The Dark Side of Valuation

Valuing young, high growth companies

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Risk Adjusted Value: Three Basic Propositions

The value of an asset is the present value of the expected cash flows on that asset, over its expected life:

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

Proposition 1: If "it" does not affect the cash flows or alter risk (thus changing discount rates), "it" cannot affect value.

Proposition 2: For an asset to have value, the expected cash flows have to be positive some time over the life of the asset.

Proposition 3: Assets that generate cash flows early in their life will be worth more than assets that generate cash flows later; the latter may however have greater growth and higher cash flows to compensate.

The fundamental determinants of value…

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

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

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

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

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)
- It is when valuing these companies that analysts find themselves tempted by the dark side, where
  - "Paradigm shifts" happen…
  - New metrics are invented …
  - The story dominates and the numbers lag…

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?

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

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

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.

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)
- When we value young companies early in the life cycle in businesses where all companies share these characteristics, we are in "valuation hell:… and the dark side looks inviting.

9a. Amazon in January 2000

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

Current Revenue $ 1,117

Current Margin: -36.71%

EBIT -410m

From previous years

NOL: 500 m

Sales Turnover Ratio: 3.00

Competitive Advantages

Revenue Growth: 42%

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

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.

	1	2	3	4	5	6	7	8	9	10
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

Forever

	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%

Amazon was trading at $84 in January 2000.

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%

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

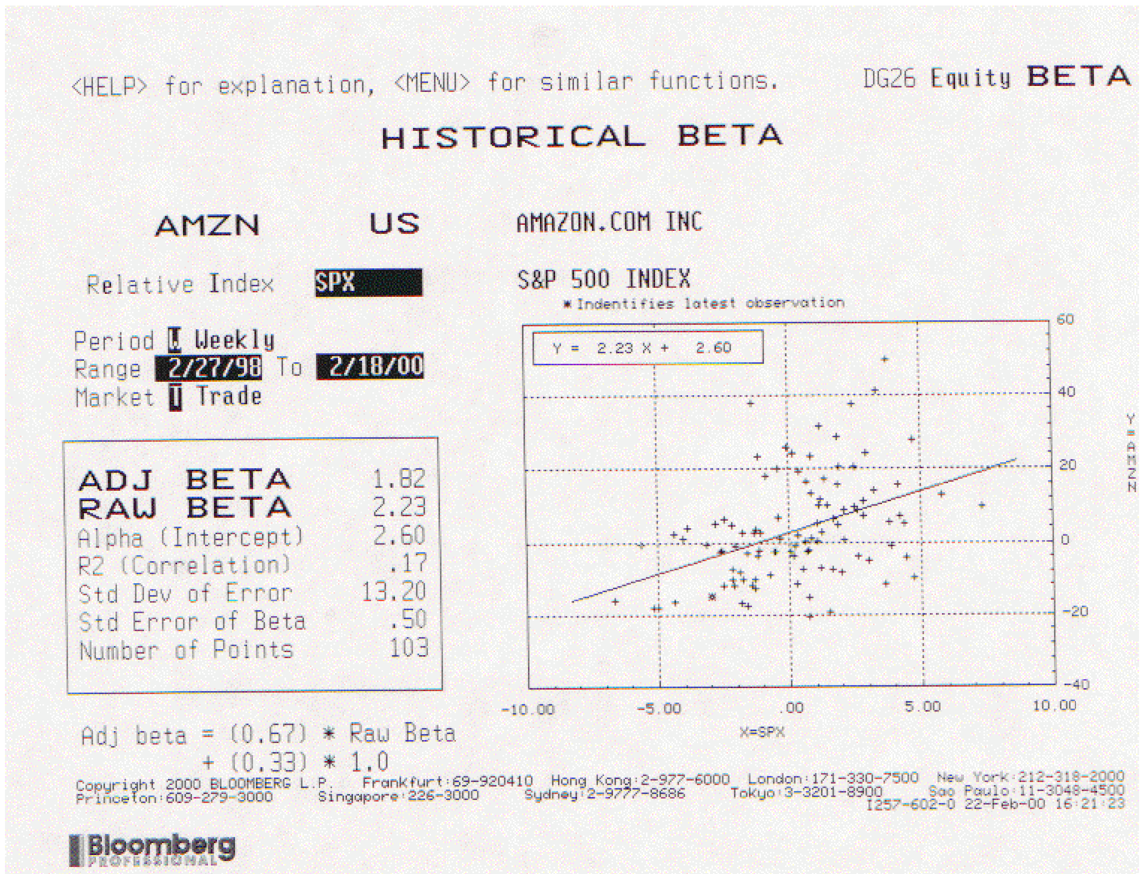
Operating Leverage

Current D/E: 1.21%

Base Equity Premium

Country Risk Premium

Lesson 1: Don't trust regression betas….



Lesson 2: The cost of capital will change over time…

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

	Yrs 1-3	4	5	6	7	8	9	10	Terminal year
Tax Rate	0.00%	16.13%	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%
Debt Ratio	1.20%	1.20%	1.20%	3.96%	4.65%	5.80%	8.10%	15.00%	15.00%
Beta	1.60	1.60	1.60	1.48	1.36	1.24	1.12	1.00	1.00
Cost of Equity	12.90%	12.90%	12.90%	12.42%	11.94%	11.46%	10.98%	10.50%	10.50%
Cost of Debt	8.00%	8.00%	8.00%	7.80%	7.75%	7.67%	7.50%	7.00%	7.00%
After-tax cost of debt	8.00%	6.71%	5.20%	5.07%	5.04%	4.98%	4.88%	4.55%	4.55%
Cost of Capital	12.84%	12.83%	12.81%	12.13%	11.62%	11.08%	10.49%	9.61%	9.61%

Lesson 3: Use updated numbers and the free cash flows will often be negative (even if the company is making money)

- When valuing Amazon in early 2000, the last annual report that was available was the 1998 annual report. For a young company, that is ancient data, since so much can change over the course of a short time period. To value Amazon the trailing 12-month numbers were used.
- Trailing 12-month inputs
  - Amazon's EBIT (Trailing 1999) = -$ 410 million
  - Tax rate used = 0%
  - Capital spending (Trailing 1999) = $ 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 million
- (Capital Spending - Depreciation)	= $212 million
- Change in Working Capital	= -$ 80 million
Current FCFF	= - $542 million

Lesson 4: Many of the operating expenses may be capital expenses….

- Since young companies are focused on generating future growth, it is possible that some or a significant portion of what accountants categorize as operating expenses represent expenditures designed to generate future growth (and thus are capital expenditures).
- In the late 1990s, many dot-com companies argued that SG&A expenses were really focused on getting new customers and should be treated as capital expenditures. Amazon, for instance, would have reported a profit if the SG&A expenses from 1999 were treated as capital expenditures, rather than operating expenses.
- If we adopt this rationale, 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?

Lesson 5: Work backwards

Year	Revenues	Operating Margin	EBIT	
Tr12m	$1,117	-36.71%	-$410	
1	$2,793	-13.35%	-$373	
2	$5,585	-1.68%	-$94	
3	$9,774	4.16%	$407	
4	$14,661	7.08%	$1,038	
5	$19,059	8.54%	$1,628	
6	$23,862	9.27%	$2,212	
7	$28,729	9.64%	$2,768	
8	$33,211	9.82%	$3,261	
9	$36,798	9.91%	$3,646	
10	$39,006	9.95%	$3,883	
TY(11)	$41,346	10.00%	$4,135	Industry Average

Lesson 6: Don't forget to pay for growth…

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2	$5,585	-1.68%	-$94	
3	$9,774	4.16%	$407	
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TY(11)	$41,346	10.00%	$4,135	Industry Average

Lesson 7: There are always scenarios where the market price can be justified…

	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

Lesson 8: You will be wrong 100% of the time… and it really is not (always) your fault…

- No matter how careful you are in getting your inputs and how well structured your model is, your estimate of value will change both as new information comes out about the company, the business and the economy.
- As information comes out, you will have to adjust and adapt your model to reflect the information. Rather than be defensive about the resulting changes in value, recognize that this is the essence of risk.
- <u>*A test:*</u> *If your valuations are unbiased, you should find yourself increasing estimated values as often as you are decreasing values. In other words, there should be equal doses of good and bad news affecting valuations (at least over time).*

9b. Amazon in January 2001

Current Revenue $ 2,465

Current Margin: -34.60%

EBIT -853m

NOL: 1,289 m

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

Sales Turnover Ratio: 3.02

Competitive Advantages

Revenue Growth: 25.41%

Expected Margin: -> 9.32%

Stable Growth

Stable Revenue Growth: 5%

Stable Operating Margin: 9.32%

Stable ROC=16.94%
Reinvest 29.5% of EBIT(1-t)

Terminal Value= 1064/(.0876-.05) =$ 28,310

	1	2	3	4	5	6	7	8	9	10	Term. Year
Revenues	$4,314	$6,471	$9,059	$11,777	$14,132	$16,534	$18,849	$20,922	$22,596	$23,726	$24,912
EBIT	-$545	-$107	$347	$774	$1,123	$1,428	$1,692	$1,914	$2,087	$2,201	$2,302
EBIT(1-t)	-$545	-$107	$347	$774	$1,017	$928	$1,100	$1,244	$1,356	$1,431	$1,509
- Reinvestment	$612	$714	$857	$900	$780	$796	$766	$687	$554	$374	$ 445
FCFF	-$1,157	-$822	-$510	-$126	$237	$132	$333	$558	$802	$1,057	$1,064

Value of Op Assets	$ 8,789
+ Cash & Non-op	$ 1,263
= Value of Firm	$10,052
- Value of Debt	$ 1,879
= Value of Equity	$ 8,173
- Equity Options	$ 845
Value per share	$ 20.83

Forever

	1	2	3	4	5	6	7	8	9	10
Debt Ratio	27.27%	27.27%	27.27%	27.27%	27.27%	24.81%	24.20%	23.18%	21.13%	15.00%
Beta	2.18	2.18	2.18	2.18	2.18	1.96	1.75	1.53	1.32	1.10
Cost of Equity	13.81%	13.81%	13.81%	13.81%	13.81%	12.95%	12.09%	11.22%	10.36%	9.50%
AT cost of debt	10.00%	10.00%	10.00%	10.00%	9.06%	6.11%	6.01%	5.85%	5.53%	4.55%
Cost of Capital	12.77%	12.77%	12.77%	12.77%	12.52%	11.25%	10.62%	9.98%	9.34%	8.76%

Cost of Equity
13.81%

Cost of Debt
6.5%+3.5%=10.0%
Tax rate = 0% -> 35%

Weights
Debt= 27.3% -> 15%

Riskfree Rate:
T. Bond rate = 5.1%

+

Beta
2.18-> 1.10

X

Risk Premium
4%

Internet/ Retail

Operating Leverage

Current D/E: 37.5%

Base Equity Premium

Country Risk Premium

Amazon.com
January 2001
Stock price = $14

Lesson 9: Here is your consolation price… the market makes even bigger adjustments…