

Difficult to value companies...

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- 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.

I. The challenge with young companies...

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Making judgments on revenues/ profits difficult because 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 are the cashflows from existing assets?

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

What is the value of equity in the firm?

What is the value added by growth assets?

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

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

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

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...

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- 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...

9a. Amazon in January 2000

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

Stable Growth

From previous years

NOL:
500 m

Current
Revenue
\$ 1,117

Current
Margin:
-36.71%

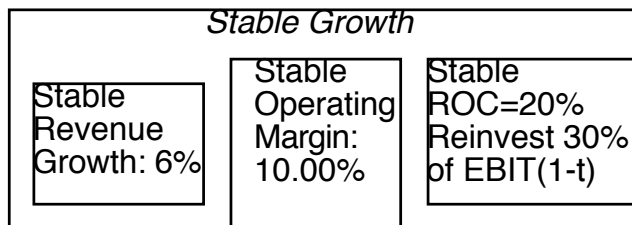
EBIT
-410m

Sales Turnover
Ratio: 3.00

Competitive
Advantages

Revenue
Growth:
42%

Expected
Margin:
-> 10.00%



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.

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

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 first 5 years
Conventional retailers after year 5*

Riskfree Rate:
T. Bond rate = 6.5%

Beta
1.60 -> 1.00

Risk Premium
4%

Internet/
Retail

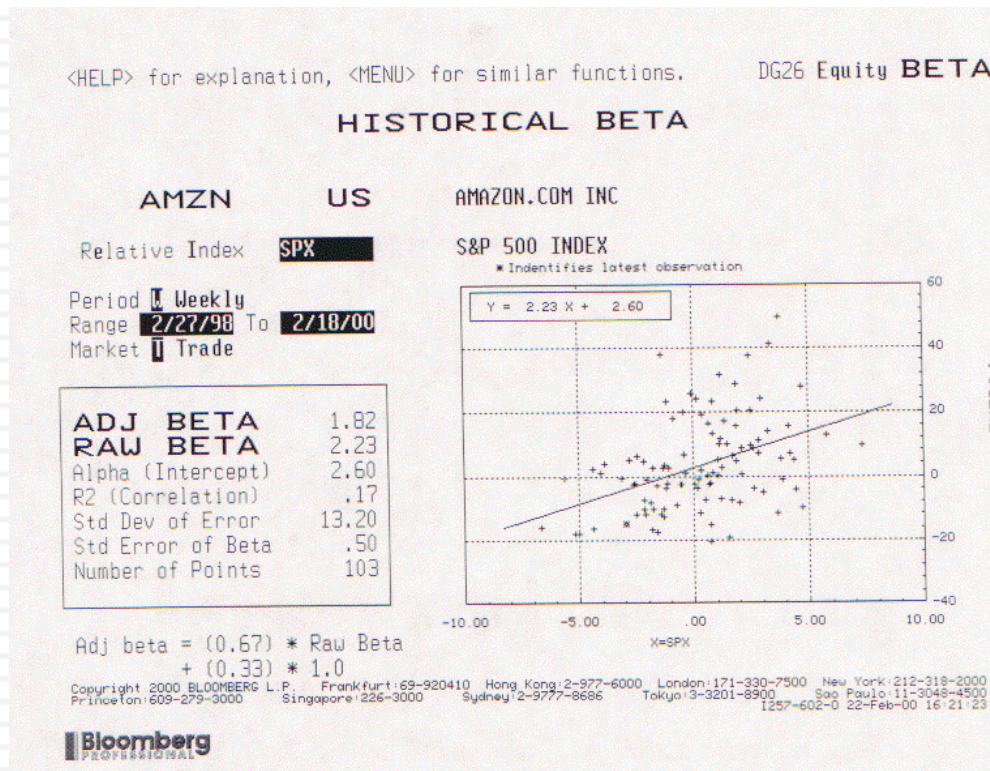
Operating
Leverage

Current
D/E: 1.21%

Base Equity
Premium

Country Risk
Premium

Lesson 1: Don't sweat the small stuff



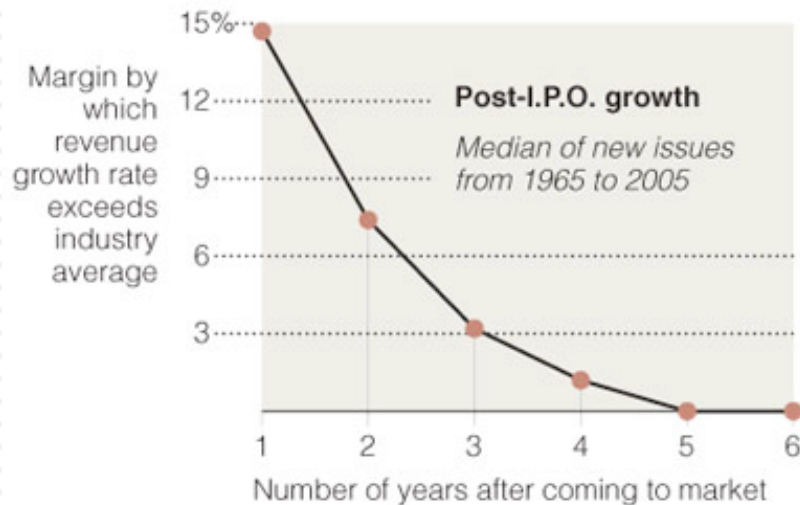
- Spotlight the business the company is in & use the beta of that business.
- Don't try to incorporate failure risk into the discount rate.
- Let the cost of capital change over time, as the company changes.
- If you are desperate, use the cross section of costs of capital to get your estimation going (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

Lesson 3: Scaling up is hard to do & failure is common

Typically, the revenue growth rate of a newly public company outpaces its industry average for only about five years.



Source: Andrew Metrick

The New York Times

- Lower revenue growth rates, as revenues scale up.
- Keep track of dollar revenues, as you go through time, measuring against market size.

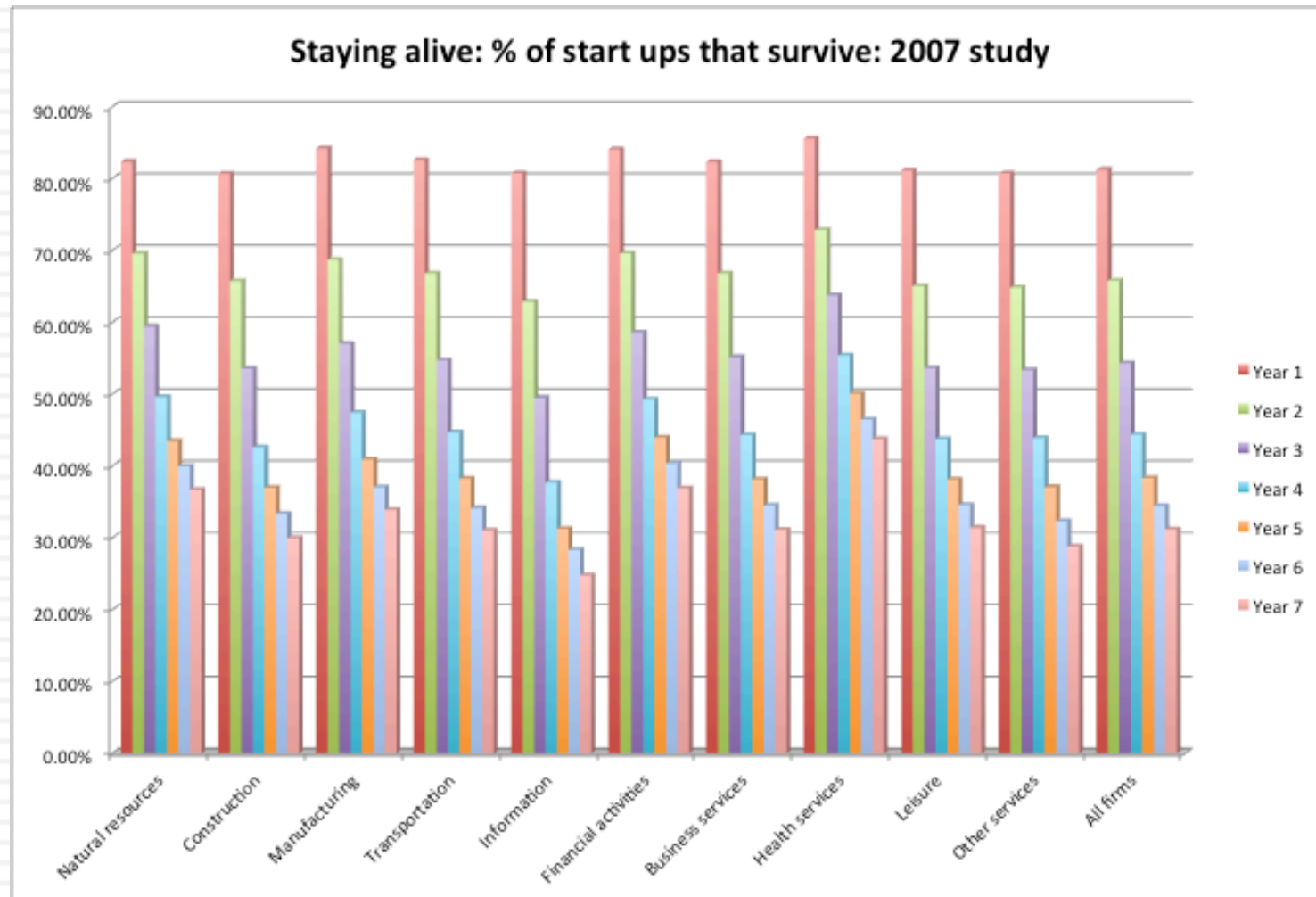
Lesson 4: Don't forget to pay for growth...

Year	Revenues	Δ Revenue	Sales/Cap	Δ Investment	Invested Capital	EBIT (1-t)	Imputed ROC
Tr 12 mths	\$1,117				\$ 487	-\$410	
1	\$2,793	\$1,676	3.00	\$559	\$ 1,045	-\$373	-76.62%
2	\$5,585	\$2,793	3.00	\$931	\$ 1,976	-\$94	-8.96%
3	\$9,774	\$4,189	3.00	\$1,396	\$ 3,372	\$407	20.59%
4	\$14,661	\$4,887	3.00	\$1,629	\$ 5,001	\$871	25.82%
5	\$19,059	\$4,398	3.00	\$1,466	\$ 6,467	\$1,058	21.16%
6	\$23,862	\$4,803	3.00	\$1,601	\$ 8,068	\$1,438	22.23%
7	\$28,729	\$4,868	3.00	\$1,623	\$ 9,691	\$1,799	22.30%
8	\$33,211	\$4,482	3.00	\$1,494	\$ 11,185	\$2,119	21.87%
9	\$36,798	\$3,587	3.00	\$1,196	\$ 12,380	\$2,370	21.19%
10	\$39,006	\$2,208	3.00	\$736	\$ 13,116	\$2,524	20.39%
TY	\$41,346	\$2,340	NA		Assumed to be =		20.00%

Lesson 5: The dilution is taken care off..

- With young growth companies, it is almost a given that the number of shares outstanding will increase over time for two reasons:
 - ▣ To grow, the company will have to issue new shares either to raise cash to take projects or to offer to target company stockholders in acquisitions
 - ▣ Many young, growth companies also offer options to managers as compensation and these options will get exercised, if the company is successful.
- In DCF valuation, both effects are already incorporated into the value per share, even though we use the current number of shares in estimating value per share
 - ▣ The need for new equity issues is captured in negative cash flows in the earlier years. The present value of these negative cash flows will drag down the current value of equity and this is the effect of future dilution.
 - ▣ The options are valued and netted out against the current value. Using an option pricing model allows you to incorporate the expected likelihood that they will be exercised and the price at which they will be exercised.

Lesson 6: If you are worried about failure, incorporate into value

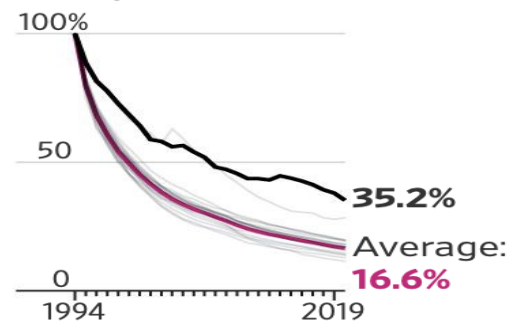


A 2019 Update: Sector Comparison

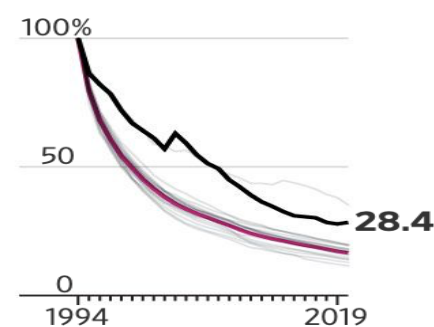
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Sectors with highest and lowest annual survival rate, compared to all sectors

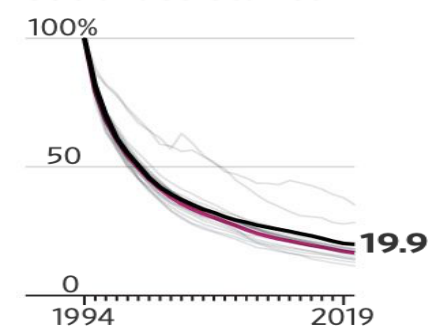
Management of companies and enterprises



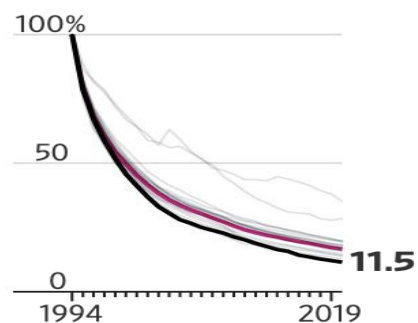
Utilities



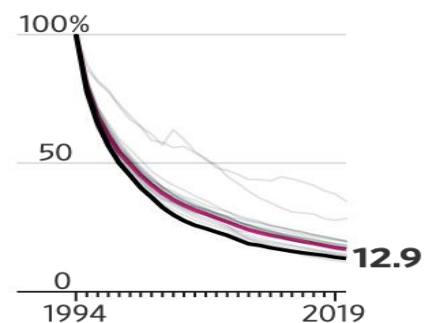
Health care and social assistance



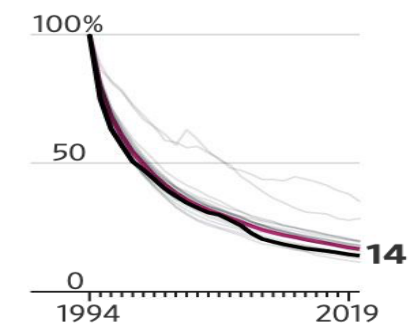
Information



Transportation and warehousing



Wholesale trade



Source: Bureau of Labor Statistics, Business Employment Dynamics data

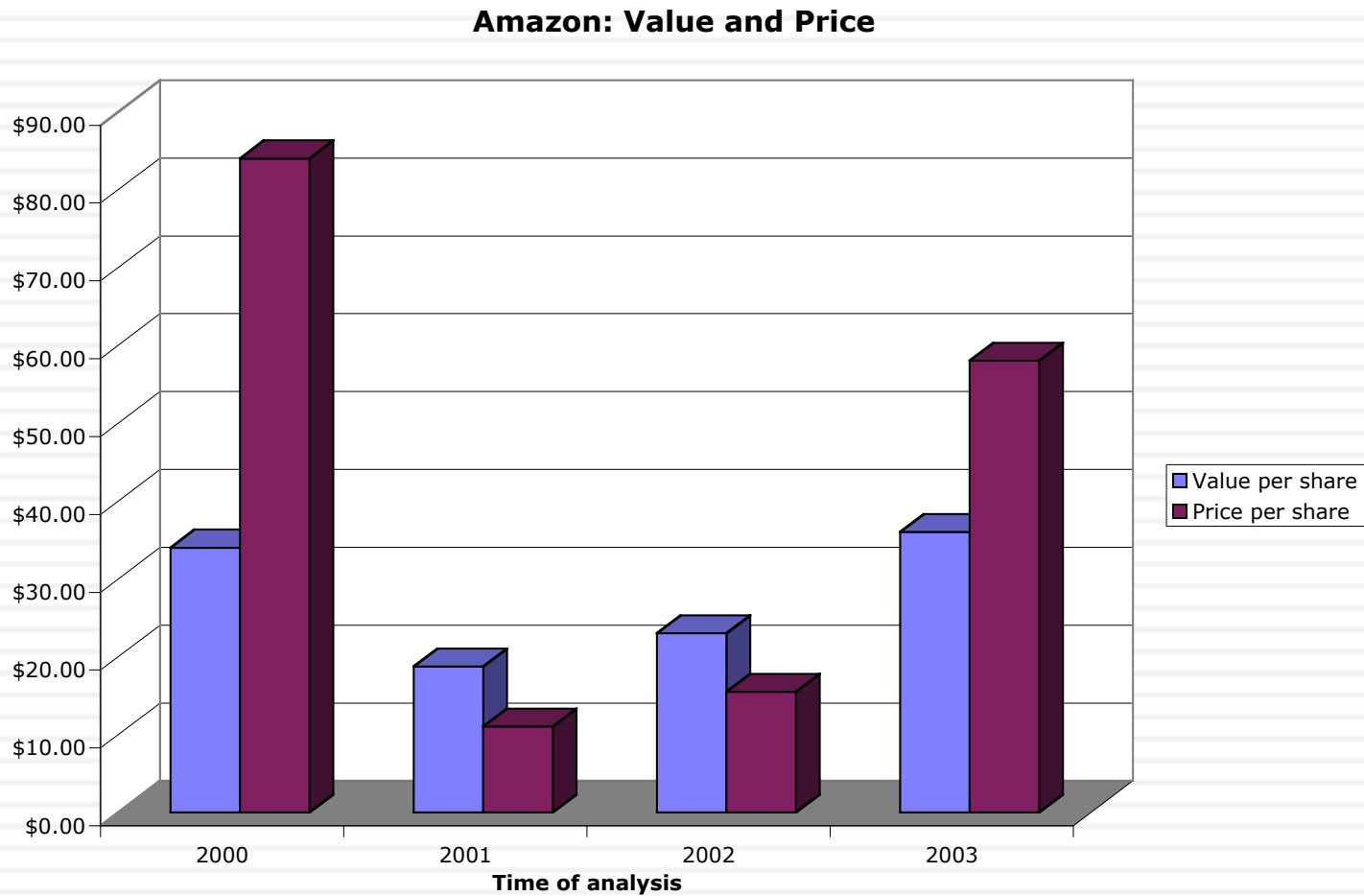
Lesson 7: There are always scenarios where the market price can be justified...

	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 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.
- A test: 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).

And the market is often “more wrong”



Assessing my 2000 forecasts, in 2014

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	<i>Revenues</i>		<i>Operating Income</i>		<i>Operating Margin</i>	
<i>Year</i>	<i>My forecast (2000)</i>	<i>Actual</i>	<i>My forecast (2000)</i>	<i>Actual</i>	<i>My forecast (2000)</i>	<i>Actual</i>
2000	\$2,793	\$2,762	-\$ 373	-\$ 664.00	-13.35%	-24.04%
2001	\$5,585	\$3,122	-\$ 94	-\$ 231.00	-1.68%	-7.40%
2002	\$9,774	\$3,932	\$ 407	\$ 106.00	4.16%	2.70%
2003	\$14,661	\$5,264	\$ 1,038	\$ 271.00	7.08%	5.15%
2004	\$19,059	\$6,921	\$ 1,628	\$ 440.00	8.54%	6.36%
2005	\$23,862	\$8,490	\$ 2,212	\$ 432.00	9.27%	5.09%
2006	\$28,729	\$10,711	\$ 2,768	\$ 389.00	9.63%	3.63%
2007	\$33,211	\$14,835	\$ 3,261	\$ 655.00	9.82%	4.42%
2008	\$36,798	\$19,166	\$ 3,646	\$ 842.00	9.91%	4.39%
2009	\$39,006	\$24,509	\$ 3,883	\$ 1,129.00	9.95%	4.61%
2010	\$41,346	\$34,204	\$ 4,135	\$ 1,406.00	10.00%	4.11%
2011	\$43,827	\$48,077	\$ 4,383	\$ 862.00	10.00%	1.79%
2012	\$46,457	\$61,093	\$ 4,646	\$ 676.00	10.00%	1.11%
2013	\$49,244	\$74,452	\$ 4,925	\$ 745.00	10.00%	1.00%
2014 (LTM)	\$51,460	\$85,247	\$ 5,146.35	\$ 97.00	10.00%	0.11%