Let the games begin… Time to value companies..

Let's have some fun!

Equity Risk Premiums in Valuation

- The equity risk premiums that I have used in the valuations that follow reflect my thinking (and how it has evolved) on the issue.
  - Pre-1998 valuations: In the valuations prior to 1998, I use a risk premium of 5.5% for mature markets (close to both the historical and the implied premiums then)
  - Between 1998 and Sept 2008: In the valuations between 1998 and September 2008, I used a risk premium of 4% for mature markets, reflecting my belief that risk premiums in mature markets do not change much and revert back to historical norms (at least for implied premiums).
  - Valuations done in 2009: After the 2008 crisis and the jump in equity risk premiums to 6.43% in January 2008, I have used a higher equity risk premium (5-6%) for the next 5 years and will assume a reversion back to historical norms (4%) only after year 5.
  - After 2009: In 2010, I reverted back to a mature market premium of 4.5%, reflecting the drop in equity risk premiums during 2009. In 2011, I used 5%, reflecting again the change in implied premium over the year. In 2012 and 2013, stayed with 6%, reverted to 5% in 2014 and will be using 5.75% in 2015.

Aswath Damodaran

The Valuation Set up

- With each company that I value in this next section, I will try to start with a story about the company and use that story to construct a valuation.

- With each valuation, rather than focus on all of the details (which will follow the blueprint already laid out), I will focus on a specific component of the valuation that is unique or different.

Aswath Damodaran

274

Training Wheels On?

Stocks that look like Bonds, Things Change and Market Valuations

Aswath Damodaran

Training Wheels valuation: Con Ed in August 2008

Test 1: Is the firm paying dividends like a stable growth firm?
Dividend payout ratio is 73%
In trailing 12 months, through June 2008
Earnings per share = $3.17
Dividends per share = $2.32

Test 2: Is the stable growth rate consistent with fundamentals?
Retention Ratio = 27%
ROE =Cost of equity = 7.7%
Expected growth = 2.1%

Growth rate forever = 2.1%

Value per share today= Expected Dividends per share next year / (Cost of equity - Growth rate)
= 2.32 (1.021)/ (.077 - ,021) = $42.30

Cost of Equity = 4.1% + 0.8 (4.5%) = 7.70%

On August 12, 2008 Con Ed was trading at $ 40.76.

Riskfree rate
4.10%
10-year T.Bond rate

Beta
0.80
Beta for regulated power utilities

Equity Risk Premium
4.5%
Implied Equity Risk Premium - US market in 8/2008

Test 3: Is the firm's risk and cost of equity consistent with a stable growith firm?
Beta of 0.80 is at lower end of the range of stable company betas: 0.8 -1.2

Why a stable growth dividend discount model?
1. Why stable growth: Company is a regulated utility, restricted from investing in new growth markets. Growth is constrained by the fact that the population (and power needs) of its customers in New York are growing at very low rates.
Growth rate forever = 2%
2. Why equity: Company's debt ratio has been stable at about 70% equity, 30% debt for decades.
3. Why dividends: Company has paid out about 97% of its FCFE as dividends over the last five years.

A breakeven growth rate to get to market price…

Con Ed: Value versus Growth Rate

Aswath Damodaran
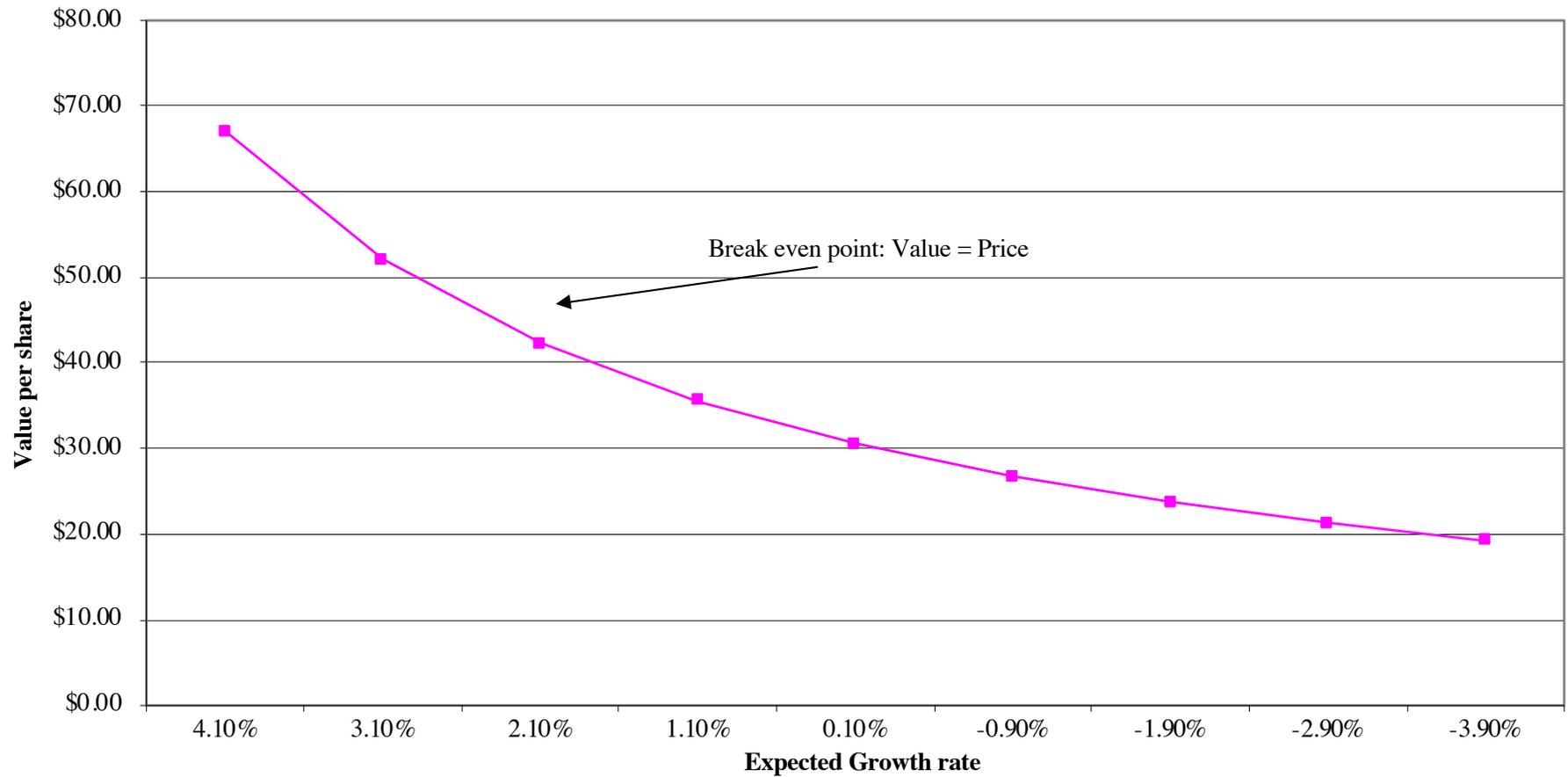
From DCF value to target price and returns...

□ Assume that you believe that your valuation of Con Ed ($42.30) is a fair estimate of the value, 7.70% is a reasonable estimate of Con Ed's cost of equity and that your expected dividends for next year (2.32*1.021) is a fair estimate, what is the expected stock price a year from now (assuming that the market corrects its mistake?)

□ If you bought the stock today at $40.76, what return can you expect to make over the next year (assuming again that the market corrects its mistake)?

Aswath Damodaran

3M: A Pre-crisis valuation

Current Cashflow to Firm
EBIT(1-t)= 5344 (1-**.35**)= 3474
- Nt CpX= 350
- Chg WC 691
= FCFF 2433
Reinvestment Rate = 1041/3474
=29.97%
Return on capital = 25.19%

Reinvestment Rate
30%

Return on Capital
25%

Expected Growth in EBIT (1-t)
.30*.25=.075
7.5%

Stable Growth
g = 3%; Beta = 1.10;
Debt Ratio= 20%; Tax rate=35%
Cost of capital = 6.76%
ROC= 6.76%;
Reinvestment Rate=3/6.76=44%

Terminal Value$_5$= 2645/(.0676-.03) = 70,409

First 5 years

Op. Assets 60607
+ Cash: 3253
- Debt 4920
=Equity 58400

Value/Share $ 83.55

Year	1	2	3	4	5	Term Yr
EBIT (1-t)	$3,734	$4,014	$4,279	$4,485	$4,619	$4,758
- Reinvestment	$1,120	$1,204	$1,312	$1,435	$1,540 ,	$2,113
= FCFF	$2,614	$2,810	$2,967	$3,049	$3,079	$2,645

Cost of capital = 8.32% (0.92) + 2.91% (0.08) = 7.88%

On September 12, 2008, 3M was trading at $70/share

Cost of Equity
8.32%

Cost of Debt
(3.72%+.75%)(1-.35)
= 2.91%

Weights
E = 92% D = 8%

Riskfree Rate:
Riskfree rate = 3.72%

+

Beta
1.15

X

Risk Premium
4%

Unlevered Beta for Sectors: 1.09

D/E=8.8%

3M: Post-crisis valuation

Lowered base operating income by 10%

Current Cashflow to Firm
EBIT(1-t)= 4810 (1-.35)= 3,180
— Nt CpX= 350
- Chg WC 691
= FCFF 2139
Reinvestment Rate = 1041/3180
=33%
Return on capital = 23.06%

Reinvestment Rate
25%

Reduced growth rate to 5%

Expected Growth in EBIT (1-t)
.25*.20=.05
5%

Return on Capital
20%

Did not increase debt ratio in stable growth to 20%

Stable Growth
g = 3%; Beta = 1.00;; ERP =4%
Debt Ratio= 8%; Tax rate=35%
Cost of capital = 7.55%
ROC= 7.55%;
Reinvestment Rate=3/7.55=40%

Terminal Value$_5$= 2434/(.0755-.03) = 53,481

Op. Assets 43,975
+ Cash: 3253
- Debt 4920
=Equity 42308

Value/Share $ 60.53

First 5 years

Year	1	2	3	4	5	Term Yr
EBIT (1-t)	$3,339	$3,506	$3,667	$3,807	$3,921	$4,038
- Reinvestment	$835	$877	$1,025	$1,288	$1,558	$1,604
= FCFF	$2,504	$2,630	$2,642	$2,519	$2,363	$2,434

Cost of capital = 10.86% (0.92) + 3.55% (0.08) = 10.27%

Higher default spread for next 5 years

Cost of Equity 10.86%

Cost of Debt
(3.96%+.1.5%)(1-.35)
= 3.55%

Weights
E = 92% D = 8%

On October 16, 2008, MMM was trading at $57/share.

Increased risk premium to 6% for next 5 years

Riskfree Rate:
Riskfree rate = 3.96%

+

Beta
1.15

X

Risk Premium
6%

Unlevered Beta for Sectors: 1.09

D/E=8.8%

Aswath Damodaran

From a Company to the Market: Valuing the S&P 500: Dividend Discount Model in January 2020

Rationale for model

Why dividends? Because it is the only tangible cash flow, right?

Why 2-stage? Because the expected growth rate in near term is higher than stable growth rate.

Dividends
$ Dividends in trailing 12 months = 58.80

Expected Growth
Analyst estimate for growth over next 5 years = 3.96%

g = Riskfree rate = 1.92%
Assume that earnings on the index will grow at same rate as economy.

Terminal Value= DPS in year 6/ (r-g)
= (71.39*1.0192)/(.0692-.0192) = 1455.21

Dividends

| 61.13 | 63.55 | 66.06 | 68.67 | 71.39 | .... |

Forever

Value of Equity per share = PV of Dividends & Terminal value at 6.92% = 1311.87

Discount at Cost of Equity

On January 1, 2020, the S&P 500 index was trading at 3230.78

Cost of Equity
1.92% + 1.00 (5.00%) = 6.92%

Riskfree Rate:
Treasury bond rate
1.92%

+

Beta
1.00

X

Risk Premium
5.00%
Set at slightly above the average ERP over the last 20 years

S&P 500 is a good reflection of overall market

Rationale for model
Why augmented dividends? Because companies are increasing returning cash in the form of stock buybacks
Why 2-stage? Because the expected growth rate in near term is higher than stable growth rate.

Dividends
$ Dividends + $ Buybacks in trailing 12 months = 150.50

Expected Growth
Analyst estimate for growth over next 5 years = 3.96%

g = Riskfree rate = 1.92%
Assume that earnings on the index will grow at same rate as economy.

Terminal Value= Augmented Dividends in year 6/ (r-g)
= (182.73*1.0192)/(.0692-.0192) = 3274.75

Dividends

156.46   162.65   169.08   175.77   182.73   ....   Forever

Discount at Cost of Equity

Value of Equity per share = PV of Cashflows & Terminal value at 6.92% = 3357.86

On January 1, 2020, the S&P 500 index was trading at 3230.78

Cost of Equity
1.92% + 1.00 (5.00%) = 6.92%

Riskfree Rate: Treasury bond rate 1.92%

+ **Beta** 1.00

X

Risk Premium
5.00%
Set just above the average ERP over the 20 years

S&P 500 is a good reflection of overall market

| $	156.46	$	162.65	$	169.08	$	175.77	$	182.73	186.24

Valuing the S&P 500: Augmented Dividends and Fundamental Growth January 2020

Rationale for model

Why augmented dividends? Because companies are increasing returning cash in the form of stock buybacks

Why 2-stage? Why not?

Dividends $ Dividends + $ Buybacks in trailing 12 months = 150.50	**Expected Growth in Earnings** Forecasted = 3.96%

g = Riskfree rate = 1.92%

Earnings on the index will grow at same rate as economy

Payout ratio = 1- g/ ROE = 1- 1.92%/18.44% = 89.66%

Earnings	163.00	169.45	176.15	183.12	190.37	197.90
Cash Payout %	92.33%	91.80%	91.27%	90.73%	90.20%	89.66%
Dividends + Buybacks	150.50	$ 155.55	$ 160.77	$ 166.15	$ 171.71	$ 177.44

Terminal Value= Augmented Dividends in year 6/ (r-g)

= (177.44*1.0192)/(.0692-.0192) = 361.7.00

Forever

Value of Equity per share = PV of Dividends & Terminal value at 6.92% = 3268.95

Discount at Cost of Equity

On January 1, 2020, the S&P 500 index was trading at 3230.78

Cost of Equity 1.92% + 1.00 (5%) = 6.92%

Riskfree Rate: Treasury bond rate 1.92%	+	**Beta** 1.00	X	**Risk Premium** 5.00% Set just above the average ERP over the last 20 years

S&P 500 is a good reflection of overall market

Evaluating the Effect of Tax Reform on January 1, 2018

Macro Inputs
US T.Bond rate (1/1/18) = 2.41%
ERP = 5.08%

Tax Reform and Aggregate Value Effects: US Equities

	Pre-tax reform	Post-tax reform
Beta	1.07	1.07
Pre-tax cost of debt	3.91%	3.91%
Marginal Tax Rate	38.00%	24.00%
Debt to Capital Ratio	23.51%	23.51%
Revenues	$12,254.10	$12,254.10
Operating Income (EBIT)	$1,438.22	$1,438.22
Effective tax rate	25.19%	20.00%
After-tax return on capital	12.76%	13.65%
Reinvestment Rate =	59.27%	65.00%
Length of growth period =	5	5
Computed Values	Pre-tax reform	Post-tax reform
Cost of Equity =	7.85%	7.85%
After-tax cost of debt =	2.42%	2.97%
Cost of capital =	6.57%	6.70%
After-tax return on capital =	12.76%	13.65%
Reinvestment Rate =	59.27%	65.00%
Expected growth rate=	7.56%	8.87%
Value of firm		
PV of FCFF in high growth =	$2,253.08	$2,139.72
Terminal value =	$30,926.29	$34,590.66
Value of firm today =	**$24,750.46**	**$27,151.37**

Marginal Tax Rate
The drop in the federal corporate tax rate from 35% to 21% lowers overall marginal tas rate (with state & local taxes) from 38% to 24%

Effective tax rate
Change in corporate tax rate on US income & shift to regional tax model for global taxes will lower effective tax rate from 25.19% to 20%

Tax effect on debt
Lower marginal tax rate increases after tax cost of debt and capital (holding debt ratio fixed).

Higher ROIC/Reinvestment
ROIC rises proportionatelhy with drop in effective tax rate. Capital expensing rules lead to marginally more reinvestment.
Expected Growth = ROIC * Reinvestment Rate

Value with old tax code inputs = $24,751 billion
Value with new tax code inputs = $27,151 billion
Change in value = **$2,400 billion**
Percentage Change in value = 2400/24,751 = **9.70%**

Aswath Damodaran

The Dark Side of Valuation

Anyone can value a company that is stable, makes money and has an established business model!

Aswath Damodaran

The fundamental determinants of value…

What is the **value added** by growth assets?
Equity: Growth in equity earnings/ cashflows
Firm: Growth in operating earnings/ cashflows

What are the **cashflows from existing assets**?
- Equity: Cashflows after debt payments
- Firm: Cashflows before debt payments

When will the firm become a **mature fiirm**, and what are the potential roadblocks?

How **risky are the cash flows** from both existing assets and growth assets?
Equity: Risk in equity in the company
Firm: Risk in the firm's operations

Aswath Damodaran

The Dark Side of Valuation…

☐ Valuing stable, money making companies with consistent and clear accounting statements, a long and stable history and lots of comparable firms is easy to do.

☐ The true test of your valuation skills is when you have to value "difficult" companies. In particular, the challenges are greatest when valuing:

- ❑ Young companies, early in the life cycle, in young businesses
- ❑ Companies that don't fit the accounting mold
- ❑ Companies that face substantial truncation risk (default or nationalization risk)

Aswath Damodaran

Difficult to value companies…

- Across the life cycle:
  - Young, growth firms: Limited history, small revenues in conjunction with big operating losses and a propensity for failure make these companies tough to value.
  - Mature companies in transition: When mature companies change or are forced to change, history may have to be abandoned and parameters have to be reestimated.
  - Declining and Distressed firms: A long but irrelevant history, declining markets, high debt loads and the likelihood of distress make them troublesome.

- Across markets
  - Emerging market companies are often difficult to value because of the way they are structured, their exposure to country risk and poor corporate governance.

- Across sectors
  - Financial service firms: Opacity of financial statements and difficulties in estimating basic inputs leave us trusting managers to tell us what's going on.
  - Commodity and cyclical firms: Dependence of the underlying commodity prices or overall economic growth make these valuations susceptible to macro factors.
  - Firms with intangible assets: Accounting principles are left to the wayside on these firms.

Aswath Damodaran

I. The challenge with young companies...

Making judgments on revenues/ profits difficult becaue you cannot draw on history. If you have no product/ service, it is difficult to gauge market potential or profitability. The company;s entire value lies in future growth but you have little to base your estimate on.

Cash flows from existing assets non-existent or negative.

What is the value added by growth assets?

What are the cashflows from existing assets?

When will the firm become a mature fiirm, and what are the potential roadblocks?

Different claims on cash flows can affect value of equity at each stage.

How risky are the cash flows from both existing assets and growth assets?

What is the value of equity in the firm?

Limited historical data on earnings, and no market prices for securities makes it difficult to assess risk.

Will the firm will make it through the gauntlet of market demand and competition. Even if it does, assessing when it will become mature is difficult because there is so little to go on.

Aswath Damodaran

Upping the ante.. Young companies in young businesses…

- When valuing a business, we generally draw on three sources of information
  - The firm's current financial statement
    - How much did the firm sell?
    - How much did it earn?
  - The firm's financial history, usually summarized in its financial statements.
    - How fast have the firm's revenues and earnings grown over time?
    - What can we learn about cost structure and profitability from these trends?
    - Susceptibility to macro-economic factors (recessions and cyclical firms)
  - The industry and comparable firm data
    - What happens to firms as they mature? (Margins.. Revenue growth… Reinvestment needs… Risk)
- It is when valuing these companies that you find yourself tempted by the dark side, where
  - "Paradigm shifts" happen…
  - New metrics are invented …
  - The story dominates and the numbers lag…

Aswath Damodaran

9a. Amazon in January 2000

Current Revenue $ 1,117

Current Margin: -36.71%

Sales to capital ratio and expected margin are retail industry average numbers

EBIT -410m
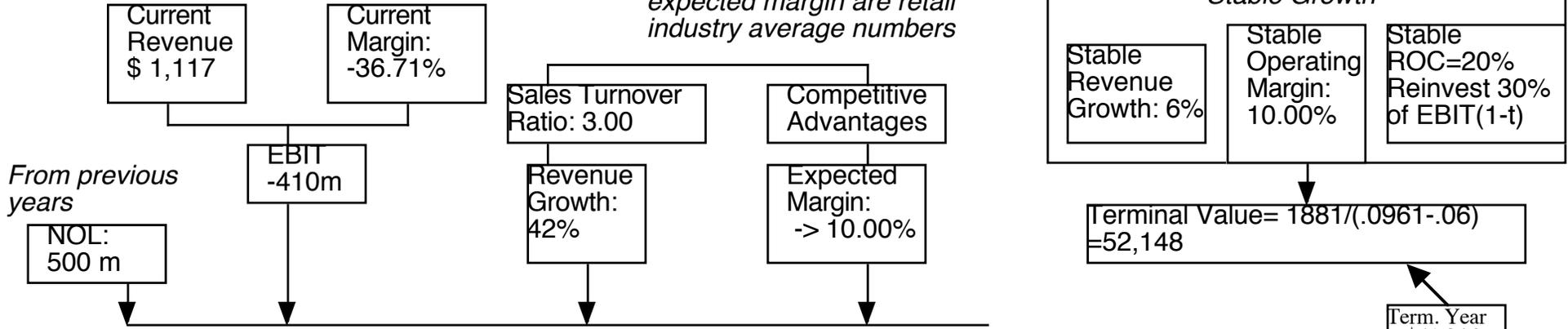
From previous years

NOL: 500 m

Sales Turnover Ratio: 3.00

Revenue Growth: 42%

Competitive Advantages

Expected Margin: -> 10.00%

Stable Growth

Stable Revenue Growth: 6%

Stable Operating Margin: 10.00%

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

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

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

	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

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

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

All existing options valued as options, using current stock price of $84.

Cost of Equity 12.90%

Used average interest coverage ratio over next 5 years to get BBB rating.

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

Weights Debt= 1.2% -> 15%

Amazon was trading at $84 in January 2000.

Pushed debt ratio to retail industry average of 15%.

Dot.com retailers for firrst 5 years
Convetional retailers after year 5

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
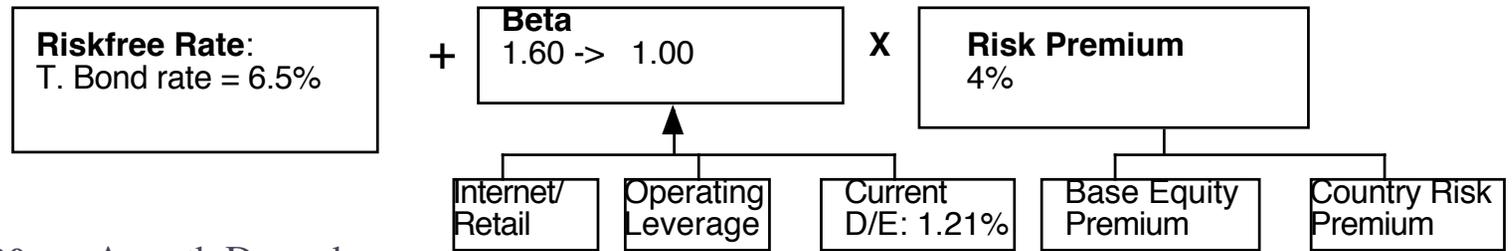
Lesson 1: Don't sweat the small stuff
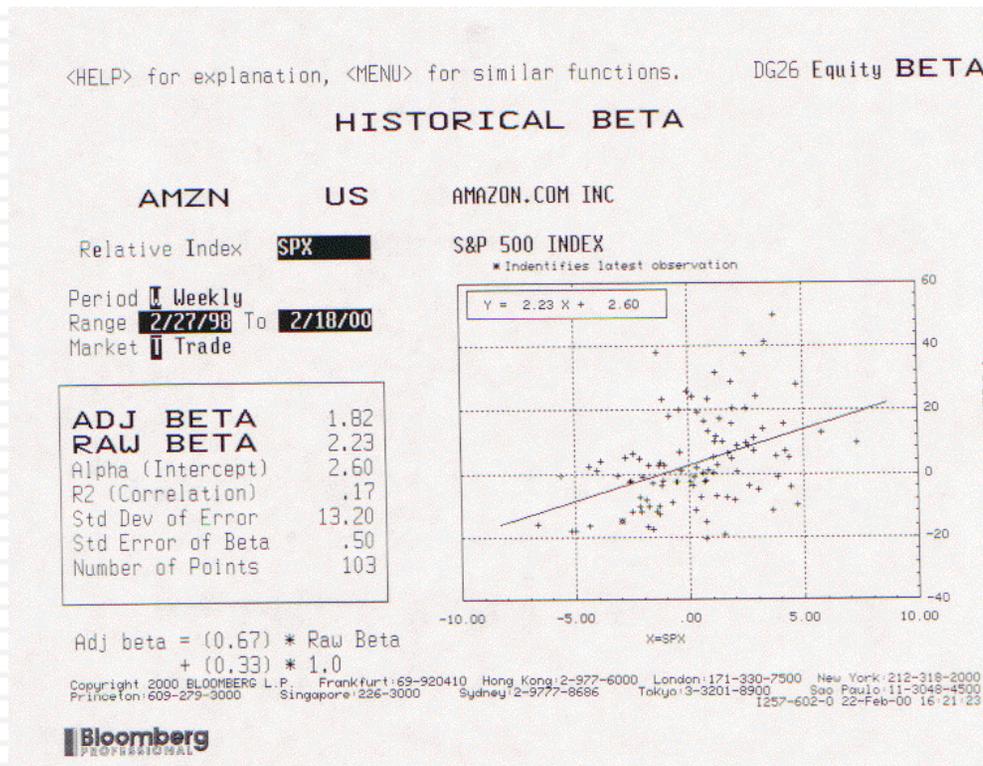
- Spotlight the business the company is in & use the beta of that business.

- Don't try to incorporate failure risk into the discount rate.

- Let the cost of capital change over time, as the company changes.

- If you are desperate, use the cross section of costs of capital to get your estimation going (use the 90th or 95th percentile across all companies).

Lesson 2: Work backwards and keep it simple...

Year	Revenue Growth	Sales	Operating Margin	EBIT	EBIT (1-t)
Tr 12 mths		$1,117	-36.71%	-$410	-$410
1	150.00%	$2,793	-13.35%	-$373	-$373
2	100.00%	$5,585	-1.68%	-$94	-$94
3	75.00%	$9,774	4.16%	$407	$407
4	50.00%	$14,661	7.08%	$1,038	$871
5	30.00%	$19,059	8.54%	$1,628	$1,058
6	25.20%	$23,862	9.27%	$2,212	$1,438
7	20.40%	$28,729	9.64%	$2,768	$1,799
8	15.60%	$33,211	9.82%	$3,261	$2,119
9	10.80%	$36,798	9.91%	$3,646	$2,370
10	6.00%	$39,006	9.95%	$3,883	$2,524
TY	6.00%	$41,346	10.00%	$4,135	$2,688