



# VALUATION 101: KEEP IT SIMPLE

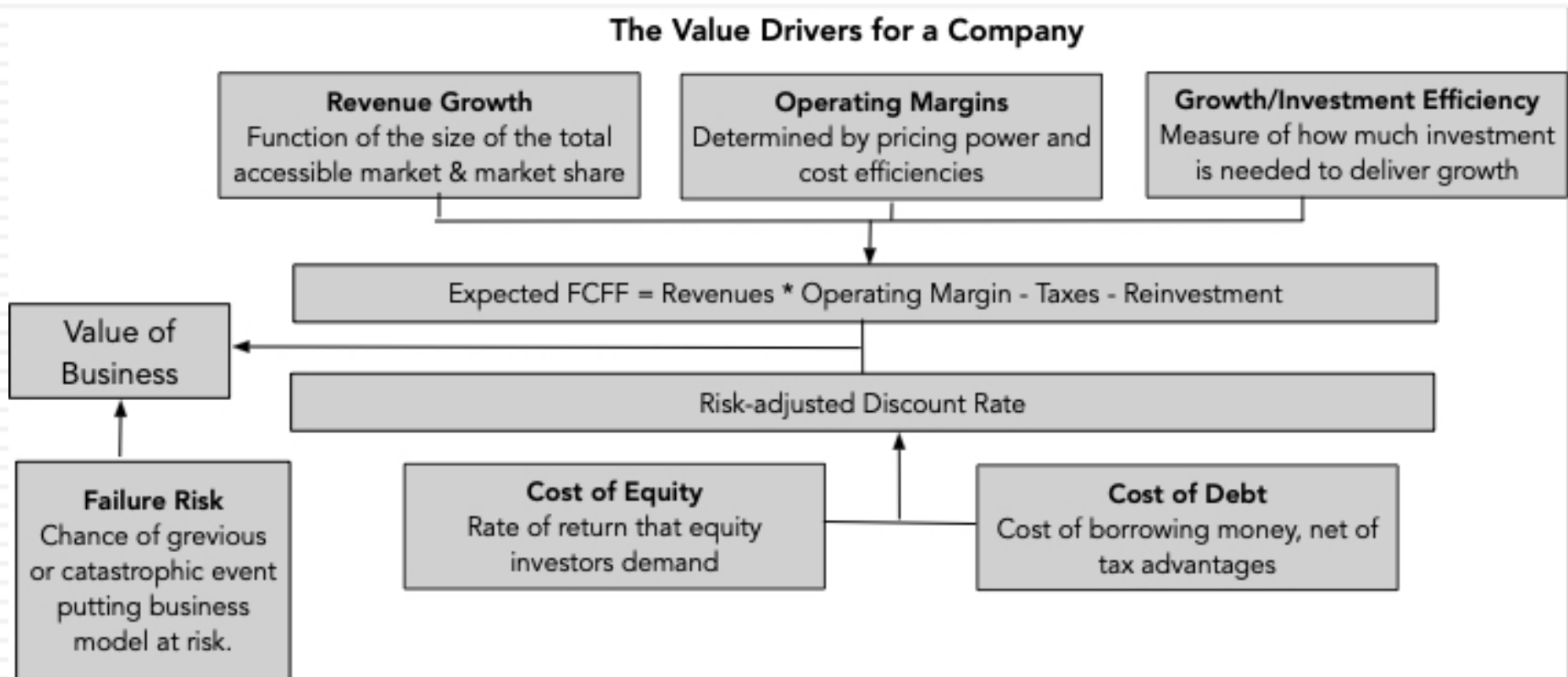
Investment Regrets and Disagreement



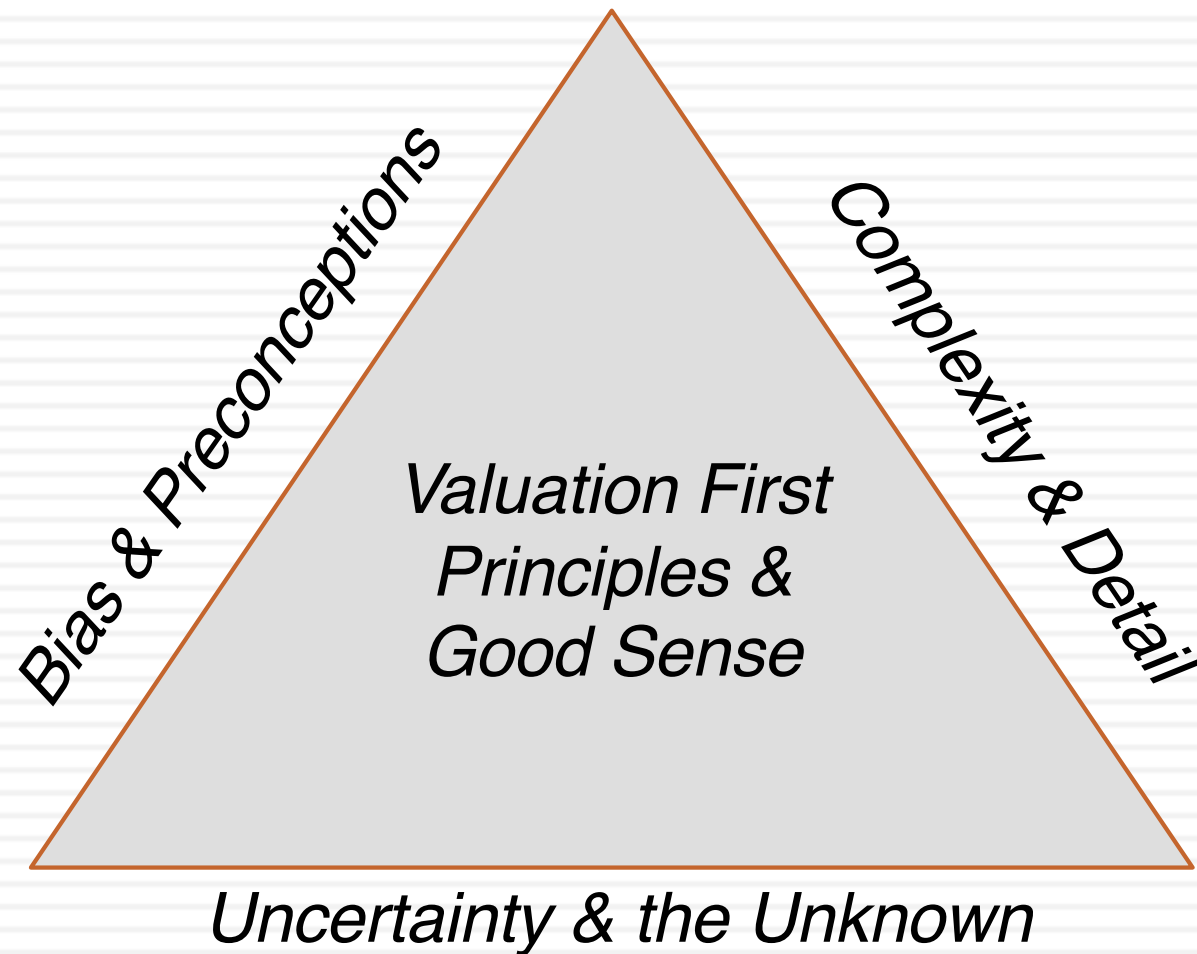
# The Lead in

The Days of Innocence?

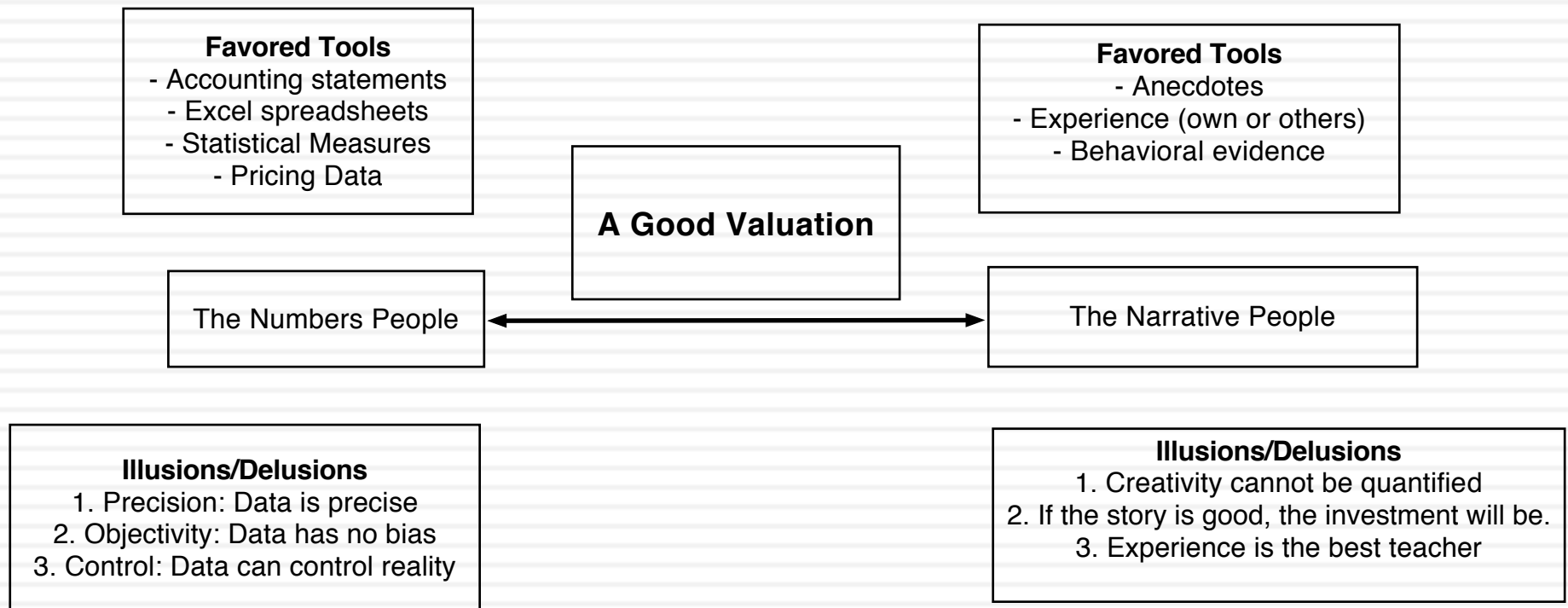
# The Basics of Value



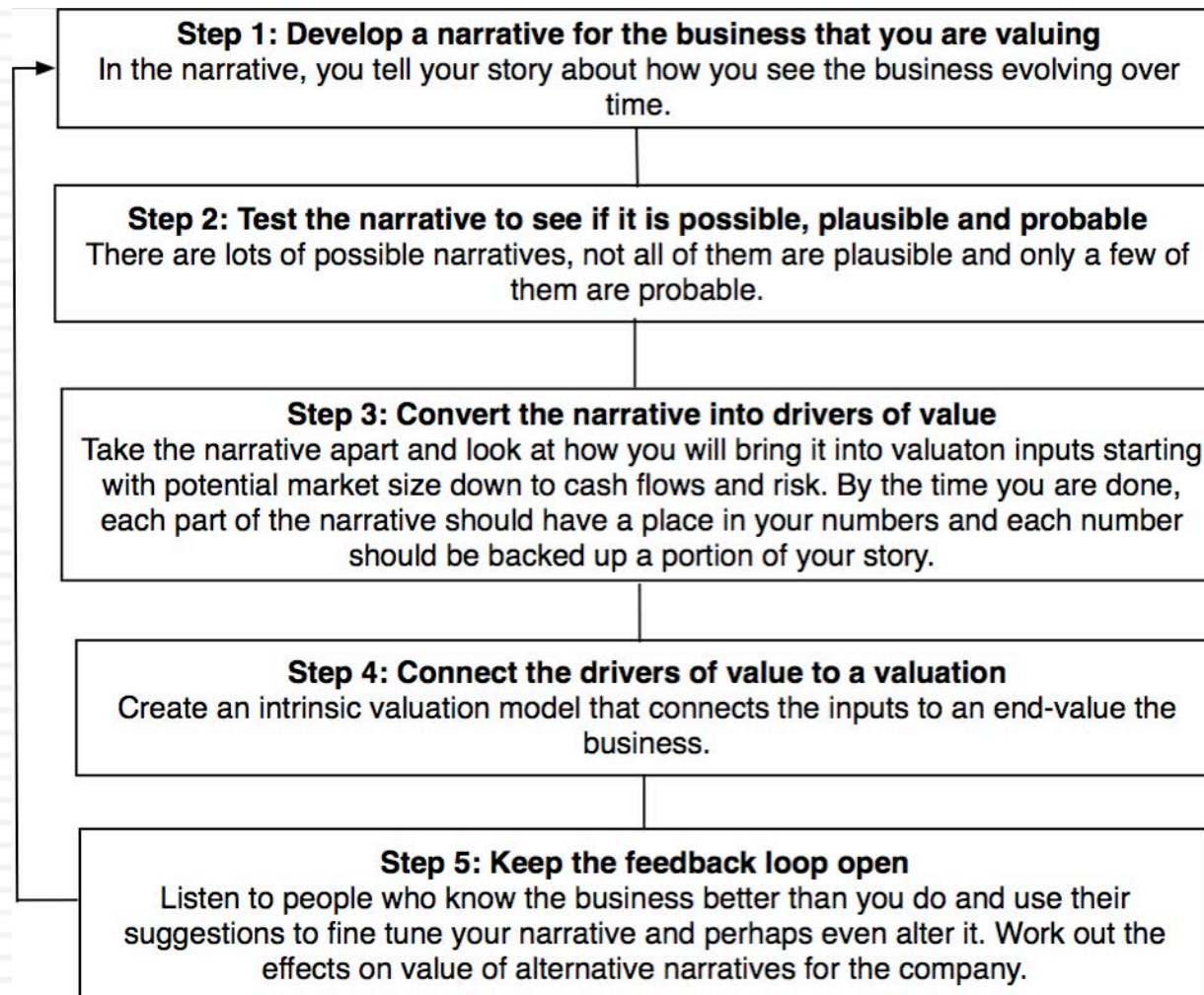
# The Bermuda Triangle of Valuation



# Healthy Valuation



# The steps in valuation



**A Teenage Phenom faces growing (up) pains!**

Tesla will grow as a high-end auto company, delivering \$100 billion in revenues in year 10. In the face of stronger competition, Tesla's brand name and better technology will allow it to deliver on profitability (with margins in the 75th percentile of auto firms) and raise enough capital to cover its large reinvestment needs for much of the next decade. While Tesla's operating risk will move towards average over time, its debt burden puts it at risk of default, and that risk has risen to 20%. There is a floor to operating value at \$35-\$40 billion, at which the firm will be attractive as an acquisition target to an auto or (more likely) a large tech firm. Overlying all of this is the danger that Elon Musk will put the company's potential at risk, by either over reaching on product offerings or committing financial malpractice.

**The Assumptions**

	Base year	Years 1-5	Years 6-10		After year 10	Link to story
Revenues (a)	\$ 22,594	30.00%	→ 2.26%		2.26%	
Operating margin (b)	1.98%	1.98%	→ 10.00%		10.00%	
Tax rate	25.00%	25.00%	→ 25.00%		25.00%	
Reinvestment (c)		Sales to capital ratio	2.00	RIR =	22.60%	
Return on capital	1.67%	Marginal ROIC =	24.53%		10.00%	
Cost of capital (d)		7.87%	→ 8.00%		8.00%	

**The Cash Flows**

	Revenues	Operating Margin	EBIT	EBIT(1-t)	Reinvestment	FCFF
1	\$ 29,372	3.58%	\$ 1,053	\$ 1,053	\$ 3,389	\$ (2,337)
2	\$ 38,184	5.19%	\$ 1,981	\$ 1,981	\$ 4,406	\$ (2,425)
3	\$ 45,821	6.79%	\$ 3,112	\$ 3,112	\$ 3,818	\$ (706)
4	\$ 54,985	8.40%	\$ 4,616	\$ 3,751	\$ 4,582	\$ (831)
5	\$ 65,982	10.00%	\$ 6,598	\$ 4,949	\$ 5,498	\$ (550)
6	\$ 76,837	10.00%	\$ 7,684	\$ 5,763	\$ 5,428	\$ 335
7	\$ 86,752	10.00%	\$ 8,675	\$ 6,506	\$ 4,958	\$ 1,549
8	\$ 94,869	10.00%	\$ 9,487	\$ 7,115	\$ 4,058	\$ 3,057
9	\$ 100,379	10.00%	\$ 10,038	\$ 7,528	\$ 2,755	\$ 4,773
10	\$ 102,647	10.00%	\$ 10,265	\$ 7,699	\$ 1,134	\$ 6,564
Terminal year	\$ 104,967	10.00%	\$ 10,497	\$ 7,873	\$ 1,779	\$ 6,093

**The Value**

Terminal value	\$ 106,156		
PV(Terminal value)	\$ 49,594		
PV (CF over next 10 years)	\$ 2,461		
Value of operating assets =	\$ 52,055		
Adjustment for distress	\$ 5,206	Default probability (based on rating) =	20.00%
- Debt & Mnority interests	\$ 14,658		
+ Cash & Other Non-operating assets	\$ 2,198		
Value of equity	\$ 34,389		
- Value of equity options	\$ 805	32 million options (CEO package & convertibles), deep out of the money right now.	
Number of shares	176.42		
Value per share	\$ 190.36	Stock was trading at =	\$185.50

**Tesla**

***Silence is golden!***

With the wind behind its back, Tesla has consolidated its hold on the electric car market and will continue to grow that market, at the expense of conventional car makers. Pushing its production towards 2 million cars by 2030, it will also be able to deliver higher margins than conventional auto companies in steady state. The rise in its market capitalization has reduced its cost of capital and the chance of failure. While Tesla will be able to invest less than other auto companies to add to capacity, its need to ramp up production will require more capital, creating negative cash flows in the near years. While other revenue sources (green energy, driverless cars in ride sharing) will supplement revenues, it will remain at its core an electric car company.

***The Assumptions***

	<i>Base year</i>	<i>Years 1-5</i>	<i>Years 6-10</i>		<i>After year 10</i>	<i>Link to story</i>
Revenues (a)	\$ 24,578	25.00% → 1.75%			1.75%	Growth in EV market & Tesla's early mover advantage work in its favor.
Operating margin (b)	1.60%	1.60% → 12.00%			12.00%	Continued economies of scale & brand
Tax rate	25.00%	25.00% → 25.00%			25.00%	Global tax rate
Reinvestment (c)		Sales to capital ratio 3.00		RIR =	17.50%	Capacity build up allows for less reinvestment in the near years.
Return on capital	1.59%	Marginal ROIC =	34.86%		10.00%	Cost of entry will limit competition.
Cost of capital (d)		7.00% → 7.40%			7.40%	Moves to median company cost of capital

***The Cash Flows***

	<i>Revenues</i>	<i>Operating Margin</i>	<i>EBIT</i>	<i>EBIT (1-t)</i>	<i>Reinvestment</i>	<i>FCFF</i>
1	\$ 30,723	3.68%	\$ 1,132	\$ 849	\$ 2,048	\$ (1,199)
2	\$ 38,403	5.76%	\$ 2,213	\$ 1,660	\$ 2,560	\$ (900)
3	\$ 48,004	7.84%	\$ 3,764	\$ 2,823	\$ 3,200	\$ (377)
4	\$ 60,005	9.92%	\$ 5,953	\$ 4,465	\$ 4,000	\$ 464
5	\$ 75,006	12.00%	\$ 9,001	\$ 6,751	\$ 5,000	\$ 1,750
6	\$ 90,270	12.00%	\$ 10,832	\$ 8,124	\$ 7,632	\$ 492
7	\$ 104,442	12.00%	\$ 12,533	\$ 9,400	\$ 7,086	\$ 2,314
8	\$ 115,983	12.00%	\$ 13,918	\$ 10,438	\$ 5,770	\$ 4,668
9	\$ 123,406	12.00%	\$ 14,809	\$ 11,107	\$ 3,711	\$ 7,395
10	\$ 125,566	12.00%	\$ 15,068	\$ 11,301	\$ 1,080	\$ 10,221
Terminal year	\$ 127,763	12.00%	\$ 15,332	\$ 11,499	\$ 2,012	\$ 9,486

***The Value***

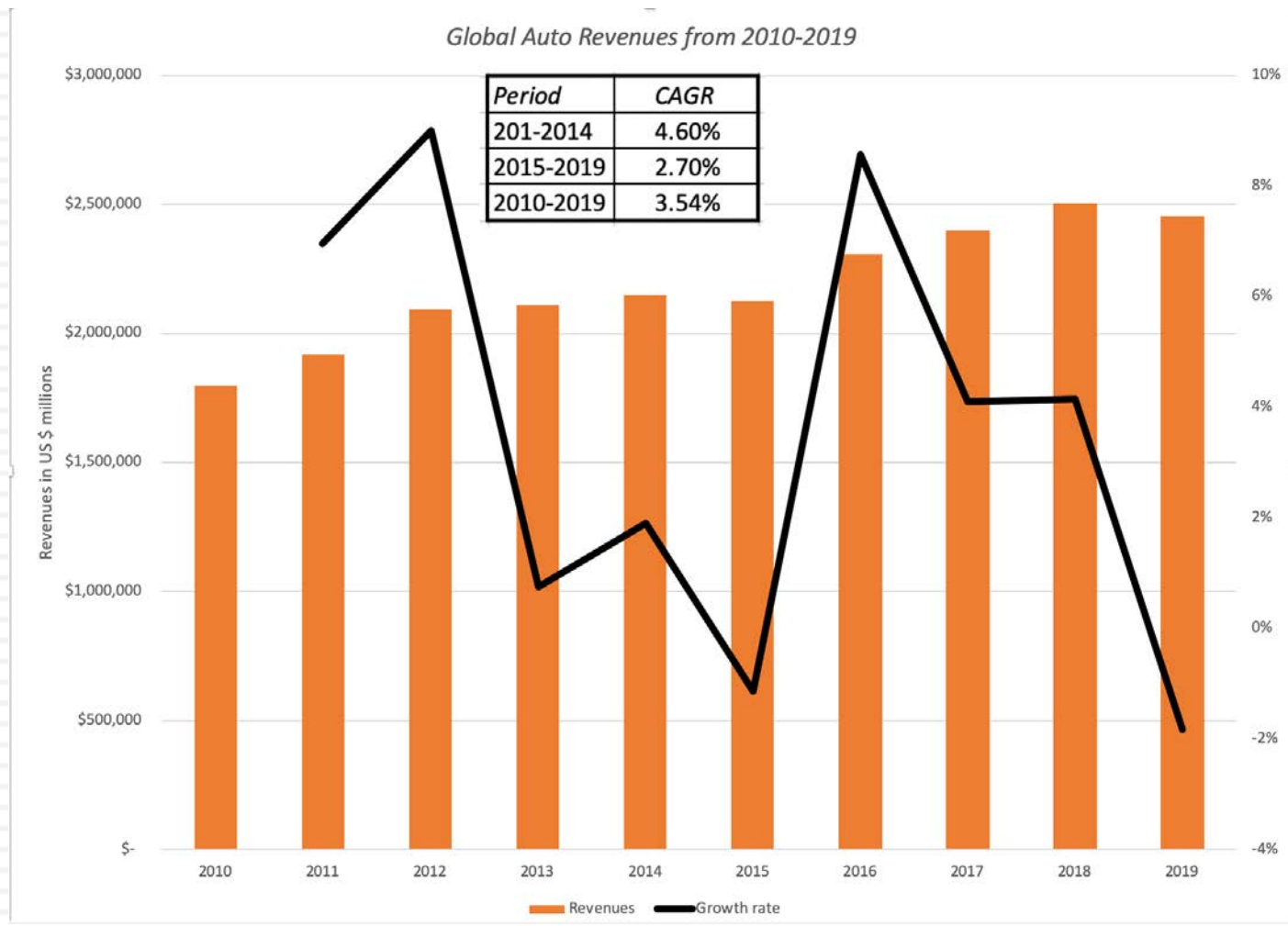
Terminal value	\$ 167,901		
PV(Terminal value)	\$ 84,402		
PV (CF over next 10 years)	\$ 12,988		
Value of operating assets =	\$ 97,390		
Adjustment for distress	\$ 4,869	Probability of failure =	10.00%
- Debt & Mnority Interests	\$ 14,708		
+ Cash & Other Non-operating assets	\$ 6,514		
Value of equity	\$ 84,326		
- Value of equity options	\$ 8,822		
Number of shares	177.00		
Value per share	\$ 426.58	Stock was trading at =	\$581.00



# The drivers of value

- The Growth Lever: The **revenue growth rate** controls how much and how quickly the firm will be able to grow its revenues from autos, software, solar panels and anything else that you believe the company. *In my Tesla story (valuation), I have estimated revenues of \$125 billion in 2030, a five-fold increase over the 2019 revenues.*
- The Profitability Lever: The **target (pre-tax) operating margin** determines how profitable you think the company will be, once its growth days start to scale down. *In keeping with my view that R&D is really a capital expense, I capitalize R&D, which improves Tesla's profitability and target an operating margin of 12% by 2025.*
- The Investment Efficiency Lever: To grow, companies have to invest in capacity and the **sales to invested capital** drives how efficiently investment is done, with higher sales to capital ratios reflecting more efficiency. *With Tesla, I assume that every dollar of investment (in new factories, technology and new R&D) in the first 5 years generates \$3 in revenue.*
- The Risk lever: The first is the **cost of capital** that I start the valuation with, a reflection of risk as seen through the eyes of a diversified investor in the company. The second is the **likelihood of failure** (or distress). *With Tesla, I set this cost of capital at 7% and assume that given its marginal profitability and significant debt load, the chance of failure is 10%.*

# The Growth Lever



# The Biggest Auto Companies

Company Name	Revenues in 2019 (LTM)	CAGR: 2010-19	Operating Income in 2019 (LTM)	Operating Margin
Toyota Motor Corporation (TSE:7203)	\$285,284.60	1.83%	\$24,146.20	8.46%
Volkswagen AG (XTRA:VOW3)	\$270,296.60	5.72%	\$22,447.90	8.30%
Daimler AG (XTRA:DAI)	\$187,796.30	4.54%	\$5,167.40	2.75%
Ford Motor Company (NYSE:F)	\$155,900.00	2.13%	\$574.00	0.37%
Honda Motor Co., Ltd. (TSE:7267)	\$145,690.50	3.24%	\$6,968.20	4.78%
General Motors Company (NYSE:GM)	\$137,237.00	0.13%	\$5,481.00	3.99%
Fiat Chrysler Automobiles N.V. (BIT:FCA)	\$117,565.20	16.08%	\$6,174.90	5.25%
SAIC Motor Corporation (SHSE:600104)	\$111,839.00	12.03%	\$2,303.10	2.06%
BMW (XTRA:BMW)	\$108,985.90	3.63%	\$7,459.40	6.84%
Nissan Motor Co., Ltd. (TSE:7201)	\$102,176.80	0.11%	\$1,290.50	1.26%
Hyundai Motor (KOSE:A005380)	\$86,053.20	1.03%	\$2,454.50	2.85%
Peugeot S.A. (ENXTPA:UG)	\$83,946.30	2.24%	\$6,841.10	8.15%
AUDI AG (XTRA:NSU)	\$64,663.20	5.37%	\$5,034.10	7.79%
Renault SA (ENXTPA:RNO)	\$63,168.00	3.61%	\$3,801.80	6.02%
Kia Motors Corporation (KOSE:A000270)	\$46,311.20	6.97%	\$1,502.70	3.24%
Tata Motors Limited (BSE:500570)	\$40,131.40	4.91%	\$914.60	2.28%
Suzuki Motor Corporation (TSE:7269)	\$34,206.70	1.03%	\$2,259.30	6.60%
Mazda Motor Corporation (TSE:7261)	\$32,769.80	1.80%	\$721.20	2.20%
Subaru Corporation (TSE:7270)	\$30,338.50	5.27%	\$2,165.10	7.14%
Tesla, Inc. (NasdaqGS:TSLA)	\$24,578.00	81.20%	\$80.00	0.33%

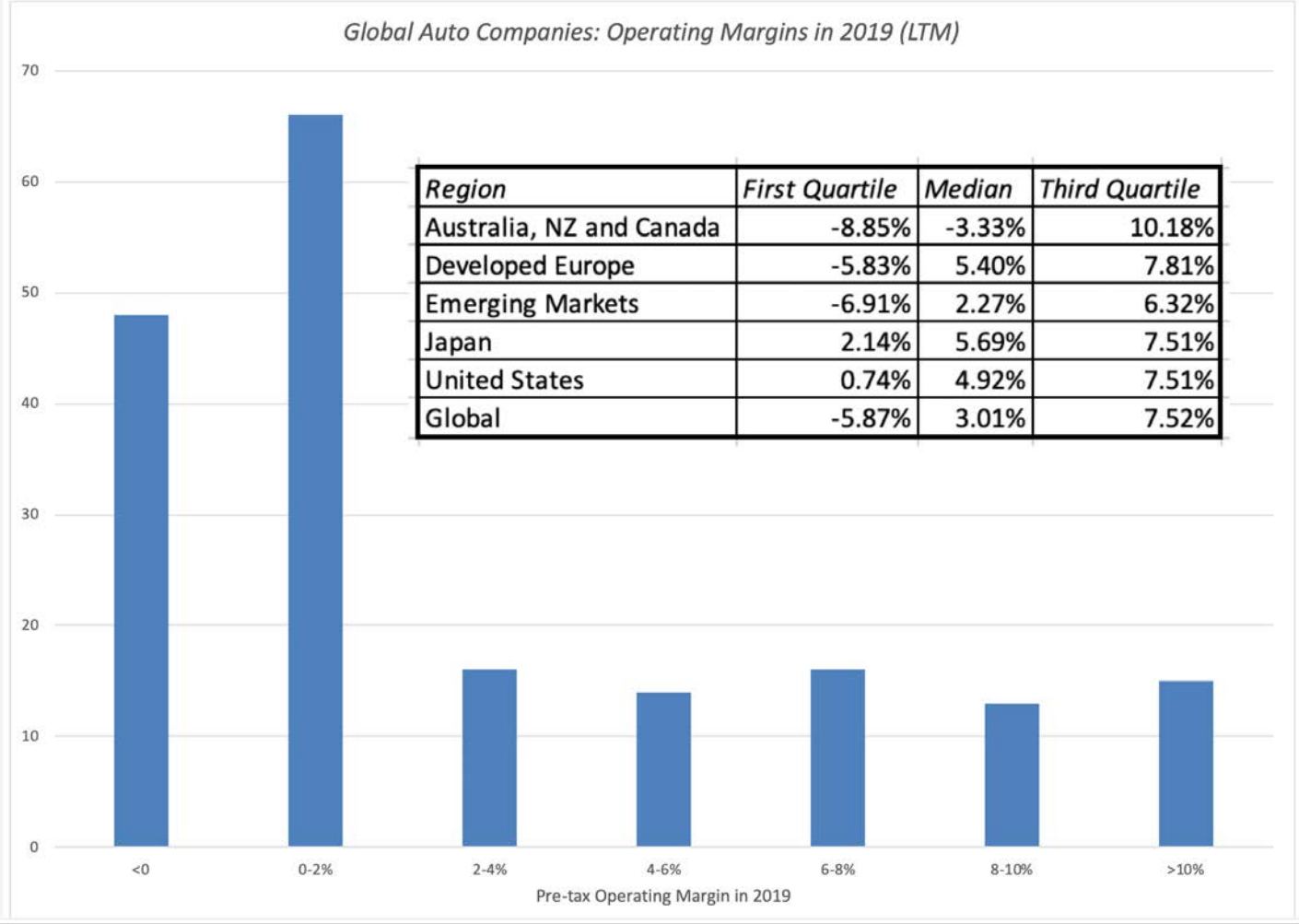
# A tech company twist?

<i>Company</i>	<i>Revenues in 2019</i>	<i>Operating Income in 2019</i>	<i>Operating Margin</i>
Apple	\$ 260,174.00	\$ 63,333	24.34%
Microsoft	\$ 129,814.00	\$ 45,799	35.28%
Alphabet Inc.	\$ 155,058.00	\$ 32,650	21.06%
Amazon.com	\$ 265,469.00	\$ 12,795	4.82%
Facebook	\$ 66,529.00	\$ 21,167	31.82%
Netflix	\$ 18,875.90	\$ 2,269	12.02%
FAANG+M	\$ 895,919.90	\$ 178,012.16	19.87%

# Your growth choice

<i>Expected Revenues in 2030 (in \$ millions)</i>	<i>CAGR (next 5 years)</i>
A1: \$65 billion (Renault-like)	15.00%
A2: \$100 billion (BMW-like)	21.00%
A3: \$150 billion (Ford & Honda-like)	28.00%
A4: \$200 billion (Daimler-like)	33.00%
A5: \$300 billion (Toyota & VW-like)	40.00%
A6: Direct Input (Enter % growth rate)	25.00%

# The Profitability Lever



# A tech twist?

- The median operating margin for tech companies (including both software & hardware is 10.25%).
- The picture is brighter for the FAANG stocks, where the aggregate operating margin across all five stocks is 19.87%, well above auto industry averages. That margin, though, is delivered on smaller revenues and with business models where production costs are a small fraction of selling prices.
- The operating margin for just software companies is even higher at 21.24%, because the marginal unit of software is close to costless to produce.

# Your choice on profitability

<i>Operating Margin in 2025</i>	<i>Target Operating Margin</i>
B1: Auto Industry First Quartile	-5.87%
B2: Auto Industry Median	3.01%
B3: Auto Industry Third Quartile	7.52%
B4: Technology Median	10.25%
B5: Software	21.24%
B6: FAANG Aggregate	19.87%
B7: Direct Input	12.00%



# 3. The Investment Efficiency Lever



# More on investment efficiency

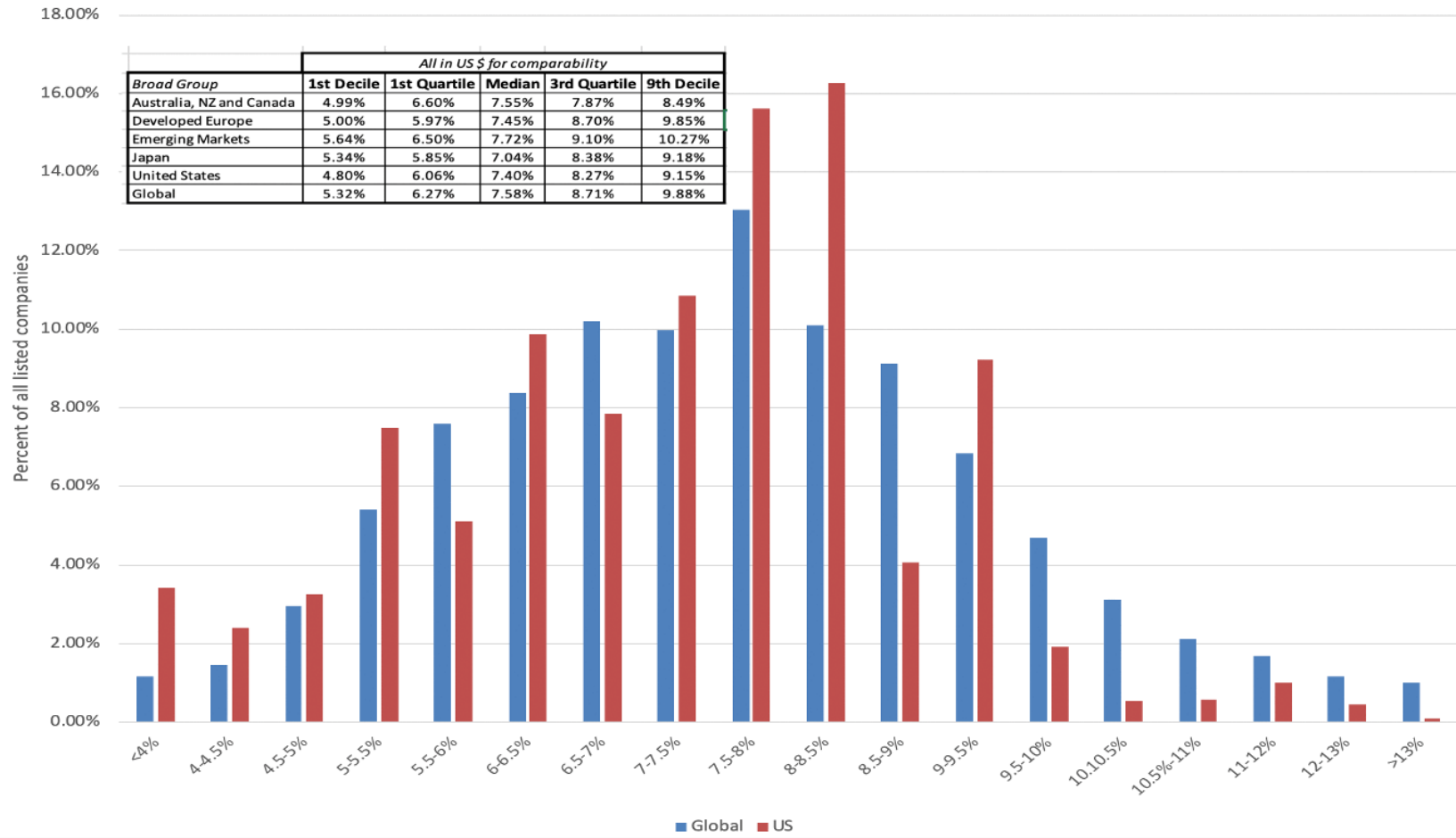
- Looking across global auto companies, the median company generates \$1.37 in sales for every dollar of capital invested, and at the 75th percentile, the more capital-efficient auto companies generate \$2.42 in revenues for every dollar of capital invested.
- My estimate of \$3 in revenues for every dollar of capital invested reflects an optimistic view of Tesla's capacity to bring technological innovation to its production processes, and reduce the capital needed to fund those processes.
- Since Tesla, in 2019, generates \$1.32 in revenue for every dollar of capital invested, my estimate is more aspirational than based on observable efficiencies, right now.

# Your choice on investment efficiency

<i>Sales to Invested Capital</i>	<i>Sales to Capital (1st 5 years)</i>
C1: Auto Industry First Quartile	0.75
C2: Auto Industry Median	1.37
C3: Auto Industry Third Quartile	2.42
C4: Technology Median	1.51
C5: Software	2.30
C6: FAANG Aggregate	1.27
C7: Direct Input	3.00

# 4. Risk: The Cost of Capital - Global

Cost of Capital in January 2020: All Listed Non-financial Service Companies



# Your choice on cost of capital & the failure rate

<i>Cost of Capital</i>	<i>Initial cost of capital</i>
D1: Automobile Median	6.94%
D2: Technology Median	8.86%
D3: All companies - First Quartile	6.27%
D4: All companies - Median	7.58%
D5: All companies - Third Quartile	8.71%
D6: Direct Input	7.00%

<i>Failure Likelihood</i>	<i>Probability of failure</i>
E1: No chance	0%
E2: 10% (Marginal profitability, High Debt)	10%
E3: 20% (Money loser, High Debt)	20%
E4: 50% (Low Growth, Money loser, High Debt)	50%

# Valuation Stories

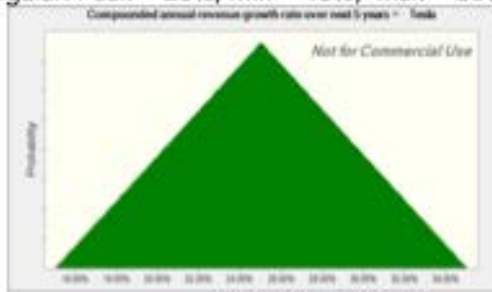
<i>Story</i>	<i>Revenues</i>	<i>Operating Margins</i>	<i>Reinvestment Efficiency</i>	<i>Risk</i>	<i>Value/Share</i>	<i>Equity Value</i>
The Big Auto	BMW-like (\$100 billion)	Auto 75th percentile	Auto 75th percentile	Auto median	\$ 105.79	\$ 27,547
	Daimler-like (\$200 billion)	Auto 75th percentile	Auto 75th percentile	Auto median	\$ 227.42	\$ 49,076
	VW/Toyota-like (\$300 billion)	Auto 75th percentile	Auto 75th percentile	Auto median	\$ 332.82	\$ 67,731
Auto+ Tech	BMW-like (\$100 billion)	Tech median	Tech median	Tech median	\$ 110.96	\$ 28,461
	Daimler-like (\$200 billion)	Tech median	Tech median	Tech median	\$ 211.84	\$ 46,317
	VW/Toyota-like (\$300 billion)	Tech median	Tech median	Tech median	\$ 297.86	\$ 61,544
An Auto FAANG	BMW-like (\$100 billion)	FAANG aggregate	FAANG aggregate	Tech median	\$ 458.37	\$ 89,953
	Daimler-like (\$200 billion)	FAANG aggregate	FAANG aggregate	Tech median	\$ 854.64	\$ 160,094
	VW/Toyota-like (\$300 billion)	FAANG aggregate	FAANG aggregate	Tech median	\$ 1,204.62	\$ 222,040
FAANG	VW/Toyota-like (\$300 billion)	Software median	Revolutionary Manufacturing	Auto median	\$ 2,105.55	\$ 381,504

# The Stories

- The Big Auto Story: If your story is that Tesla will emerge from its growth period as one of the largest auto companies in the world (revenues of \$100- \$300 billion in year 10), with top-tier auto company margins (7.42%), investment efficiency (2.42) and cost of capital (6.94%), the value per share ranges from \$106/share (with BMW like revenues) to \$227/share (with Daimler-like revenues) to \$333/share (with VW/Toyota like revenues).
- The Techy Auto Company Story: Tesla is an auto/software/services company with tech company characteristics, giving it higher margins (10.25%) and a higher cost of capital (8.86%). With this story, the value per share ranges from \$111/share (with BMW like revenues) to \$212/share (with Daimler-like revenues) to \$298/share (with VW/Toyota like revenues). Put simply, the higher risk nullifies the benefits of higher profitability.
- The FAANGy Auto Company: Tesla not only develops a tech twist, but becomes as successful as the most successful tech companies (I use the FAANG stocks + Microsoft). In this story, the margins approach 18.97% and with a tech cost of capital, the value per share ranges from \$459/share (with BMW like revenues) to \$855/share (with Daimler-like revenues) to \$2,106/share (with VW/Toyota like revenues).
- The Make-your-best Company: I give Tesla the best possible outcomes on each variable, revenues like VW/Toyota, margins like pure software companies (21.24%), a sales to capital ratio that is higher than any of the sector averages (4.00) and a cost of capital of an auto company (6.94%), and arrive at a value per share of \$2106.

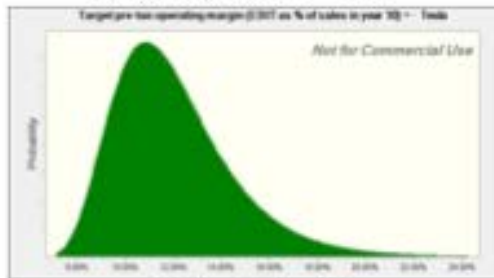
### Revenue Growth

Triangular: Peak = 25%, Min = 15%; Max = 35%



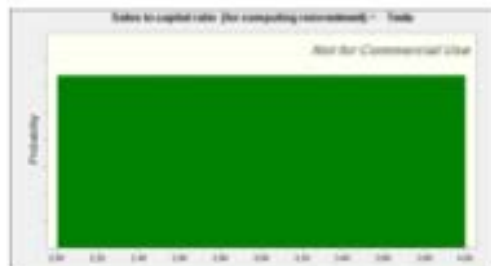
### Operating Margin

Log Normal: Mean = 12%



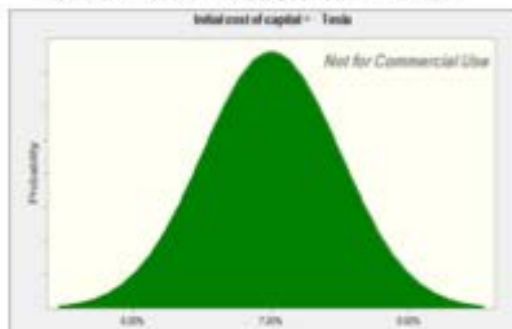
### Sales to Capital

Uniform: Min = 1.00 Max = 3.00



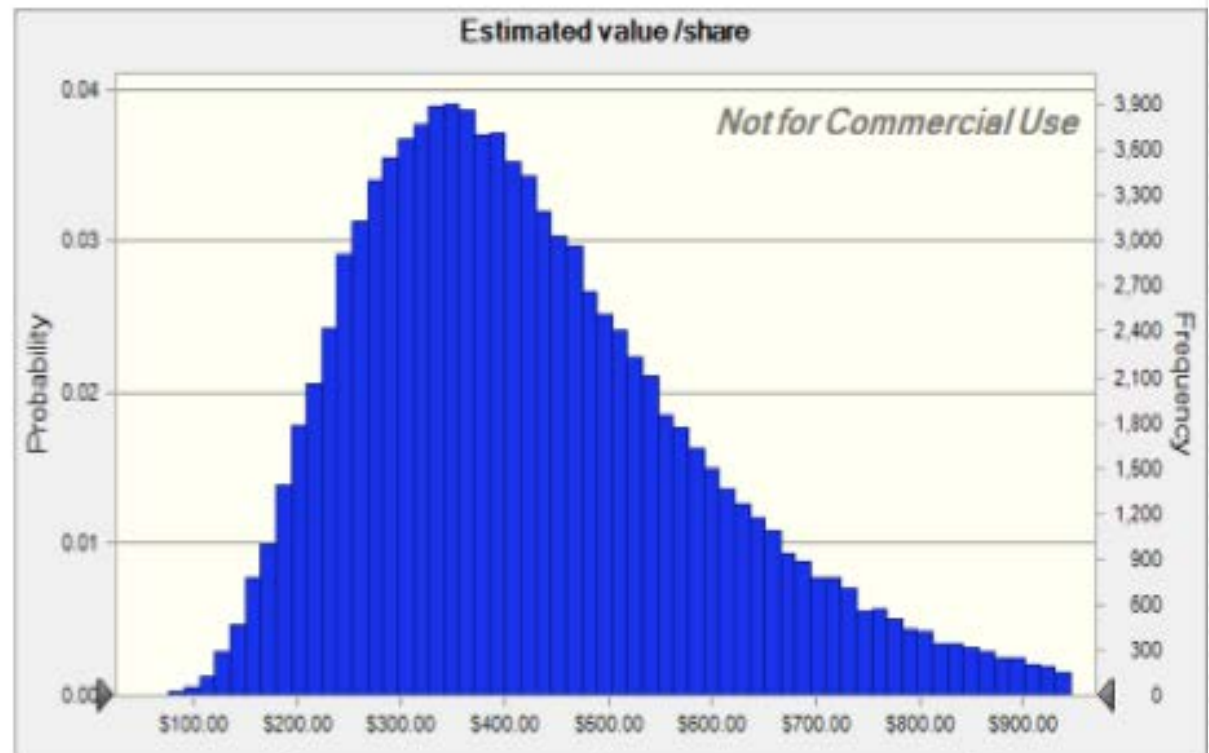
### Cost of Capital

Normal: Mean = 7% Std dev = 0.5%



### Tesla Value/Share in January 2020

Across 100,000 Simulations



Percentile	Value/Share
0%	\$47.04
10%	\$236.52
20%	\$283.69
30%	\$324.12
40%	\$361.82
50%	\$401.33
60%	\$444.87
70%	\$496.96
80%	\$564.30
90%	\$673.09
100%	\$2,210.68





# A COVID Break

Crisis times?

# The lead up to the crisis... On February 14..



# A Crisis hits.. Damage assessment on March 20, 2020

	Index	Country/Region	Level on 3/20	% Change	
				3/13-3/20	Last Month
<i>Americas</i>	S&P 500	US	2305	-14.98%	-30.94%
	NASDAQ	US	6994	-12.52%	-25.96%
	TSX	Canada	11852	-13.59%	-33.58%
	IPC Mexico	Mexico	34270	-10.02%	-23.51%
	Bovespa	Brazil	67069	-18.88%	-41.00%
<i>Europe</i>	FTSE 100	UK	5191	-3.27%	-29.89%
	DAX	Germany	8929	-3.28%	-34.25%
	CAC 40	France	4131	-1.67%	-33.31%
	S&P Euro 350	Europe	1181	1.59%	-31.32%
<i>Asia</i>	Nikkei 225	Japan	16553	-10.81%	-29.50%
	Shanghai 50	China	2628	-6.09%	-11.45%
	Hang Seng	Hong Kong	22805	-5.11%	-16.49%
	BSE	India	29916	-12.28%	-25.88%
<i>Australia &amp; NZ</i>	ASX 50	Australia	4828	-12.87%	-31.97%
	NZX 50	New Zealand	9202	-6.36%	-23.79%
<i>Africa</i>	FTSE JSE top 40	South Africa	36302	-8.04%	-29.62%
	NSE All-Share	Nigeria	22198	-2.36%	-18.95%

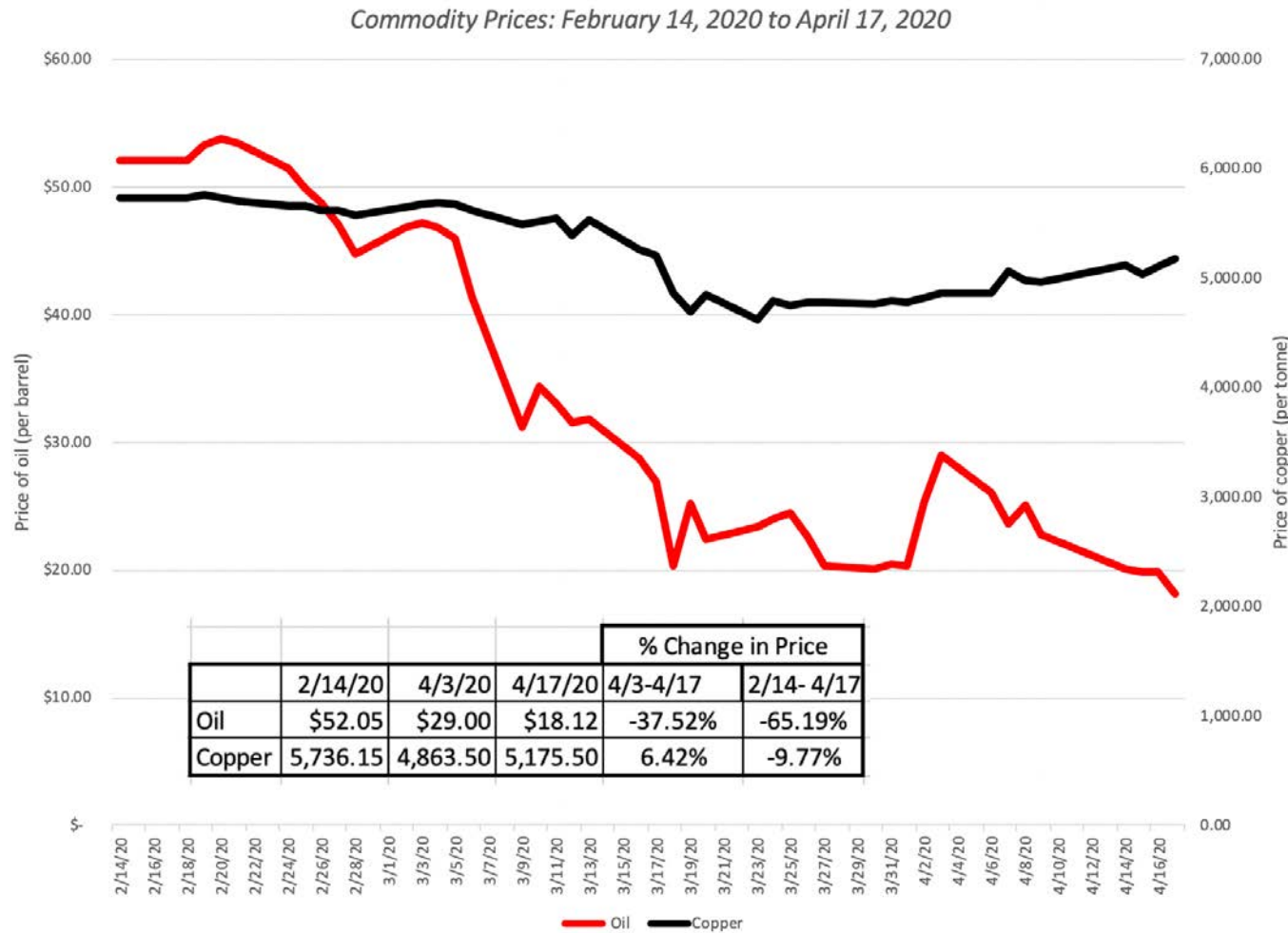
# A Come back or False Security? From 3/17-4/17

	<i>Index</i>	<i>Country/Region</i>	<i>Level on 4/17</i>	<i>% Change</i>	
				<i>4-10-4/17</i>	<i>3/17-4/17</i>
<i>Americas</i>	S&P 500	US	2875	2.68%	4.09%
	NASDAQ 100	US	8832	0.85%	6.00%
	TSX	Canada	14360	2.02%	22.51%
	IPC Mexico	Mexico	34743	0.37%	-2.22%
	iBovespa	Brazil	78990	0.20%	18.08%
<i>Europe</i>	FTSE 100	UK	5787	-0.08%	13.90%
	DAX	Germany	10626	-0.66%	25.87%
	CAC 40	France	4499	-0.66%	20.27%
	S&P Europe 350	Europe	1341	-0.11%	19.55%
<i>Asia</i>	Nikkei 225	Japan	19897	2.05%	18.96%
	Shanghai 50	China	2809	2.15%	6.98%
	Hang Seng	Hong Kong	24380	-0.23%	9.37%
	Sensex	India	27591	2.93%	9.42%
<i>Australia &amp; NZ</i>	ASX 200	Australia	5068	-0.01%	10.79%
	NZX 50	New Zealand	9935	7.21%	14.00%
<i>Africa</i>	FTSE/JSE TOP 40	South Africa	44599	-1.18%	29.75%
	NSE All Share	Nigeria	21099	1.75%	1.60%

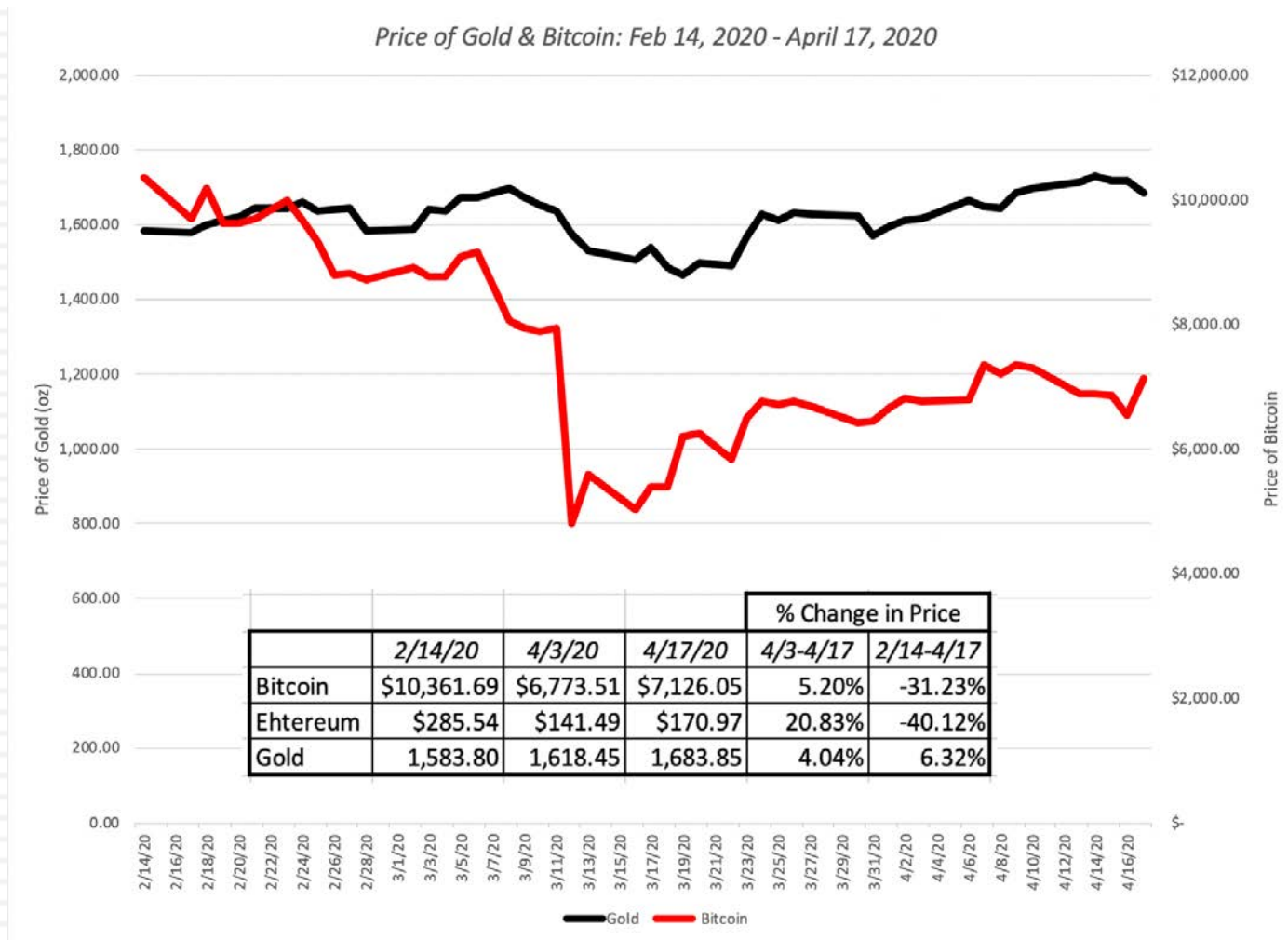
# A Flight to Safety? Treasuries

	<b>Yields on US Treasuries</b>			
<b>Maturity</b>	<b>2/14/20</b>	<b>4/3/20</b>	<b>4/10/20</b>	<b>4/17/20</b>
3 month	1.58%	0.10%	0.25%	0.12%
2 year	1.42%	0.23%	0.23%	0.20%
5 year	1.42%	0.39%	0.41%	0.36%
10 year	1.59%	0.62%	0.73%	0.65%
20 year	1.89%	1.05%	1.15%	1.08%
30 year	2.04%	1.24%	1.35%	1.27%
	<b>Yield curve slope</b>			
2 yr - 3 month	-0.16%	0.13%	-0.02%	0.08%
10 yr - 2 yr	0.17%	0.39%	0.50%	0.45%
30 yr - 10 yr	0.45%	0.62%	0.62%	0.62%

# Divergent Stories: Oil and Copper



# Crisis Asset: Gold and Bitcoin

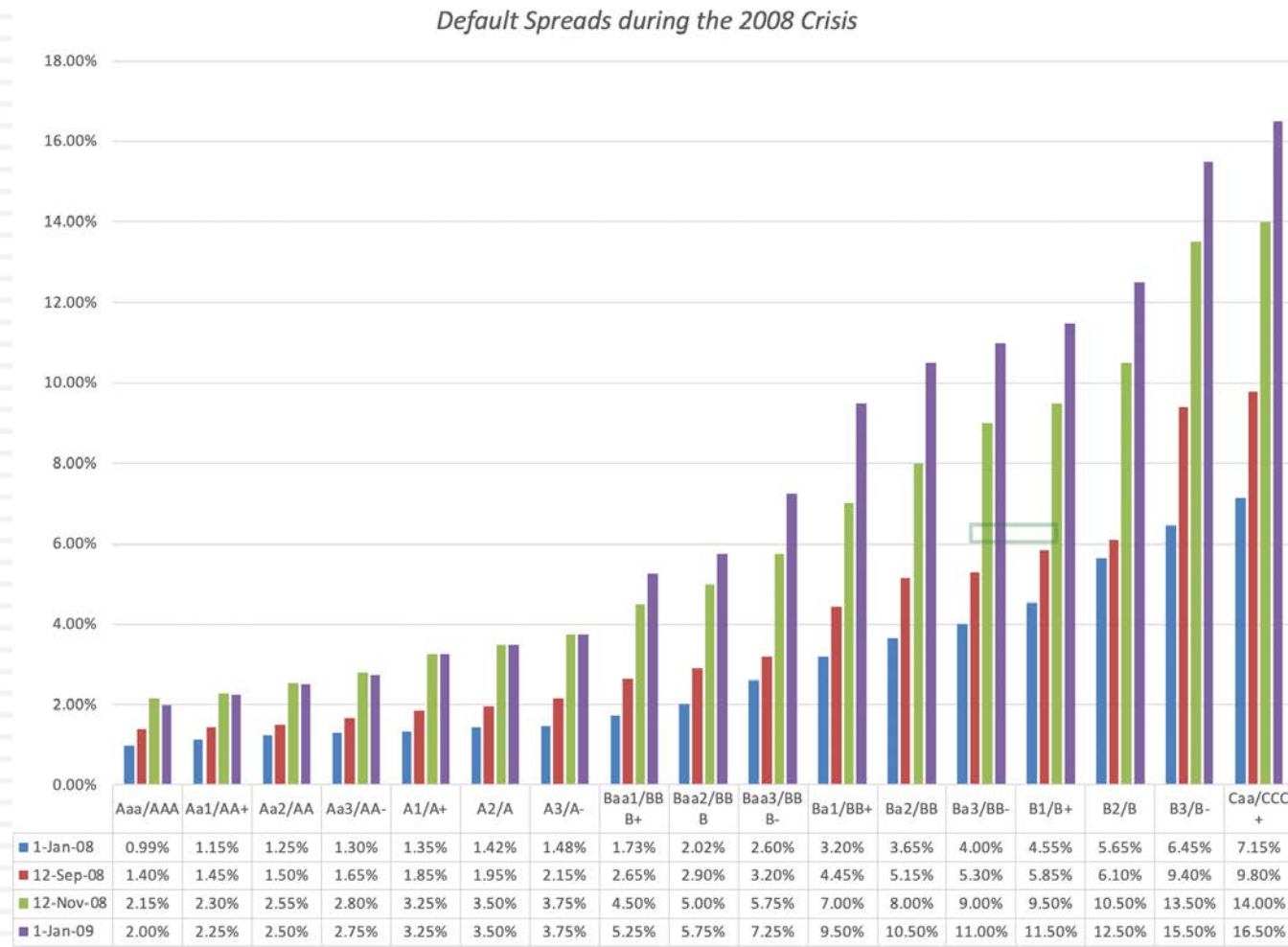


# The price of risk: Determinants

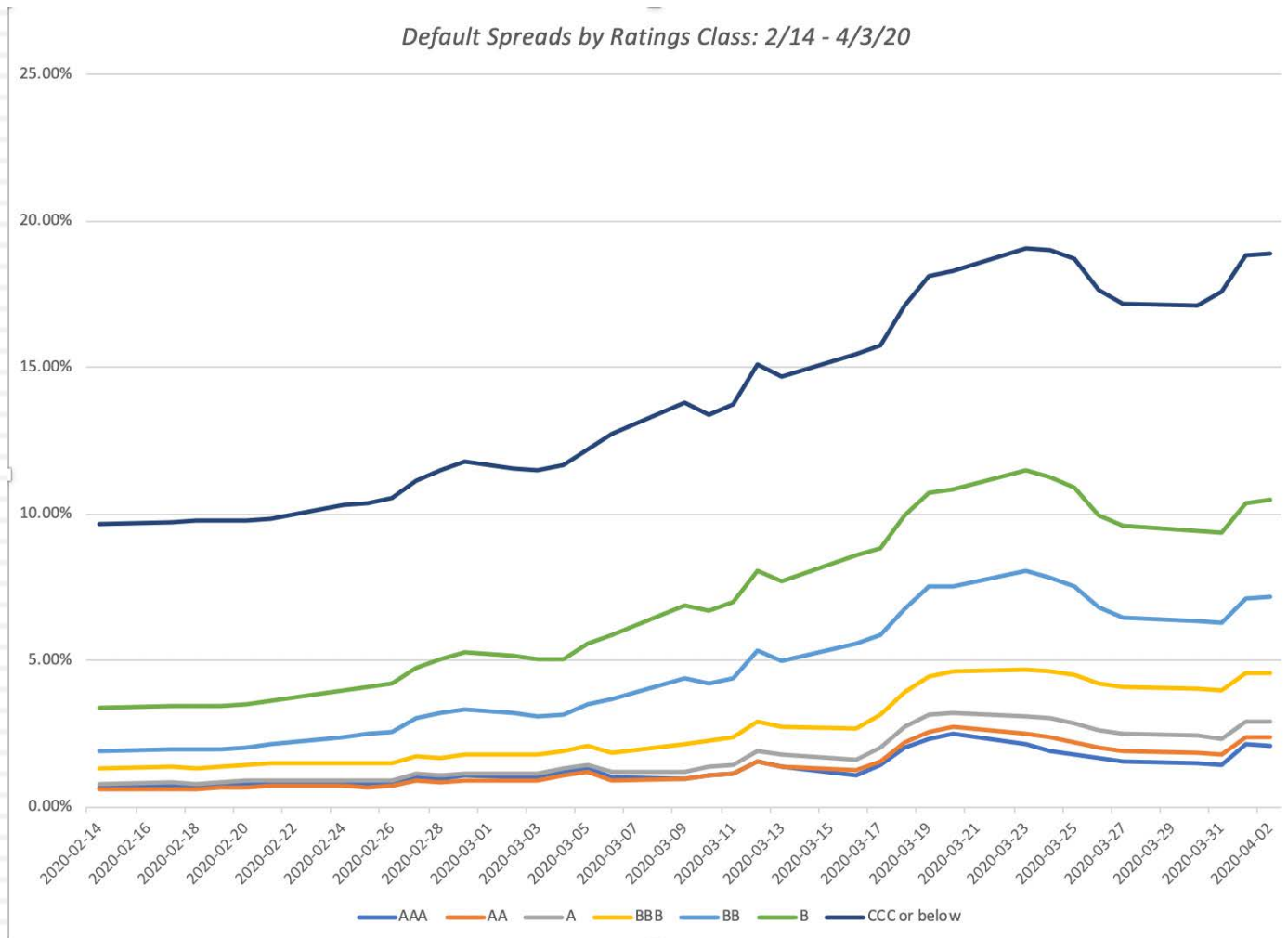
- The price of risk changes on a day-to-day basis, and is determined by a combination of variables that encompass almost everything going on in the world from
  - ▣ uncertainty about future economic growth (more uncertainty -> higher price for risk) to
  - ▣ political stability (more instability -> higher price for risk) to
  - ▣ worries about catastrophes/disasters (more worries -> higher price for risk) to
  - ▣ investor risk aversion (greater risk aversion -> higher price for risk) to
  - ▣ information availability/reliability (less reliable and accessible information -> higher risk premiums).
- The more general point though that emerges from identifying the determinants is that changes in these determinants will play out as changing prices for risk, and since investing and valuation has to be based upon current and update prices for risk, you need measurement approaches that capture these day-to-day changes.



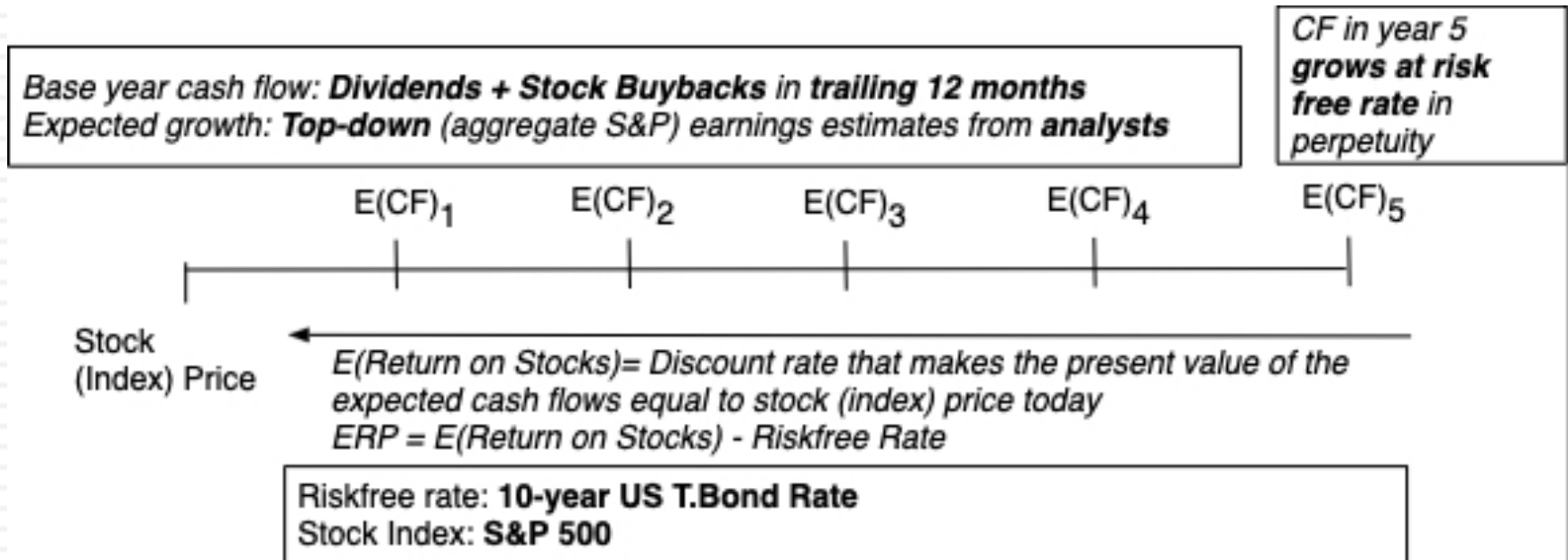
# Bond Default Spreads during the 2008 crisis



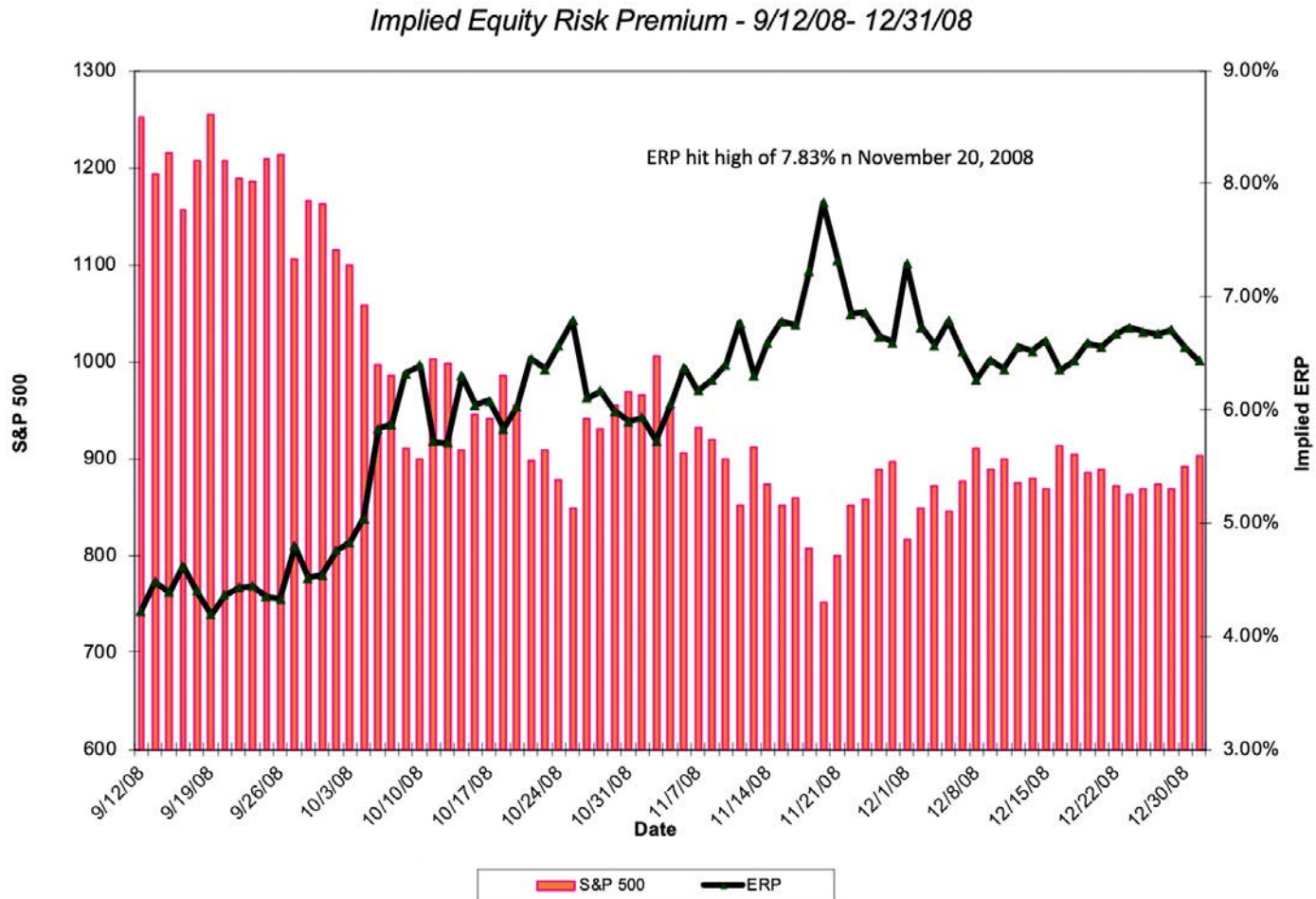
# Bond Market Default Spreads: The COVID crisis



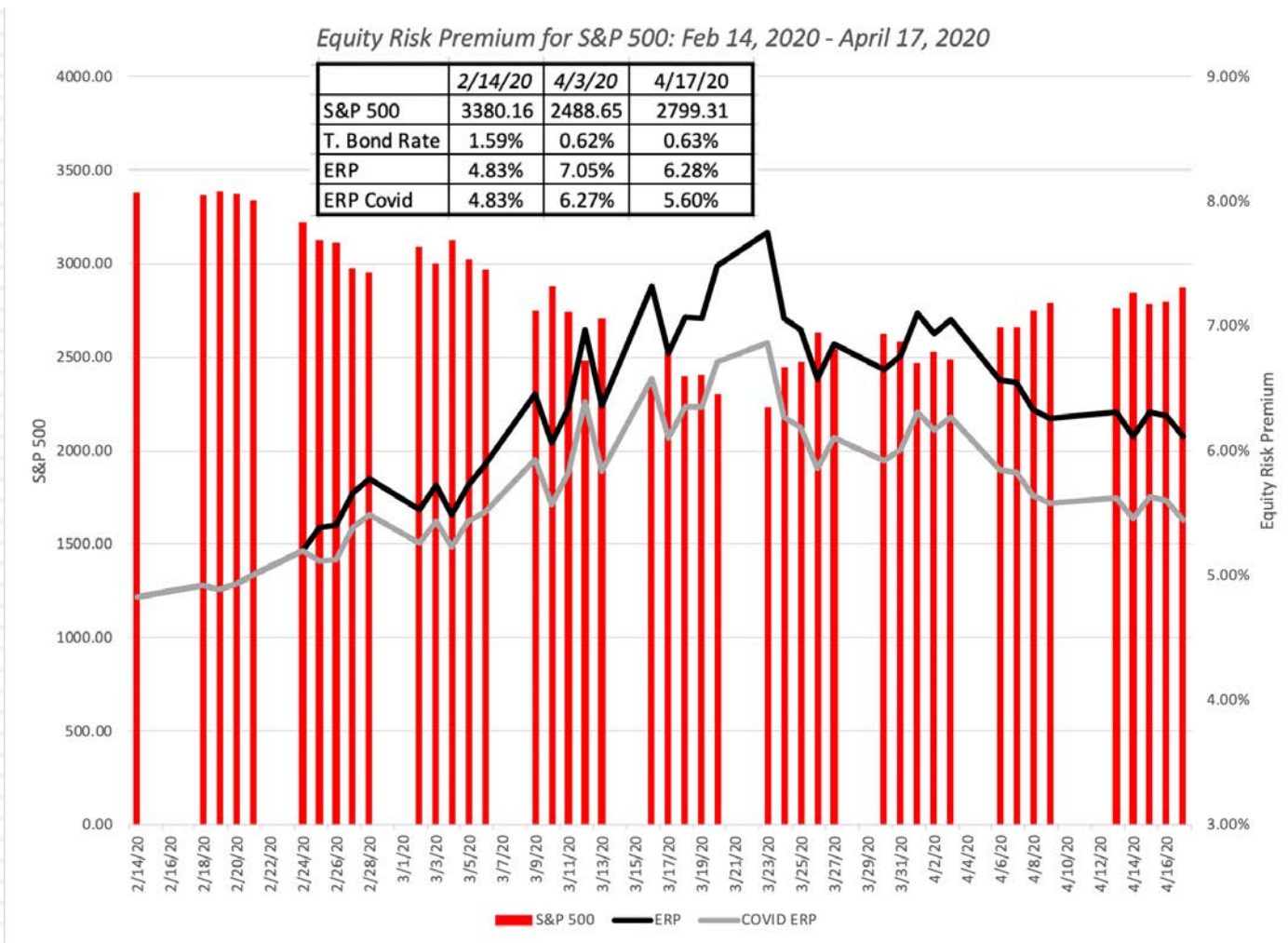
# An Equity Market Price of Risk



# The 2008 Crisis



# The Price of Risk: Equities



ERP : April 1, 2020

Andorra	9.49%	7.08%	Italy	10.04%	7.37%
Austria	6.74%	5.59%	Jersey (States of)	7.30%	5.89%
Belgium	7.12%	5.80%	Liechtenstein	6.01%	5.20%
Cyprus	11.51%	8.16%	Luxembourg	6.01%	5.20%
Denmark	6.01%	5.20%	Malta	7.56%	6.04%
Finland	6.74%	5.59%	Netherlands	6.01%	5.20%
France	6.92%	5.69%	Norway	6.01%	5.20%
Germany	6.01%	5.20%	Portugal	10.04%	7.37%
Greece	14.25%	9.64%	Spain	8.93%	6.77%
Guernsey (States of)	8.93%	6.77%	Sweden	6.01%	5.20%
Iceland	7.56%	6.04%	Switzerland	6.01%	5.20%
Ireland	7.56%	6.04%	Turkey	14.25%	9.64%
Isle of Man	6.92%	5.69%	United Kingdom	6.92%	5.69%
			<b>Western Europe</b>	<b>7.51%</b>	<b>6.01%</b>

Canada	6.01%	5.20%
United States	6.01%	5.20%
<b>North America</b>	<b>6.01%</b>	<b>5.20%</b>

Argentina	24.52%	14.08%
Belize	17.91%	11.62%
Bolivia	14.25%	8.75%
Brazil	11.51%	8.16%
Chile	7.30%	5.89%
Colombia	9.49%	7.08%
Costa Rica	16.08%	9.64%
Ecuador	24.30%	11.62%
El Salvador	17.91%	11.62%
Guatemala	10.58%	7.66%
Honduras	14.25%	9.64%
Mexico	8.21%	6.38%
Nicaragua	17.91%	10.63%
Panama	8.93%	6.77%
Paraguay	10.58%	7.66%
Peru	8.21%	6.38%
Suriname	16.08%	10.63%
Uruguay	14.25%	9.64%
Venezuela	24.52%	22.89%
<b>Latin America</b>	<b>11.79%</b>	<b>8.48%</b>

Angola	17.91%	11.62%
Benin	16.08%	10.63%
Botswana	7.56%	6.04%
Burkina Faso	16.08%	10.63%
Cameroon	16.08%	10.63%
Cape Verde	16.08%	10.63%
Congo (DR)	19.73%	12.59%
Congo (Republic of)	22.49%	14.08%
Côte d'Ivoire	12.60%	8.75%
Egypt	16.08%	10.63%
Ethiopia	14.25%	9.64%
Gabon	19.73%	12.59%
Ghana	17.91%	11.62%
Kenya	16.08%	10.63%
Mali	17.91%	11.62%
Morocco	10.58%	7.66%
Mozambique	22.49%	14.08%
Namibia	11.51%	8.16%
Niger	17.91%	11.62%
Nigeria	16.08%	10.63%
Rwanda	16.08%	10.63%
Senegal	12.60%	8.75%
South Africa	10.58%	7.37%
Swaziland	16.08%	10.63%
Tanzania	14.25%	9.64%
Togo	17.91%	11.62%
Tunisia	16.08%	10.63%
Uganda	16.08%	10.63%
Zambia	24.52%	14.08%
<b>Africa</b>	<b>14.71%</b>	<b>9.89%</b>

Albania	14.25%	9.64%
Armenia	12.60%	8.75%
Azerbaijan	11.51%	8.16%
Belarus	17.91%	11.62%
Bosnia and Herzego	17.91%	11.62%
Bulgaria	9.49%	7.08%
Croatia	11.51%	8.16%
Czech Republic	7.12%	5.80%
Estonia	7.30%	5.89%
Georgia	11.51%	8.16%
Hungary	10.04%	7.37%
Kazakhstan	10.04%	7.37%
Kyrgyzstan	16.08%	10.63%
Latvia	8.21%	6.38%
Lithuania	8.21%	6.38%
Macedonia	12.60%	8.75%
Moldova	17.91%	11.62%
Montenegro	14.25%	9.64%
Poland	7.56%	6.04%
Romania	10.04%	7.37%
Russia	10.04%	7.37%
Serbia	12.60%	8.75%
Slovakia	7.56%	6.04%
Slovenia	8.93%	6.77%
Tajikistan	17.91%	11.62%
Ukraine	19.73%	12.59%
Uzbekistan	9.49%	7.08%
<b>E. Europe &amp; Russia</b>	<b>9.98%</b>	<b>7.34%</b>

Abu Dhabi	6.92%	5.69%
Bahrain	16.08%	10.63%
Iraq	19.73%	12.59%
Israel	7.30%	5.89%
Jordan	14.25%	9.64%
Kuwait	6.92%	5.69%
Lebanon	24.52%	14.08%
Oman	11.51%	7.66%
Qatar	7.12%	5.80%
Ras Al Khaimah (Er	19.73%	12.59%
Saudi Arabia	7.30%	5.89%
Sharjah	9.49%	6.38%
United Arab Emirate	6.92%	5.69%
<b>Middle East</b>	<b>8.93%</b>	<b>6.77%</b>

Country	PRS Risk Score	ERP (4/1/20)	ERP (1/1/20)
Algeria	63	17.91%	11.62%
Brunei	82.75	6.74%	5.59%
Gambia	63.75	17.91%	11.62%
Guinea	57	24.30%	15.06%
Guinea-Bissau	63.25	17.91%	11.62%
Guyana	63.75	17.91%	11.62%
Haiti	57.5	22.49%	14.08%
Iran	62.5	17.91%	11.62%
Korea, D.P.R.	50.5	27.03%	17.03%
Liberia	49.5	31.93%	21.71%
Libya	69.5	11.51%	8.16%
Madagascar	65.5	16.08%	10.63%
Malawi	63.5	17.91%	11.62%
Myanmar	64	17.91%	11.62%
Sierra Leone	57	24.30%	15.06%
Somalia	53	27.03%	17.03%
Sudan	39.75	31.93%	21.71%
Syria	53	27.03%	17.03%
Yemen, Republic	54.5	27.03%	17.03%
Zimbabwe	50.5	27.03%	17.03%

Bangladesh	12.60%	8.75%
Cambodia	16.08%	10.63%
China	7.30%	5.89%
Fiji	12.60%	8.75%
Hong Kong	7.12%	5.69%
India	9.49%	7.08%
Indonesia	9.49%	7.08%
Japan	7.30%	5.89%
Korea	6.92%	5.69%
Laos	8.21%	NA
Macao	7.12%	5.80%
Malaysia	8.21%	6.38%
Maldives	16.08%	10.63%
Mauritius	8.93%	6.77%
Mongolia	17.91%	11.62%
Pakistan	17.91%	11.62%
Papua New Guinea	16.08%	10.63%
Philippines	9.49%	7.08%
Singapore	6.01%	5.20%
Solomon Islands	17.91%	11.62%
Sri Lanka	16.08%	10.63%
Taiwan	7.12%	5.80%
Thailand	8.93%	6.77%
Vietnam	12.60%	8.75%
<b>Asia</b>	<b>7.89%</b>	<b>6.21%</b>

Australia	6.01%	5.20%
Cook Islands	14.25%	9.64%
New Zealand	6.01%	5.20%
<b>Australia &amp; NZ</b>	<b>6.02%</b>	<b>5.20%</b>

# Equities: By Region

Sub Region	Number of firms	Mkt Cap (2/14)	Mkt Cap (4/3)	Mkt Cap (4/17)	Mkt Cap: 4/3- 4/17		Mkt Cap: 2/14 - 4/17	
					\$ Change	% Change	\$ Change	% Change
Africa	652	\$ 579,706	\$ 352,644	\$ 381,099	\$ 28,455	8.07%	\$ (198,607)	-34.26%
Australia & NZ	1,356	\$ 1,617,545	\$ 1,038,217	\$ 1,193,976	\$ 155,759	15.00%	\$ (423,569)	-26.19%
Canada	1,576	\$ 2,234,720	\$ 1,508,434	\$ 1,690,178	\$ 181,744	12.05%	\$ (544,542)	-24.37%
China	6,161	\$ 14,027,134	\$ 12,659,745	\$ 13,253,719	\$ 593,974	4.69%	\$ (773,415)	-5.51%
Eastern Europe & Russia	414	\$ 816,760	\$ 564,470	\$ 580,852	\$ 16,382	2.90%	\$ (235,908)	-28.88%
EU & Environs	4,770	\$ 13,667,991	\$ 9,893,062	\$ 10,757,788	\$ 864,727	8.74%	\$ (2,910,202)	-21.29%
India	1,941	\$ 2,201,867	\$ 1,410,184	\$ 1,602,062	\$ 191,879	13.61%	\$ (599,805)	-27.24%
Japan	3,811	\$ 6,041,538	\$ 4,742,114	\$ 5,232,948	\$ 490,834	10.35%	\$ (808,590)	-13.38%
Latin America & Caribbean	934	\$ 2,373,918	\$ 1,376,023	\$ 1,527,171	\$ 151,148	10.98%	\$ (846,747)	-35.67%
Middle East	1,150	\$ 3,073,924	\$ 2,719,466	\$ 2,665,047	\$ (54,419)	-2.00%	\$ (408,877)	-13.30%
Small Asia	7,694	\$ 5,061,281	\$ 3,772,641	\$ 4,175,157	\$ 402,516	10.67%	\$ (886,124)	-17.51%
UK	1,094	\$ 3,072,497	\$ 2,052,755	\$ 2,298,374	\$ 245,618	11.97%	\$ (774,123)	-25.20%
United States	4,928	\$ 35,642,353	\$ 25,634,234	\$ 29,784,527	\$4,150,293	16.19%	\$ (5,857,826)	-16.44%
Global	36,481	\$ 90,411,233	\$ 67,723,989	\$ 75,142,899	\$7,418,910	10.95%	\$ (15,268,334)	-16.89%

# Equities: By Sector

Primary Sector	Number of firms	Mkt Cap (2/14)	Mkt Cap (4/3)	Mkt Cap (4/17)	Mkt Cap: 4/3- 4/17		Mkt Cap: 2/14 - 4/17	
					\$ Change	% Change	\$ Change	% Change
Communication Services	1,682	\$ 7,341,638	\$ 5,771,726	\$ 6,396,994	\$ 625,268	10.83%	\$ (944,644)	-12.87%
Consumer Discretionary	4,945	\$ 10,158,898	\$ 7,308,734	\$ 8,555,018	\$1,246,284	17.05%	\$ (1,603,880)	-15.79%
Consumer Staples	2,298	\$ 7,118,491	\$ 6,080,159	\$ 6,548,231	\$ 468,073	7.70%	\$ (570,260)	-8.01%
Energy	1,316	\$ 5,938,328	\$ 4,339,633	\$ 4,383,093	\$ 43,460	1.00%	\$ (1,555,234)	-26.19%
Financials	3,844	\$ 14,919,508	\$ 10,094,701	\$ 10,933,915	\$ 839,214	8.31%	\$ (3,985,593)	-26.71%
Global	36,481	\$ 90,411,233	\$ 67,723,989	\$ 75,142,899	\$7,418,910	10.95%	\$(15,268,334)	-16.89%
Health Care	3,411	\$ 8,968,840	\$ 7,582,188	\$ 8,581,301	\$ 999,113	13.18%	\$ (387,539)	-4.32%
Industrials	6,564	\$ 10,121,550	\$ 7,170,567	\$ 7,951,424	\$ 780,857	10.89%	\$ (2,170,126)	-21.44%
Information Technology	4,875	\$ 13,601,118	\$ 10,328,554	\$ 11,798,990	\$1,470,437	14.24%	\$ (1,802,128)	-13.25%
Materials	4,414	\$ 4,991,381	\$ 3,736,573	\$ 4,139,741	\$ 403,168	10.79%	\$ (851,640)	-17.06%
Real Estate	2,311	\$ 4,050,062	\$ 2,859,551	\$ 3,164,030	\$ 304,479	10.65%	\$ (886,032)	-21.88%
Utilities	817	\$ 3,200,581	\$ 2,450,935	\$ 2,689,435	\$ 238,500	9.73%	\$ (511,146)	-15.97%
All firms	36,481	\$ 90,411,233	\$ 67,723,989	\$ 75,142,899	\$7,418,910	10.95%	\$(15,268,334)	-16.89%



# Equities: Most & least damaged Industries

	Worst Performing Industries (2/14 - 4/17)						
				Mkt Cap: 4/3- 4/17		Mkt Cap: 2/14 - 4/17	
Industry	Mkt Cap (2/14)	Mkt Cap (4/3)	Mkt Cap (4/17)	\$ Change	% Change	\$ Change	% Change
Oil/Gas (Production and Exploration)	\$ 692,554	\$ 386,341	\$ 404,834	\$ 18,493	4.79%	\$ (287,719)	-41.54%
Homebuilding	\$ 247,004	\$ 126,947	\$ 154,145	\$ 27,198	21.43%	\$ (92,859)	-37.59%
Air Transport	\$ 559,439	\$ 306,560	\$ 350,468	\$ 43,908	14.32%	\$ (208,971)	-37.35%
Broadcasting	\$ 164,761	\$ 93,291	\$ 107,844	\$ 14,553	15.60%	\$ (56,917)	-34.55%
Oilfield Svcs/Equip.	\$ 741,428	\$ 445,056	\$ 488,541	\$ 43,485	9.77%	\$ (252,887)	-34.11%
Food Wholesalers	\$ 93,056	\$ 52,910	\$ 61,559	\$ 8,649	16.35%	\$ (31,497)	-33.85%
Oil/Gas Distribution	\$ 653,462	\$ 386,630	\$ 437,227	\$ 50,597	13.09%	\$ (216,235)	-33.09%
Hotel/Gaming	\$ 717,777	\$ 394,003	\$ 490,025	\$ 96,022	24.37%	\$ (227,752)	-31.73%
Aerospace/Defense	\$ 1,217,331	\$ 683,209	\$ 832,292	\$ 149,082	21.82%	\$ (385,039)	-31.63%
Reinsurance	\$ 180,550	\$ 109,101	\$ 123,655	\$ 14,554	13.34%	\$ (56,895)	-31.51%
	Best Performing Industries (2/14 - 4/17)						
				Mkt Cap: 4/3- 4/17		Mkt Cap: 2/14 - 4/17	
Industry	Mkt Cap (2/14)	Mkt Cap (4/3)	Mkt Cap (4/17)	\$ Change	% Change	\$ Change	% Change
Retail (Online)	\$ 2,455,790	\$ 2,081,460	\$ 2,483,956	\$ 402,496	19.34%	\$ 28,166	1.15%
Drugs (Biotechnology)	\$ 1,409,166	\$ 1,242,047	\$ 1,422,584	\$ 180,537	14.54%	\$ 13,417	0.95%
Precious Metals	\$ 418,906	\$ 350,674	\$ 417,290	\$ 66,616	19.00%	\$ (1,616)	-0.39%
Software (Internet)	\$ 226,911	\$ 173,926	\$ 224,558	\$ 50,632	29.11%	\$ (2,353)	-1.04%
Healthcare Information and Technology	\$ 772,828	\$ 656,136	\$ 759,471	\$ 103,335	15.75%	\$ (13,357)	-1.73%
Drugs (Pharmaceutical)	\$ 3,623,939	\$ 3,190,552	\$ 3,497,146	\$ 306,594	9.61%	\$ (126,793)	-3.50%
Food Processing	\$ 1,792,176	\$ 1,617,124	\$ 1,718,626	\$ 101,502	6.28%	\$ (73,550)	-4.10%
Retail (General)	\$ 1,054,814	\$ 903,932	\$ 1,004,714	\$ 100,781	11.15%	\$ (50,100)	-4.75%
Healthcare Products	\$ 1,829,639	\$ 1,500,672	\$ 1,723,383	\$ 222,710	14.84%	\$ (106,257)	-5.81%
Household Products	\$ 1,453,345	\$ 1,260,149	\$ 1,358,804	\$ 98,655	7.83%	\$ (94,541)	-6.51%

# Equities: Net Debt Ratios

<i>Net Debt to EBITDA</i>	<i>Number of firms</i>	<i>Mkt Cap (2/14)</i>	<i>Mkt Cap (4/3)</i>	<i>Mkt Cap (4/17)</i>	<i>Mkt Cap: 4/3- 4/17</i>		<i>Mkt Cap: 2/14 - 4/17</i>	
					<i>\$ Change</i>	<i>% Change</i>	<i>\$ Change</i>	<i>% Change</i>
Bottom decile	2,549	\$ 2,438,332	\$ 2,001,936	\$ 2,180,230	\$ 178,294	8.91%	\$ (258,102)	-10.59%
2nd decile	2,550	\$ 5,077,547	\$ 4,147,232	\$ 4,602,779	\$ 455,548	10.98%	\$ (474,768)	-9.35%
3rd decile	2,550	\$ 8,075,126	\$ 6,468,172	\$ 7,272,203	\$ 804,031	12.43%	\$ (802,922)	-9.94%
4th decile	2,549	\$ 8,668,340	\$ 7,068,705	\$ 7,520,089	\$ 451,383	6.39%	\$ (1,148,252)	-13.25%
5th decile	2,550	\$ 13,089,926	\$ 10,206,289	\$ 11,465,333	\$ 1,259,044	12.34%	\$ (1,624,593)	-12.41%
6th decile	2,550	\$ 12,069,805	\$ 9,099,941	\$ 10,091,424	\$ 991,483	10.90%	\$ (1,978,382)	-16.39%
7th decile	2,549	\$ 10,285,530	\$ 7,492,767	\$ 8,351,601	\$ 858,833	11.46%	\$ (1,933,929)	-18.80%
8th decile	2,550	\$ 8,192,083	\$ 5,881,602	\$ 6,639,747	\$ 758,145	12.89%	\$ (1,552,336)	-18.95%
9th decile	2,550	\$ 6,872,631	\$ 4,676,233	\$ 5,291,833	\$ 615,600	13.16%	\$ (1,580,798)	-23.00%
Top decile	2,550	\$ 2,620,044	\$ 1,721,135	\$ 1,907,582	\$ 186,447	10.83%	\$ (712,462)	-27.19%
EBITDA negative	10,984	\$ 13,021,868	\$ 8,959,977	\$ 9,820,078	\$ 860,101	9.60%	\$ (3,201,790)	-24.59%



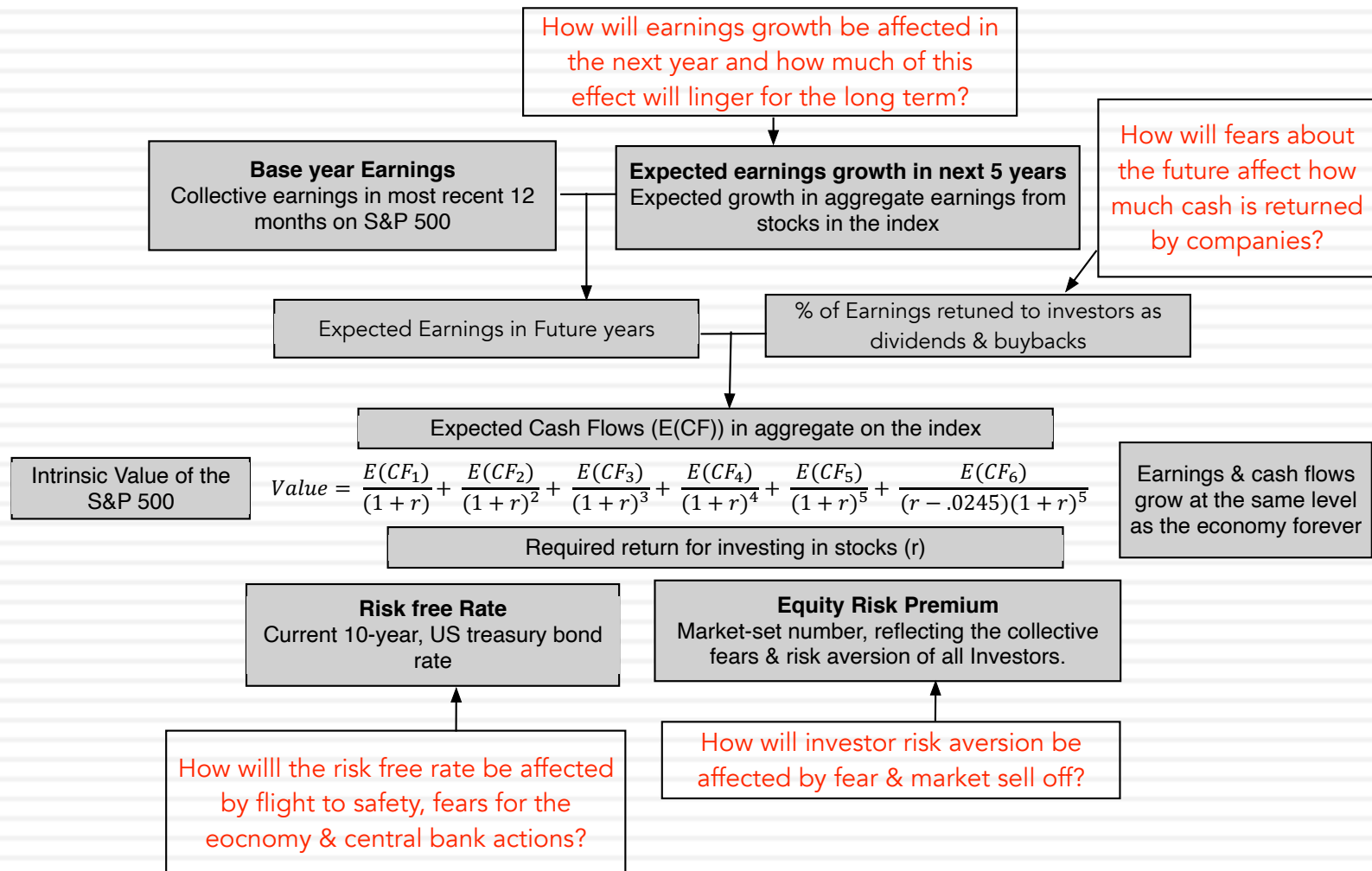
# Valuation after COVID

Keep it simple!

# The dark side beckons...

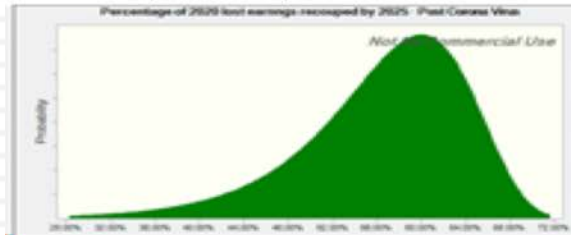
- If your concept of valuation is downloading last year's financials for a company into a spread sheet and then using historical growth rates, with some mean reversion thrown in, to forecast future numbers, you are probably feeling lost right now, and with good reason.
- It is also not a time to wring our hands, complain that there is too much uncertainty and argue that the fundamentals don't matter.
  - ▣ If you do so, you will be drawn to the dark side of investing, where fundamentals don't matter (paradigm shifts, anyone?), new pricing metrics get invented and you are at the mercy of mood and momentum.
- Ironically, it is precisely at times like these that you need to go back to basics.

# Valuing the Market: COVID effect

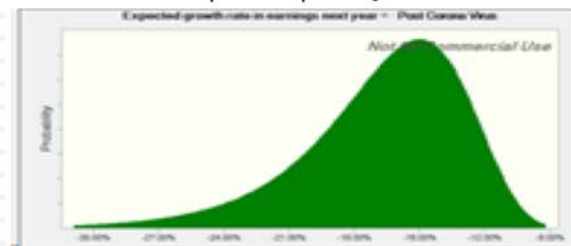


# What now? Valuing the Index

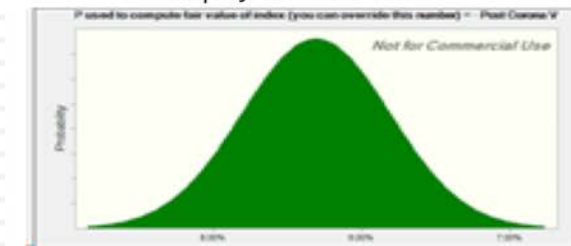
Expected drop in 2020 Earnings



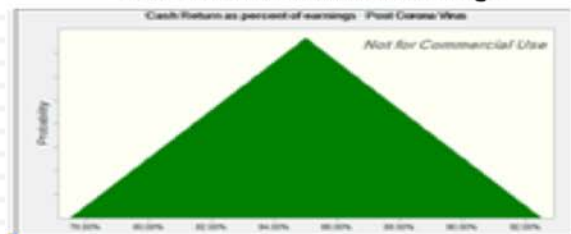
% of drop recouped by 2025



Equity Risk Premium

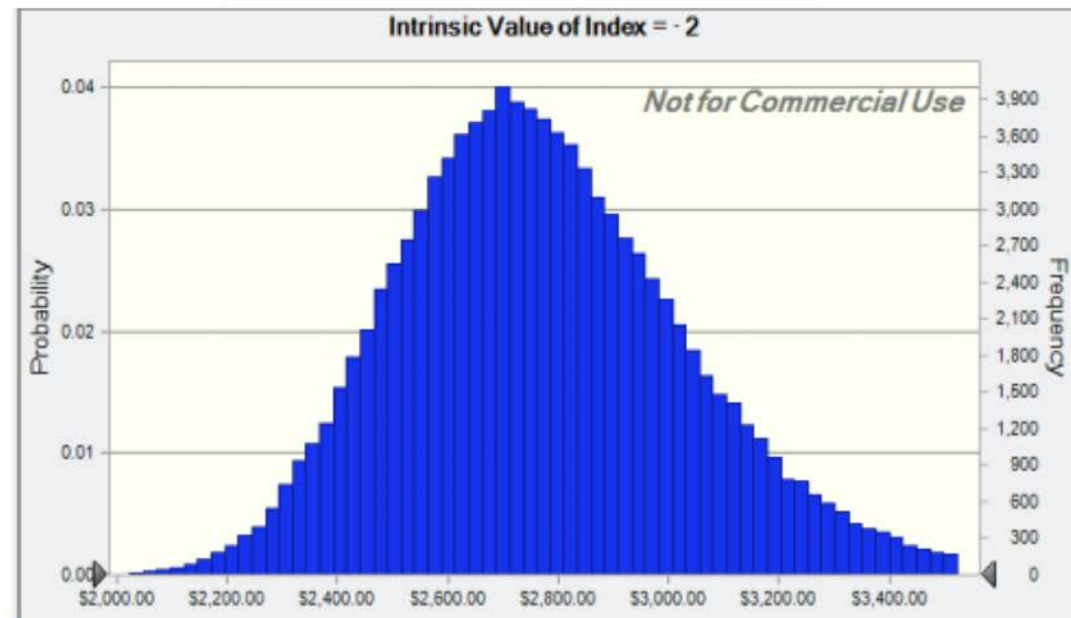


Cash Returned as % of Earnings

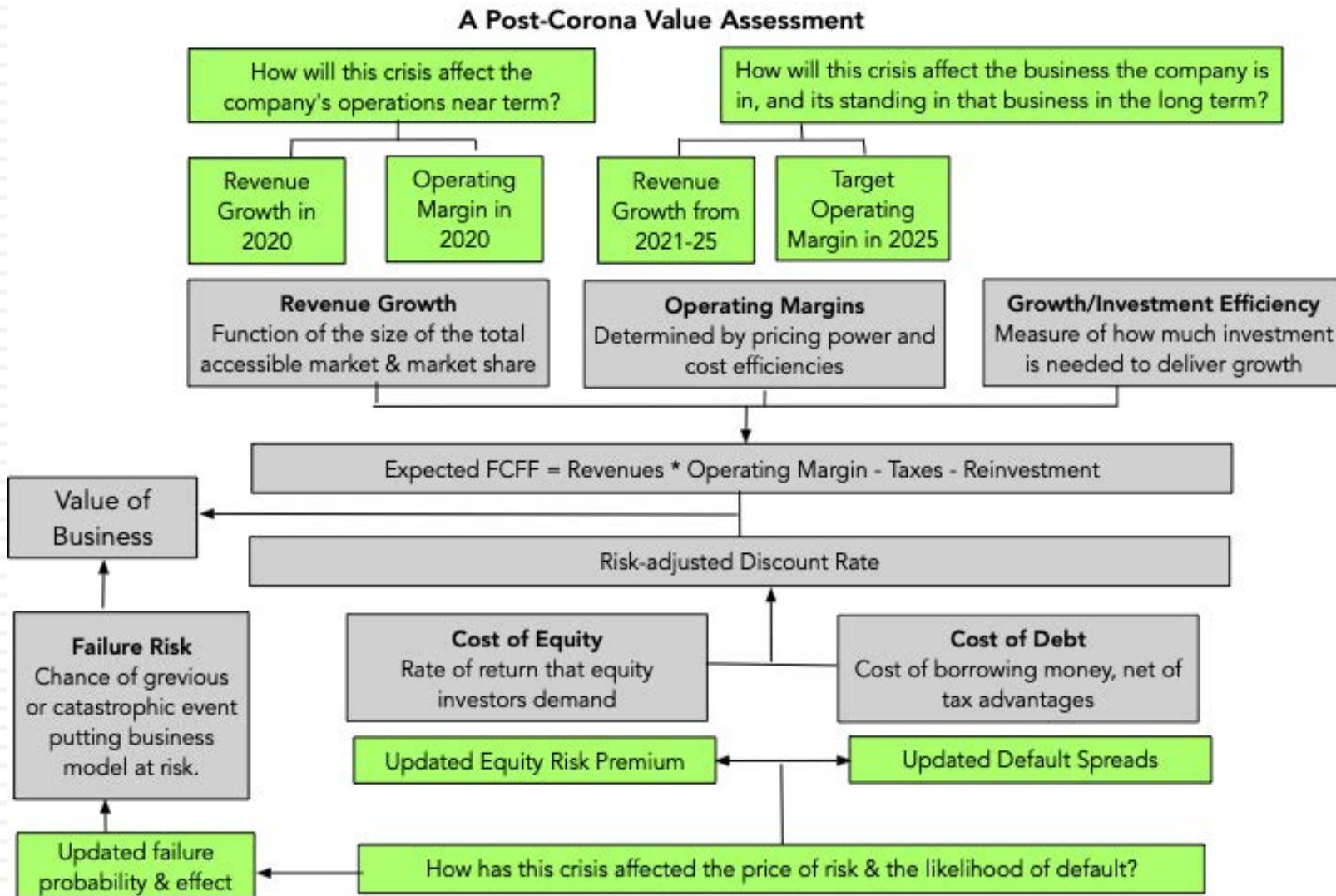


Valuing the S&P 500 Index: March 13, 2020

Percentile	S&P 500 Index
0%	\$1,903.33
10%	\$2,450.16
20%	\$2,547.91
30%	\$2,621.98
40%	\$2,688.01
50%	\$2,750.84
60%	\$2,817.83
70%	\$2,893.02
80%	\$2,986.04
90%	\$3,123.78
100%	\$4,452.38



# Valuing Individual Stocks: A Post-Corona Version



## Boeing

### The Story

Boeing is in deep trouble. Already exposed to significant pain because of its mishandling of the Boeing 737 Max, which caused revenues to plummet in 2019, the company is facing a mountain of pain with the Corona Virus decimating the airline business (Boeing's customers). I assume more pain the year to come, with revenues dropping even with the 737 Max returning to the fold and increased losses. After that, I assume that there will be higher growth, as airlines start playing catch up and buy more aircraft from a duopoly. I assume that margins will revert back to pre-2018 levels over the next 5 years and that during the next year, Boeing is exposed to a risk of failure, not so much because it will go out of business (it is too big to fail) but from needing a bailout from the government that is large enough to wipe out equity (as was the case with GM in 2009).

### The Assumptions

	Base year	In 2020	Years 1-5	Years 6-10	After year 10	Link to story
Revenues (a)	\$ 76,559	-10.0%	15.00%	2.00%	2.00%	Duopoly, growing market
Operating margin (b)	-3.10%	-5.0%	-3.10%	9.60%	9.60%	Industry margins, also close to historical
Tax rate	25.00%		25.00%	25.00%	25.00%	
Reinvestment (c)			Sales to capital ratio	3.80	20.00%	
Return on capital	-11.78%		Marginal ROIC =	76.00%	10.00%	
Cost of capital (d)			8.51%	7.50%	7.50%	

### The Cash Flows

	Revenues	Operating Margin	EBIT	EBIT (1-t)	Reinvestment	FCFF
1	\$ 68,903	-5.00%	\$ (3,445)	\$ (3,445)	\$ (2,014)	\$ (1,431)
2	\$ 79,239	4.73%	\$ 3,751	\$ 3,675	\$ 2,719	\$ 955
3	\$ 91,124	9.60%	\$ 8,749	\$ 6,562	\$ 3,127	\$ 3,435
4	\$ 104,793	9.60%	\$ 10,061	\$ 7,546	\$ 3,596	\$ 3,950
5	\$ 120,512	9.60%	\$ 11,571	\$ 8,678	\$ 4,136	\$ 4,542
6	\$ 135,455	9.60%	\$ 13,005	\$ 9,754	\$ 3,932	\$ 5,822
7	\$ 148,730	9.60%	\$ 14,280	\$ 10,710	\$ 3,493	\$ 7,217
8	\$ 159,439	9.60%	\$ 15,308	\$ 11,481	\$ 2,817	\$ 8,664
9	\$ 166,773	9.60%	\$ 16,012	\$ 12,009	\$ 1,930	\$ 10,080
10	\$ 170,108	9.60%	\$ 16,333	\$ 12,249	\$ 878	\$ 11,372
Terminal year	\$ 173,510	9.60%	\$ 16,659	\$ 12,494	\$ 2,499	\$ 9,996

### The Value

Terminal value	\$ 181,737		
PV(Terminal value)	\$ 82,610		
PV (CF over next 10 years)	\$ 30,378		
Value of operating assets =	\$ 112,988		
Adjustment for distress	\$ 11,299	Probability of failure =	20.00%
- Debt & Mnority Interests	\$ 28,532		
+ Cash & Other Non-operating assets	\$ 10,030		
Value of equity	\$ 83,187		
- Value of equity options	\$ -		
Number of shares	566.00		
Value per share	\$ 146.97	Stock was trading at =	\$127.68