



LET THE GAMES BEGIN... TIME TO
VALUE COMPANIES..

Let's have some fun!

Equity Risk Premiums in Valuation

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- 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.
 - In 2010, 2011 & 2012: 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.

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

**Training Wheels valuation:
Con Ed in August 2008**

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%

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

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

Test 3: Is the firm's risk and cost of equity consistent with a stable growth 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%

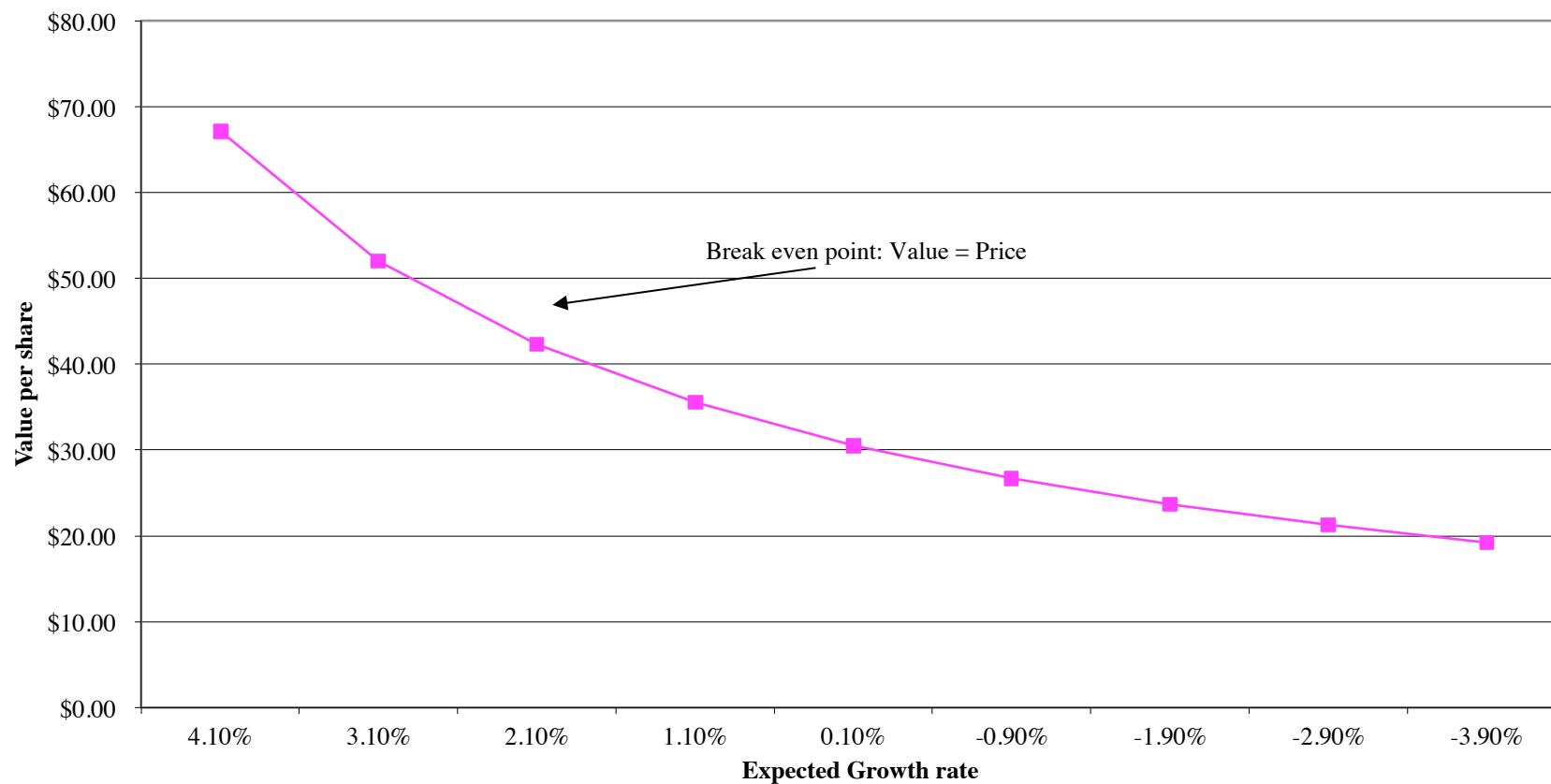
2. Why equity: Company's debt ratio has been stable at about 70% equity, 30% debt for decades.

3. Why dividends: Company has paid out about 97% of its FCFE as dividends over the last five years.

A break even growth rate to get to market price...

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Con Ed: Value versus Growth Rate



From DCF value to target price and returns...

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- 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)?

3M: A Pre-crisis valuation

Current Cashflow to Firm

$\text{EBIT}(1-t) = 5344 (1-.35) = 3474$
 $- \text{Nt CpX} = 350$
 $- \text{Chg WC} = 691$
 $= \text{FCFF} = 2433$
 $\text{Reinvestment Rate} = 1041/3474 = 29.97\%$
 $\text{Return on capital} = 25.19\%$

Reinvestment Rate
 30%

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

Return on Capital
 25%

Stable Growth

$g = 3\%$; $\text{Beta} = 1.10$;
 $\text{Debt Ratio} = 20\%$; $\text{Tax rate} = 35\%$
 $\text{Cost of capital} = 6.76\%$
 $\text{ROC} = 6.76\%$;
 $\text{Reinvestment Rate} = 3/6.76 = 44\%$

Terminal Value₅ = $2645 / (.0676 - .03) = 70,409$

First 5 years

Op. Assets 60607
 $+ \text{Cash} = 3253$
 $- \text{Debt} = 4920$
 $= \text{Equity} = 58400$

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

Term Yr
 $\$4,758$
 $\$2,113$
 $\$2,645$

Value/Share \$ 83.55

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

Cost of Equity
 8.32%

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

Weights
 $E = 92\%$ $D = 8\%$

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

Riskfree Rate:
 Riskfree rate = 3.72%

+

Beta
 1.15

x

Risk Premium
 4%

Unlevered Beta for
 Sectors: 1.09

$D/E = 8.8\%$

Lowered base operating income by 10%

3M: Post-crisis valuation

Reduced growth rate to 5%

Did not increase debt ratio in stable growth to 20%

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%

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

Return on Capital
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 Value₅ = 2434 / (.0755 - .03) = 53,481

| | |
|-------------|----------|
| Op. Assets | 43,975 |
| + Cash: | 3253 |
| - Debt | 4920 |
| =Equity | 42308 |
| Value/Share | \$ 60.53 |

| | | | | | | |
|----------------|---------|---------|---------|---------|---------|---------|
| 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.

Riskfree Rate:
Riskfree rate = 3.96%

Increased risk premium to 6% for next 5 years

Beta 1.15 x Risk Premium 6%

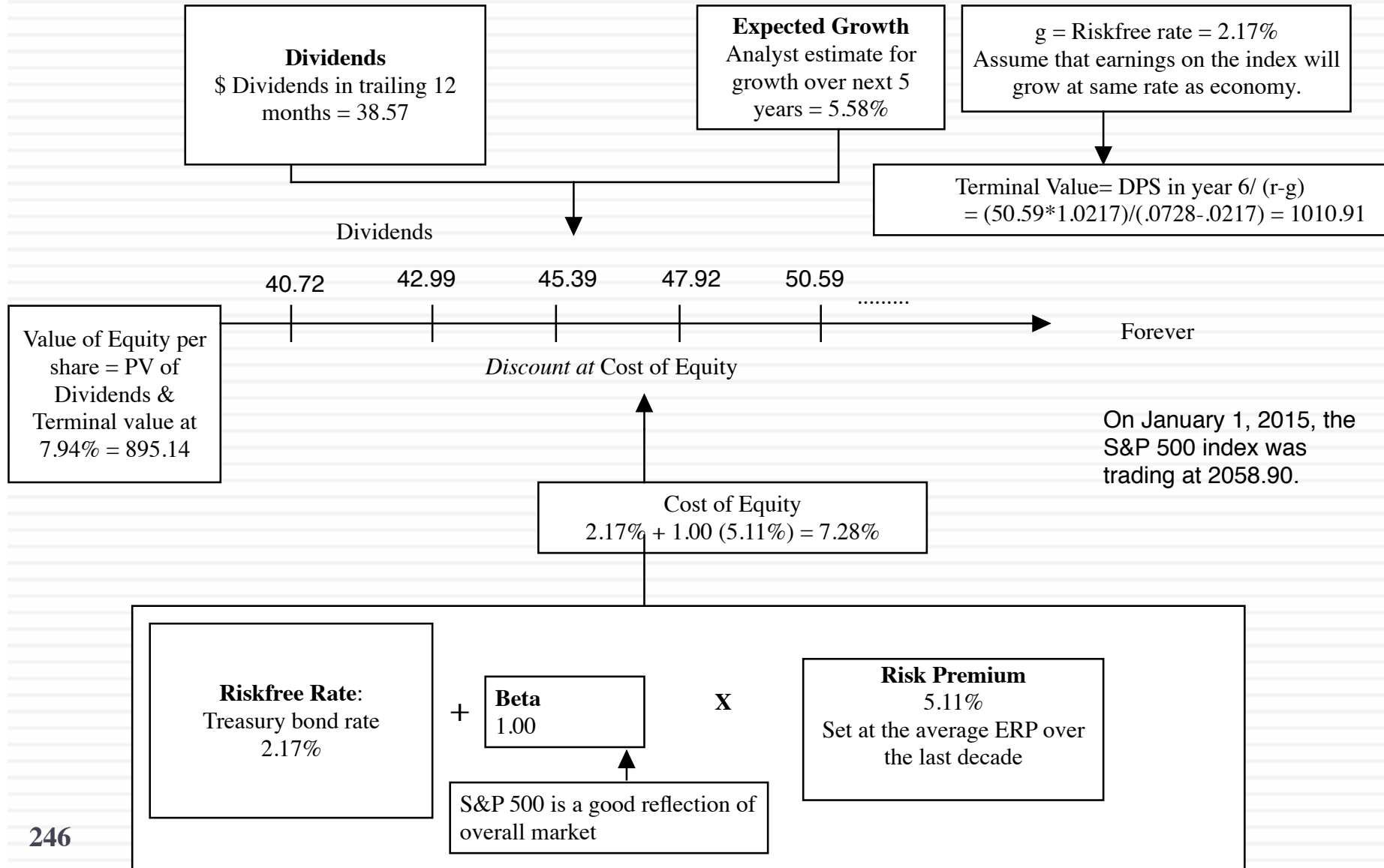
Unlevered Beta for Sectors: 1.09 D/E=8.8%

From a Company to the Market: Valuing the S&P 500: Dividend Discount Model in January 2015

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.

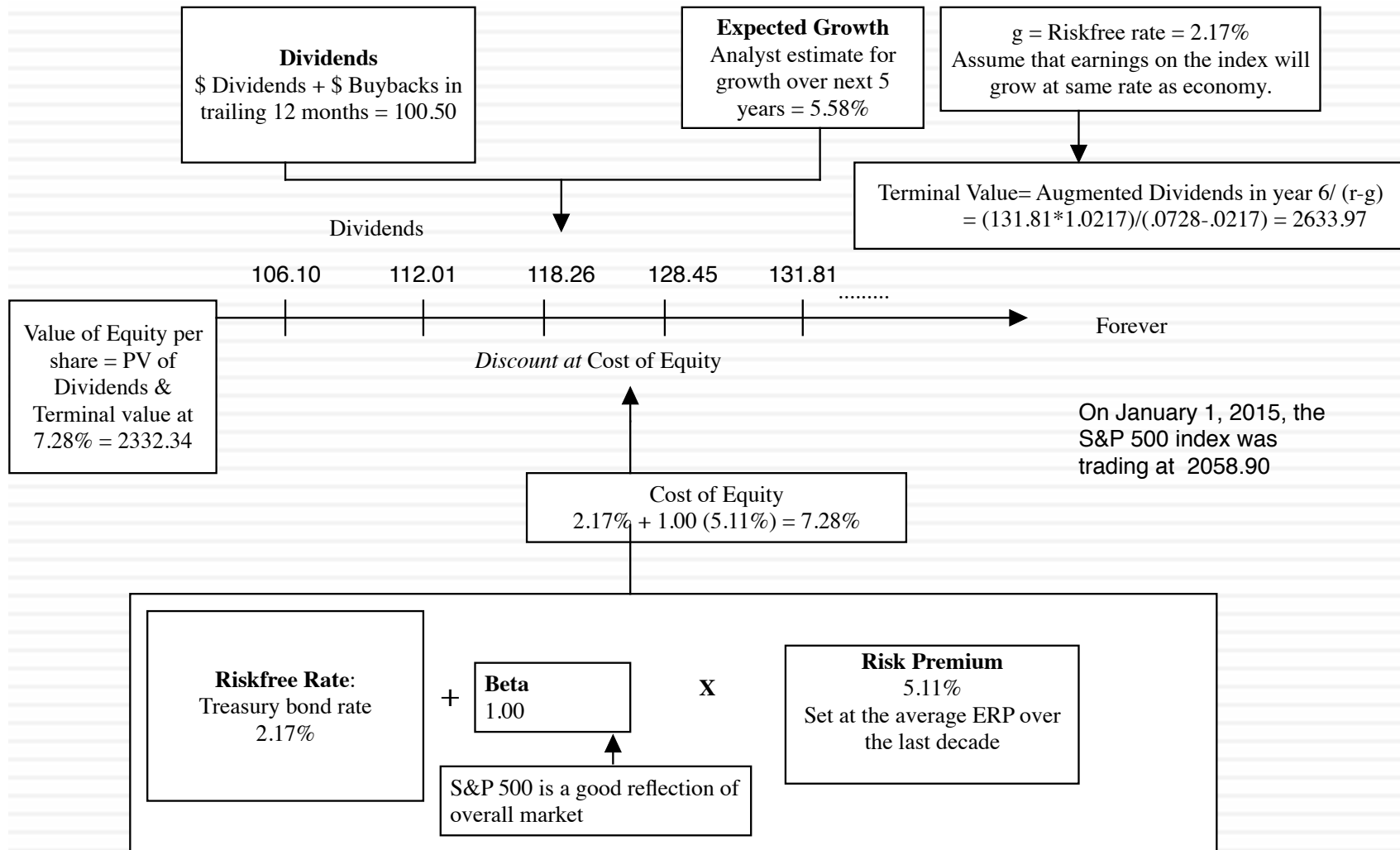


From a Company to the Market: Valuing the S&P 500: Augmented Dividend Discount Model in January 2015

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.

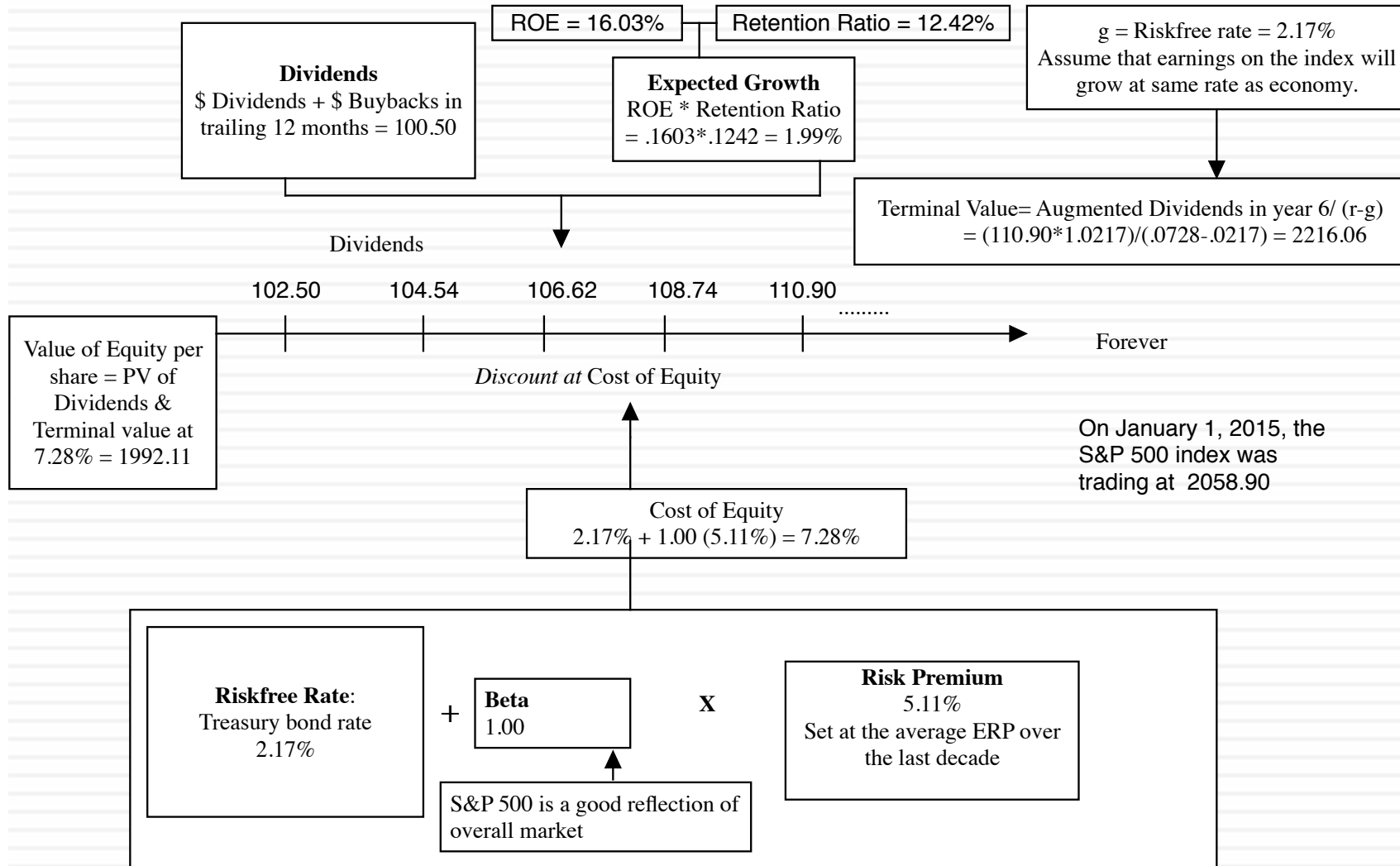


Valuing the S&P 500: Augmented Dividends and Fundamental Growth January 2015

Rationale for model

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

Why 2-stage? Why not?



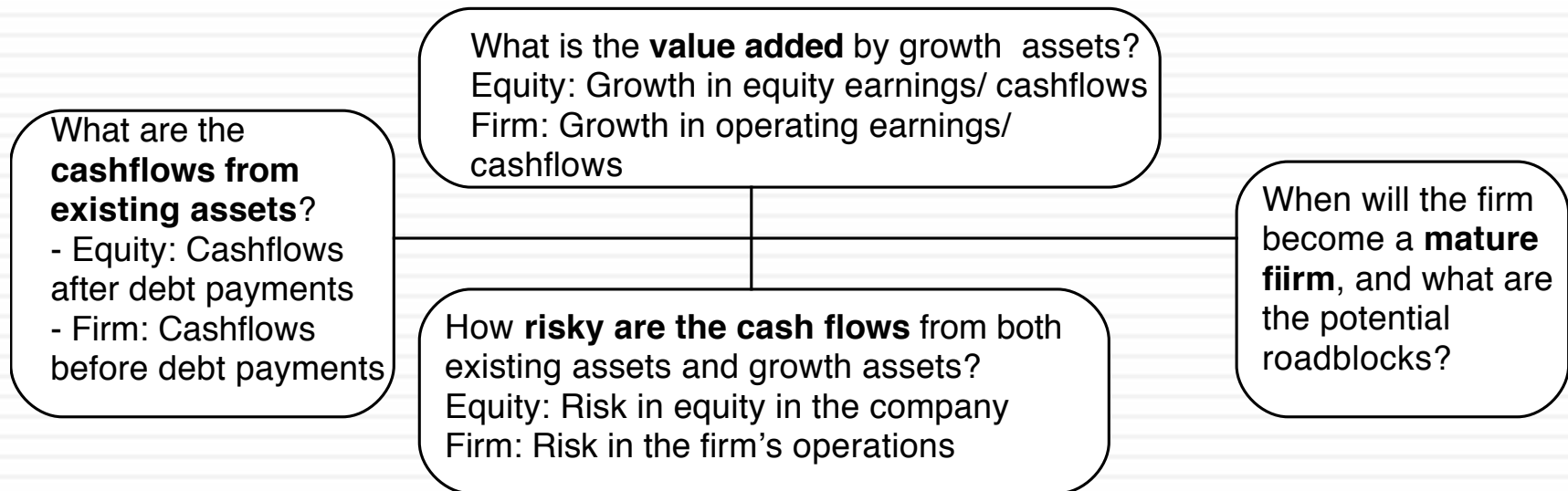


THE DARK SIDE OF VALUATION: VALUING DIFFICULT-TO-VALUE COMPANIES

Anyone can value a money-making stable company..

The fundamental determinants of value...

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The Dark Side of Valuation...

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- 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)

Difficult to value companies...

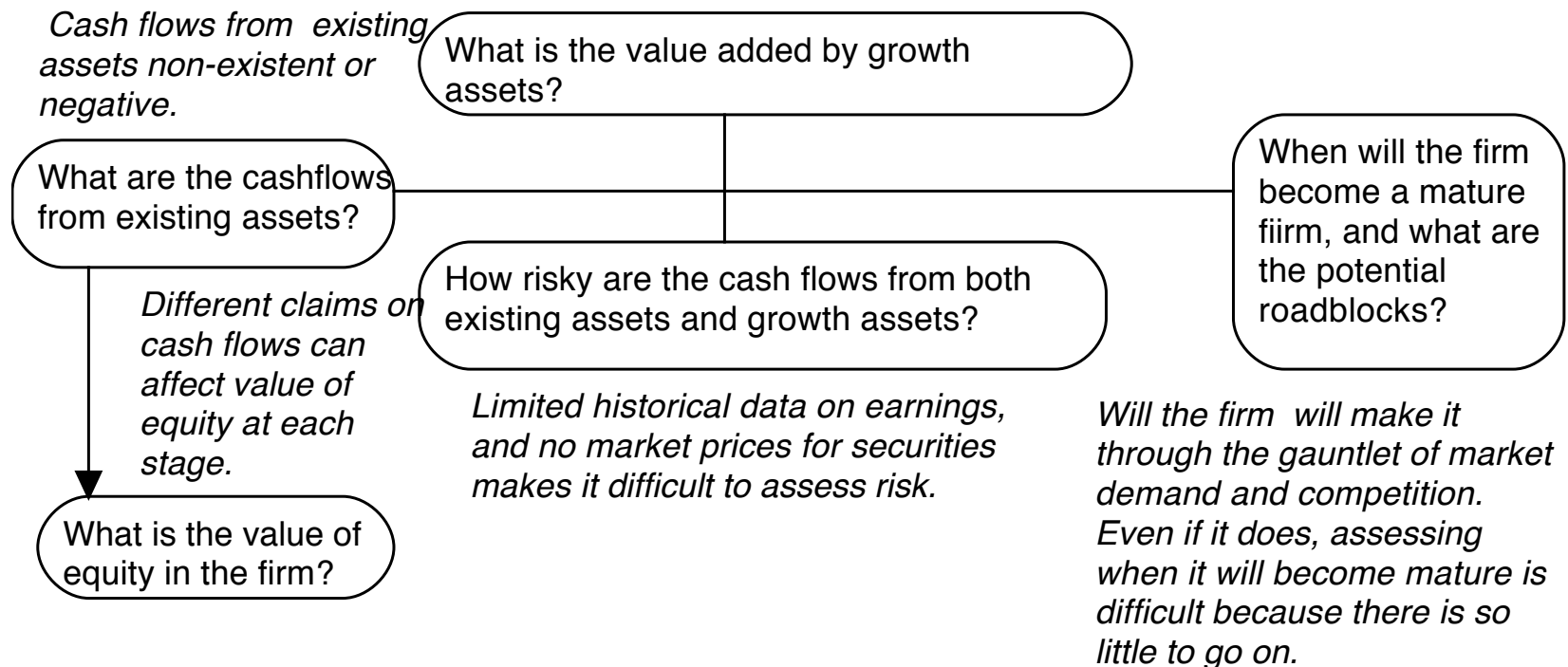
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- Across the life cycle:
 - Young, growth firms: Limited history, small revenues in conjunction with big operating losses and a propensity for failure make these companies tough to value.
 - Mature companies in transition: When mature companies change 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.



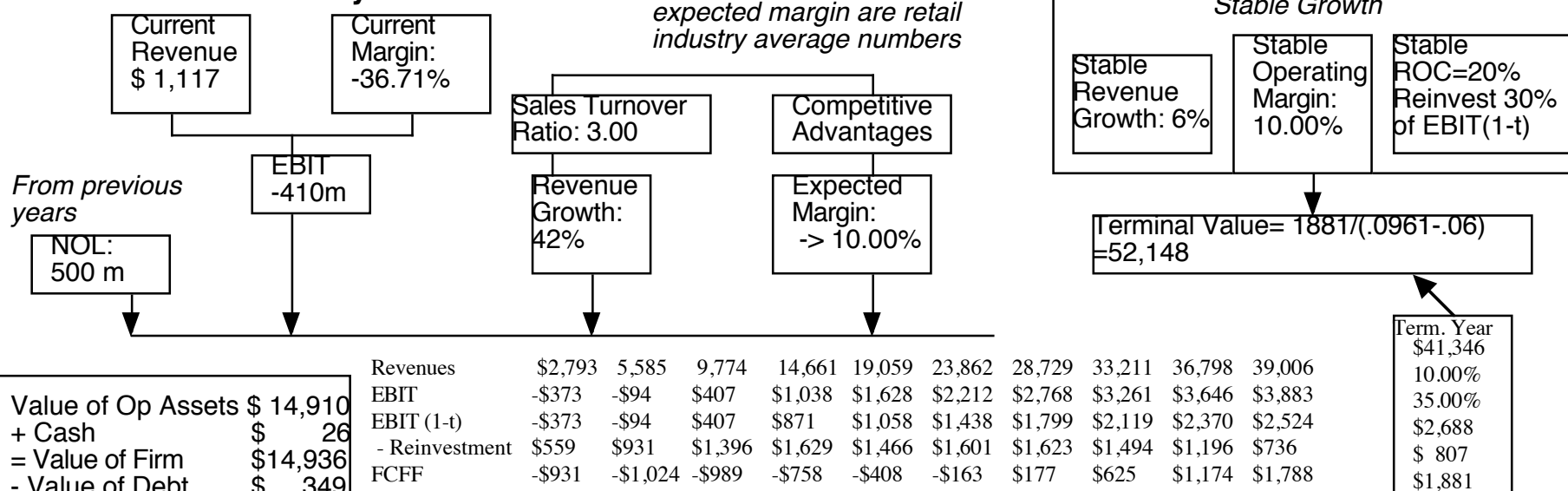
Upping the ante.. Young companies in young businesses...

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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



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

| | 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

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 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

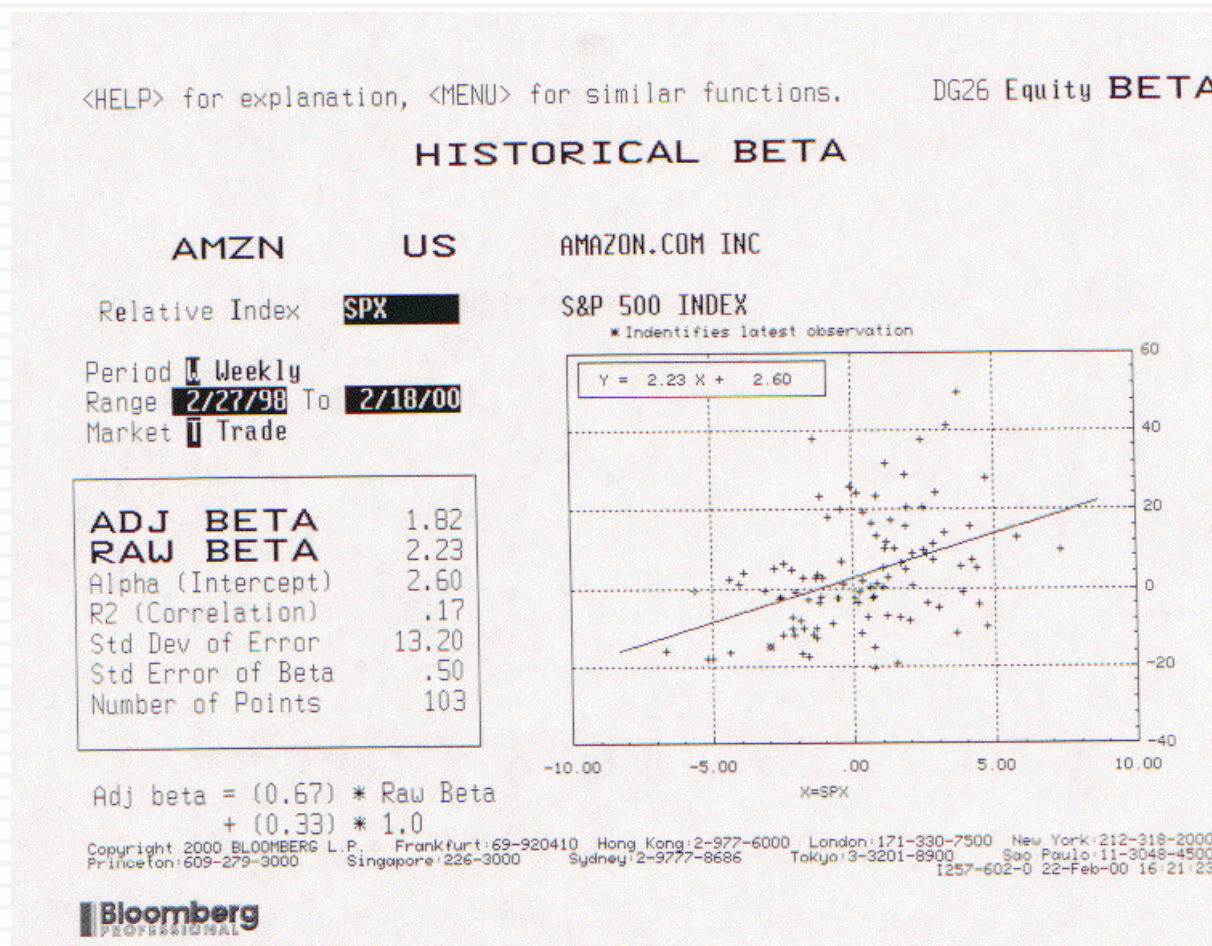
Current D/E: 1.21%

Base Equity Premium

Country Risk Premium

Lesson 1: Don't trust regression betas....

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

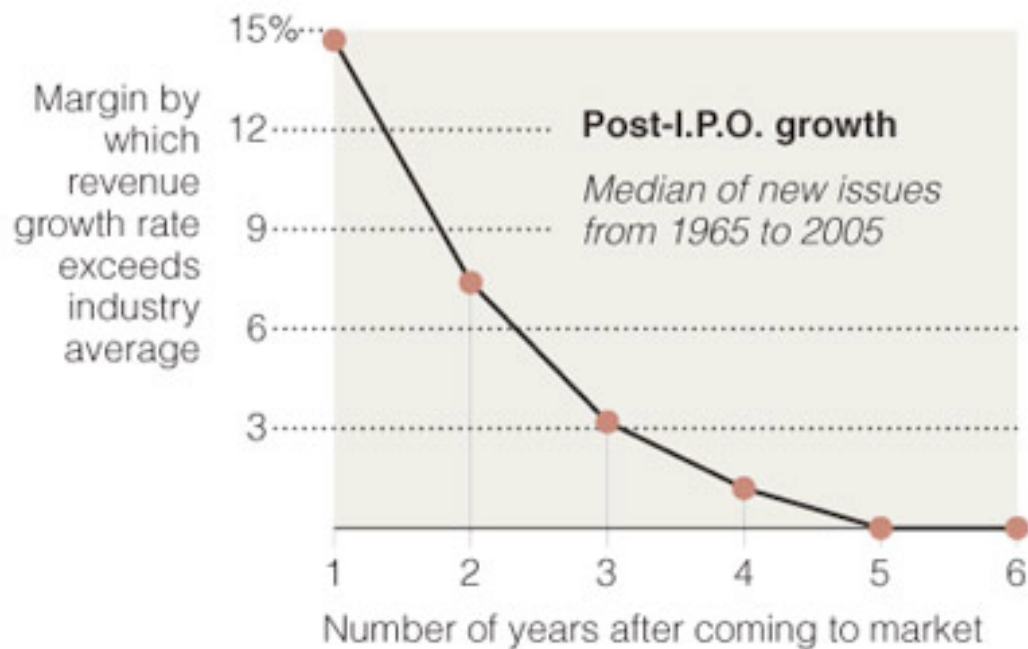
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| Year | Revenues | Operating Margin | EBIT |
|--------|----------|------------------|---------|
| Tr12m | \$1,117 | -36.71% | -\$410 |
| 1 | \$2,793 | -13.35% | -\$373 |
| 2 | \$5,585 | -1.68% | -\$94 |
| 3 | \$9,774 | 4.16% | \$407 |
| 4 | \$14,661 | 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 |

Lesson 3: Scaling up is hard to do...

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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