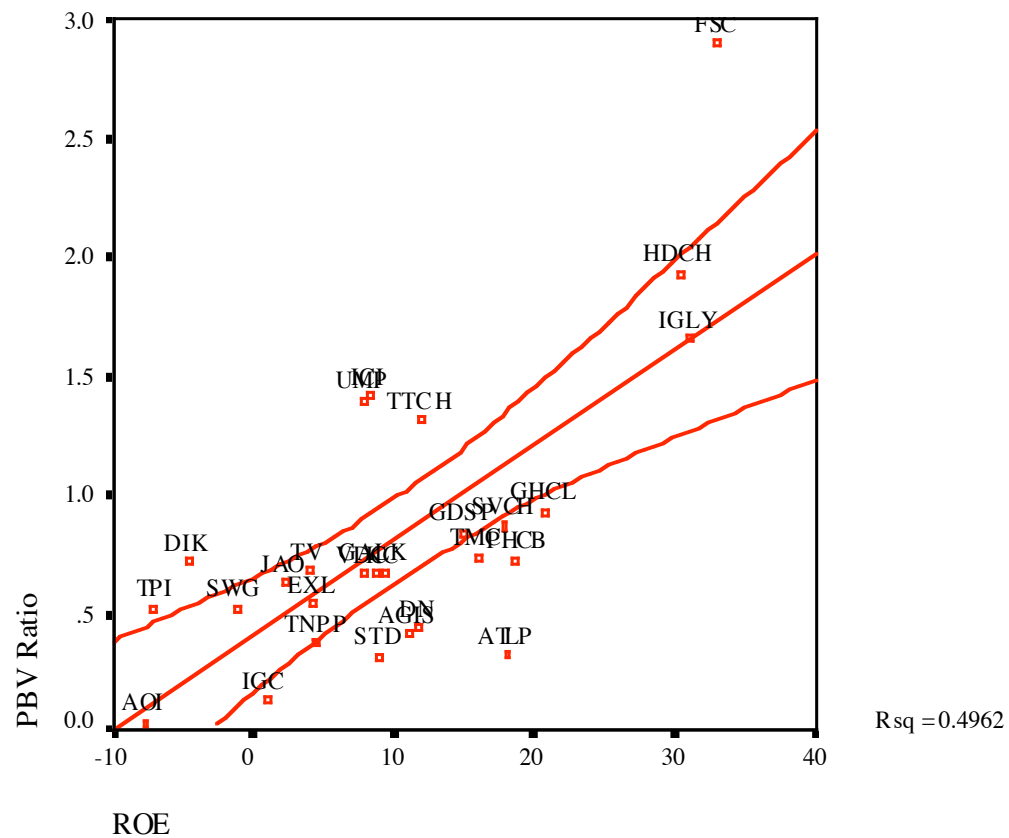
	<i>Market Cap</i>	<i>PE Ratio</i>	<i>Payout Ratio</i>	<i>Std Deviation</i>	<i>Expected Growth Rate in EPS - Next 5 years</i>
Infosys	358171.6	28.80	17.43%	41.64%	28.50%
Wipro	362554.9	34.95	2.53%	52.98%	25.00%

Based upon these numbers, which company would you pick? What might you be missing in this comparison?

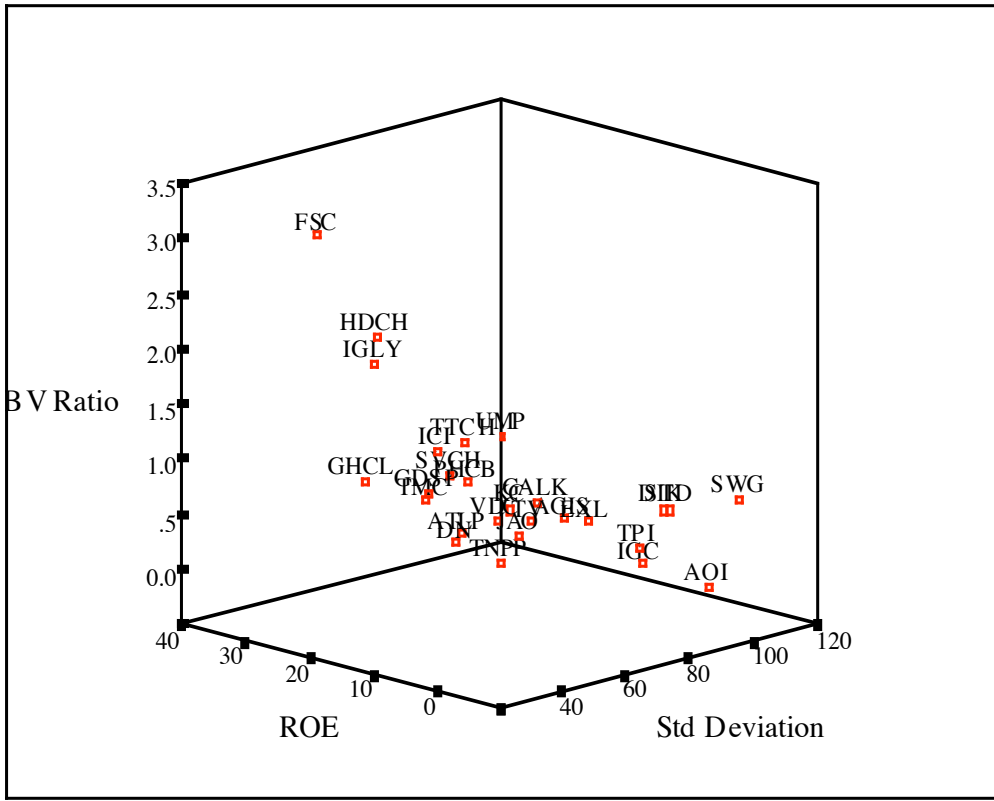
## Comparing PBV Ratios: Indian Chemical Companies

Short Name	Market Cap	PBV Ratio	ROE	Std Deviation
ASHOK ORGANIC	27	0.03	-7.67%	90.15%
INDIA GELATINE	105	0.12	0.99%	86.48%
STANDARD INDS	248	0.31	8.85%	110.76%
ATUL LTD	896	0.32	18.11%	63.06%
TAMILNADU PETRO	1682	0.37	4.45%	48.52%
AEGIS LOGISTICS	260	0.41	11.17%	82.65%
DEEPAK NITRITE	299	0.43	11.80%	49.24%
TRANSPEK INDUS	158	0.51	-7.00%	69.79%
NARMADA GELATINE	178	0.51	-1.16%	112.96%
EXCEL INDS LTD	523	0.54	4.26%	76.26%
JAYANT AGRO-ORG	233	0.63	2.30%	50.91%
VANAVIL DYES	190	0.66	7.96%	54.81%
KANORIA CHEMICAL	916	0.67	9.37%	62.29%
GUJARAT ALKALIES	2148	0.67	8.80%	69.12%
VASHISTI DETERGE	458	0.68	3.99%	57.86%
DAI-ICHI KARKARI	346	0.72	-4.47%	82.86%
PHILLIPS CARBON	717	0.73	18.80%	66.53%
THIRUMALAI CHEMS	607	0.74	15.97%	47.81%
GODREJ INDUSTRIE	2332	0.84	14.89%	46.50%
SAVITA CHEMICALS	962	0.86	17.77%	59.21%
GHCL LTD	2006	0.92	20.91%	38.67%
TATA CHEMICALS	21469	1.31	12.02%	52.25%
ULTRAMARINE & PG	518	1.39	7.96%	55.98%
ICI INDIA LTD	7038	1.41	8.21%	36.13%
INDIA GLYCOLS	2062	1.66	31.17%	62.45%
SCHENECTADY HERD	764	1.92	30.39%	61.64%
FOSECO INDIA LTD	1144	2.89	33.04%	47.73%
<b>Sector</b>	<b>60661</b>	<b>1.29</b>	<b>9.19%</b>	<b>64.54%</b>

## A Different Look: PBV versus ROE



# Considering Risk as well...



$$PBV = 0.82 + 3.57 \text{ ROE} - 0.55 \text{ Std Dev}$$

# Back to Lemmings...

