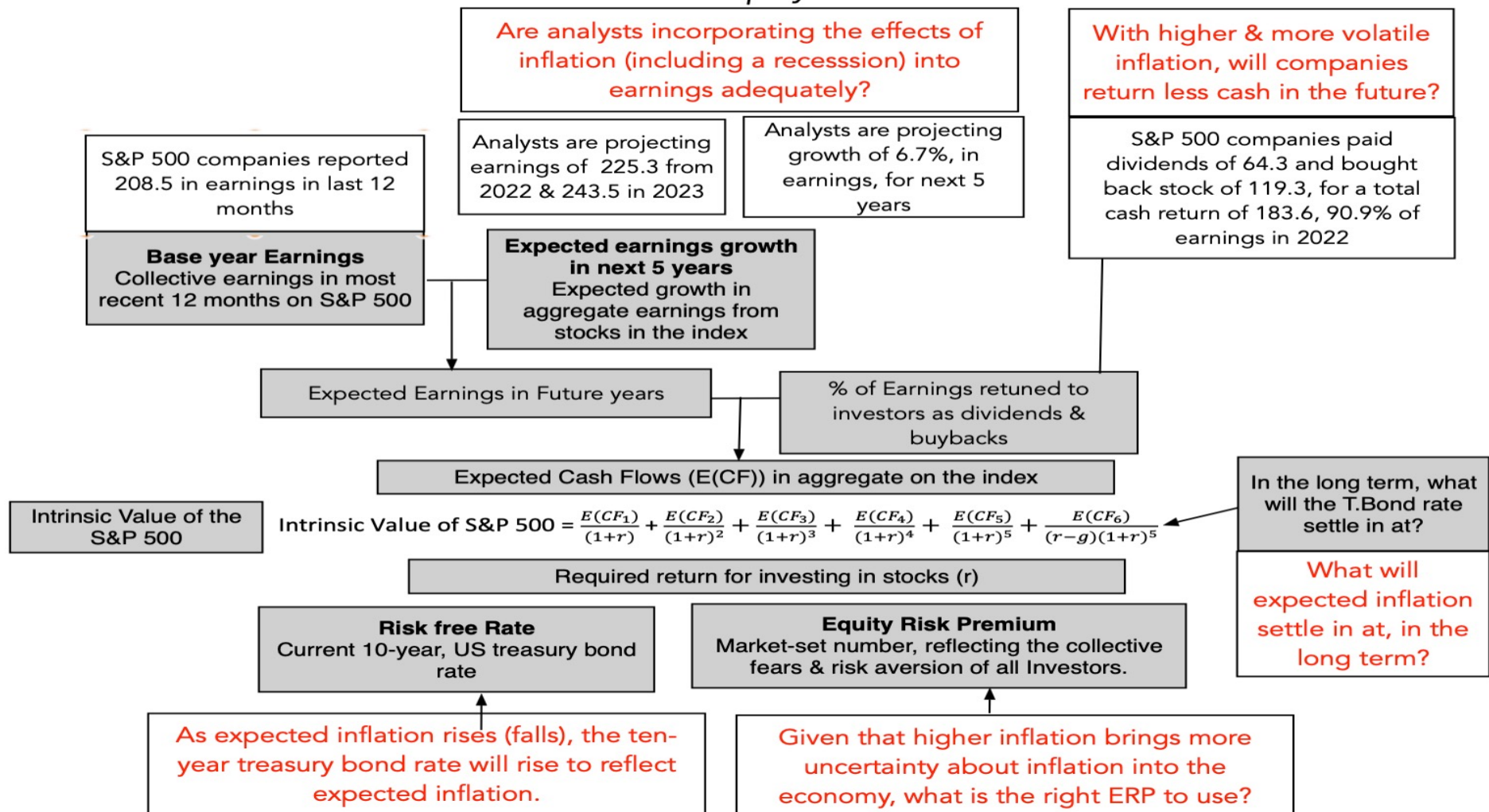


# Valuing the S&P 500 Index (September 2022)

## Inflation and Equity Value: The Drivers



# 1. Earnings

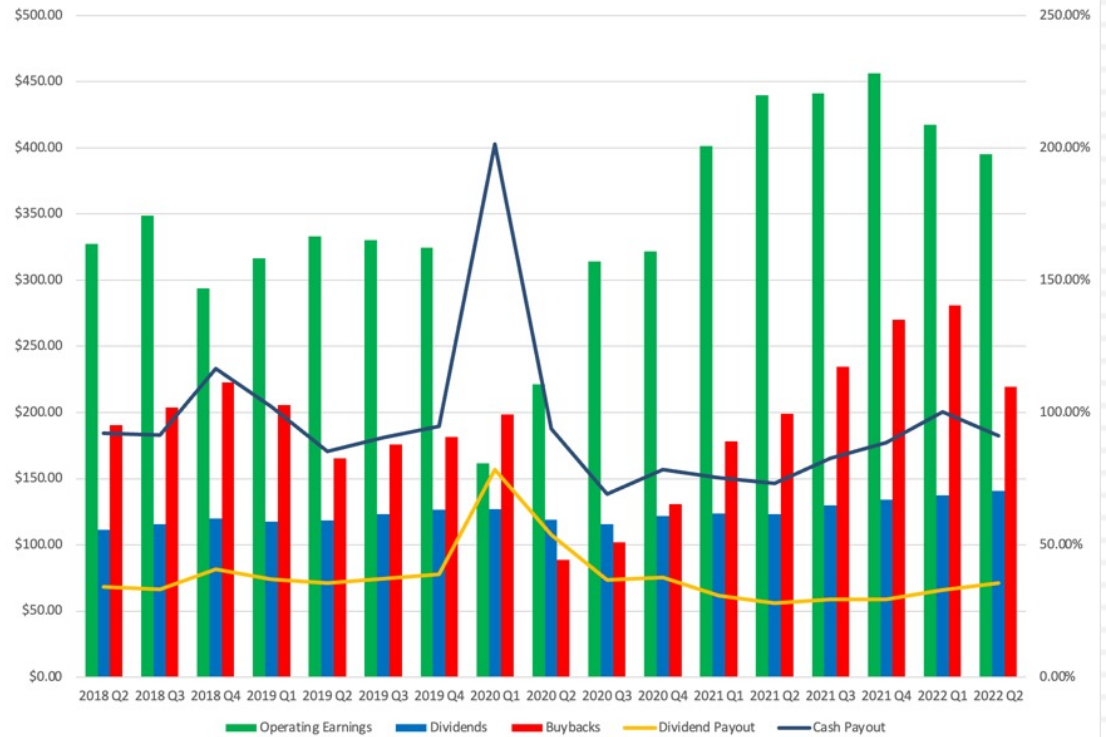
<i>Start of Month</i>	<i>Expected Earnings in 2022</i>	<i>% Change over prior month</i>	<i>% Change over start of year</i>	<i>Expected Earnings in 2023</i>	<i>% Change over prior month</i>	<i>% Change over start of year</i>
01/01/22	223.34			244.94		
02/01/22	223.78	0.20%	0.20%	245.93	0.40%	0.40%
03/01/22	225.43	0.74%	0.94%	247.94	0.82%	1.22%
04/01/22	227.3	0.83%	1.77%	249.52	0.64%	1.87%
05/01/22	227.29	0.00%	1.77%	250.11	0.24%	2.11%
06/01/22	228.03	0.33%	2.10%	248.96	-0.46%	1.64%
07/01/22	229.57	0.68%	2.79%	251.99	1.22%	2.88%
08/01/22	228.27	-0.57%	2.21%	248.35	-1.44%	1.39%
09/01/22	225.36	-1.27%	0.90%	243.64	-1.90%	-0.53%
09/20/22	225.34	-0.01%	0.90%	243.46	-0.07%	-0.60%

# 2. Cash Return

S&P 500 Aggregate Earnings, Dividends and Buybacks: 2001-2021

Year	Earnings	Dividends	Buybacks	Dividend Payout	Cash Payout
2001	38.85	15.74	14.34	40.51%	77.43%
2002	46.04	15.96	13.87	34.67%	64.78%
2003	54.69	17.88	13.70	32.69%	57.74%
2004	67.68	19.01	21.59	28.09%	59.99%
2005	76.45	22.34	38.82	29.23%	80.01%
2006	87.72	25.04	48.12	28.55%	83.40%
2007	82.54	28.14	67.22	34.09%	115.53%
2008	49.51	28.45	39.07	57.46%	136.37%
2009	56.86	21.97	15.46	38.64%	65.82%
2010	83.77	22.65	32.88	27.04%	66.28%
2011	96.44	26.53	44.75	27.51%	73.91%
2012	96.82	31.25	44.65	32.28%	78.39%
2013	104.92	34.90	53.23	33.26%	84.00%
2014	116.16	39.55	62.44	34.04%	87.79%
2015	100.48	43.41	64.94	43.20%	107.83%
2016	106.26	45.70	62.32	43.01%	101.66%
2017	124.51	48.93	60.85	39.30%	88.17%
2018	152.78	54.39	96.11	35.60%	98.51%
2019	157.18	58.50	87.81	37.22%	93.08%
2020	139.76	57.00	61.66	40.78%	84.90%
2021	205.35	60.65	104.61	29.53%	80.48%
Average				35.56%	85.05%
1st Quartile				29.53%	73.91%
Median				34.09%	83.40%
3rd Quartile				39.30%	93.08%

Quarterly Data on Earnings, Dividends and Buybacks: S&P 500



# My S&P 500 Story

## An Intrinsic (and Personal) Valuation of the S&P 500 on September 23, 2022

### My Earnings Estimates

Analysts are underestimating the effect of a recession on future earnings, and I am reducing their 2023 estimates by 15%, with ripple effects on earnings beyond. (I am leaving 2022 estimates untouched, because the bulk of the year is behind us.

### Cash Return

While companies have collectively returned 90.5% of earnings as dividends and buybacks in the most recent 12 months, recession fears and uncertainty will lead them to reduce this cash returns to 80% of earnings (consistent with growth in long term), over time.

### Intrinsic Value Estimate (based on your choice of ERP)

	2021	2022	2023	2024	2025	2026	Terminal Year
Analyst Estimate of Earnings	208.53	225.34	243.46	259.79	273.70	284.65	296.03
My Estimate of Earnings	\$208.53	225.34	206.94	225.03	243.13	252.85	262.97
Expected Earnings Growth Rate		8.06%	-8.16%	6.71%	5.35%	4.00%	4.00%
Expected cash payout as % of earnings	90.50%	90.50%	87.88%	85.25%	82.63%	80.00%	80.00%
Expected Dividends + Buybacks =	\$188.72	\$203.93	\$181.85	\$191.84	\$200.89	\$202.28	210.37
Expected Terminal Value =						\$ 4,207.49	
Riskfree Rate	3.69%	3.75%	3.81%	3.88%	3.94%	4.00%	4.00%
Required Return on Stocks	8.69%	8.75%	8.81%	8.88%	8.94%	9.00%	9.00%
Present Value =		\$187.52	\$153.67	\$148.90	\$143.12	\$2,882.41	
<b>Intrinsic Value of Index =</b>	<b>3515.63</b>						
<b>Actual Index level =</b>	<b>3693.23</b>						
<b>% Under or Over Valuation =</b>	<b>-4.81%</b>						

### Ten-year Treasury Bond Rate

I will assume that the bulk of the rise in rates has already occurred, and that the T.Bond rate will converge to 4%, over the next five years.

### Equity Risk Premium

The equity risk premium is 5%, close to both the historical average risk premium earned on stocks from 1928 - 2022 and the average implied equity risk premium over the last decade. Adding it to the ten-year bond rate yields the required return on stocks.

*In my overarching story for equities, I am building in the assumption that there will be a recession that creates both short term & long term damage to corporate earnings, but helps in restraining inflation, bringing it down from 2022 levels to about 3% in the long term (above the 2011-2021 average of 1.73%).*

# What if?

Valuing the S&P 500 on Sept 23, 2022									
	<i>Earnings = 30% below Estimates</i>			<i>Earnings = 15% below Estimates</i>			<i>Earnings = Estimates</i>		
<b>Riskfree Rate</b>	<i>ERP =4%</i>	<i>ERP =5%</i>	<i>ERP =6%</i>	<i>ERP =4%</i>	<i>ERP =5%</i>	<i>ERP =6%</i>	<i>ERP =4%</i>	<i>ERP =5%</i>	<i>ERP =6%</i>
<b>2%</b>	4276	3416	2842	4677	3737	3110	5449	4348	3615
<b>3%</b>	4132	3303	2750	4519	3613	3009	5169	4129	3436
<b>4%</b>	3979	3183	2653	4352	3482	2903	4889	3910	3257
<b>5%</b>	3819	3058	2551	4176	3345	2790	4609	3690	3078
<b>6%</b>	3650	2926	2443	3991	3200	2672	4328	3471	2899
<i>Index was trading at 3693 on 9/23/22. Shaded cells are higher than 3693</i>									

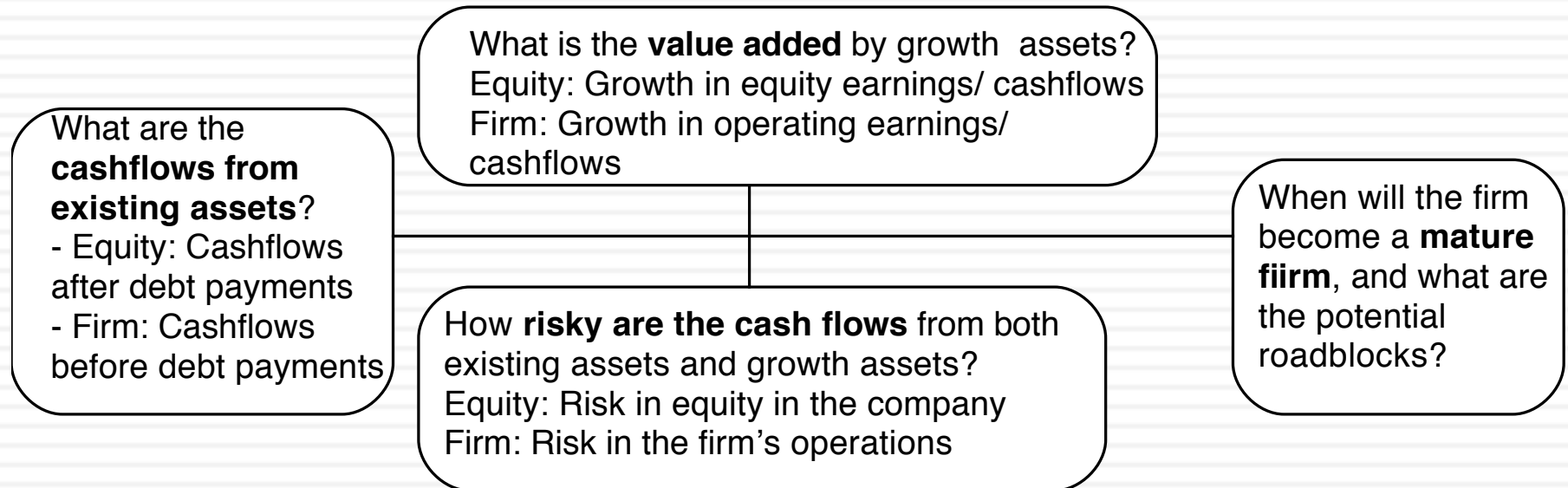
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# The Dark Side of Valuation

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

# 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.*

*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?

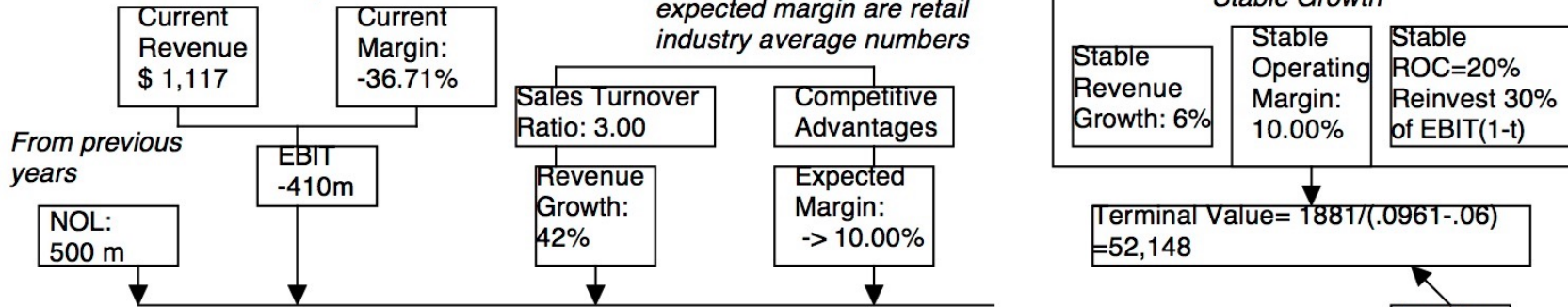
*Will the firm will make it through the gauntlet of market demand and competition. Even if it does, assessing when it will become mature is difficult because there is so little to go on.*

# 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...

### Amazon in January 2000



Value of Op Assets \$ 15,170  
 + Cash \$ 26  
 = Value of Firm \$ 14,936  
 - Value of Debt \$ 349  
 = Value of Equity \$ 14,847  
 - Equity Options \$ 2,892  
 Value per share \$ 35.08

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

	150.00%	100.00%	75.00%	50.00%	30.00%	25.20%	20.40%	15.60%	10.80%	6.00%	Term. Year
Revenues	\$ 2,793	\$ 5,585	\$ 9,774	\$ 14,661	\$ 19,059	\$ 23,862	\$ 28,729	\$ 33,211	\$ 36,798	\$ 39,006	\$ 41,346
Operating Margin	-13.35%	-1.68%	4.16%	7.08%	8.54%	9.27%	9.64%	9.82%	9.91%	9.95%	10.00%
EBIT	-\$373	-\$94	\$407	\$1,038	\$1,628	\$2,212	\$2,768	\$3,261	\$3,646	\$3,883	\$4,135
EBIT(1-t)	-\$373	-\$94	\$407	\$871	\$1,058	\$1,438	\$1,799	\$2,119	\$2,370	\$2,524	\$2,688
- Reinvestment	\$600	\$967	\$1,420	\$1,663	\$1,543	\$1,688	\$1,721	\$1,619	\$1,363	\$961	\$155
FCFF	-\$931	-\$1,024	-\$989	-\$758	-\$408	-\$163	\$177	\$625	\$1,174	\$1,788	\$1,881

	1	2	3	4	5	6	7	8	9	10	Forever
Cost of Equity	12.90%	12.90%	12.90%	12.90%	12.90%	12.42%	11.94%	11.46%	10.98%	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%	
After-tax 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%	11.62%	11.08%	10.49%	9.61%	

**Cost of Equity 12.90%**

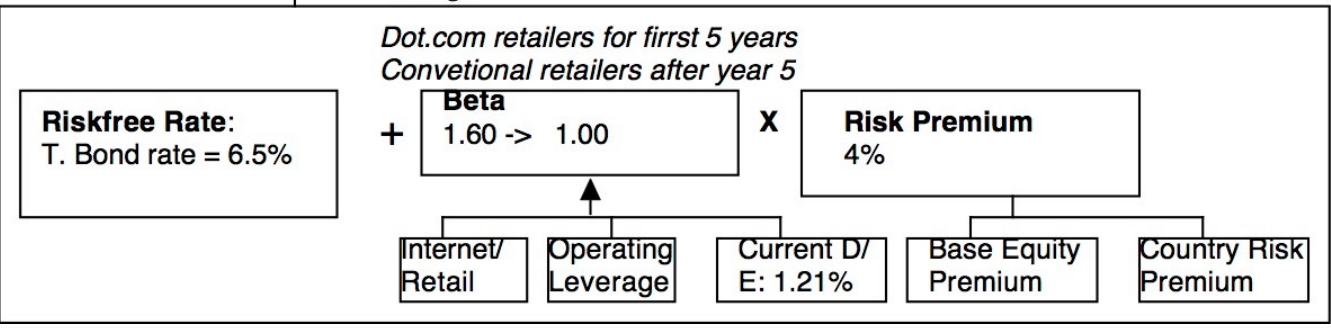
Used average interest coverage ratio over next 5 years to get BBB rating.

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

**Weights Debt= 1.2% -> 15%**

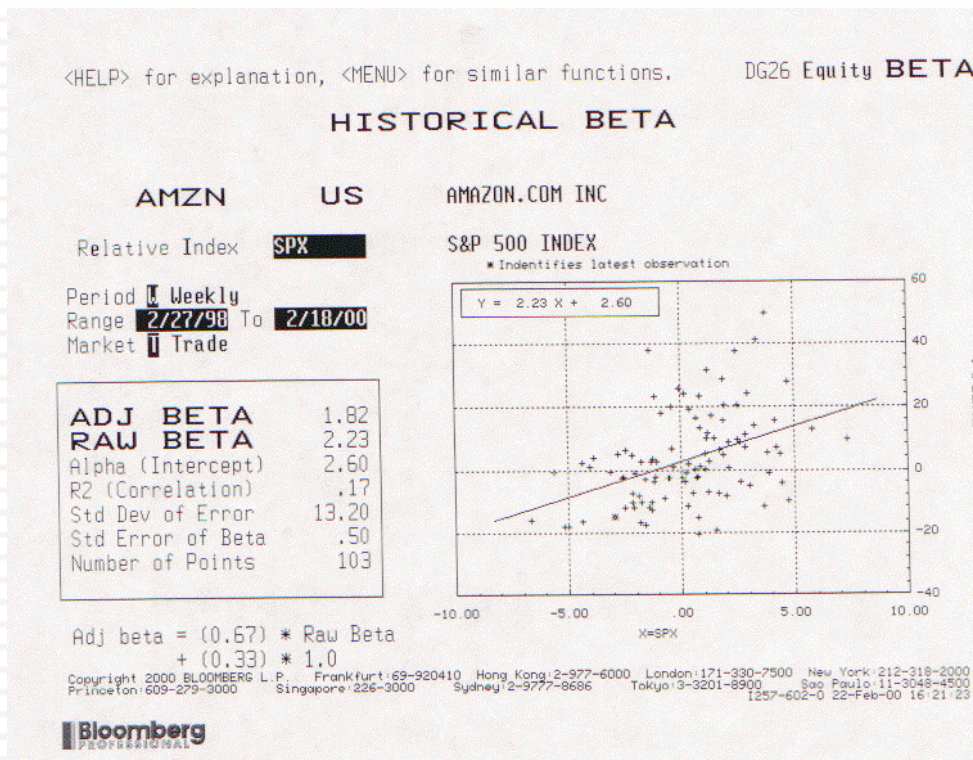
Amazon was trading at \$84 in January 2000.

Pushed debt ratio to retail industry average of 15%.





# Lesson 1: Don't sweat the small stuff



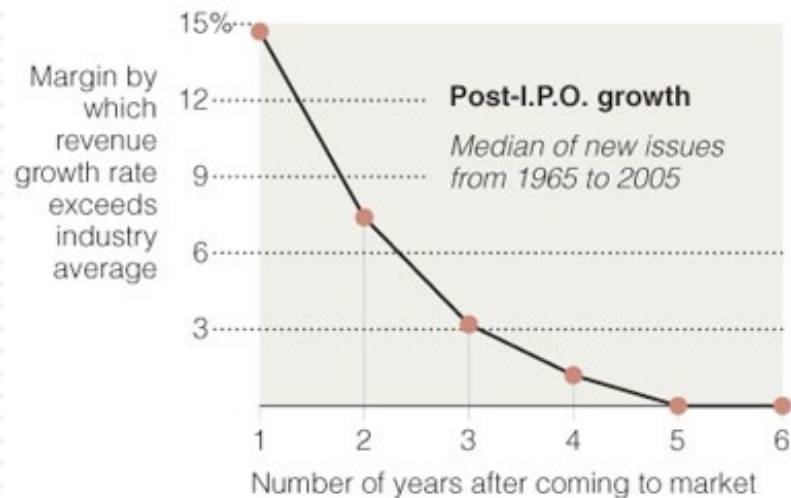
- Spotlight the business the company is in & use the beta of that business.
- Don't try to incorporate failure risk into the discount rate.
- Let the cost of capital change over time, as the company changes.
- If you are desperate, use the cross section of costs of capital to get your estimation going (use the 90<sup>th</sup> or 95<sup>th</sup> 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.



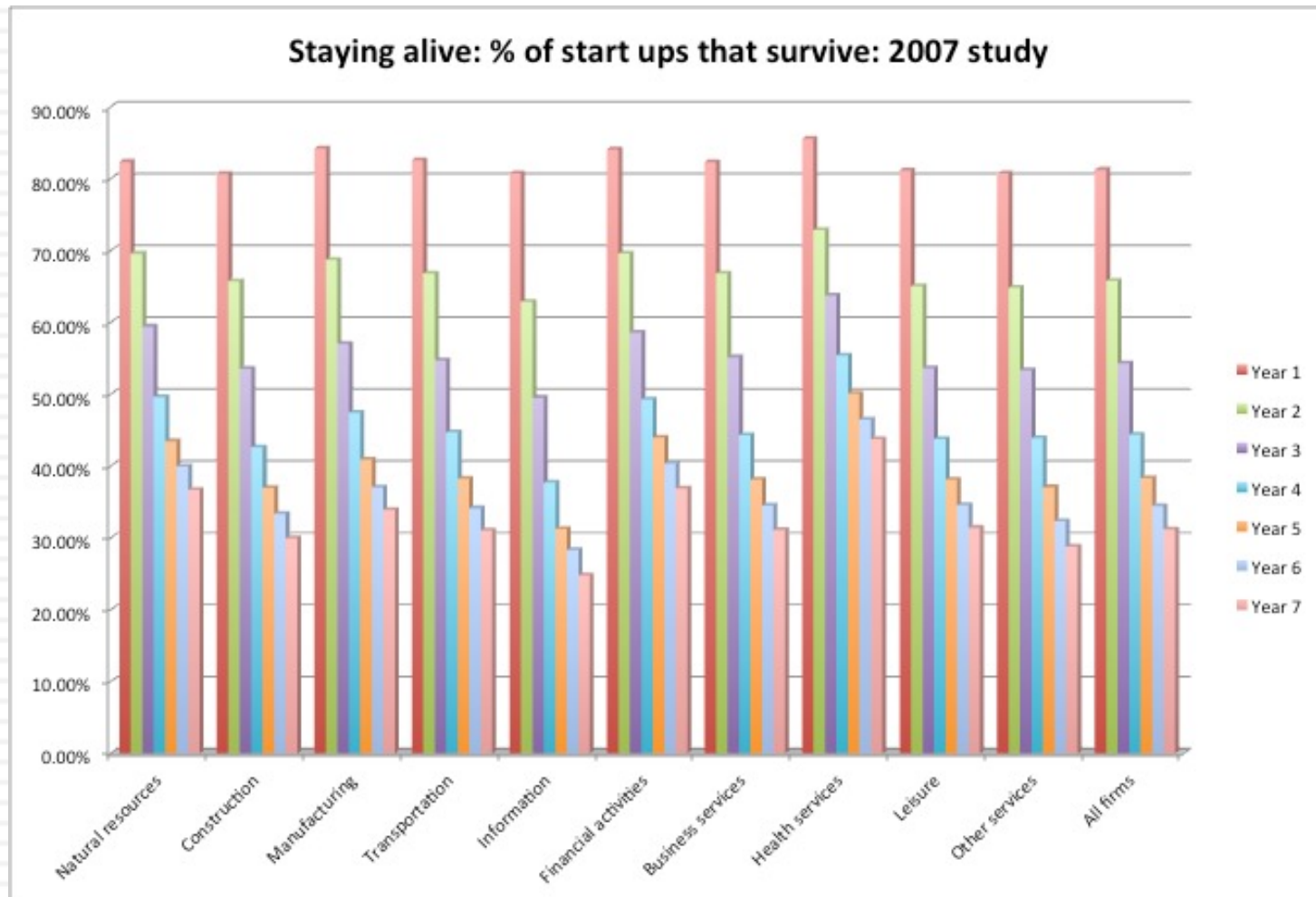
# Lesson 4: Don't forget to pay for growth...

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.
- 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. In the Amazon valuation, the value of equity is reduced by \$3.09 billion (the present value of negative FCF in the first 6 years), about a 16% reduction. That takes care of new issues in the future.
  - ▣ The existing options are valued and netted out against the current value, taking care of the option overhang. The future earnings are after stock based compensation expenses (don't fall for the "its not a cash expense" ploy) to take care of future option grants.

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

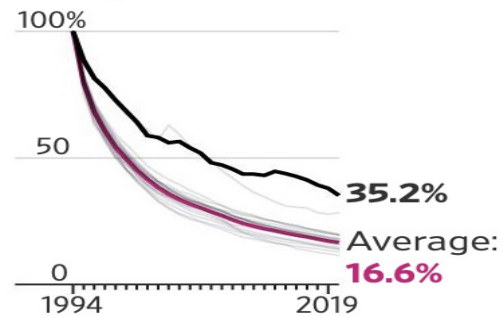


# A 2019 Update: Sector Comparison

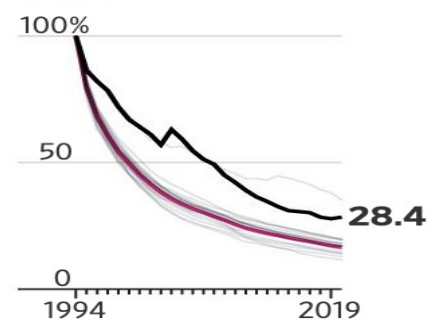
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## Sectors with highest and lowest annual survival rate, compared to all sectors

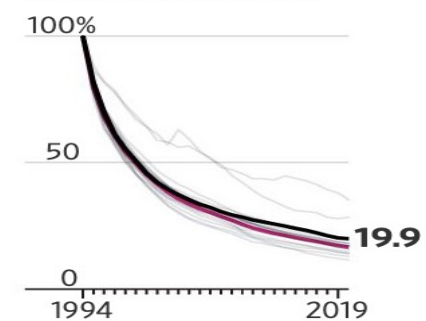
### Management of companies and enterprises



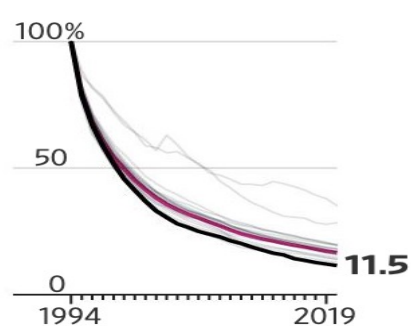
### Utilities



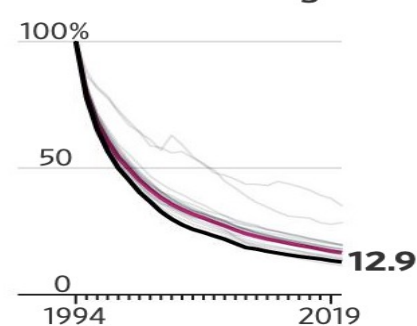
### Health care and social assistance



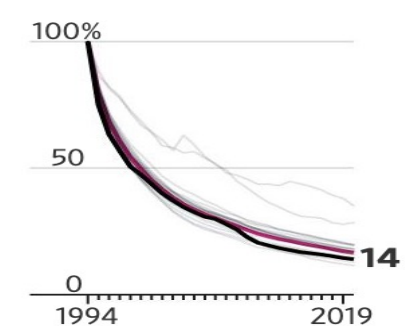
### Information



### 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