

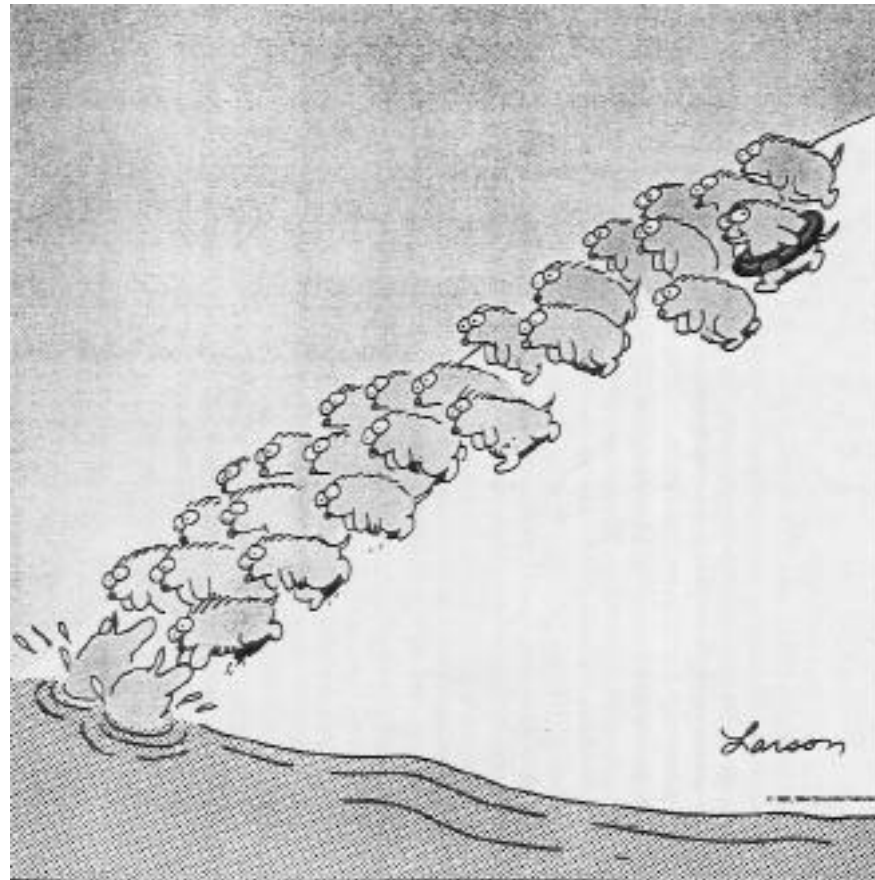


The Dark Side of Valuation

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The Lemming Effect...



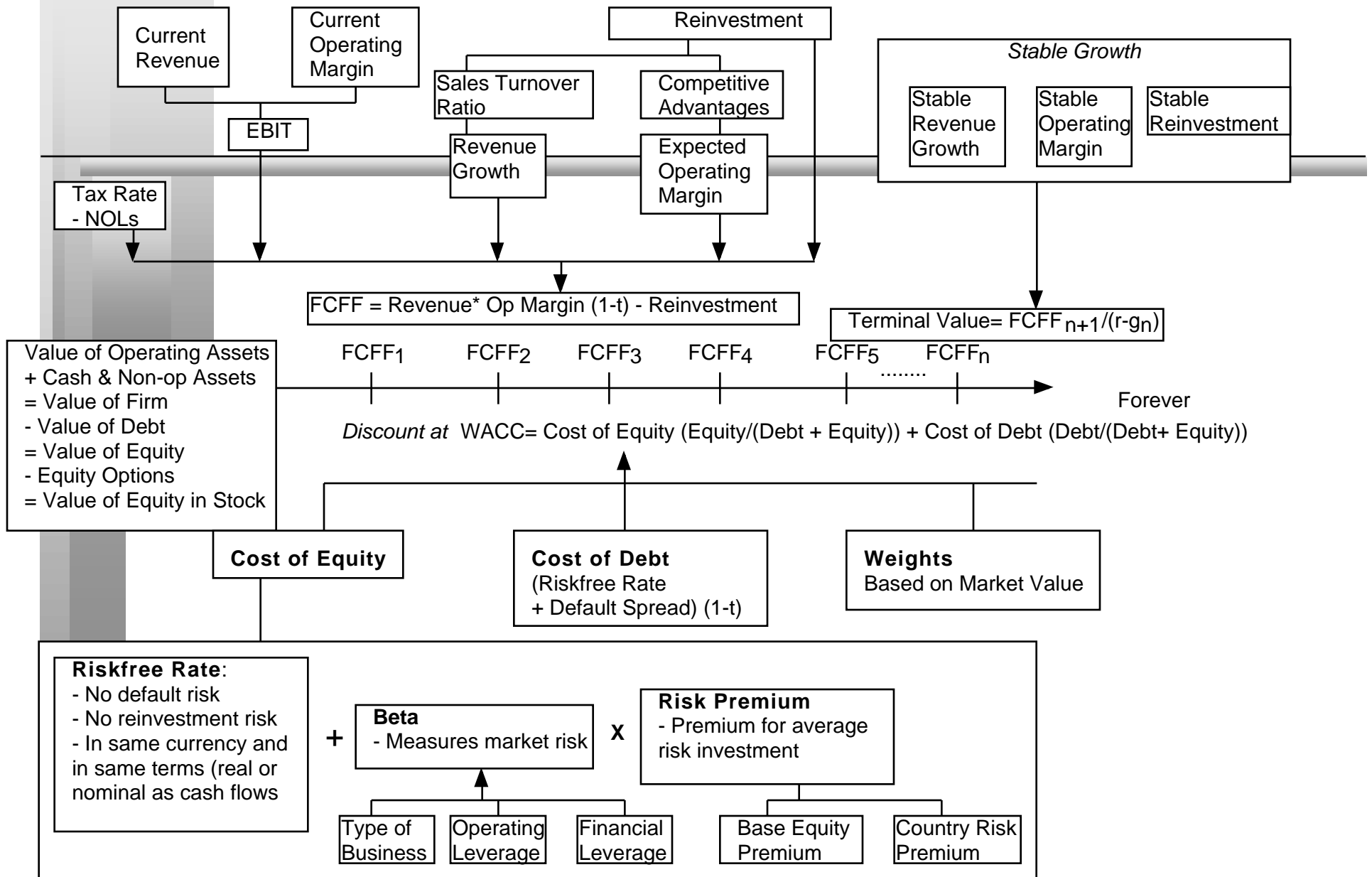
To make our estimates, we draw our information from..

- 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.
 - Revenue Growth and Cost Structure
 - Susceptibility to macro-economic factors
- The industry and comparable firm data
 - What happens to firms as they mature?

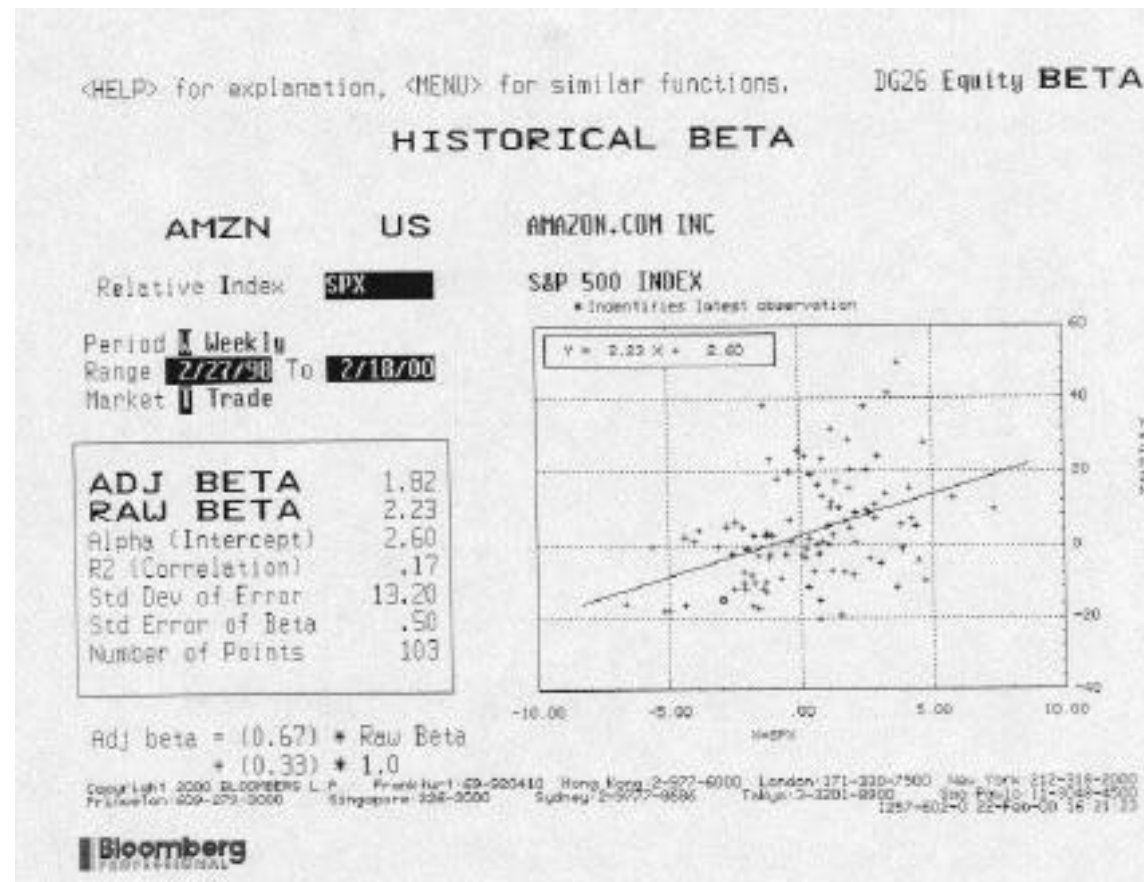
The Dark Side...

- Valuation is most difficult when a company
 - Has negative earnings and low revenues in its current financial statements
 - No history
 - No comparable firms

Discounted Cash Flow Valuation: High Growth with Negative Earnings



Beta Estimation: Amazon



Amazon's Bottom-up Beta

Unlevered beta for firms in internet retailing = 1.60

Unlevered beta for firms in specialty retailing = 1.00

- Amazon is a specialty retailer, but its risk currently seems to be determined by the fact that it is an online retailer. Hence we will use the beta of internet companies to begin the valuation but move the beta, after the first five years, towards the beta of the retailing business.

Estimating Synthetic Ratings and cost of debt

- 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

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

- Amazon.com has negative operating income; this yields a negative interest coverage ratio, which should suggest a low rating. We computed an average interest coverage ratio of 2.82 over the next 5 years. This yields an average rating of BBB for Amazon.com for the first 5 years.

Estimating the cost of debt

- The synthetic rating for Amazon.com is BBB. The default spread for BBB rated bonds is 1.50%
- Pre-tax cost of debt = Riskfree Rate + Default spread
$$= 6.50\% + 1.50\% = 8.00\%$$
- After-tax cost of debt right now = $8.00\% (1 - 0) = 8.00\%$:
The firm is paying no taxes currently.

	1-3	4	5
Pre-tax	8.00%	8.00%	8.00%
Tax rate	0%	16.13%	35%
After-tax	8.00%	6.71%	5.20%

Estimating Cost of Capital: Amazon.com

■ Equity

- Cost of Equity = $6.50\% + 1.60 (4.00\%) = 12.90\%$
- Market Value of Equity = $\$ 84/\text{share} * 340.79 \text{ mil shs}$
 $= \$ 28,626 \text{ mil } (98.8\%)$

■ Debt

- Cost of debt = $6.50\% + 1.50\% (\text{default spread}) = 8.00\%$
- Market Value of Debt = $\$ 349 \text{ mil } (1.2\%)$

■ Cost of Capital

$$\text{Cost of Capital} = 12.9 \% (.988) + 8.00\% (1 - 0) (.012) = 12.84\%$$

Calendar Years, Financial Years and Updated Information

- The operating income and revenue that we use in valuation should be updated numbers. One of the problems with using financial statements is that they are dated.
- 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.

	<i>Last 10-K</i>	<i>Trailing 12-month</i>
Revenues	\$ 610 million	\$1,117 million
EBIT	- \$125 million	- \$ 410 million

Are S, G & A expenses capital expenditures?

- Many internet companies are arguing that selling and G&A expenses are the equivalent of R&D expenses for a high-technology firms and should be treated as capital expenditures.
- If we adopt this rationale, we should be computing earnings before these expenses, which will make many of these firms profitable. It will also mean that they are reinvesting far more than we think they are. It will, however, make not their cash flows less negative.
- Should Amazon.com's selling expenses be treated as cap ex?

Amazon.com's Tax Rate

Year	1	2	3	4	5
EBIT	-\$373	-\$94	\$407	\$1,038	\$1,628
Taxes	\$0	\$0	\$0	\$167	\$570
EBIT(1-t)	-\$373	-\$94	\$407	\$871	\$1,058
Tax rate	0%	0%	0%	16.13%	35%
NOL	\$500	\$873	\$967	\$560	\$0

After year 5, the tax rate becomes 35%.

Estimating FCFF: Amazon.com

- EBIT (Trailing 1999) = -\$ 410 million
- Tax rate used = 0% (Assumed Effective = Marginal)
- Capital spending = \$ 243 million (includes acquisitions)
- Depreciation (Trailing 1999) = \$ 31 million
- Non-cash Working capital Change (1999) = - 80 million
- Estimating FCFF (1999)

Current EBIT * (1 - tax rate) = - 410 (1-0)= - \$410 mil

- (Capital Spending - Depreciation) = \$212 mil

- Change in Working Capital = -\$ 80 mil

Current FCFF = - \$542 mil

Expected Growth at Amazon.com

- The fundamental equation for estimating growth is
Growth in operating income = ROC * Reinvestment Rate
- For Amazon, the effect of reinvestment shows up in revenue growth rates and changes in expected operating margins:

$$\text{Expected Revenue Growth} = \text{Reinvestment (in \$ terms)} * \text{(Sales/ Capital)}$$

- The effect on expected margins is more subtle. Amazon's reinvestments (especially in acquisitions) may help create barriers to entry and other competitive advantages that will ultimately translate into high operating margins.

Growth in Revenues, Earnings and Reinvestment: Amazon

Yr	Rev Gr	\$ Rev Ch	\$ Investment	ROC
1	150.00%	\$1,676	\$559	-76.62%
2	100.00%	\$2,793	\$931	-8.96%
3	75.00%	\$4,189	\$1,396	20.59%
.....				
9	10.80%	\$3,587	\$1,196	21.19%
10	6.00%	\$2,208	\$736	20.39%

Amazon.com: Stable Growth Inputs

	High Growth	Stable Growth
Beta	1.60	1.00
Debt Ratio	1.20%	15%
Return on Capital	Negative	20%
Expected Growth Rate	NMF	6%
Reinvestment Rate	>100%	$6\%/20\% = 30\%$

Estimating the Value of Equity Options

- Details of options outstanding

Average strike price of options outstanding = \$ 13.375

Average maturity of options outstanding = 8.4 years

Standard deviation in $\ln(\text{stock price})$ = 50.00%

Annualized dividend yield on stock = 0.00%

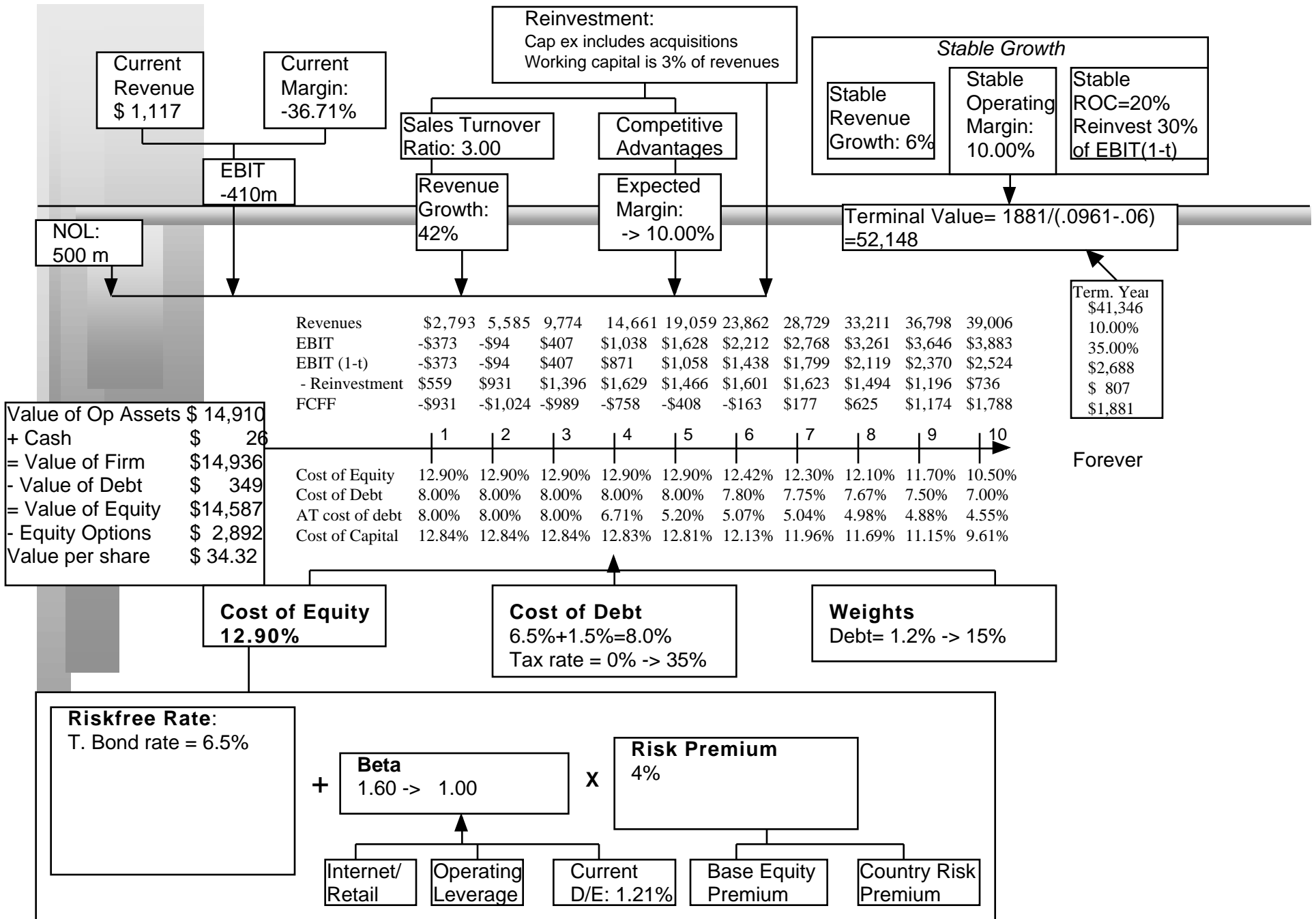
Treasury bond rate = 6.50%

Number of options outstanding = 38 million

Number of shares outstanding = 340.79 million

- Value of options outstanding

- Value of equity options = \$ 2,892 million



What do you need to break-even at \$ 84?

	6%	8%	10%	12%	14%
30%	\$ (1.94)	\$ 2.95	\$ 7.84	\$ 12.71	\$ 17.57
35%	\$ 1.41	\$ 8.37	\$ 15.33	\$ 22.27	\$ 29.21
40%	\$ 6.10	\$ 15.93	\$ 25.74	\$ 35.54	\$ 45.34
45%	\$ 12.59	\$ 26.34	\$ 40.05	\$ 53.77	\$ 67.48
50%	\$ 21.47	\$ 40.50	\$ 59.52	\$ 78.53	\$ 97.54
55%	\$ 33.47	\$ 59.60	\$ 85.72	\$ 111.84	\$ 137.95
60%	\$ 49.53	\$ 85.10	\$ 120.66	\$ 156.22	\$ 191.77



Relative Valuation

What is relative valuation?

- 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.
 - compare the standardized value or multiple for the asset being analyzed to the standardized values for comparable asset, controlling for any differences.

The Four Steps to Understanding Multiples

- Define the multiple
 - Multiple can be defined in different ways by users.
- Describe the multiple
 - Too many people who use a multiple have no idea what its cross sectional distribution is.
- Analyze the multiple
 - It is critical that we understand the fundamentals that drive each multiple.
- Apply the multiple
 - Defining the comparable universe and controlling for differences .

Price Sales Ratio: Definition

- The price/sales ratio is the ratio of the market value of equity to the sales.
- Price/ Sales=
$$\frac{\text{Market Value of Equity}}{\text{Total Revenues}}$$
- Consistency Tests
 - The price/sales ratio is internally inconsistent, since the market value of equity is divided by the total revenues of the firm.

Price/Sales Ratio: Determinants

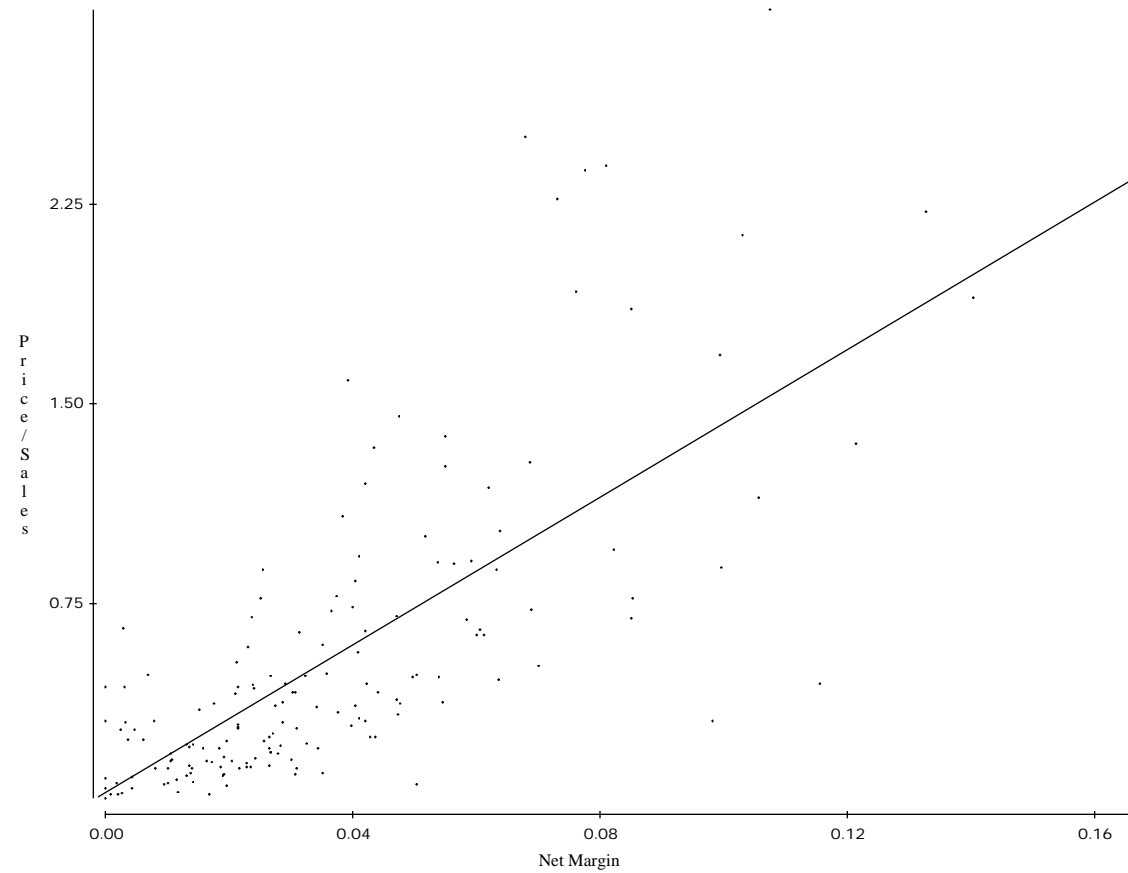
- The price/sales ratio of a stable growth firm can be estimated beginning with a 2-stage equity valuation model:

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

- Dividing both sides by the sales per share:

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

PS and Net Margins: Retailers

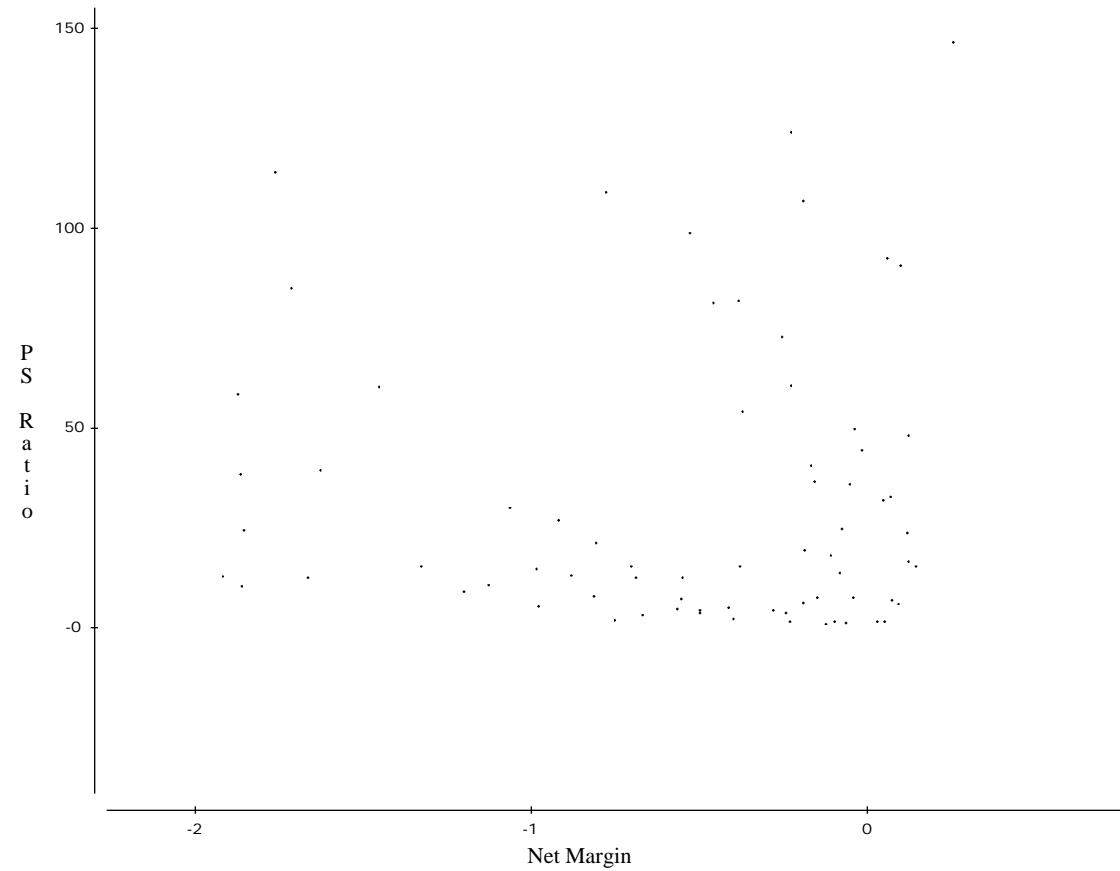


Regression Results: PS Ratios and Margins

- Regressing PS ratios against net margins,
$$PS = 0.0376 + 13.89 (\text{Net Margin}) \quad R^2 = 53.70\%$$

(13.70)
- Thus, a 1% increase in the margin results in an increase of 0.1389 in the price sales ratios.
- The regression also allows us to get predicted PS ratios for these firms.

A Case Study: The Internet Stocks



PS Ratios and Margins are not highly correlated

- Regressing PS ratios against current margins yields:

$$\text{PS} = 81.36 - 7.54(\text{Net Margin}) \quad R^2 = 0.04$$

(0.49)

- Firms are priced based upon expected margins:

$$\text{PS} = 30.61 - 2.77 \ln(\text{Rev}) + 6.42 (\text{Rev Gr}) + 5.11 (\text{Cash/Rev})$$

(0.66) (2.63) (3.49)

R squared = 31.8%

Predicted PS for Amazon

$$= 30.61 - 2.77(7.1039) + 6.42(1.9946) + 5.11 (.3069) = 30.42$$

Actual PS for Amazon = 25.63

In summary...

- If sectors are loosely defined (as is the internet sector) to include retailers, software producers, publishers and service companies, multiples have to be used with caution.
- Differences in multiples for companies that derive almost all of their value from future growth are better explained by looking at variables that are likely be correlated with future growth than by looking at current earnings or cash flows.

Back to Lemmings...

