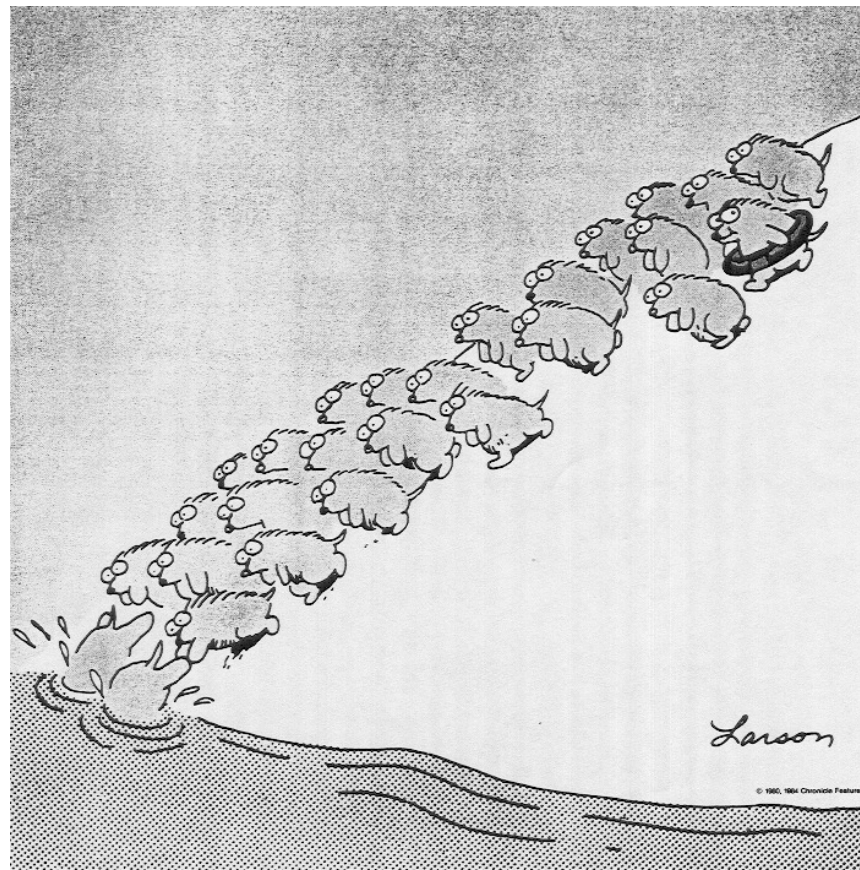# ~~Advanced~~ Valuation

Aswath Damodaran

www.damodaran.com

Some Initial Thoughts

" One hundred thousand lemmings cannot be wrong"

Graffiti

Misconceptions about Valuation

- ■ 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

- **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

- **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 <u>life of the asset</u>
  - to estimate the <u>cash flows</u> during the life of the asset
  - to estimate the <u>discount rate</u> to apply to these cash flows to get present value

- **Market Inefficiency**: Markets are assumed to make <u>mistakes</u> in pricing assets <u>across time</u>, and are assumed to correct themselves over time, as new information comes out about assets.
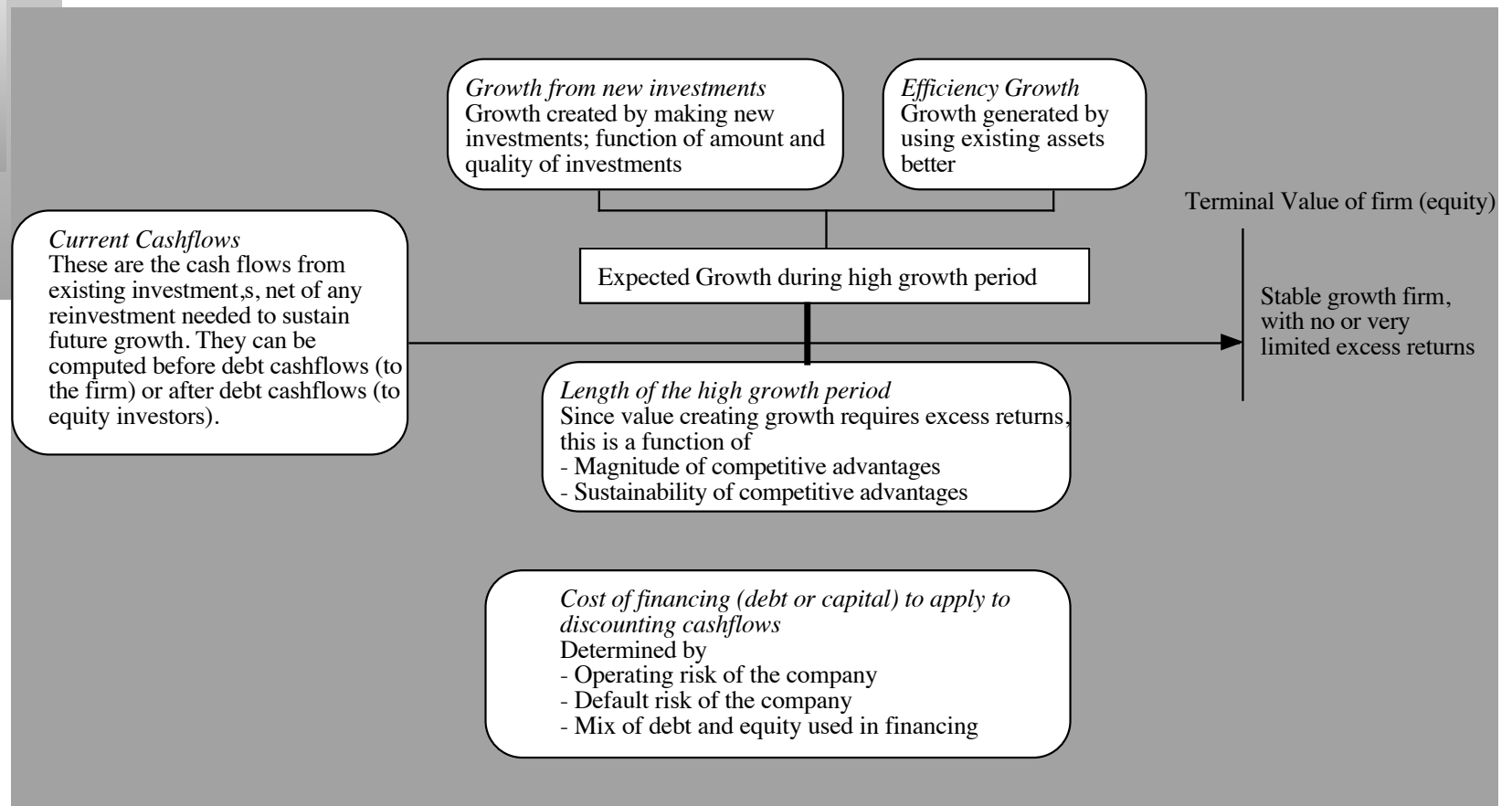
DCF Choices: Equity Valuation versus Firm Valuation

Firm Valuation: Value the entire business

Assets		Liabilities	
Existing Investments Generate cashflows today Includes long lived (fixed) and short-lived(working capital) assets	Assets in Place	Debt	Fixed Claim on cash flows Little or No role in management *Fixed Maturity* *Tax Deductible*
Expected Value that will be created by future investments	Growth Assets	Equity	Residual Claim on cash flows Significant Role in management *Perpetual Lives*

Equity valuation: Value just the equity claim in the business

The Drivers of Value…

Growth from new investments
Growth created by making new investments; function of amount and quality of investments

Efficiency Growth
Growth generated by using existing assets better

Terminal Value of firm (equity)

Current Cashflows
These are the cash flows from existing investment,s, net of any reinvestment needed to sustain future growth. They can be computed before debt cashflows (to the firm) or after debt cashflows (to equity investors).

Expected Growth during high growth period

Stable growth firm, with no or very limited excess returns

Length of the high growth period
Since value creating growth requires excess returns, this is a function of
- Magnitude of competitive advantages
- Sustainability of competitive advantages

Cost of financing (debt or capital) to apply to discounting cashflows
Determined by
- Operating risk of the company
- Default risk of the company
- Mix of debt and equity used in financing

DISCOUNTED CASHFLOW VALUATION

Cashflow to Firm
EBIT (1-t)
- (Cap Ex - Depr)
- Change in WC
= FCFF

Expected Growth
Reinvestment Rate
* Return on Capital

Firm is in stable growth:
Grows at constant rate
forever

Terminal Value= $FCFF_{n+1}/(r-g_n)$

Value of Operating Assets
+ Cash & Non-op Assets
= Value of Firm
- Value of Debt
= Value of Equity

$FCFF_1$ $FCFF_2$ $FCFF_3$ $FCFF_4$ $FCFF_5$ $FCFF_n$
....
Forever

Discount at WACC= Cost of Equity (Equity/(Debt + Equity)) + Cost of Debt (Debt/(Debt+ Equity))

Cost of Equity

Cost of Debt
(Riskfree Rate
+ Default Spread) (1-t)

Weights
Based on Market Value

Riskfree Rate :
- No default risk
- No reinvestment risk
- In same currency and
in same terms (real or
nominal as cash flows

+

Beta
- Measures market risk

X

Risk Premium
- Premium for average
risk investment

Type of Business	Operating Leverage	Financial Leverage	Base Equity Premium	Country Risk Premium

Amgen: Status Quo

Cap Ex = Acc net Cap Ex(255) + Acquisitions (3975) + R&D (2216)

Current Cashflow to Firm
EBIT(1-t)= :7336(1-.28)= 6058
- Nt CpX= 6443
- Chg WC 37
= FCFF - 423
Reinvestment Rate = 6480/6058
=106.98%
Return on capital = 16.71%

Reinvestment Rate
60%

Expected Growth in EBIT (1-t)
.60*.16=.096
9.6%

Return on Capital
16%

Stable Growth
g = 4%; Beta = 1.10;
Debt Ratio= 20%; Tax rate=35%
Cost of capital = 8.08%
ROC= 10.00%;
Reinvestment Rate=4/10=40%

Growth decreases gradually to 4%

Terminal Value$_{10}$= 7300/(.0808-.04) = 179,099

First 5 years

Year	1	2	3	4	5	6	7	8	9	10	Term Yr
EBIT	$9,221	$10,106	$11,076	$12,140	$13,305	$14,433	$15,496	$16,463	$17,306	$17,998	18718
EBIT (1-t)	$6,639	$7,276	$7,975	$8,741	$9,580	$10,392	$11,157	$11,853	$12,460	$12,958	12167
- Reinvestment	$3,983	$4,366	$4,785	$5,244	$5,748	$5,820	$5,802	$5,690	$5,482	$5,183	4867
= FCFF	$2,656	$2,911	$3,190	$3,496	$3,832	$4,573	$5,355	$6,164	$6,978	$7,775	7300

Op. Assets 94214
+ Cash: 1283
- Debt 8272
=Equity 87226
-Options 479
Value/Share $ 74.33

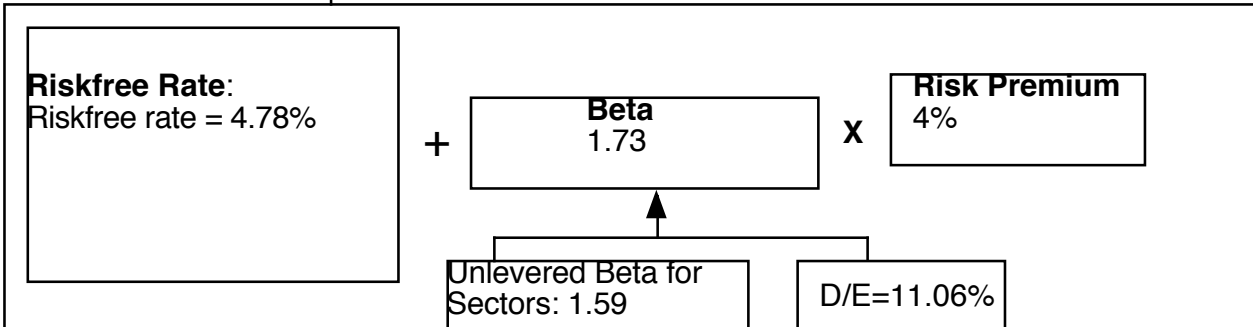Cost of Capital (WACC) = 11.7% (0.90) + 3.66% (0.10) = 10.90%

Debt ratio increases to 20%
Beta decreases to 1.10

On May 1,2007, Amgen was trading at $ 55/share

Cost of Equity
11.70%

Cost of Debt
(4.78%+.85%)(1-.35)
= 3.66%

Weights
E = 90% D = 10%

Riskfree Rate:
Riskfree rate = 4.78%

+

Beta
1.73

X

Risk Premium
4%

Unlevered Beta for Sectors: 1.59

D/E=11.06%

Tata Motors: April 2010

Average reinvestment rate from 2005-09: 179.59%; without acquisitions: 70%

Current Cashflow to Firm
EBIT(1-t) :	Rs 20,116
- Nt CpX	Rs 31,590
- Chg WC	Rs 2,732
= FCFF	- Rs 14,205

Reinv Rate = (31590+2732)/20116 = 170.61%; Tax rate = 21.00%
Return on capital = 17.16%

Reinvestment Rate 70%

Return on Capital 17.16%

Expected Growth from new inv.
.70*.1716=0.1201

Stable Growth
g = 5%; Beta = 1.00
Country Premium= 3%
Cost of capital = 10.39%
Tax rate = 33.99%
ROC= 10.39%;
Reinvestment Rate=g/ROC
=5/ 10.39= 48.11%

Terminal Value$_5$= 23493/(.1039-.05) = Rs 435,686

Op. Assets Rs210,813
+ Cash: 11418
+ Other NO 140576
- Debt 109198
=Equity 253,628

Value/Share Rs 614

Rs Cashflows

Year	1	2	3	4	5	6	7	8	9	10	
EBIT (1-t)	22533	25240	28272	31668	35472	39236	42848	46192	49150	51607	45278
- Reinvestment	15773	17668	19790	22168	24830	25242	25138	24482	23264	21503	21785
FCFF	6760	7572	8482	9500	10642	13994	17711	21710	25886	30104	23493

Discount at Cost of Capital (WACC) = 14.00% (.747) + 8.09% (0.253) = 12.50%

Growth declines to 5% and cost of capital moves to stable period level.

Cost of Equity 14.00%

Cost of Debt
(5%+ 4.25%+3)(1-.3399)
= 8.09%

Weights
E = 74.7% D = 25.3%

On April 1, 2010
Tata Motors price = Rs 781

Riskfree Rate:
Rs Riskfree Rate= 5%

+

Beta 1.20

X

Mature market premium 4.5%

+

Lambda 0.80

X

Country Equity Risk Premium 4.50%

Unlevered Beta for Sectors: 1.04

Firm's D/E Ratio: 33%

Country Default Spread 3%

X

Rel Equity Mkt Vol 1.50

Kristin's Kandy: Valuation in March 2006

Current Cashflow to Firm
EBIT(1-t) :   300
- Nt CpX   100
- Chg WC   40
= FCFF   160
Reinvestment Rate = 46.67%

Reinvestment Rate
46.67%

Expected Growth in EBIT (1-t)
.4667*.1364= .0636
6.36%

Return on Capital
13.64%

Stable Growth
g = 4%; Beta =3.00;
ROC= 12.54%
Reinvestment Rate=31.90%

Terminal Value$_5$= 289/(.1254-.04) = 3,403

Firm Value: 2,571
+ Cash   125
- Debt: 900
=Equity   1,796
- Illiq Discount 12.5%
Adj Value   1,571

Year	1	2	3	4	5	Term Yr
EBIT (1-t)	$319	$339	$361	$384	$408	425
- Reinvestment	$149	$158	$168	$179	$191	136
=FCFF	$170	$181	$193	$205	$218	289

Discount at Cost of Capital (WACC) = 16.26% (.70) + 3.30% (.30) = 12.37%

Cost of Equity 16.26%

Cost of Debt
(4.5%+1.00)(1-.40)
= 3.30%
Synthetic rating = A-

Weights
E =70% D = 30%

Riskfree Rate:
Riskfree rate = 4.50%
(10-year T.Bond rate)

+

Total Beta
2.94

X

Risk Premium
4.00%

1/3 of risk is market risk

Adjusted for ownrer non-diversification
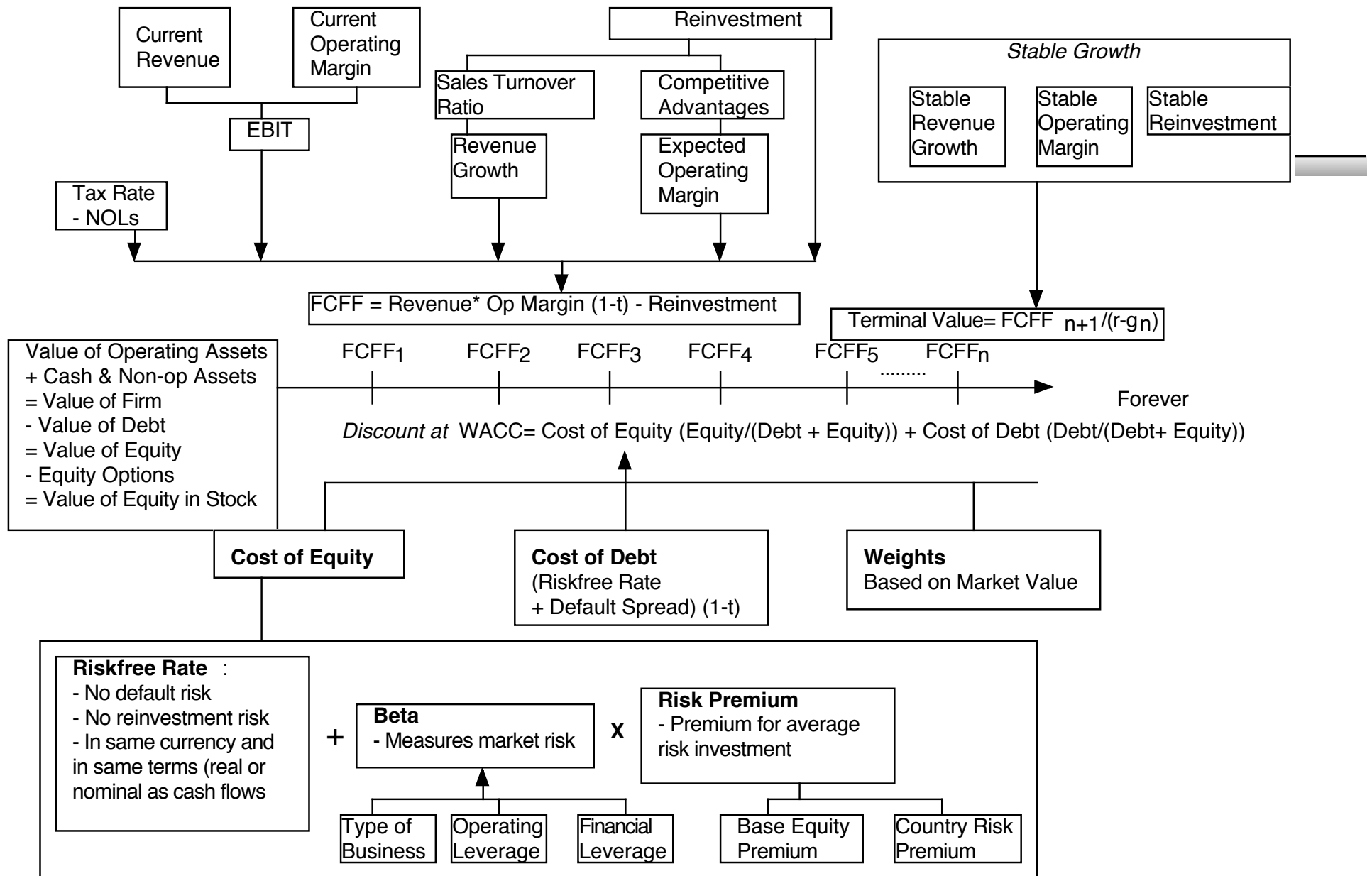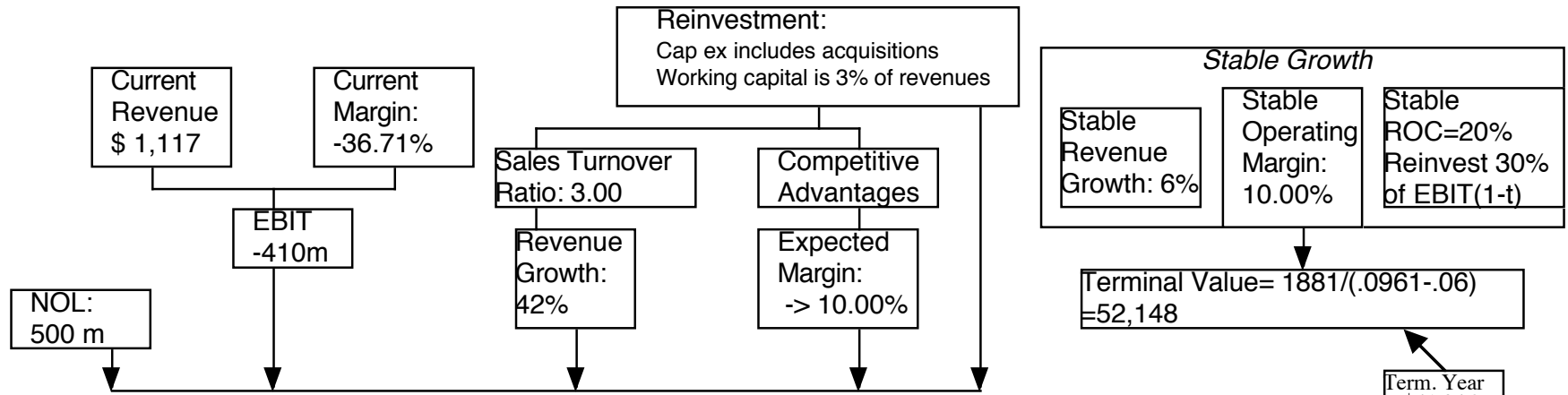
Market Beta: 0.98

Unlevered Beta for Sectors: 0.78

Firm's D/E Ratio: 30/70

Mature risk premium 4%

Country Risk Premium 0%

Discounted Cash Flow Valuation: High Growth with Negative Earnings

Current Revenue	Current Operating Margin		Reinvestment			Stable Growth		

Current Revenue · Current Operating Margin

Reinvestment → Sales Turnover Ratio · Competitive Advantages

Stable Growth
- Stable Revenue Growth
- Stable Operating Margin
- Stable Reinvestment

EBIT

Sales Turnover Ratio → Revenue Growth

Competitive Advantages → Expected Operating Margin

Tax Rate - NOLs

$$FCFF = Revenue * Op\ Margin\ (1-t) - Reinvestment$$

$$Terminal\ Value = FCFF_{n+1}/(r-g_n)$$

Value of Operating Assets
+ Cash & Non-op Assets
= Value of Firm
- Value of Debt
= Value of Equity
- Equity Options
= Value of Equity in Stock

$FCFF_1$ $FCFF_2$ $FCFF_3$ $FCFF_4$ $FCFF_5$ $FCFF_n$ ....

Forever

Discount at $WACC = Cost\ of\ Equity\ (Equity/(Debt + Equity)) + Cost\ of\ Debt\ (Debt/(Debt+ Equity))$

Cost of Equity

Cost of Debt
(Riskfree Rate
+ Default Spread) (1-t)

Weights
Based on Market Value

Riskfree Rate :
- No default risk
- No reinvestment risk
- In same currency and in same terms (real or nominal as cash flows

+

Beta
- Measures market risk

X

Risk Premium
- Premium for average risk investment

Type of Business	Operating Leverage	Financial Leverage		Base Equity Premium	Country Risk Premium

Aswath Damodaran

12

Reinvestment:
Cap ex includes acquisitions
Working capital is 3% of revenues

Stable Growth

| Current Revenue $ 1,117 | Current Margin: -36.71% |

EBIT -410m

NOL: 500 m

Sales Turnover Ratio: 3.00

Competitive Advantages

Stable Revenue Growth: 6%

Stable Operating Margin: 10.00%

Stable ROC=20% Reinvest 30% of EBIT(1-t)

Revenue Growth: 42%

Expected Margin: -> 10.00%

Terminal Value= 1881/(.0961-.06) =52,148

		$2,793	5,585	9,774	14,661	19,059	23,862	28,729	33,211	36,798	39,006
Revenues		$2,793	5,585	9,774	14,661	19,059	23,862	28,729	33,211	36,798	39,006
EBIT		-$373	-$94	$407	$1,038	$1,628	$2,212	$2,768	$3,261	$3,646	$3,883
EBIT (1-t)		-$373	-$94	$407	$871	$1,058	$1,438	$1,799	$2,119	$2,370	$2,524
- Reinvestment		$559	$931	$1,396	$1,629	$1,466	$1,601	$1,623	$1,494	$1,196	$736
FCFF		-$931	-$1,024	-$989	-$758	-$408	-$163	$177	$625	$1,174	$1,788

Term. Year
$41,346
10.00%
35.00%
$2,688
$ 807
$1,881

	1	2	3	4	5	6	7	8	9	10
Cost of Equity	12.90%	12.90%	12.90%	12.90%	12.90%	12.42%	12.30%	12.10%	11.70%	10.50%
Cost of Debt	8.00%	8.00%	8.00%	8.00%	8.00%	7.80%	7.75%	7.67%	7.50%	7.00%
AT cost of debt	8.00%	8.00%	8.00%	6.71%	5.20%	5.07%	5.04%	4.98%	4.88%	4.55%
Cost of Capital	12.84%	12.84%	12.84%	12.83%	12.81%	12.13%	11.96%	11.69%	11.15%	9.61%

Forever

Value of Op Assets	$ 14,910
+ Cash	$ 26
= Value of Firm	$14,936
- Value of Debt	$ 349
= Value of Equity	$14,587
- Equity Options	$ 2,892
Value per share	$ 34.32

Cost of Equity 12.90%

Cost of Debt
6.5%+1.5%=8.0%
Tax rate = 0% -> 35%

Weights
Debt= 1.2% -> 15%

Riskfree Rate :
T. Bond rate = 6.5%

Beta
1.60 -> 1.00

X

Risk Premium
4%

+

Internet/ Retail

Operating Leverage

Current D/E: 1.21%

Base Equity Premium

Country Risk Premium
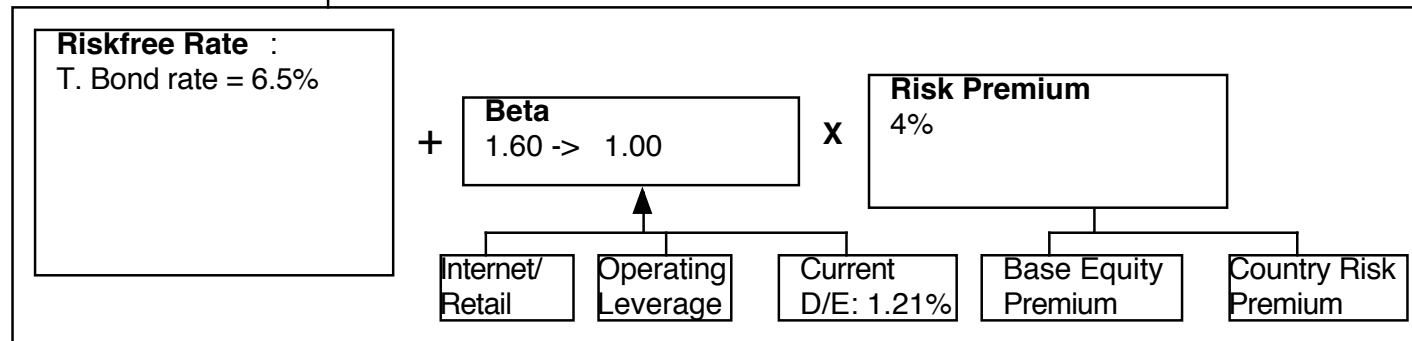
**Amazon.com
January 2000
Stock Price = $ 84**

I. Measure earnings right..

Firm's history	Comparable Firms	Operating leases - Convert into debt - Adjust operating income	R&D Expenses - Convert into asset - Adjust operating income

Normalize Earnings

Cleanse operating items of
- Financial Expenses
- Capital Expenses
- Non-recurring expenses

Measuring Earnings

Update
- Trailing Earnings
- Unofficial numbers
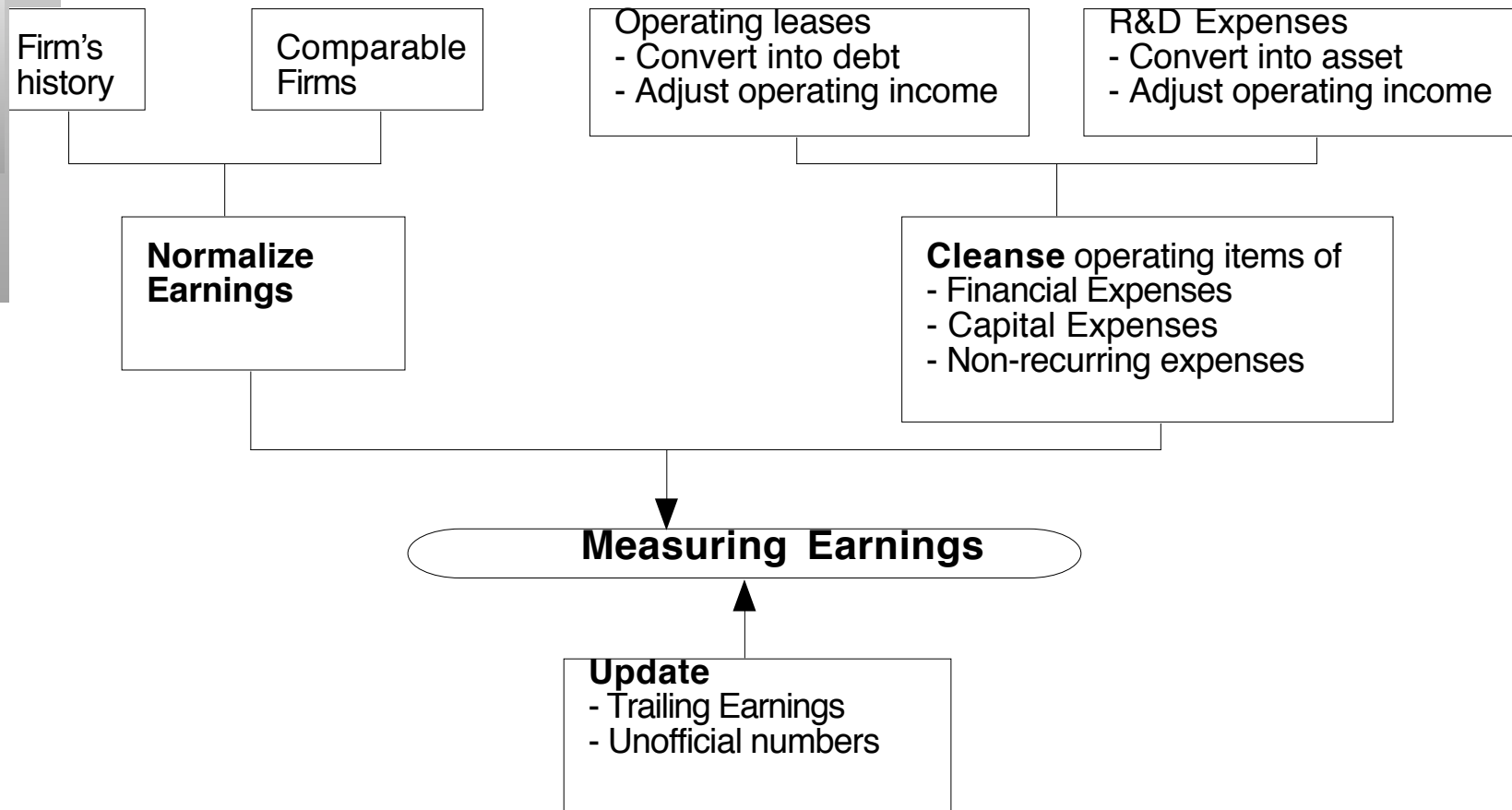
Operating Leases at Amgen in 2007

■ Amgen has lease commitments and its cost of debt (based on it's A rating) is 5.63%.

Year	Commitment	Present Value
1	$96.00	$90.88
2	$95.00	$85.14
3	$102.00	$86.54
4	$98.00	$78.72
5	$87.00	$66.16
6-12	$107.43	$462.10 ($752 million prorated)
Debt Value of leases =		$869.55

■ Debt outstanding at Amgen = $7,402 + $ 870 = $8,272 million
■ Adjusted Operating Income = Stated OI + Lease exp this year - Depreciation
= 5,071 m + 69 m - 870/12 = $5,068 million (12 year life for assets)
■ Approximate Operating income= $5,071 m + 870 m (.0563) = $ 5,120 million

Capitalizing R&D Expenses: Amgen

■ R & D was assumed to have a 10-year life.

Year	R&D Expense	Unamortized portion		Amortization this year
Current	3366.00	1.00	3366.00	
-1	2314.00	0.90	2082.60	$231.40
-2	2028.00	0.80	1622.40	$202.80
-3	1655.00	0.70	1158.50	$165.50
-4	1117.00	0.60	670.20	$111.70
-5	865.00	0.50	432.50	$86.50
-6	845.00	0.40	338.00	$84.50
-7	823.00	0.30	246.90	$82.30
-8	663.00	0.20	132.60	$66.30
-9	631.00	0.10	63.10	$63.10
-10	558.00	0.00	0.00	$55.80
Value of Research Asset =			$10,112.80	$1,149.90

Adjusted Operating Income = $5,120 + 3,366 - 1,150 = $7,336 million

II. Get the big picture (not the accounting one) when it comes to cap ex and working capital

- ■ <u>Capital expenditures should include</u>
  - • <u>Research and development expenses</u>, once they have been re-categorized as capital expenses.
  - • <u>Acquisitions of other firms</u>, whether paid for with cash or stock.
- ■ Working capital should be defined not as the difference between current assets and current liabilities but as the difference between non-cash current assets and non-debt current liabilities.
- ■ On both items, start with what the company did in the most recent year but do look at the company's history and at industry averages.

Amgen's Net Capital Expenditures

- If we define capital expenditures broadly to include R&D and acquisitions:

Accounting Capital Expenditures =	$1,218 million
- Accounting Depreciation =	$ 963 million
Accounting Net Cap Ex =	$ 255 million
Net R&D Cap Ex = (3366-1150) =	$2,216 million
Acquisitions in 2006 =	$3,975 million
Total Net Capital Expenditures =	$ 6,443 million

- Acquisitions have been a volatile item. Amgen was quiet on the acquisition front in 2004 and 2005 and had a significant acquisition in 2003.

III. Betas do not come from regressions…

<HELP> for explanation, <MENU> for similar functions.   DG26 Equity **BETA**

HISTORICAL BETA

AMZN	US	AMAZON.COM INC

Relative Index **SPX**   S&P 500 INDEX

Indentifies latest observation

Period █ Weekly
Range **2/27/98** To **2/18/00**
Market █ Trade

$Y = 2.23 X + 2.60$

ADJ BETA	1.82
RAW BETA	2.23
Alpha (Intercept)	2.60
R2 (Correlation)	.17
Std Dev of Error	13.20
Std Error of Beta	.50
Number of Points	103

Adj beta = (0.67) * Raw Beta
              + (0.33) * 1.0

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Princeton:609-279-3000   Singapore:226-3000   Sydney:2-9777-8686   Tokyo:3-3201-8900   Sao Paulo:11-3048-4500
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Bloomberg
PROFESSIONAL

Carry much noise…

Look better for some companies, but looks can be deceptive…

Bottom-up Betas

Step 1: Find the business or businesses that your firm operates in.

Possible Refinements

Step 2: Find publicly traded firms in each of these businesses and obtain their regression betas. Compute the simple average across these regression betas to arrive at an average beta for these publicly traded firms. Unlever this average beta using the average debt to equity ratio across the publicly traded firms in the sample.
Unlevered beta for business = Average beta across publicly traded firms/ (1 + (1- t) (Average D/E ratio across firms))

If you can, adjust this beta for differences between your firm and the comparable firms on operating leverage and product characteristics.

Step 3: Estimate how much value your firm derives from each of the different businesses it is in.

While revenues or operating income are often used as weights, it is better to try to estimate the value of each business.

Step 4: Compute a weighted average of the unlevered betas of the different businesses (from step 2) using the weights from step 3.
Bottom-up Unlevered beta for your firm = Weighted average of the unlevered betas of the individual business

If you expect the business mix of your firm to change over time, you can change the weights on a year-to-year basis.

Step 5: Compute a levered beta (equity beta) for your firm, using the market debt to equity ratio for your firm.
Levered bottom-up beta = Unlevered beta (1+ (1-t) (Debt/Equity))

If you expect your debt to equity ratio to change over time, the levered beta will change over time.

Two examples…

- **Amgen**
  - The unlevered beta for pharmaceutical firms is 1.59. Using Amgen's debt to equity ratio of 11%, the bottom up beta for Amgen is
  - Bottom-up Beta = 1.59 (1+ (1-.35)(.11)) = 1.73
- **Tata Motors**
  - The unlevered beta for automobile firms is 0.98. Using Tata Motor's debt to equity ratio of 33.87%, the bottom up beta for Tata Motors is
  - Bottom-up Beta = 0.98 (1+ (1-.3399)(.3387)) = 1.20
- A Question to ponder: Tata Motors recently made two big investments.
  - Tata Nano: Promoted as the cheapest car in the world, Tata Motors hopes that volume (especially in Asia) will make up for tight margins.
  - Jaguar/Land Rover: Tata acquired both firms, catering to luxury markets.

  What effect will these investments have on Tata Motor's beta?

Private companies:
Total Risk versus Market Risk

■ If you are valuing a private company for sale to a buyer who is not diversified, you should adjust the beta to reflect total risk rather than market risk. Since the R squared of the regression measures the proportion of the risk that is market risk:

Total Beta = Market Beta / Correlation of the sector with the market

■ To estimate the beta for Kristin Kandy:
- Unlevered beta for publicly traded food processing companies = 0.98
- Average correlation of food processing companies with market = 0.333
- Total Beta = 0.98/0.33 = 2.94
- Total Cost of Equity = 4.50% + 2.94 (4%) = 16.26%

■ You should not make this adjustment if the potential buyer is diversified (a publicly traded company or diversified investor). You may choose an intermediate number (between 0.98 and 2.94) for a partially diversified buyer (a venture capitalist, for instance).

IV. And the past is not always a good indicator of the future

■ It is standard practice to use historical premiums as forward looking premiums. :

	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2011	7.55%	5.79%	5.62%	4.10%
	2.22%	2.36%		
1962-2011	5.38%	3.36%	4.02%	2.35%
	2.39%	2.68%		
2002-2011	3.12%	-1.92%	1.08%	-3.61%
	6.46%	8.94%		

■ An alternative is to back out the premium from market prices:

In the trailing 12 months, the cash returned to stockholders was 74.17. Using the average cash yield of 4.71% for 2002-2011 the cash returned would have been 59.29.

Analysts expect earnings to grow 9.6% in 2012, 11.9% in 2013, 8.2% in 2014, 4.5% in 2015 and 2% therafter, resulting in a compounded annual growth rate of 7.18% over the next 5 years. We will assume that dividends & buybacks will grow 7.18% a year for the next 5 years.

After year 5, we will assume that earnings on the index will grow at 1.87%, the same rate as the entire economy (= riskfree rate).

| 63.54 | 68.11 | 73.00 | 78.24 | 83.86 |

January 1, 2012
S&P 500 is at 1257.60
Adjusted Dividends &
Buybacks for 2011 = 59.29

$$1257.60 = \frac{63.54}{(1+r)} + \frac{68.11}{(1+r)^2} + \frac{73.00}{(1+r)^3} + \frac{78.24}{(1+r)^4} + \frac{83.86}{(1+r)^5} + \frac{83.86(1.0187)}{(r-.0187)(1+r)^5}$$

Expected Return on Stocks (1/1/12) = 7.91%
T.Bond rate on 1/1/12 = 1.87%
Equity Risk Premium = 8.03% - 3.29% = 6.04%

Data Sources:
Dividends and Buybacks last year: S&P
Expected growth rate: News stories, Yahoo! Finance, Bloomberg

Aswath Damodaran

Implied Premiums in the US: 1960-2010

Implied Premium for US Equity Market
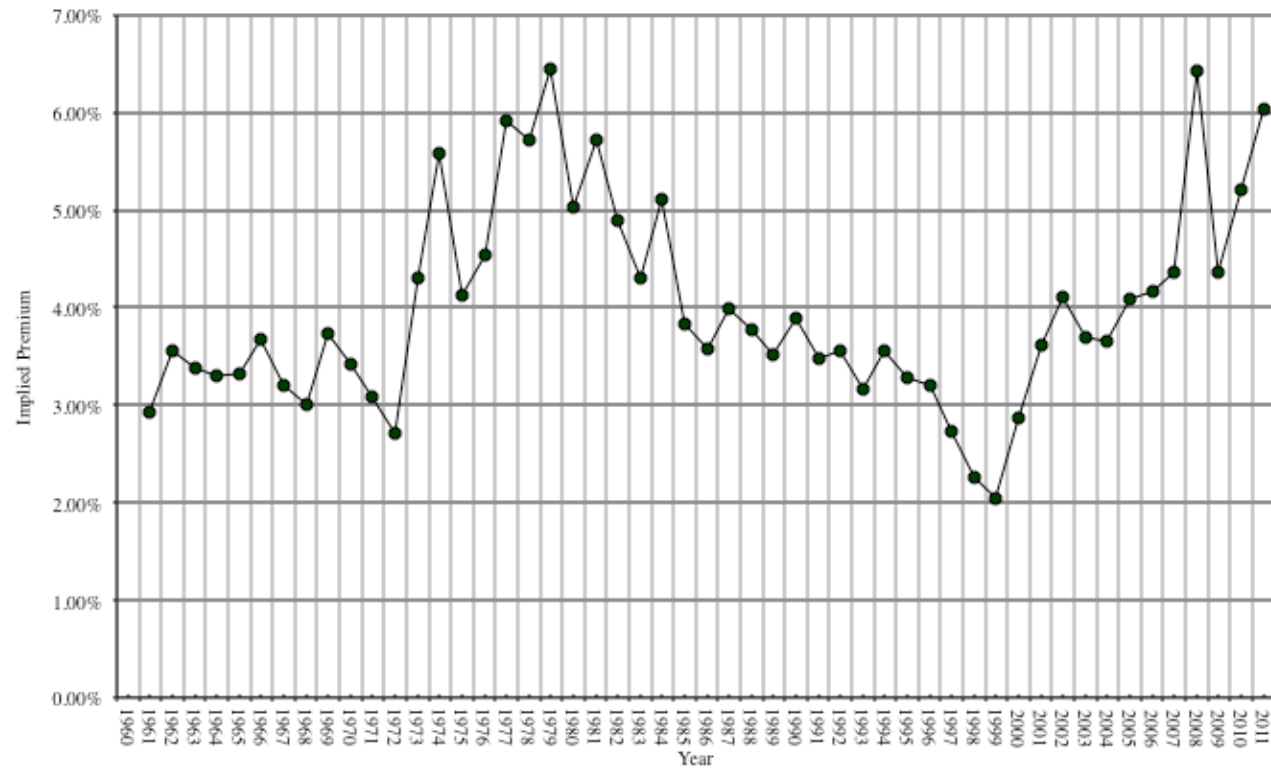
The Anatomy of a Crisis: Implied ERP from September 12, 2008 to January 1, 2009

Implied Equity Risk Premium - 9/12- 12/31/08

Average implied ERP: 1960-2007 =4.00%
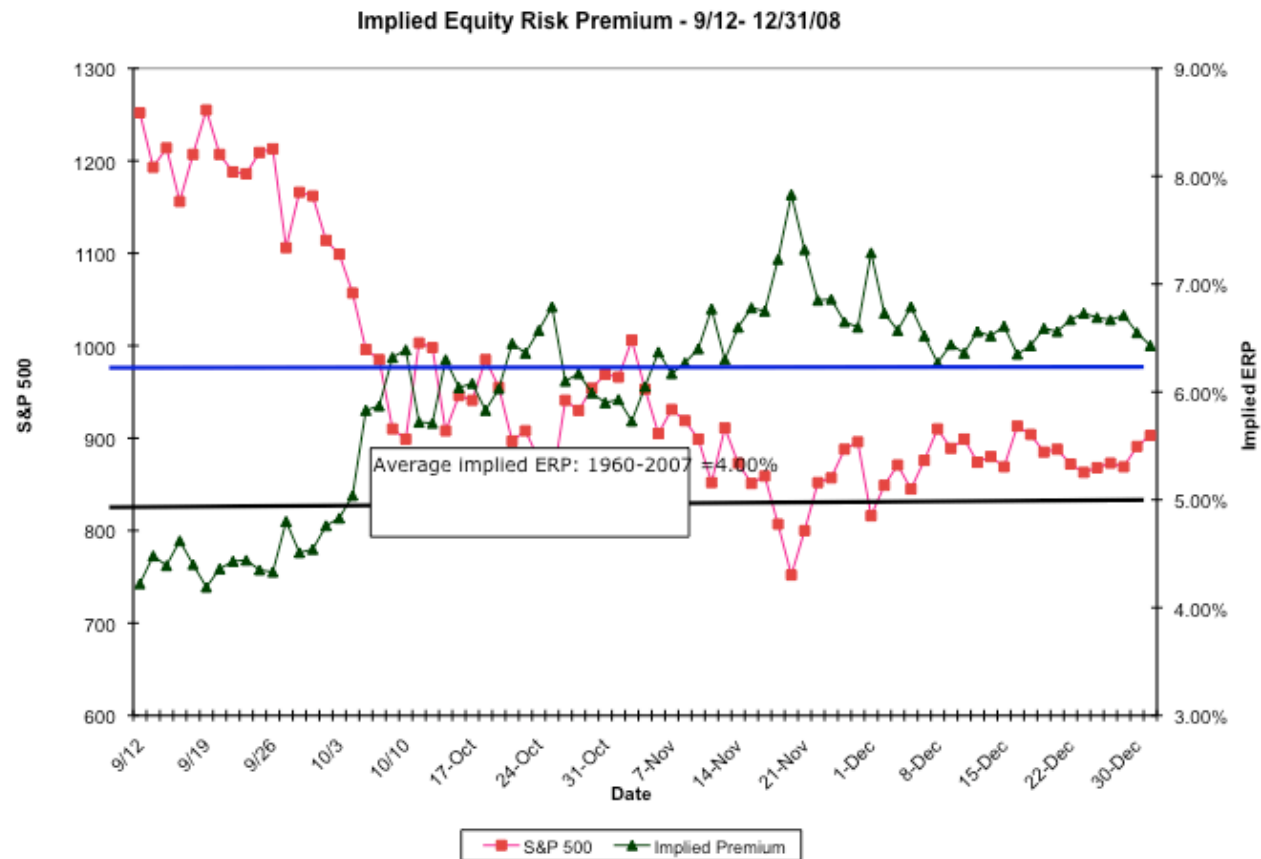
Implied Premium for India using the Sensex: April 2010

- Level of the Index = 17559
- FCFE on the Index = 3.5% (Estimated FCFE for companies in index as % of market value of equity)
- Other parameters
  - Riskfree Rate = 5% (Rupee)
  - Expected Growth (in Rupee)
    - Next 5 years = 20% (Used expected growth rate in Earnings)
    - After year 5 = 5%
- Solving for the expected return:
  - Expected return on Equity = 11.72%
  - Implied Equity premium for India =11.72% - 5% = 6.72%

V. There is a downside to globalization…

■ Emerging markets offer growth opportunities but they are also riskier. If we want to count the growth, we have to also consider the risk.

■ Two ways of estimating the country risk premium:
- *Default spread on Country Bond*: In this approach, the country equity risk premium is set equal to the default spread of the bond issued by the country.
  - Equity Risk Premium for mature market = 4.5%
  - Equity Risk Premium for India = 4.5% + 3% = 7.5%
- *Adjusted for equity risk*: The country equity risk premium is based upon the volatility of the equity market relative to the government bond rate.

  Country risk premium= Default Spread* $\sigma_{\text{Country Equity}}$ / $\sigma_{\text{Country Bond}}$
  - Standard Deviation in Sensex = 30%
  - Standard Deviation in Indian government bond= 20%
  - Default spread on Indian Bond= 3%
  - Total equity risk premium for India = 4.5% + 3% (30/20) = 9%

Country Risk Premiums
June 2012

North America	Total ERP	CRP
Canada	6.00%	0.00%
United States	6.00%	0.00%
NORTH AM	6.00%	0.00%

Latin America	Total ERP	CRP
Argentina	15.00%	9.00%
Belize	9.00%	3.00%
Bolivia	10.88%	4.88%
Brazil	8.63%	2.63%
Chile	7.05%	1.05%
Colombia	9.00%	3.00%
Costa Rica	9.00%	3.00%
Ecuador	18.75%	12.75%
El Salvador	10.13%	4.13%
Guatemala	9.60%	3.60%
Honduras	13.50%	7.50%
Mexico	8.25%	2.25%
Nicaragua	15.00%	9.00%
Panama	9.00%	3.00%
Paraguay	12.00%	6.00%
Peru	9.00%	3.00%
Uruguay	9.60%	3.60%
Venezuela	12.00%	6.00%
LAT AM	9.42%	3.42%

W. Europe	Total ERP	CRP
Spain	9.00%	3.00%
Austria	6.00%	0.00%
Belgium	7.05%	1.05%
Cyprus	10.88%	4.88%
Denmark	6.00%	0.00%
Finland	6.00%	0.00%
France	6.00%	0.00%
Germany	6.00%	0.00%
Greece	16.50%	10.50%
Iceland	9.00%	3.00%
Ireland	9.60%	3.60%
Italy	7.73%	1.73%
Malta	7.73%	1.73%
Netherlands	6.00%	0.00%
Norway	6.00%	0.00%
Portugal	10.88%	4.88%
Sweden	6.00%	0.00%
Switzerland	6.00%	0.00%
Turkey	9.60%	3.60%
United Kingdom	6.00%	0.00%
W. EUROPE	6.80%	0.80%

Africa	Total ERP	CRP
Angola	10.88%	4.88%
Botswana	7.50%	1.50%
Egypt	13.50%	7.50%
Mauritius	8.25%	2.25%
Morocco	9.60%	3.60%
Namibia	9.00%	3.00%
South Africa	7.73%	1.73%
Tunisia	9.00%	3.00%
AFRICA	9.82%	3.82%

E. Europe	Total ERP	CRP
Albania	12.00%	6.00%
Armenia	10.13%	4.13%
Azerbaijan	9.00%	3.00%
Belarus	15.00%	9.00%
Bosnia	15.00%	9.00%
Bulgaria	8.63%	2.63%
Croatia	9.00%	3.00%
Czech Republic	7.28%	1.28%
Estonia	7.28%	1.28%
Georgia	10.88%	4.88%
Hungary	9.60%	3.60%
Kazakhstan	8.63%	2.63%
Latvia	9.00%	3.00%
Lithuania	8.25%	2.25%
Moldova	15.00%	9.00%
Montenegro	10.88%	4.88%
Poland	7.50%	1.50%
Romania	9.00%	3.00%
Russia	8.25%	2.25%
Slovakia	7.50%	1.50%
Slovenia [1]	7.50%	1.50%
Ukraine	13.50%	7.50%
E. EUROPE	8.60%	2.60%

Middle East	Total ERP	CRP
Bahrain	8.25%	2.25%
Israel	7.28%	1.28%
Jordan	10.13%	4.13%
Kuwait	6.75%	0.75%
Lebanon	12.00%	6.00%
Oman	7.28%	1.28%
Qatar	6.75%	0.75%
Saudi Arabia	7.05%	1.05%
UAE	6.75%	0.75%
MIDDLE EAST	7.16%	1.16%

Asia	Total ERP	CRP
Bangladesh	10.88%	4.88%
Cambodia	13.50%	7.50%
China	7.05%	1.05%
Fiji Islands	12.00%	6.00%
Hong Kong	6.38%	0.38%
India	9.00%	3.00%
Indonesia	9.00%	3.00%
Japan	7.05%	1.05%
Korea	7.28%	1.28%
Macao	7.05%	1.05%
Malaysia	7.73%	1.73%
Mongolia	12.00%	6.00%
Pakistan	15.00%	9.00%
New Guinea	12.00%	6.00%
Philippines	10.13%	4.13%
Singapore	6.00%	0.00%
Sri Lanka	12.00%	6.00%
Taiwan	7.05%	1.05%
Thailand	8.25%	2.25%
Vietnam	12.00%	6.00%
ASIA	7.63%	1.63%
WO JAPAN	7.77%	1.77%

Aus & NZ	Total ERP	CRP
Australia	6.00%	0.00%
New Zealand	6.00%	0.00%
AUS & NZ	6.00%	0.00%

Black #: Total ERP
Red #: Country risk premium
AVG: GDP weighted average

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VI. And it is not just emerging market companies that are exposed to this risk..

- If we 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(Return)=Riskfree Rate+ β (US premium) + λ (Country ERP)

- 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:

  λ = % of revenues domestically$_{firm}$/ % of revenues domestically$_{avg\ firm}$

  Consider two firms – Tata Motors and Tata Consulting Services. In 2008-09, Tata Motors got about 91.37% of its revenues in India and TCS got 7.62%. The average Indian firm gets about 80% of its revenues in India:

  $\lambda_{Tata\ Motors}$ = 91%/80% = 1.14
  λ_{TCS} = 7.62%/80% = 0.09

- 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

Estimating lambdas: Tata Motors versus TCS

	Tata Motors	*TCS*
% of production/ operations in India	High	High
% of revenues in India	91.37% (in 2009) Estimated 70% (in 2010)	7.62%
Lambda	0.80	0.20
Flexibility in moving operations	Low. Significant physical assets.	High. Human capital is mobile.

VII. Discount rates can (and often should) change over time…

- The inputs into the cost of capital - the cost of equity (beta), the cost of debt (default risk) and the debt ratio - can change over time. For younger firms, they should change over time.

- At the minimum, they should change when you get to your terminal year to inputs that better reflect a mature firm.

VIII. Growth has to be earned (not endowed or estimated)

Expected Growth

├── Net Income
│   ├── *Retention Ratio=* 1 - Dividends/Net Income
│   ├── X
│   └── *Return on Equity* Net Income/Book Value of Equity
│
└── Operating Income
    ├── *Reinvestment Rate =* (Net Cap Ex + Chg in WC/EBIT(1-t)
    ├── X
    └── *Return on Capital =* EBIT(1-t)/Book Value of Capital
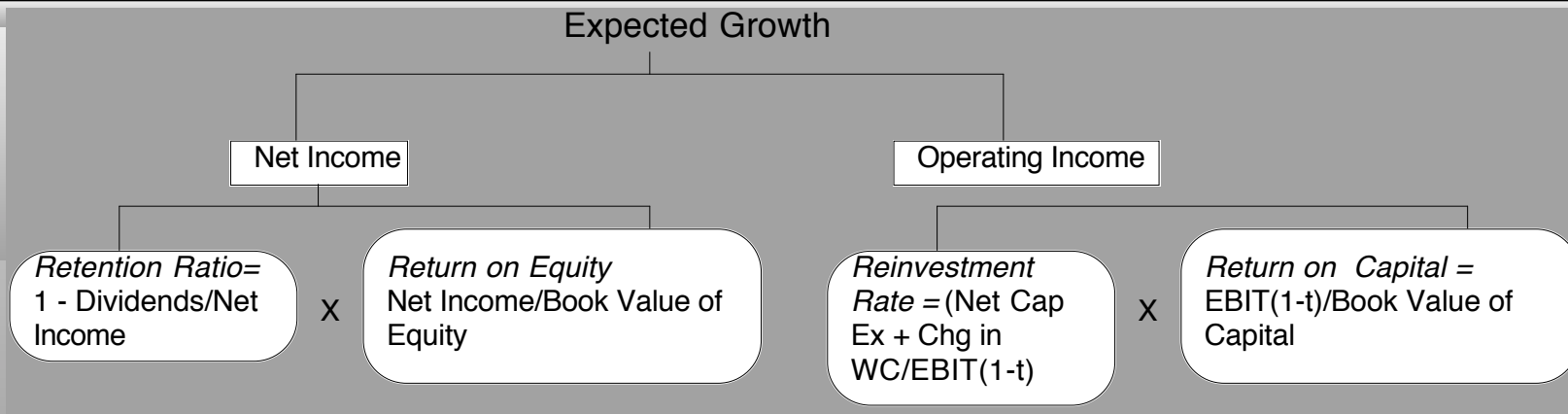
Adjust EBIT for
a. Extraordinary or one-time expenses or income
b. Operating leases and R&D
c. Cyclicality in earnings (Normalize)
d. Acquisition Debris (Goodwill amortization etc.)

Use a marginal tax rate to be safe. A high ROC created by paying low effective taxes is not sustainable

$$ROC = \frac{EBIT\ (1-\ tax\ rate)}{Book\ Value\ of\ Equity + Book\ value\ of\ debt - Cash}$$

Adjust book equity for
1. Capitalized R&D
2. Acquisition Debris (Goodwill)

Adjust book value of debt for
a. Capitalized operating leases

Use end of prior year numbers or average over the year but be consistent in your application

IX. All good things come to an end..And the terminal value is not an ATM…

This tax rate locks in forever. Does it make sense to use an effective tax rate?

Are you reinvesting enough to sustain your stable growth rate? Check
Reinv Rate = g/ ROC

$$\text{Terminal Value}_n = \frac{\text{EBIT}_{n+1}\ (1 - \text{tax rate})\ (1 - \text{Reinvestment Rate})}{\text{Cost of capital} - \text{Expected growth rate}}$$

This is a mature company. It's cost of capital should reflect that.

This growth rate should be less than the nominlnal growth rate of the economy

Terminal Value and Growth

	Amgen	Tata Motors	Kristin Kandy	Amazon
0%	$150,652	INR 435,686	$3,387	$27,973
1%	$154,749	INR 435,686	$3,387	$29,662
2%	$160,194	INR 435,686	$3,387	$31,794
3%	$167,784	INR 435,686	$3,387	$34,573
4%	$179,099	INR 435,686	$3,387	$38,342
ROIC	10.00%	10.39%	12.54%	20.00%
Cost of capital	8.08%	10.39%	12.54%	9.61%

X. The loose ends matter…

Value of Operating Assets	Since this is a discounted cashflow valuation, should there be a real option premium?
+ Cash and Marketable Securities	Operating versus Non-opeating cash Should cash be discounted for earning a low return?
+ Value of Cross Holdings	How do you value cross holdings in other companies? What if the cross holdings are in private businesses?
+ Value of Other Assets	What about other valuable assets? How do you consider under utlilized assets?
Value of Firm	Should you discount this value for opacity or complexity? How about a premium for synergy? What about a premium for intangibles (brand name)?
- Value of Debt	What should be counted in debt? Should you subtract book or market value of debt? What about other obligations (pension fund and health care? What about contingent liabilities? What about minority interests?
= Value of Equity	Should there be a premium/discount for control? Should there be a discount for distress
- Value of Equity Options	What equity options should be valued here (vested versus non-vested)? How do you value equity options?
= Value of Common Stock	Should you divide by primary or diluted shares?
/ Number of shares	
= Value per share	Should there be a discount for illiquidity/ marketability? Should there be a discount for minority interests?

1. The Value of Cash
An Exercise in Cash Valuation

	Company A	*Company B*	*Company C*
Enterprise Value	$ 1 billion	$ 1 billion	$ 1 billion
Cash	$ 100 mil	$ 100 mil	$ 100 mil
Return on Capital	10%	5%	22%
Cost of Capital	10%	10%	12%
Trades in	US	US	Argentina

In which of these companies is cash most likely to trade at face value, at a discount and at a premium?

Cash: Discount or Premium?

Market Value of $ 1 in cash:
Estimates obtained by regressing Enterprise Value against Cash Balances

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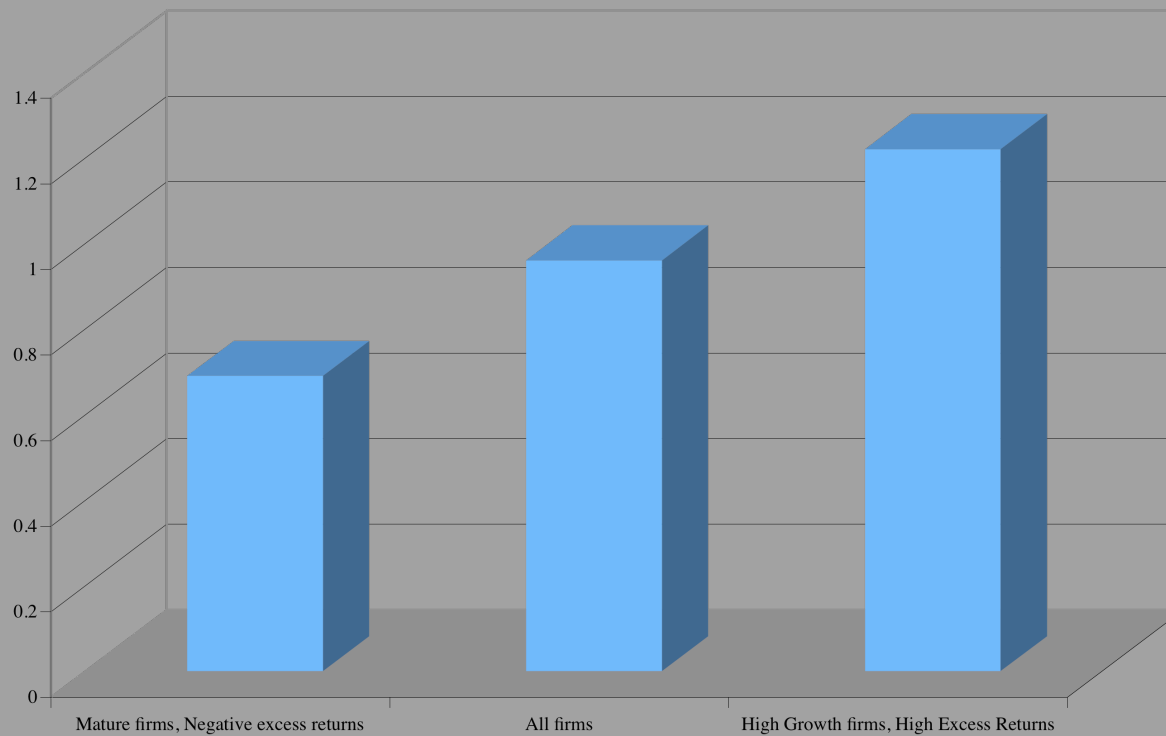
2. Dealing with Holdings in Other firms

- Holdings in other firms can be categorized into
    - Minority passive holdings, in which case only the dividend from the holdings is shown in the balance sheet
    - Minority active holdings, in which case the share of equity income is shown in the income statements
    - Majority active holdings, in which case the financial statements are consolidated.

- We tend to be sloppy in practice in dealing with cross holdings. After valuing the operating assets of a firm, using consolidated statements, it is common to add on the balance sheet value of minority holdings (which are in book value terms) and subtract out the minority interests (again in book value terms), representing the portion of the consolidated company that does not belong to the parent company.

How to value holdings in other firms.. In a perfect world..

- In a perfect world, we would strip the parent company from its subsidiaries and value each one separately. The value of the combined firm will be
  - Value of parent company + Proportion of value of each subsidiary
- To do this right, you will need to be provided detailed information on each subsidiary to estimated cash flows and discount rates.

Two compromise solutions…

- <u>The market value solution</u>: When the subsidiaries are publicly traded, you could use their traded market capitalizations to estimate the values of the cross holdings. You do risk carrying into your valuation any mistakes that the market may be making in valuation.

- <u>The relative value solution</u>: When there are too many cross holdings to value separately or when there is insufficient information provided on cross holdings, you can convert the book values of holdings that you have on the balance sheet (for both minority holdings and minority interests in majority holdings) by using the average price to book value ratio of the sector in which the subsidiaries operate.

Tata Motor's Cross Holdings

- Tata Steel
- Tata Chemicals
- Non-listed Tata companies

3. Other Assets that have not been counted yet..

■ **Unutilized assets**: If you have assets or property that are not being utilized (vacant land, for example), you have not valued it yet. You can assess a market value for these assets and add them on to the value of the firm.

■ **Overfunded pension plans**: If you have a defined benefit plan and your assets exceed your expected liabilities, you could consider the over funding with two caveats:

 • Collective bargaining agreements may prevent you from laying claim to these excess assets.
 • There are tax consequences. Often, withdrawals from pension plans get taxed at much higher rates.

 Do not double count an asset. If you count the income from an asset in your cashflows, you cannot count the market value of the asset in your value.

4. A Discount for Complexity:
An Experiment

	Company A	*Company B*
Operating Income	$ 1 billion	$ 1 billion
Tax rate	40%	40%
ROIC	10%	10%
Expected Growth	5%	5%
Cost of capital	8%	8%
Business Mix	Single Business	Multiple Businesses
Holdings	Simple	Complex
Accounting	Transparent	Opaque

■ *Which firm would you value more highly?*

Measuring Complexity: Volume of Data in Financial Statements

Company	Number of pages in last 10Q	Number of pages in last 10K
General Electric	65	410
Microsoft	63	218
Wal-mart	38	244
Exxon Mobil	86	332
Pfizer	171	460
Citigroup	252	1026
Intel	69	215
AIG	164	720
Johnson & Johnson	63	218
IBM	85	353

Measuring Complexity: A Complexity Score

Item	Factors	Follow-up Question	Answer	Weighting factor	Gerdau Score	GE Score
Operating Income	1. Multiple Businesses	Number of businesses (with more than 10% of revenues) =	1	2.00	2	30
	2. One-time income and expenses	Percent of operating income =	10%	10.00	1	0.8
	3. Income from unspecified sources	Percent of operating income =	0%	10.00	0	1.2
	4. Items in income statement that are volatile	Percent of operating income =	15%	5.00	0.75	1
Tax Rate	1. Income from multiple locales	Percent of revenues from non-domestic locales =	70%	3.00	2.1	1.8
	2. Different tax and reporting books	Yes or No	No	Yes=3	0	3
	3. Headquarters in tax havens	Yes or No	No	Yes=3	0	0
	4. Volatile effective tax rate	Yes or No	Yes	Yes=2	2	0
Capital Expenditures	1. Volatile capital expenditures	Yes or No	Yes	Yes=2	2	2
	2. Frequent and large acquisitions	Yes or No	Yes	Yes=4	4	4
	3. Stock payment for acquisitions and investments	Yes or No	No	Yes=4	0	4
Working capital	1. Unspecified current assets and current liabilities	Yes or No	No	Yes=3	0	0
	2. Volatile working capital items	Yes or No	Yes	Yes=2	2	2
Expected Growth rate	1. Off-balance sheet assets and liabilities (operating leases and R&D)	Yes or No	No	Yes=3	0	3
	2. Substantial stock buybacks	Yes or No	No	Yes=3	0	3
	3. Changing return on capital over time	Is your return on capital volatile?	Yes	Yes=5	5	5
	4. Unsustainably high return	Is your firm's ROC much higher than industry average?	No	Yes=5	0	0
Cost of capital	1. Multiple businesses	Number of businesses (more than 10% of revenues) =	1	1.00	1	20
	2. Operations in emerging markets	Percent of revenues=	50%	5.00	2.5	2.5
	3. Is the debt market traded?	Yes or No	No	No=2	2	0
	4. Does the company have a rating?	Yes or No	Yes	No=2	0	0
	5. Does the company have off-balance sheet debt?	Yes or No	No	Yes=5	0	5
No-operating assets	Minority holdings as percent of book assets	Minority holdings as percent of book assets	0%	20.00	0	0.8
Firm to Equity value	Consolidation of subsidiaries	Minority interest as percent of book value of equity	63%	20.00	12.6	1.2
Per share value	Shares with different voting rights	Does the firm have shares with different voting rights?	Yes	Yes = 10	10	0
	Equity options outstanding	Options outstanding as percent of shares	0%	10.00	0	0.25
		Complexity Score =			48.95	90.55

Dealing with Complexity

In Discounted Cashflow Valuation

■ The Aggressive Analyst: Trust the firm to tell the truth and value the firm based upon the firm's statements about their value.

■ The Conservative Analyst: Don't value what you cannot see.

■ The Compromise: Adjust the value for complexity

- Adjust cash flows for complexity
- Adjust the discount rate for complexity
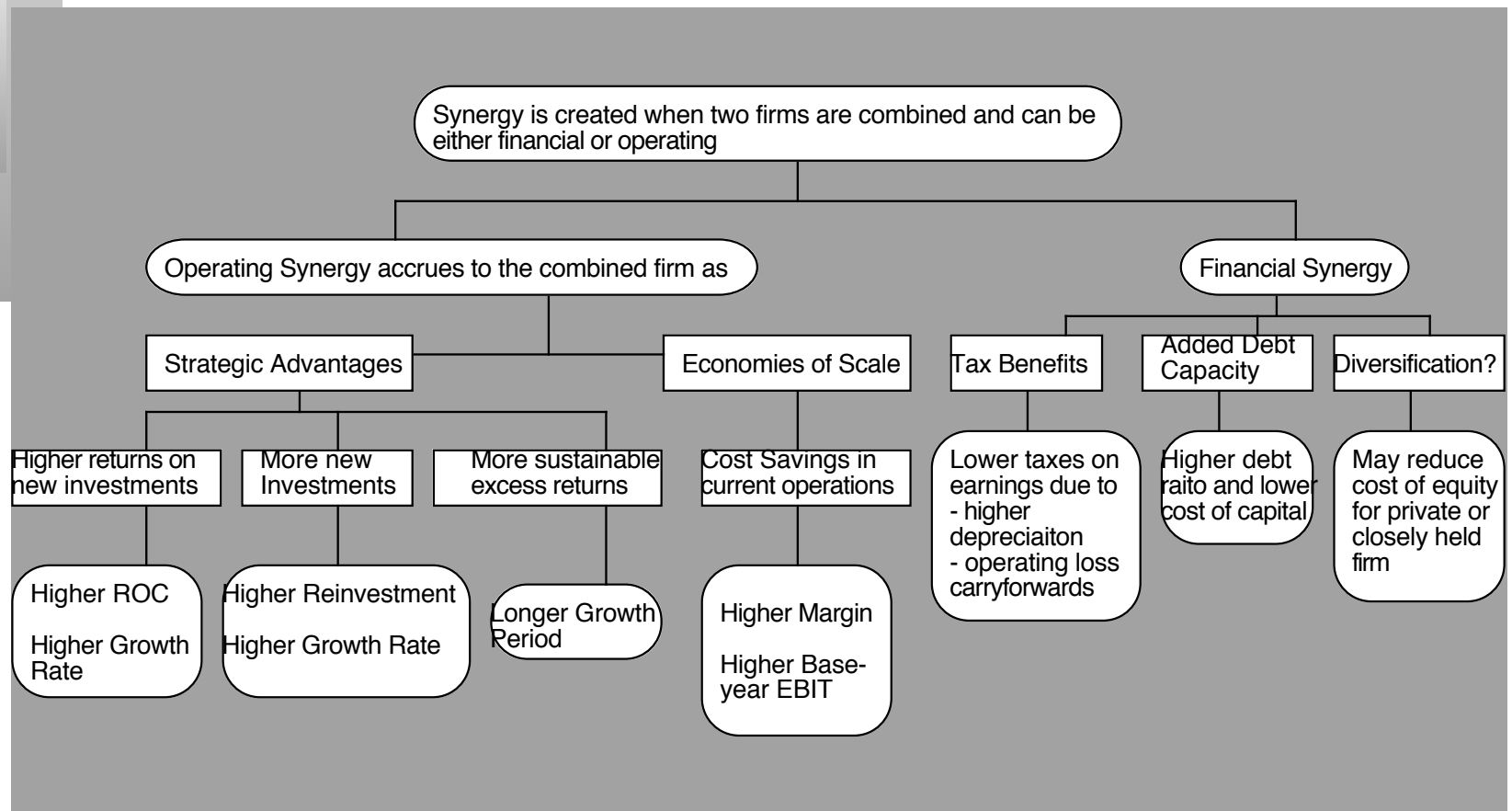- Adjust the expected growth rate/ length of growth period
- Value the firm and then discount value for complexity

In relative valuation

In a relative valuation, you may be able to assess the price that the market is charging for complexity:

With the hundred largest market cap firms, for instance:

PBV = 0.65 + 15.31 ROE – 0.55 Beta + 3.04 Expected growth rate – 0.003 # Pages in 10K

5. The Value of Synergy

Synergy is created when two firms are combined and can be either financial or operating

Operating Synergy accrues to the combined firm as

Financial Synergy

Strategic Advantages

Economies of Scale

Tax Benefits

Added Debt Capacity

Diversification?

Higher returns on new investments

More new Investments

More sustainable excess returns

Cost Savings in current operations

Lower taxes on earnings due to
- higher depreciaiton
- operating loss carryforwards

Higher debt raito and lower cost of capital

May reduce cost of equity for private or closely held firm

Higher ROC

Higher Growth Rate

Higher Reinvestment

Higher Growth Rate

Longer Growth Period

Higher Margin

Higher Base-year EBIT

Valuing Synergy

(1) the firms involved in the merger are **valued independently**, by discounting expected cash flows to each firm at the weighted average cost of capital for that firm.

(2) the **value of the combined firm, with no synergy**, is obtained by adding the values obtained for each firm in the first step.

(3) The **effects of synergy are built into expected growth rates and cashflows**, and the combined firm is re-valued with synergy.

Value of Synergy = Value of the combined firm, with synergy - Value of the combined firm, without synergy

Valuing Synergy: P&G + Gillette

	P&G	Gillette	Piglet: No Synergy	Piglet: Synergy	
Free Cashflow to Equity	$5,864.74	$1,547.50	$7,412.24	$7,569.73	Annual operating expenses reduced by $250 million
Growth rate for first 5 years	12%	10%	11.58%	12.50%	Slighly higher growth rate
Growth rate after five years	4%	4%	4.00%	4.00%	
Beta	0.90	0.80	0.88	0.88	
Cost of Equity	7.90%	7.50%	7.81%	7.81%	Value of synergy
Value of Equity	$221,292	$59,878	$281,170	$298,355	**$17,185**

6. Brand name, great management, superb product …
Are we short changing the intangibles?

■ There is often a temptation to add on premiums for intangibles. Among them are
- Brand name
- Great management
- Loyal workforce
- Technological prowess

■ There are two potential dangers:
- For some assets, the value may already be in your value and adding a premium will be double counting.
- For other assets, the value may be ignored but incorporating it will not be easy.

Valuing Brand Name

	Coca Cola	With Cott Margins
Current Revenues =	$21,962.00	$21,962.00
Length of high-growth period	10	10
Reinvestment Rate =	50%	50%
Operating Margin (after-tax)	15.57%	5.28%
Sales/Capital (Turnover ratio)	1.34	1.34
Return on capital (after-tax)	20.84%	7.06%
Growth rate during period (g) =	10.42%	3.53%
Cost of Capital during period =	7.65%	7.65%
Stable Growth Period		
Growth rate in steady state =	4.00%	4.00%
Return on capital =	7.65%	7.65%
Reinvestment Rate =	52.28%	52.28%
Cost of Capital =	7.65%	7.65%
Value of Firm =	**$79,611.25**	**$15,371.24**

7. Be circumspect about defining debt for cost of capital purposes…

■ **General Rule**: Debt generally has the following characteristics:

- Commitment to make fixed payments in the future
- The fixed payments are tax deductible
- Failure to make the payments can lead to either default or loss of control of the firm to the party to whom payments are due.

■ Defined as such, debt should include

- All interest bearing liabilities, short term as well as long term
- All leases, operating as well as capital

■ Debt should not include

- Accounts payable or supplier credit

But should consider other potential liabilities when getting to equity value…

■ If you have under funded pension fund or health care plans, you should consider the under funding at this stage in getting to the value of equity.

  • If you do so, you should not double count by also including a cash flow line item reflecting cash you would need to set aside to meet the unfunded obligation.

  • You should not be counting these items as debt in your cost of capital calculations….

■ If you have contingent liabilities - for example, a potential liability from a lawsuit that has not been decided - you should consider the expected value of these contingent liabilities

  • Value of contingent liability = Probability that the liability will occur * Expected value of liability

8. The Value of Control

■ The value of the control premium that will be paid to acquire a block of equity will depend upon two factors -

- **Probability that control of firm will change**: This refers to the probability that incumbent management will be replaced. this can be either through acquisition or through existing stockholders exercising their muscle.
- **Value of Gaining Control of the Company:** The value of gaining control of a company arises from two sources - the increase in value that can be wrought by changes in the way the company is managed and run, and the side benefits and perquisites of being in control

Value of Gaining Control = Present Value (Value of Company with change in control - Value of company without change in control) + Side Benefits of Control

Increase Cash Flows

More efficient operations and cost cuttting: Higher Margins

Divest assets that have negative EBIT

Reduce tax rate
- moving income to lower tax locales
- transfer pricing
- risk management

Revenues

* Operating Margin

= EBIT

- Tax Rate * EBIT

EBIT (1-t)

+ Depreciation
- Capital Expenditures
- Chg in Working Capital
= FCFF

Live off past over-investment

Better inventory management and tighter credit policies

Reduce the cost of capital

Make your product/service less discretionary

Reduce Operating leverage

Reduce beta

Cost of Equity * (Equity/Capital) + Pre-tax Cost of Debt (1- tax rate) * (Debt/Capital)

Match your financing to your assets: Reduce your default risk and cost of debt

Shift interest expenses to higher tax locales

Change financing mix to reduce cost of capital
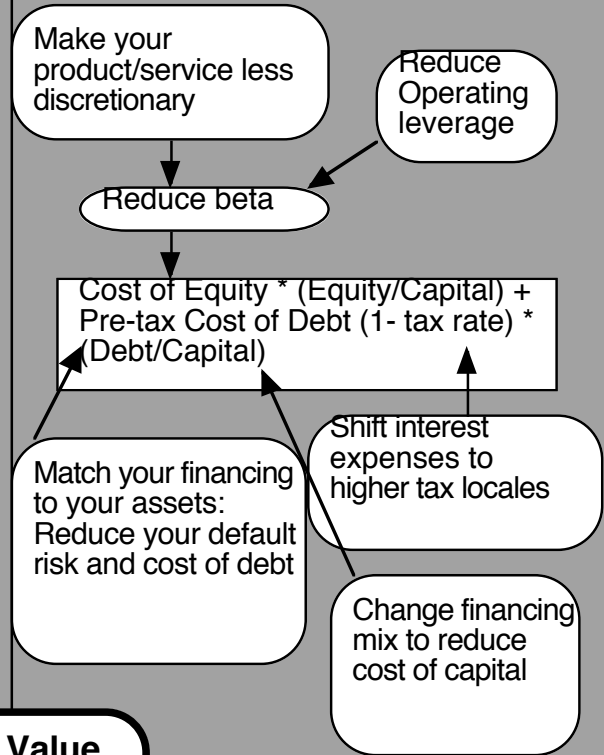
Firm Value

Increase Expected Growth

Reinvest more in projects

Do acquisitions

Increase operating margins

Reinvestment Rate

* Return on Capital

= Expected Growth Rate

Increase capital turnover ratio
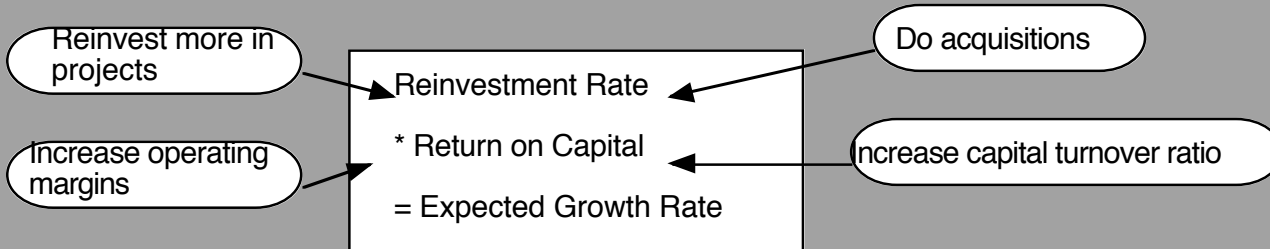
Increase length of growth period

Build on existing competitive advantages

Create new competitive advantages

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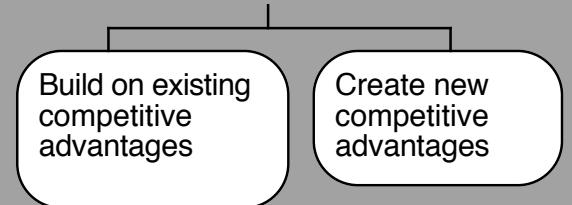
Adris Grupa (Status Quo): 4/2010

Current Cashflow to Firm
EBIT(1-t) : 436 HRK
- Nt CpX 3 HRK
- Chg WC -118 HRK
= FCFF 551 HRK
Reinv Rate = (3-118)/436= -26.35%;
Tax rate = 17.35%
Return on capital = 8.72%

Average from 2004-09
70.83%

Reinvestment Rate
70.83%

Expected Growth from new inv.
.7083*.0969 =0.0686
or 6.86%

Average from 2004-09
9.69%

Return on Capital
9.69%

Stable Growth
g = 4%; Beta = 0.80
Country Premium= 2%
Cost of capital = 9.92%
Tax rate = 20.00%
ROC=9.92%;
Reinvestment Rate=g/ROC
=4/9.92= 40.32%

Terminal Value$_5$= 365/(.0992-.04) =6170 HRK

HKR Cashflows

Op. Assets 4312
+ Cash: 1787
- Debt 141
- Minority int 465
=Equity 5,484
(Common + Preferred shares)
Value non-voting share
335 HRK/share

Year	1	2	3	4	5	
EBIT (1-t)	HRK 466	HRK 498	HRK 532	HRK 569	HRK 608	612
- Reinvestment	HRK 330	HRK 353	HRK 377	HRK 403	HRK 431	246
FCFF	HRK 136	HRK 145	HRK 155	HRK 166	HRK 177	365

Discount at $ Cost of Capital (WACC) = 10.7% (.974) + 5.40% (0.026) = 10.55%

On May 1, 2010
AG Pfd price = 279 HRK
AG Common = 345 HRK

Cost of Equity
10.70%

Cost of Debt
(4.25%+ 0.5%+2%)(1-.20)
= 5.40 %

Weights
E = 97.4% D = 2.6%

Riskfree Rate:
HRK Riskfree Rate=
4.25%

+

Beta
0.70

X

Mature market premium
4.5%

+

Lambda
0.68
X
CRP for Croatia
(3%)

Lambda
0.42
X
CRP for Central Europe
(3%)

Unlevered Beta for
Sectors: 0.68

Firm's D/E
Ratio: 2.70%

Country Default
Spread
2%

X

Rel Equity
Mkt Vol
1.50

Aswath Damodaran
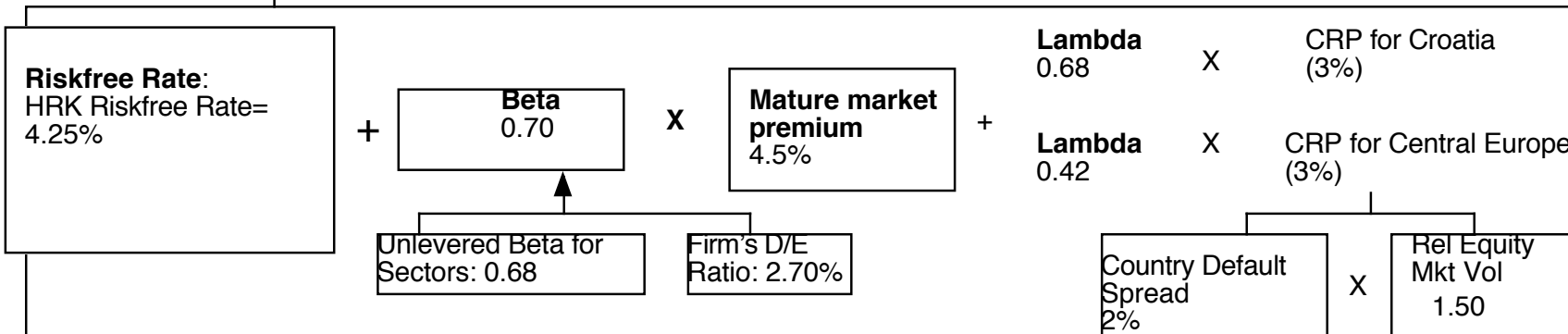
Adris Grupa: 4/2010 (Restructured)

Current Cashflow to Firm
EBIT(1-t) :   436 HRK
- Nt CpX   3 HRK
- Chg WC   -118 HRK
= FCFF   551 HRK
Reinv Rate = (3-118)/436= -26.35%;
Tax rate = 17.35%
Return on capital = 8.72%

Increased ROIC to cost of capital

Average from 2004-09
70.83%

Reinvestment Rate
70.83%

Expected Growth from new inv.
.7083*.01054=0.
or 6.86%

Return on Capital
10.54%

Stable Growth
g = 4%; Beta = 0.80
Country Premium= 2%
Cost of capital = 9.65%
Tax rate = 20.00%
ROC=9.94%;
Reinvestment Rate=g/ROC
=4/9.65= 41/47%

Terminal Value5= 367/(.0965-.04) =6508 HRK

HKR Cashflows

Op. Assets	4545	Year	1	2	3	4	5	
+ Cash:	1787	EBIT (1-t)	HRK 469	HRK 503	HRK 541	HRK 581	HRK 623	628
- Debt	141	- Reinvestment	HRK 332	HRK 356	HRK 383	HRK 411	HRK 442	246
- Minority int	465	FCFF	HRK 137	HRK 147	HRK 158	HRK 169	HRK 182	367
=Equity	5,735							
Value/non-voting	334							
Value/voting	362							

Discount at $ Cost of Capital (WACC) = 11.12% (.90) + 8.20% (0.10) = 10.55%

Changed mix of debt and equity tooptimal

On May 1, 2010
AG Pfd price = 279 HRK
AG Common = 345 HRK

Cost of Equity
11.12%

Cost of Debt
(4.25%+ 4%+2%)(1-.20)
= 8.20%

Weights
E = 90 % D = 10 %

Riskfree Rate:
HRK Riskfree Rate=
4.25%

+

Beta
0.75

X

Mature market premium
4.5%

+

Lambda
0.68

X

CRP for Croatia
(3%)

Lambda
0.42

X

CRP for Central Europe
(3%)

Unlevered Beta for
Sectors: 0.68

Firm's D/E
Ratio: 11.1%

Country Default
Spread
2%

X

Rel Equity
Mkt Vol
1.50

Value of Control and the Value of Voting Rights

- The value of control at Adris Grupa can be computed as the difference between the status quo value (5469) and the optimal value (5735).
- The value of a voting share derives entirely from the capacity you have to change the way the firm is run. In this case, we have two values for Adris Grupa's Equity.

  Status Quo Value of Equity = 5,469 million HKR

  All shareholders, common and preferred, get an equal share of the status quo value.

  Value for a non-voting share = 5469/(9.616+6.748) = 334 HKR/share

  Optimal value of Equity = 5,735 million HKR

  Value of control at Adris Grupa = 5,735 – 5469 = 266 million HKR

  Only voting shares get a share of this value of control

  Value per voting share = 334 HKR + 266/9.616 = 362 HKR

9. Distress and the Going Concern Assumption

- Traditional valuation techniques are built on the assumption of a going concern, i.e., a firm that has continuing operations and there is no significant threat to these operations.
  - In discounted cashflow valuation, this going concern assumption finds its place most prominently in the terminal value calculation, which usually is based upon an infinite life and ever-growing cashflows.
  - In relative valuation, this going concern assumption often shows up implicitly because a firm is valued based upon how other firms - most of which are healthy - are priced by the market today.

- When there is a significant likelihood that a firm will not survive the immediate future (next few years), traditional valuation models may yield an over-optimistic estimate of value.

Current Revenue
$ 4,390

Current Margin:
4.76%

Reinvestment:
Capital expenditures include cost of new casinos and working capital

Stable Growth

Stable Revenue Growth: 3%

Stable Operating Margin: 17%

Stable ROC=10% Reinvest 30% of EBIT(1-t)

EBIT $ 209m

Extended reinvestment break, due ot investment in past

Industry average

Expected Margin:
-> 17%

Terminal Value= 758(.0743-.03)
=$ 17,129

Term. Year

	1	2	3	4	5	6	7	8	9	10		
Revenues	$4,434	$4,523	$5,427	$6,513	$7,815	$8,206	$8,616	$9,047	$9,499	$9,974	$10,273	
Oper margin	5.81%	6.86%	7.90%	8.95%	10%	11.40%	12.80%	14.20%	15.60%	17%	17%	
EBIT	$258	$310	$429	$583	$782	$935	$1,103	$1,285	$1,482	$1,696	$ 1,746	
Tax rate	26.0%	26.0%	26.0%	26.0%	26.0%	28.4%	30.8%	33.2%	35.6%	38.00%	38%	
EBIT * (1 - t)	$191	$229	$317	$431	$578	$670	$763	$858	$954	$1,051	$1,083	
- Reinvestment	-$19	-$11	$0	$22	$58	$67	$153	$215	$286	$350	$ 325	
FCFF	$210	$241	$317	$410	$520	$603	$611	$644	$668	$701	$758	

	1	2	3	4	5	6	7	8	9	10
Beta	3.14	3.14	3.14	3.14	3.14	2.75	2.36	1.97	1.59	1.20
Cost of equity	21.82%	21.82%	21.82%	21.82%	21.82%	19.50%	17.17%	14.85%	12.52%	10.20%
Cost of debt	9%	9%	9%	9%	9%	8.70%	8.40%	8.10%	7.80%	7.50%
Debtl ratio	73.50%	73.50%	73.50%	73.50%	73.50%	68.80%	64.10%	59.40%	54.70%	50.00%
Cost of capital	9.88%	9.88%	9.88%	9.88%	9.88%	9.79%	9.50%	9.01%	8.32%	7.43%

Forever

Value of Op Assets	$ 9,793
+ Cash & Non-op	$ 3,040
= Value of Firm	$12,833
- Value of Debt	$ 7,565
= Value of Equity	$ 5,268
Value per share	$ 8.12

Cost of Equity
21.82%

Cost of Debt
3%+6%= 9%
9% (1-.38)=5.58%

Weights
Debt= 73.5% ->50%

Riskfree Rate:
T. Bond rate = 3%

+ Beta 3.14-> 1.20

X Risk Premium 6%

Las Vegas Sands Feburary 2009 Trading @ $4.25

Casino 1.15

Current D/E: 277%

Base Equity Premium

Country Risk Premium

The Distress Factor

■ In February 2009, LVS was rated B+ by S&P. Historically, <u>28.25% of B+ rated bonds default</u> within 10 years. LVS has a 6.375% bond, maturing in February 2015 (7 years), trading at $529. If we discount the expected cash flows on the bond at the riskfree rate, we can back out the probability of distress from the bond price:

$$529 = \sum_{t=1}^{t=7} \frac{63.75(1-p_{Distress})^t}{(1.03)^t} + \frac{1000(1-p_{Distress})^7}{(1.03)^7}$$

■ Solving for the probability of bankruptcy, we get:

$\pi_{Distress}$ = Annual probability of default = 13.54%

- Cumulative probability of surviving 10 years = $(1 - .1354)^{10}$ = 23.34%
- Cumulative probability of distress over 10 years = 1 - .2334 = .7666 or 76.66%

■ If LVS is becomes distressed:

- Expected distress sale proceeds = $2,769 million < Face value of debt
- Expected equity value/share = $0.00

■ Expected value per share = $8.12 (1 - .7666) + $0.00 (.7666) = $1.92

10. Analyzing the Effect of Illiquidity on Value

■ Investments which are less liquid should trade for less than otherwise similar investments which are more liquid.

■ The size of the illiquidity discount should vary across firms and also across time. The conventional practice of relying upon studies of restricted stocks or IPOs will fail sooner rather than later.

- Restricted stock studies are based upon small samples of troubled firms
- The discounts observed in IPO studies are too large for these to be arms length transactions. They just do not make sense.

Illiquidity Discounts from Bid-Ask Spreads

■ Using data from the end of 2000, for instance, we regressed the bid-ask spread against annual revenues, a dummy variable for positive earnings (DERN: 0 if negative and 1 if positive), cash as a percent of firm value and trading volume.

Spread = 0.145 – 0.0022 ln (Annual Revenues) -0.015 (DERN) – 0.016 (Cash/Firm Value) – 0.11 ($ Monthly trading volume/ Firm Value)

■ We could substitute in the revenues of Kristin Kandy ($5 million), the fact that it has positive earnings and the cash as a percent of revenues held by the firm (8%):

Spread = 0.145 – 0.0022 ln (Annual Revenues) -0.015 (DERN) – 0.016 (Cash/Firm Value) – 0.11 ($ Monthly trading volume/ Firm Value)

= 0.145 – 0.0022 ln (5) -0.015 (1) – 0.016 (.08) – 0.11 (0) = .12.52%

■ Based on this approach, we would estimate an illiquidity discount of 12.52% for Kristin Kandy.

Relative Valuation

Aswath Damodaran

Relative valuation is pervasive…

■ Most asset valuations are relative.

■ Most equity valuations on Wall Street are relative valuations.

- Almost 85% of equity research reports are based upon a multiple and comparables.

- More than 50% of all acquisition valuations are based upon multiples

- Rules of thumb based on multiples are not only common but are often the basis for final valuation judgments.

■ While there are more discounted cashflow valuations in consulting and corporate finance, they are often relative valuations masquerading as discounted cash flow valuations.

- The objective in many discounted cashflow valuations is to back into a number that has been obtained by using a multiple.

- The terminal value in a significant number of discounted cashflow valuations is estimated using a multiple.

The Reasons for the allure…

"If you think I'm crazy, you should see the guy who lives across the hall"

Jerry Seinfeld talking about Kramer in a Seinfeld episode

"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

- ■ **Define the multiple**
  - In use, the same multiple can be defined in <u>different ways</u> by different users. When comparing and using multiples, estimated by someone else, it is critical that we <u>understand how the multiples have been estimated</u>

- ■ **Describe the multiple**
  - Too many people who use a multiple have <u>no idea what its cross sectional distribution</u> 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 <u>understand the fundamentals</u> that drive each multiple, and the <u>nature of the relationship</u> between the multiple and each variable.

- ■ **Apply the multiple**
  - Defining the <u>comparable universe</u> and <u>controlling for differences</u> is far more difficult in practice than it is in theory.

Definitional Tests

■ 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.

Example 1: Price Earnings Ratio: Definition

PE = Market Price per Share / 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

Example 2: Enterprise Value /EBITDA Multiple

■ The enterprise value to EBITDA multiple is obtained by netting cash out against debt to arrive at enterprise value and dividing by EBITDA.

$$\frac{\text{Enterprise Value}}{\text{EBITDA}} = \frac{\text{Market Value of Equity} + \text{Market Value of Debt} - \text{Cash}}{\text{Earnings before Interest, Taxes and Depreciation}}$$

■ Why do we net out cash from firm value?

■ What happens if a firm has cross holdings which are categorized as:

- Minority interests?
- Majority active interests?

Descriptive Tests

- What is the <u>average and standard deviation</u> for this multiple, across the universe (market)?

- What is the <u>median</u> for this multiple?
  - The median for this multiple is often a more reliable comparison point.

- How <u>large are the outliers</u> to the distribution, and <u>how do we deal</u> 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 <u>cannot be estimated</u>? Will ignoring these cases lead to a <u>biased estimate</u> of the multiple?

- How has this multiple <u>changed over time</u>?
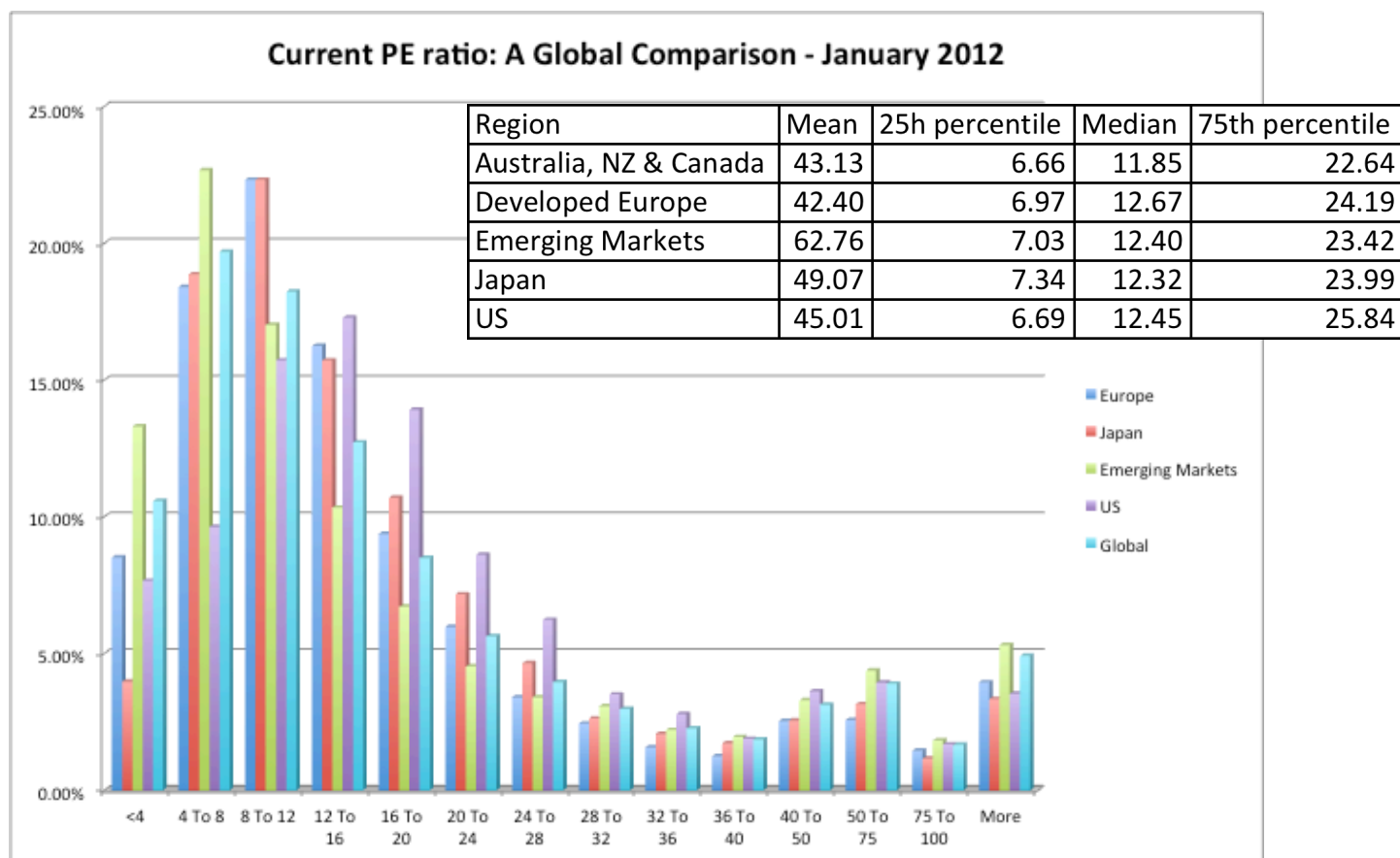
1. Multiples have skewed distributions…

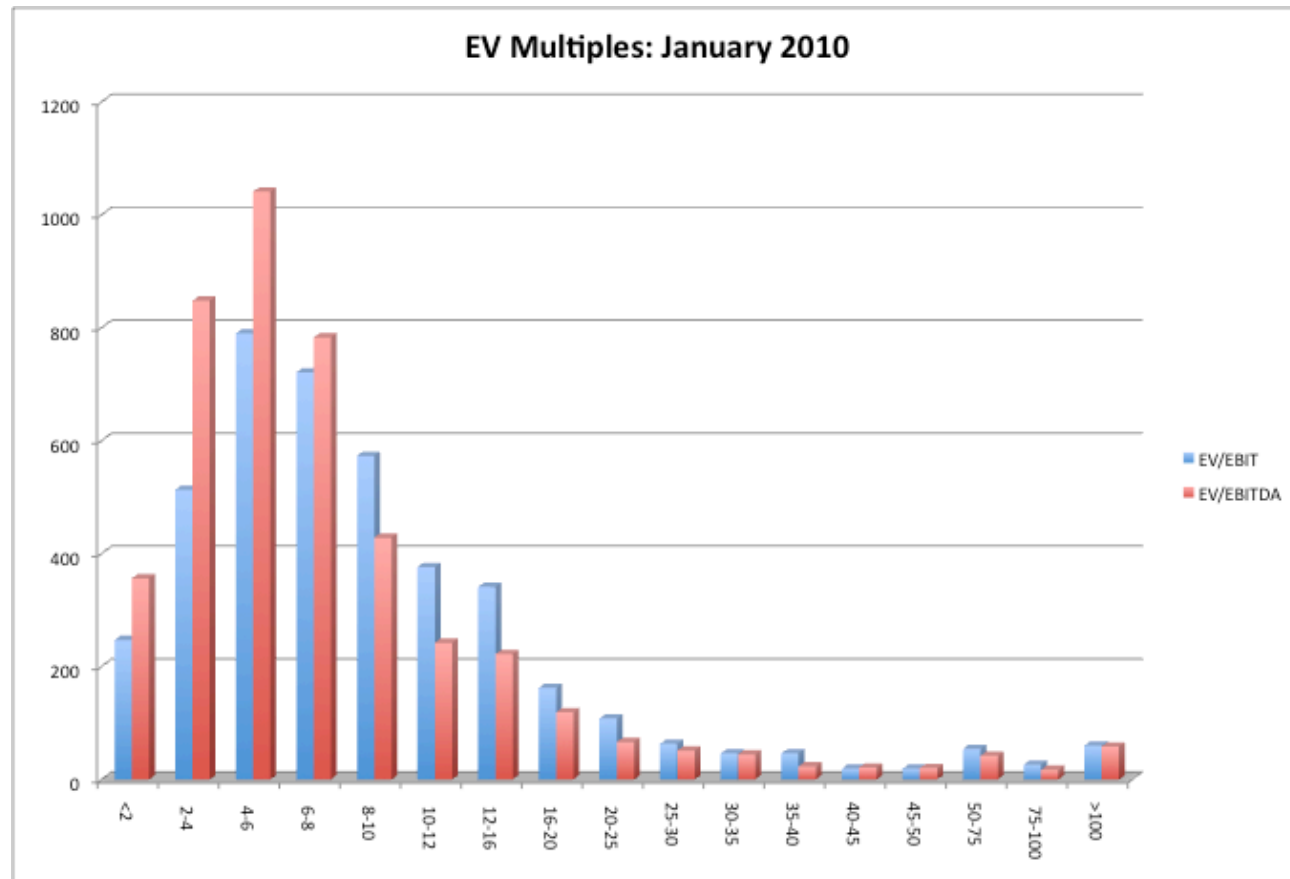PE Ratios for US companies - January 2012
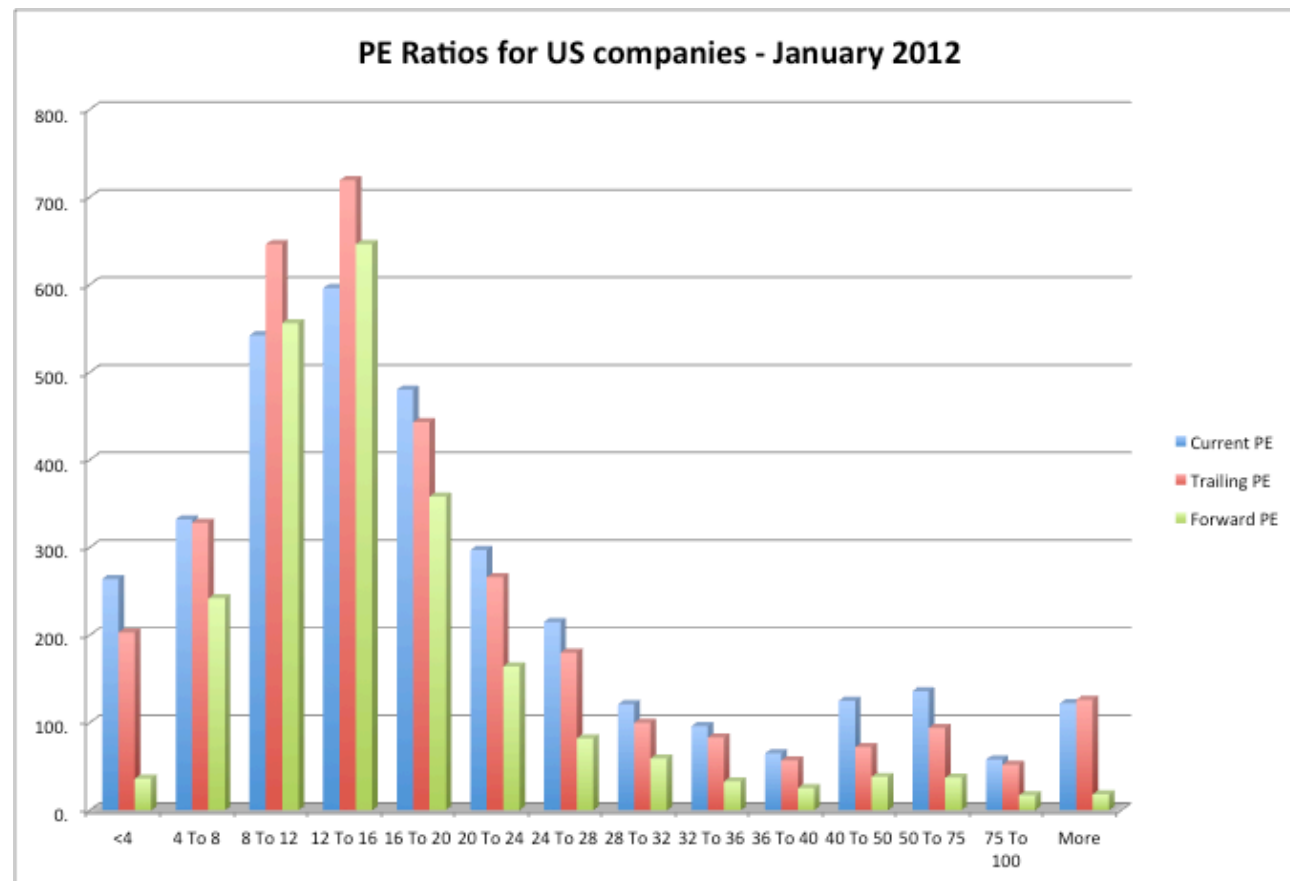
2. Making statistics "dicey"

	Current PE	Trailing PE	Forward PE
Total firms	5891	5891	5891
Number of firms with PE	3456	3375	2311
Average	42.56	33.67	18.28
Median	15.94	14.56	13.74
Minimum	0.1	0.2	0.44
25th percentile	10.11	10	10.34
75th percentile	25.34	22.34	18.69
Maximum	18358	5083	780
Standard deviation	7.26	3.00	0.62
Skewness	33.40	21.86	15.98

3. Markets have a lot in common
PE Ratios: US, Europe, Japan and Emerging Markets –
January 2012

Current PE ratio: A Global Comparison - January 2012

Region	Mean	25h percentile	Median	75th percentile
Australia, NZ & Canada	43.13	6.66	11.85	22.64
Developed Europe	42.40	6.97	12.67	24.19
Emerging Markets	62.76	7.03	12.40	23.42
Japan	49.07	7.34	12.32	23.99
US	45.01	6.69	12.45	25.84

Legend:
- Europe
- Japan
- Emerging Markets
- US
- Global

X-axis categories: <4, 4 To 8, 8 To 12, 12 To 16, 16 To 20, 20 To 24, 24 To 28, 28 To 32, 32 To 36, 36 To 40, 40 To 50, 50 To 75, 75 To 100, More

4. Simplistic rules almost always break down…6 times EBITDA may not be cheap…

Or it may be…

EV/EBIT & EV/EBITDA- US companies in January 2012
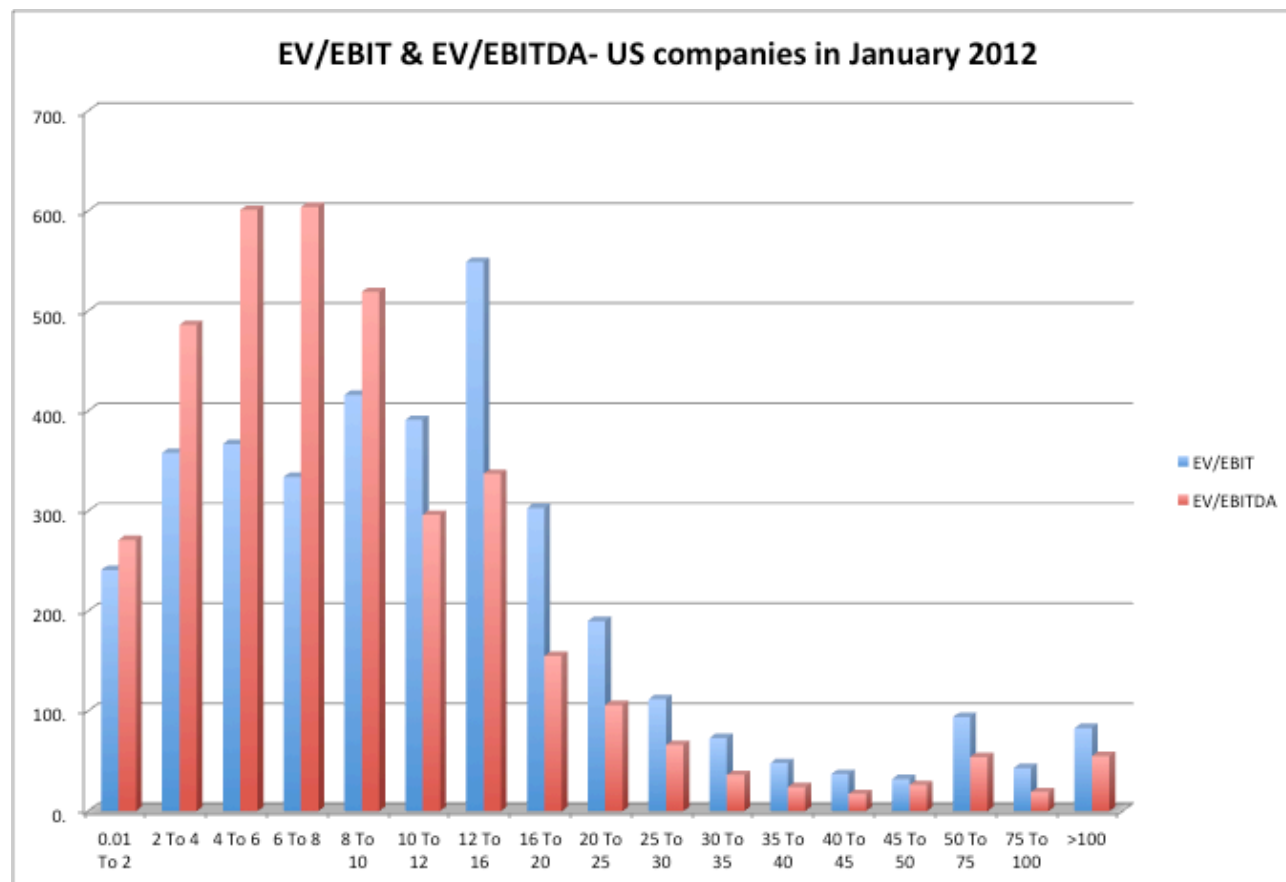
Analytical Tests

- ■ What are the <u>fundamentals</u> 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 <u>changes in these fundamentals </u>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.**

PE Ratio: Understanding the Fundamentals

■ To understand the fundamentals, start with a basic <u>equity</u> discounted cash flow model.

■ With the dividend discount model,

$$P_0 = \frac{DPS_1}{r - g_n}$$

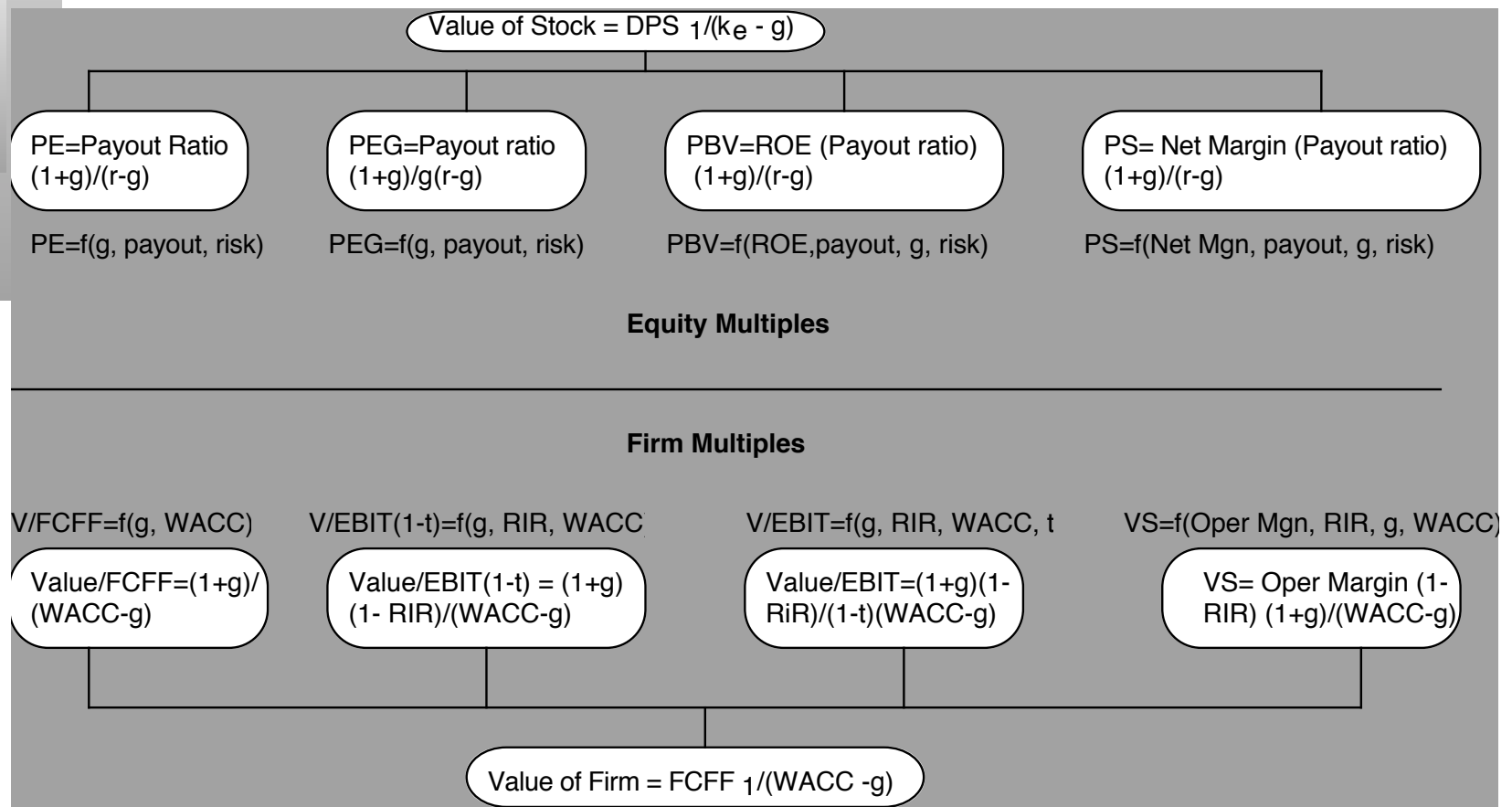■ Dividing both sides by the current earnings per share,

$$\frac{P_0}{EPS_0} = PE = \frac{\text{Payout Ratio} * (1 + g_n)}{r - g_n}$$

■ If this had been a FCFE Model,

$$P_0 = \frac{FCFE_1}{r - g_n}$$

$$\frac{P_0}{EPS_0} = PE = \frac{(FCFE/\text{Earnings}) * (1 + g_n)}{r - g_n}$$

The Determinants of Multiples…

$$\text{Value of Stock} = DPS_1/(k_e - g)$$

PE=Payout Ratio $(1+g)/(r-g)$	PEG=Payout ratio $(1+g)/g(r-g)$	PBV=ROE (Payout ratio) $(1+g)/(r-g)$	PS= Net Margin (Payout ratio) $(1+g)/(r-g)$

PE=f(g, payout, risk)   PEG=f(g, payout, risk)   PBV=f(ROE,payout, g, risk)   PS=f(Net Mgn, payout, g, risk)

Equity Multiples

Firm Multiples

V/FCFF=f(g, WACC)   V/EBIT(1-t)=f(g, RIR, WACC   V/EBIT=f(g, RIR, WACC, t   VS=f(Oper Mgn, RIR, g, WACC)

Value/FCFF=$(1+g)/$ $(WACC-g)$	Value/EBIT(1-t) = $(1+g)$ $(1- RIR)/(WACC-g)$	Value/EBIT=$(1+g)(1-$ $RiR)/(1-t)(WACC-g)$	VS= Oper Margin $(1-$ $RIR) (1+g)/(WACC-g)$

$$\text{Value of Firm} = FCFF_1/(WACC - g)$$

Application Tests

■ 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.**

An Example: Comparing PE Ratios across a Sector: PE

Company Name	PE	Growth
PT Indosat ADR	7.8	0.06
Telebras ADR	8.9	0.075
Telecom Corporation of New Zealand ADR	11.2	0.11
Telecom Argentina Stet - France Telecom SA ADR B	12.5	0.08
Hellenic Telecommunication Organization SA ADR	12.8	0.12
Telecomunicaciones de Chile ADR	16.6	0.08
Swisscom AG ADR	18.3	0.11
Asia Satellite Telecom Holdings ADR	19.6	0.16
Portugal Telecom SA ADR	20.8	0.13
Telefonos de Mexico ADR L	21.1	0.14
Matav RT ADR	21.5	0.22
Telstra ADR	21.7	0.12
Gilat Communications	22.7	0.31
Deutsche Telekom AG ADR	24.6	0.11
British Telecommunications PLC ADR	25.7	0.07
Tele Danmark AS ADR	27	0.09
Telekomunikasi Indonesia ADR	28.4	0.32
Cable & Wireless PLC ADR	29.8	0.14
APT Satellite Holdings ADR	31	0.33
Telefonica SA ADR	32.5	0.18
Royal KPN NV ADR	35.7	0.13
Telecom Italia SPA ADR	42.2	0.14
Nippon Telegraph & Telephone ADR	44.3	0.2
France Telecom SA ADR	45.2	0.19
Korea Telecom ADR	71.3	0.44

PE, Growth and Risk

Dependent variable is: PE

R squared = 66.2%   R squared (adjusted) = 63.1%

Variable	Coefficient	SE	t-ratio	prob
Constant	13.1151	3.471	3.78	0.0010
Growth rate	121.223	19.27	6.29	≤ 0.0001
Emerging Market	-13.8531	3.606	-3.84	0.0009

Emerging Market is a dummy: 1 if emerging market

0 if not

Is Telebras under valued?

- Predicted PE = 13.12 + 121.22 (.075) - 13.85 (1) = 8.35
- At an actual price to earnings ratio of 8.9, Telebras is slightly overvalued.

Amgen's Relative Value

Company Name	Market Cao	PE Ratio	Expected Growth	Beta	ROE
King Pharmac.	$5,064	12.64	-0.50%	1.10	20.29%
Pfizer Inc.	$190,923	12.74	2.00%	0.85	21.07%
GlaxoSmithKline ADR	$158,986	15.63	5.00%	0.85	55.29%
Amgen	$66,847	15.99	15.00%	0.85	22.05%
Wyeth	$74,271	17.35	9.00%	1.00	29.22%
Novartis AG ADR	$133,805	18.58	7.50%	0.70	17.52%
Lilly (Eli)	$66,440	19.21	7.00%	0.85	31.49%
Merck & Co.	$110,731	20.09	7.00%	0.85	31.40%
Hospira Inc.	$6,416	20.72	8.00%	0.70	22.75%
Cephalon Inc.	$5,183	21.17	14.00%	1.15	18.69%
Forest Labs.	$16,381	24.56	10.00%	0.80	24.72%
Teva Pharmac. (ADR)	$29,272	27.30	14.50%	0.75	17.75%
Gilead Sciences	$37,365	32.17	17.50%	0.90	63.97%
Schering-Plough	$46,814	34.63	29.50%	0.95	20.89%
Novo Nordisk ADR	$33,333	35.87	14.50%	0.85	21.22%
Bristol-Myers Squibb	$58,636	36.99	7.00%	1.00	13.65%
Genentech Inc.	$83,856	39.69	27.50%	0.80	22.29%
Allergan Inc.	$18,595	41.15	15.00%	0.85	14.38%
Biogen Idec Inc.	$15,254	70.13	33.50%	1.10	3.04%
Celgene Corp.	$23,683	343.23	59.00%	1.30	3.49%
MedImmune Inc.	$13,560	797.62	58.00%	1.00	1.23%

The Drivers of PE Ratios…

■ Regressing PE ratios against growth, we get

- PE = 14.86 + 0.85 (Expected growth rate) $R^2 = 49\%$
- Plugging in Amgen's expected growth rate of 15%, we get
- PE = 14.86 + 0.85 (15) = 27.61

■ At 16 times earnings, Amgen seems to be significantly undervalued by almost 40% relative to the rest of the pharmaceutical sector.

Comparisons to the entire market: Why not?

- In contrast to the 'comparable firm' approach, the information in the entire cross-section of firms can be used to predict PE ratios.

- The simplest way of summarizing this information is with a multiple regression, with the PE ratio as the dependent variable, and proxies for risk, growth and payout forming the independent variables.

PE Ratio: Standard Regression for US stocks - January 2012

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.340[a]	.116	.114	1068.79044

a. Predictors: (Constant), Payout Ratio, 3-yr Regression Beta, Expected Growth in EPS: next 5 years

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.477	.760		17.734	.000
	Expected Growth in EPS: next 5 years	40.841	2.627	.354	15.545	.000
	3-yr Regression Beta	-2.006	.499	-.092	-4.023	.000
	Payout Ratio	2.881	.992	.066	2.905	.004

a. Dependent Variable: Current PE
b. Weighted Least Squares Regression – Weighted by Market Cap

Amgen valued relative to the market

■ Plugging in Amgen's numbers into the January 2007 market regression:

- Expected growth rate = 15%
- Beta = 0.85
- Payout ratio = 0%
- Predicted PE = 10.645 + 1.176 (15) - 2.621 (0.85) = 26.06

■ Again, at 16 times earnings, Amgen seems to be significantly undervalued, relative to how the market is pricing all other stocks.

Fundamentals in other markets: PE regressions across markets…

Region	Regression – January 2012	R squared
Europe	PE = 19.57 - 2.91 Payout - 3.67 Beta	6.9%
Japan	PE = 21.69 - 0.31 Expected Growth -4.12 Beta	5.3%
Emerging Markets	PE = 15.48+ 9.03 ROE - 2.77 Beta + 2.91 Payout	4.3%

Choosing Between the Multiples

■ As presented in this section, there are dozens of multiples that can be potentially used to value an individual firm.

■ In addition, relative valuation can be relative to a sector (or comparable firms) or to the entire market (using the regressions, for instance)

■ Since there can be only one final estimate of value, there are three choices at this stage:

- Use a simple average of the valuations obtained using a number of different multiples

- Use a weighted average of the valuations obtained using a nmber of different multiples

- Choose one of the multiples and base your valuation on that multiple

Picking one Multiple

- This is usually the best way to approach this issue. While a range of values can be obtained from a number of multiples, the "best estimate" value is obtained using one multiple.
- The multiple that is used can be chosen in one of two ways:
  - Use the multiple that <u>best fits your objective</u>. Thus, if you want the company to be undervalued, you pick the multiple that yields the highest value.
  - Use the multiple that <u>has the highest R-squared</u> in the sector when regressed against fundamentals. Thus, if you have tried PE, PBV, PS, etc. and run regressions of these multiples against fundamentals, use the multiple that works best at explaining differences across firms in that sector.
  - Use the multiple that seems to <u>make the most sense</u> for that sector, given how value is measured and created.

Conventional usage…

Sector	Multiple Used	Rationale
Cyclical Manufacturing	PE, Relative PE	Often with normalized earnings
Growth firms	PEG ratio	Big differences in growth rates
Young growth firms w/ losses	Revenue Multiples	What choice do you have?
Infrastructure	EV/EBITDA	Early losses, big DA
REIT	P/CFE (where CFE = Net income + Depreciation)	Big depreciation charges on real estate
Financial Services	Price/ Book equity	Marked to market?
Retailing	Revenue multiples	Margins equalize sooner or later

Aswath Damodaran

A closing thought…