VALUATION 101: KEEP IT SIMPLE

Investment Regrets and Disagreement

The Lead in

Valuation 101

Theme 1: Characterizing Valuation as a discipline

- In a science, if you get the inputs right, you should get the output right. The laws of physics and mathematics are universal and there are no exceptions. **Valuation is not a science**.
- In an art, there are elements that can be taught but there is also a magic that you either have or you do not. The essence of an art is that you are either a great artist or you are not. **Valuation is not an art.**
- A craft is a skill that you learn by doing. The more you do it, the better you get at it. **Valuation is a craft.**

Theme 2: Valuing an asset is not the same as pricing that asset

Drivers of intrinsic value
- Cashflows from existing assets
- Growth in cash flows
- Quality of Growth

Drivers of price
- Market moods & momentum
- Surface stories about fundamentals

Accounting Estimates

Valuation Estimates

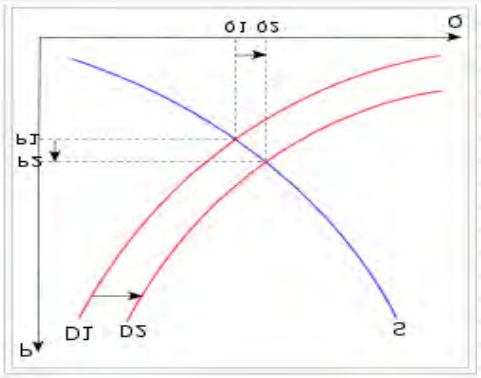
INTRINSIC VALUE

Value

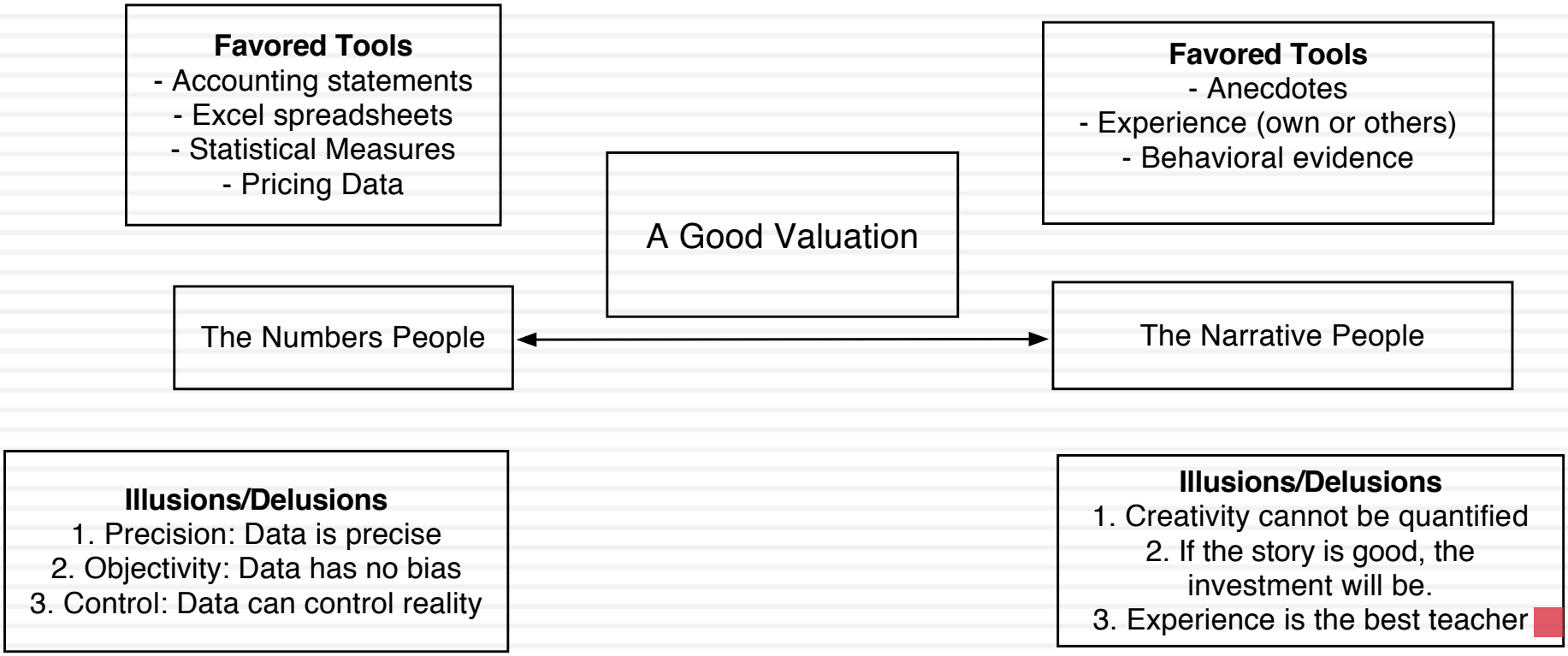
THE GAP
Is there one?
If so, will it close?
If it will close, what will cause it to close?

Price

PRICE



Theme 3: Good valuation = Story + Numbers

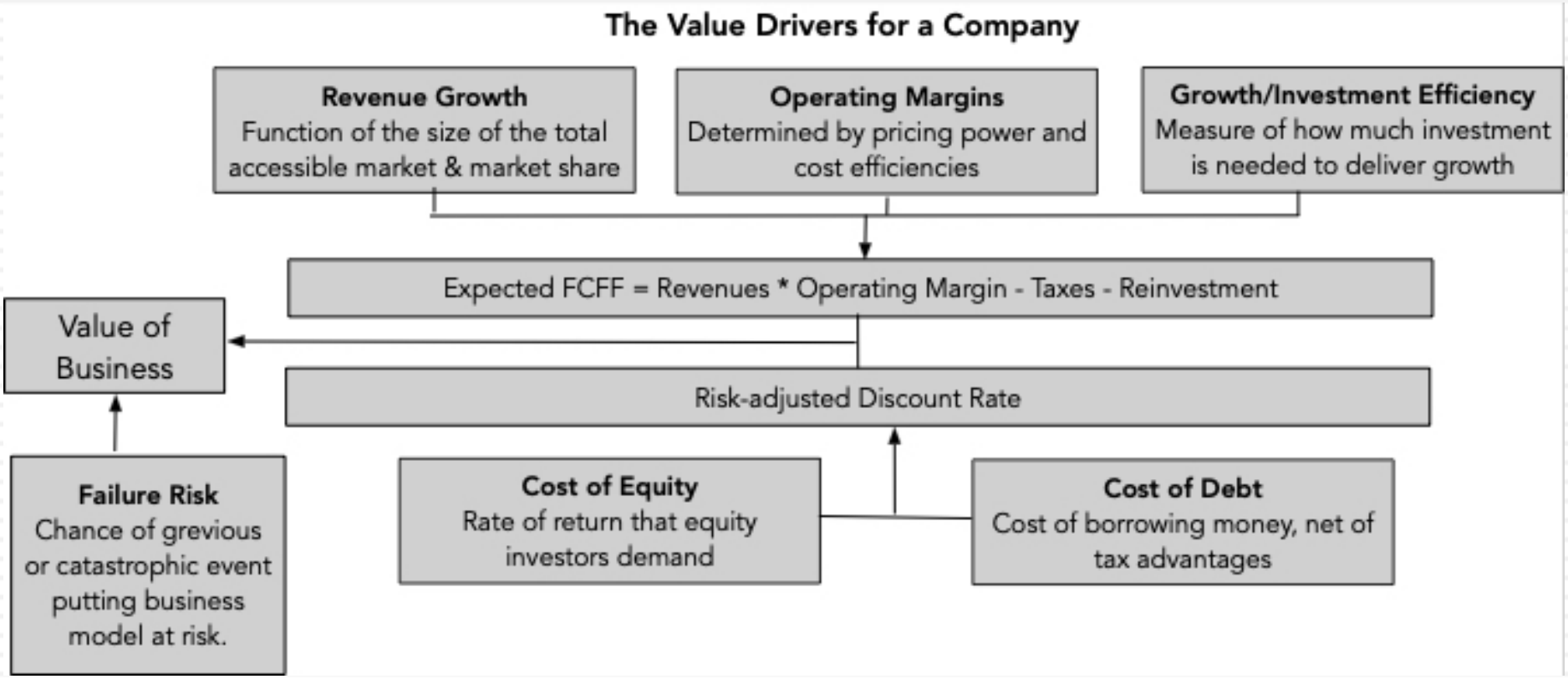


Theme 4: If you value something, you should be willing to act on it..

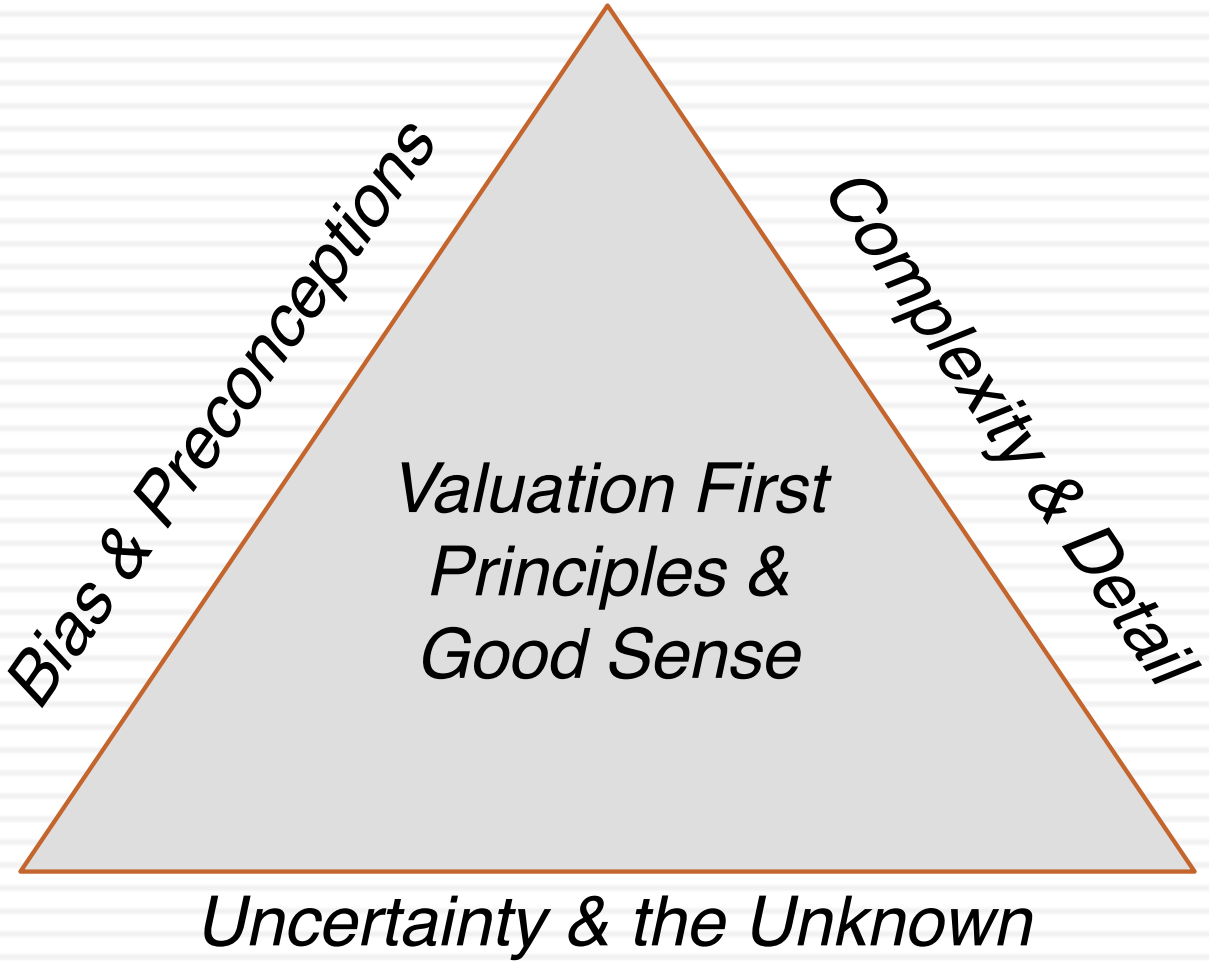
- There is very little theory in valuation and I am not sure what an academic valuation would like like and am not sure that I want to find out.
- Pragmatism, not purity: The end game is to estimate a value for an asset. I plan to get there, even if it means taking short cuts and making assumptions that would make purists blanch.
- To act on your valuations, you have to have faith in
  - In your own valuation judgments.
  - In markets: that prices will move towards your value estimates.

  That faith will have to be earned.

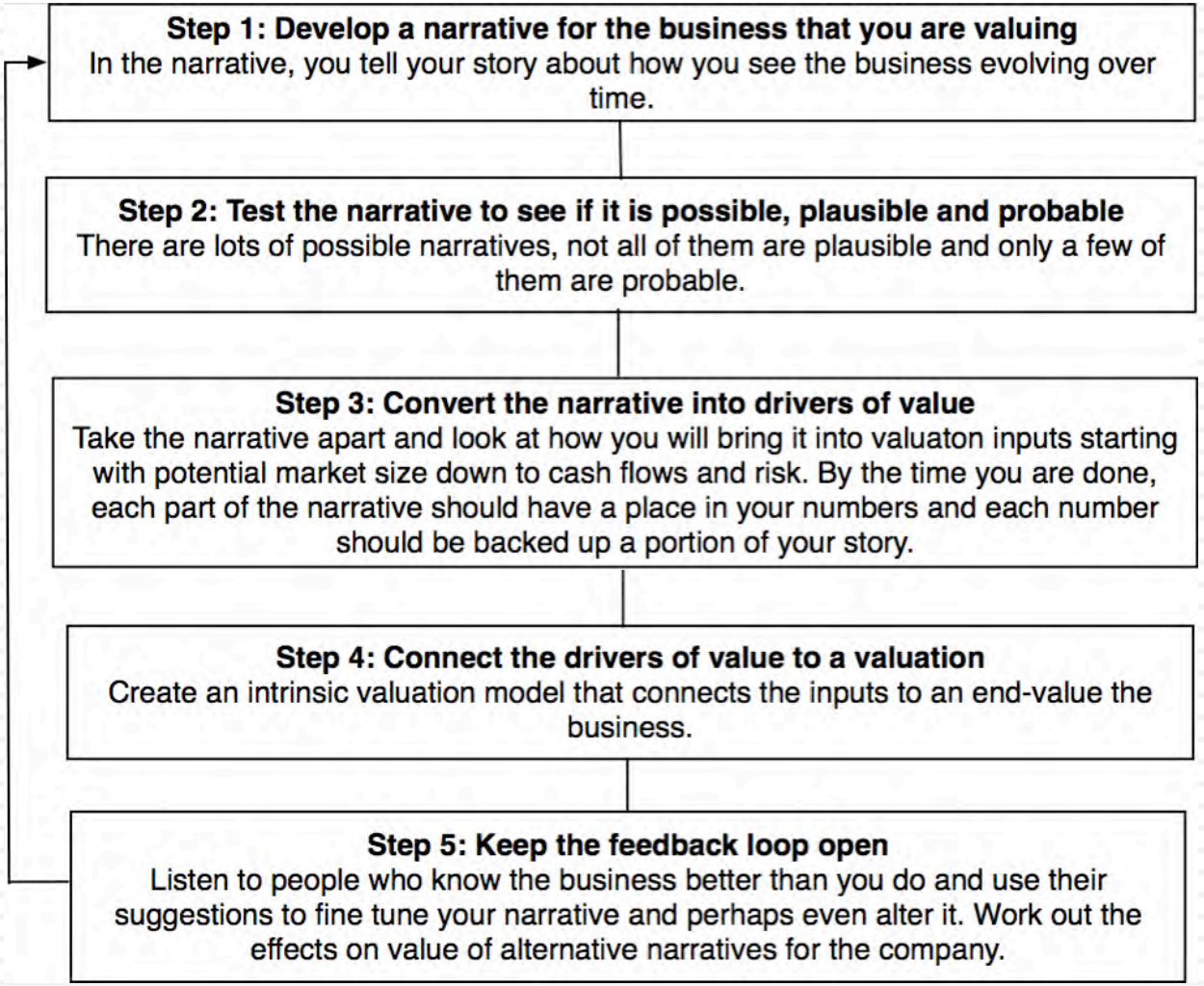
The Basics of Value



The Bermuda Triangle of Valuation



The steps in valuation



Tesla						Jun-19
A Teenage Phenom faces growing (up) pains!						
Tesla will grow as a high-end auto company, deilivering $100 billion in revenues in year 10. In the face of stronger competition, Tesla's brand name and batter 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 acqusition 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. Wgile 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

	Base year	Years 1-5	Years 6-10		After year 10	Link to story
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

	Revenues	Operating Margin	EBIT	EBIT (1-t)	Reinvestment	FCFF
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

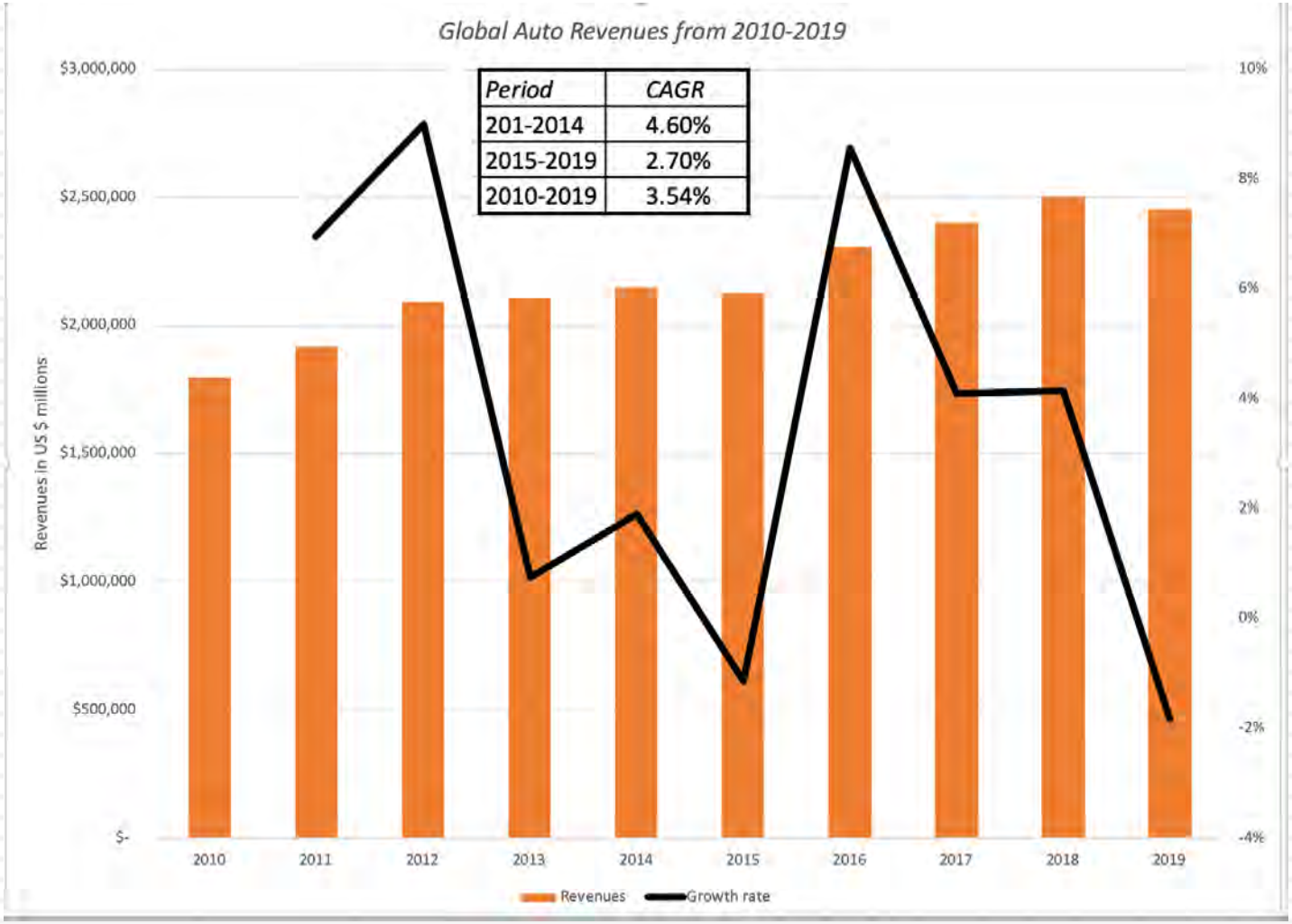
The Value

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%

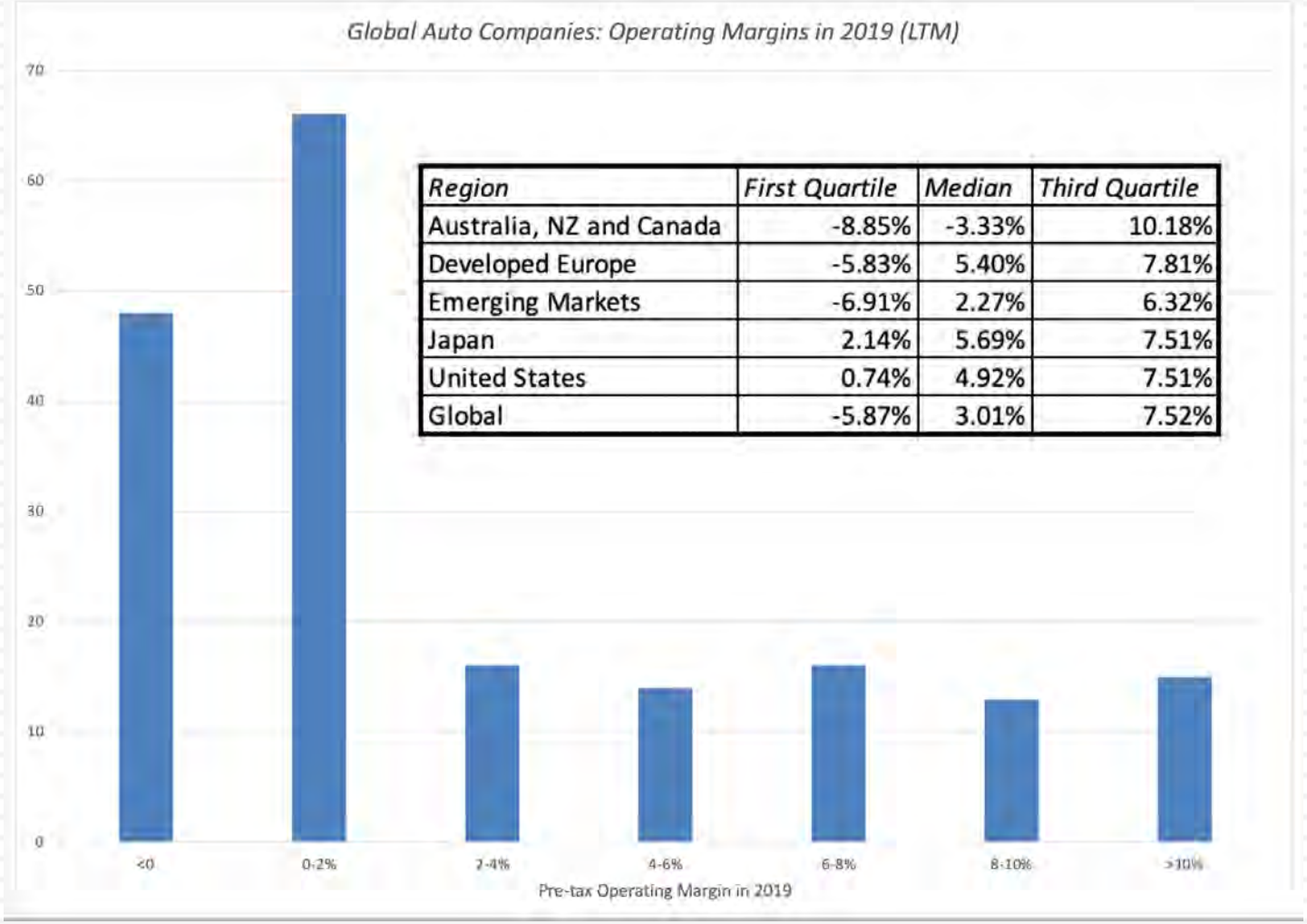
A tech company twist?

Company	*Revenues in 2019*	*Operating Income in 2019*	*Operating Margin*
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

Expected Revenues in 2030 (in $ millions)	*CAGR (next 5 years)*
A1: $65 billion (Renault-lie)	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



Region	First Quartile	Median	Third Quartile
Australia, NZ and Canada	-8.85%	-3.33%	10.18%
Developed Europe	-5.83%	5.40%	7.81%
Emerging Markets	-6.91%	2.27%	6.32%
Japan	2.14%	5.69%	7.51%
United States	0.74%	4.92%	7.51%
Global	-5.87%	3.01%	7.52%

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

Operating Margin in 2025	*Target Operating Margin*
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

Region	*First Quartile*	*Median*	*Third Quartile*
Australia, NZ and Canada	0.06	0.75	2.33
Developed Europe	0.81	1.58	2.93
Emerging Markets	0.70	1.29	2.41
Japan	1.17	2.13	3.00
United States	0.62	0.95	2.39
Global	0.75	1.37	2.42

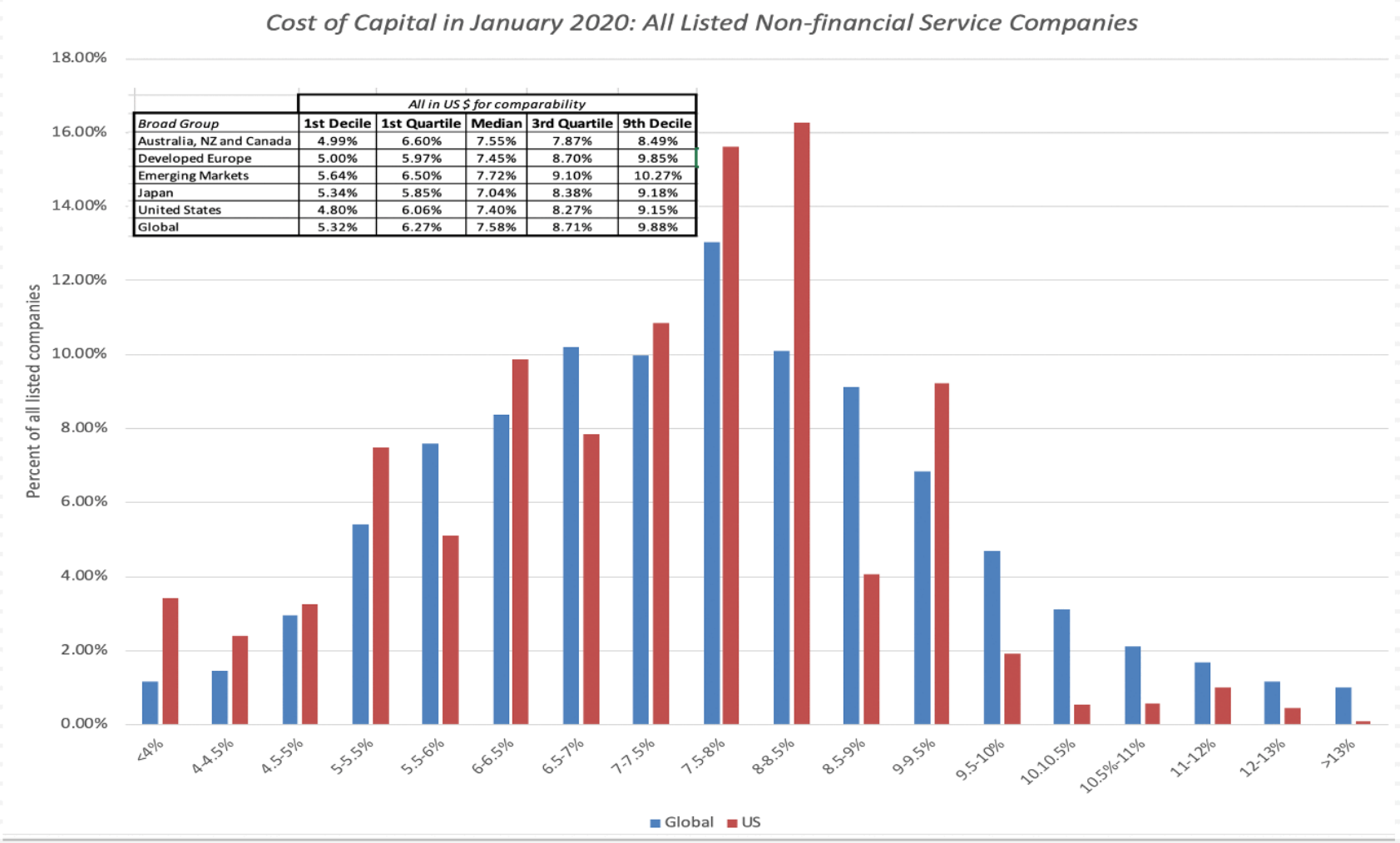
More on investment efficiency

- 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

Sales to Invested Capital	*Sales to Capital (1st 5 years)*
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



	All in US $ for comparability				
Broad Group	**1st Decile**	**1st Quartile**	**Median**	**3rd Quartile**	**9th Decile**
Australia, NZ and Canada	4.99%	6.60%	7.55%	7.87%	8.49%
Developed Europe	5.00%	5.97%	7.45%	8.70%	9.85%
Emerging Markets	5.64%	6.50%	7.72%	9.10%	10.27%
Japan	5.34%	5.85%	7.04%	8.38%	9.18%
United States	4.80%	6.06%	7.40%	8.27%	9.15%
Global	5.32%	6.27%	7.58%	8.71%	9.88%

Your choice on cost of capital & the failure rate

Cost of Capital	*Initial cost of capital*
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%

Failure Likelihood	*Probability of failure*
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 De	50%

Valuation Stories

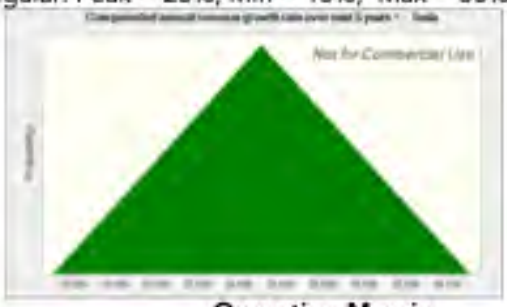
Story	Revenues	Operating Margins	Reinvestment Efficiency	Risk	Value/Share	Equity Value
The Big Auto	BMW-like ($100 billion)	Auto 75th percentile	Auto 75th percentile	Auto median	$ 105.79	$ 27,547
	Daimler-like ($200 billion)	Auto 75th percentile	Auto 75th percentile	Auto median	$ 227.42	$ 49,076
	VW/Toyota-like ($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.

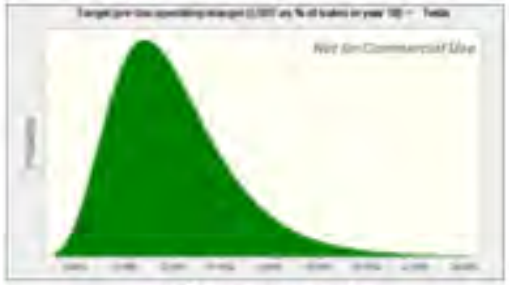
Revenue Growth

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



Operating Margin

Log Normal: Mean = 12%

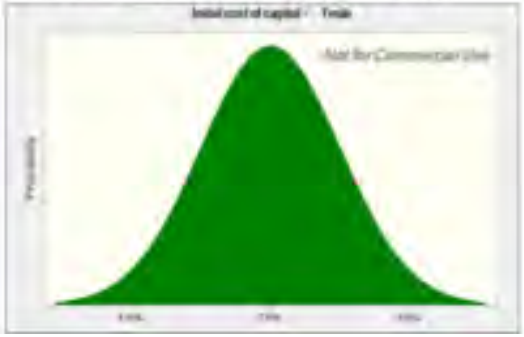


Sales to Capital

Unirform: Min =1.00 Max = 3.00

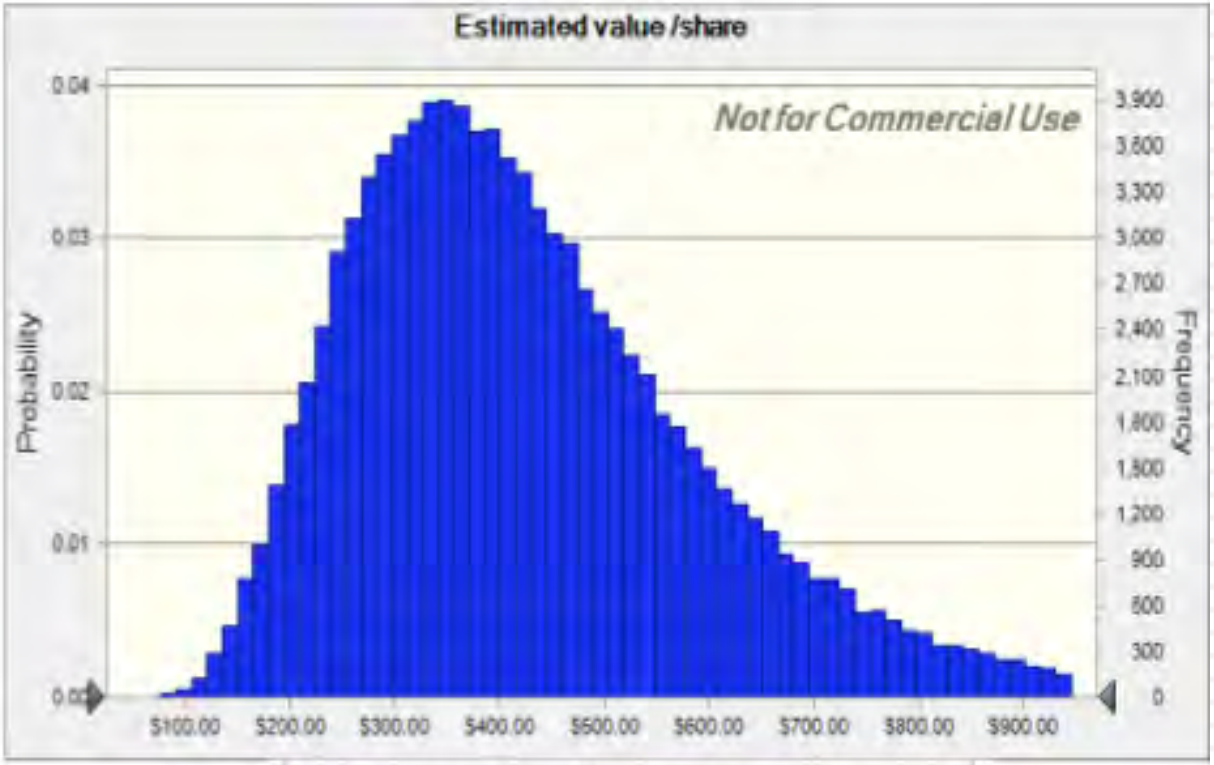
Cost of Capital

Normal: Mean = 7% Std dev = 0.5%



Tesla Value/Share in January 2020

Across 100,000 Simulations

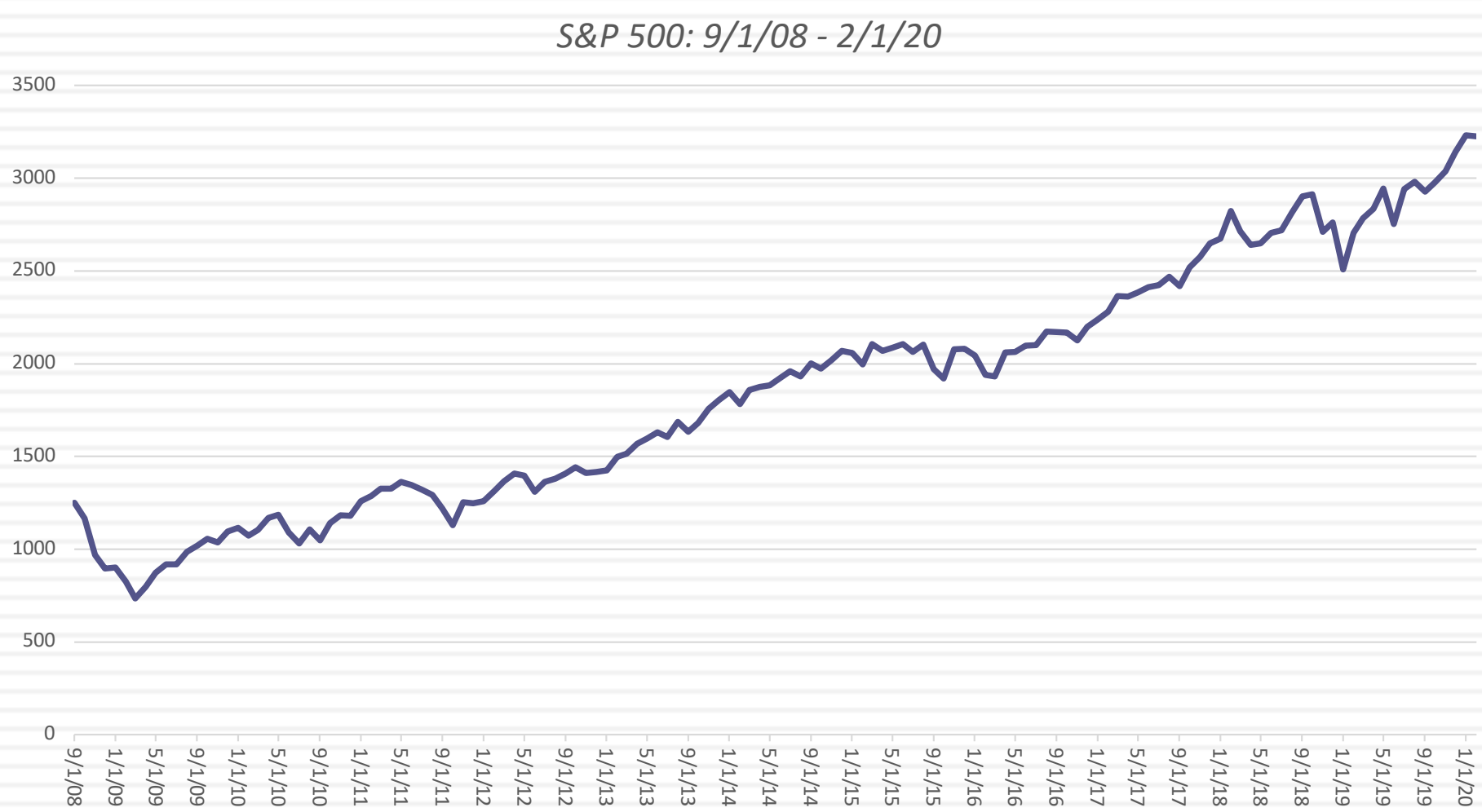


Percentile	Value/Share
0%	$47.04
10%	$236.52
20%	$283.69
30%	$324.12
40%	$361.82
50%	$401.33
60%	$444.87
70%	$496.96
80%	$564.30
90%	$673.09
100%	$2,210.68

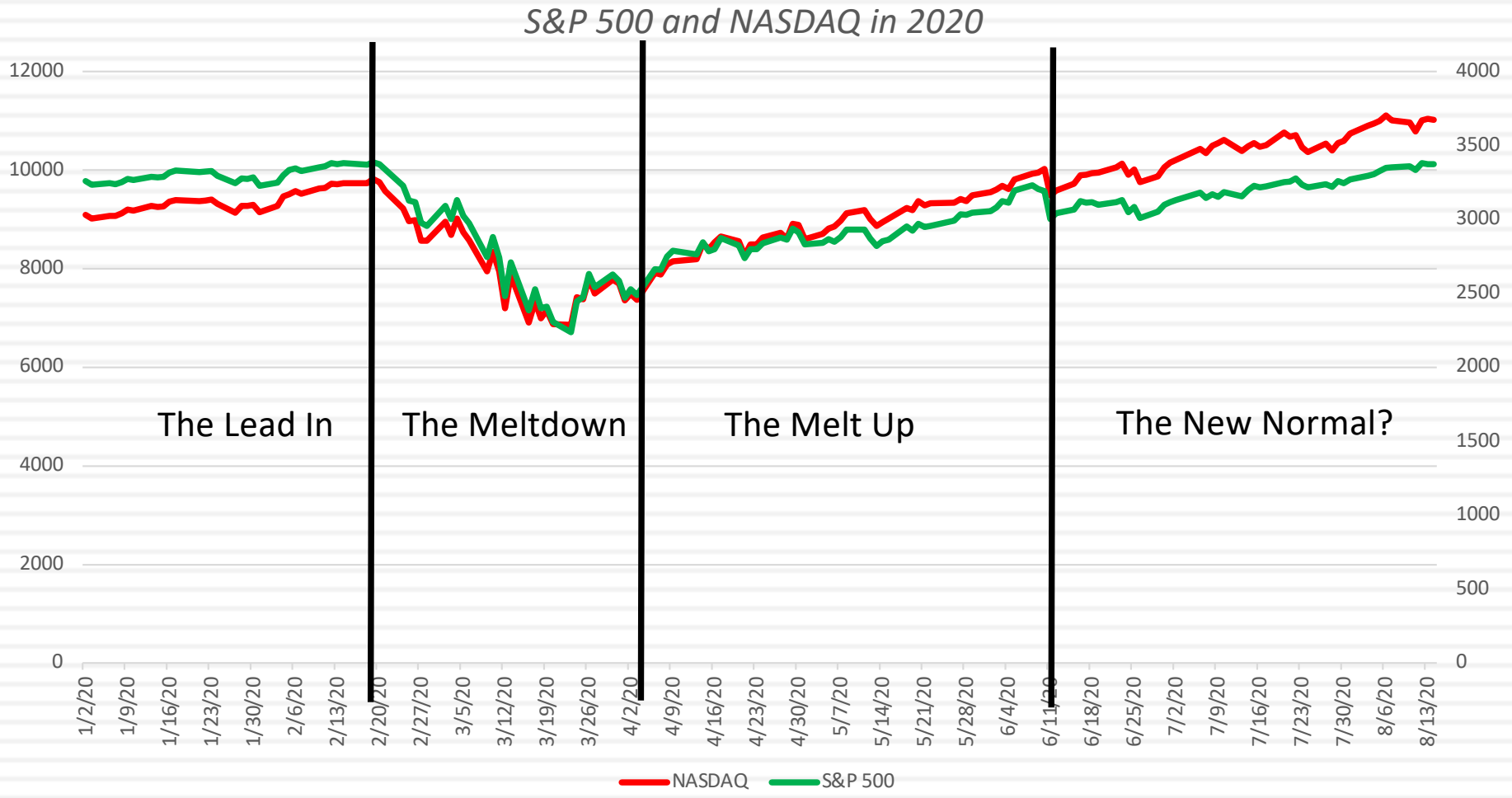
A COVID Break

Crisis times?

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



The COVID Crisis: US Equities, from February 14 to August 14, 2020



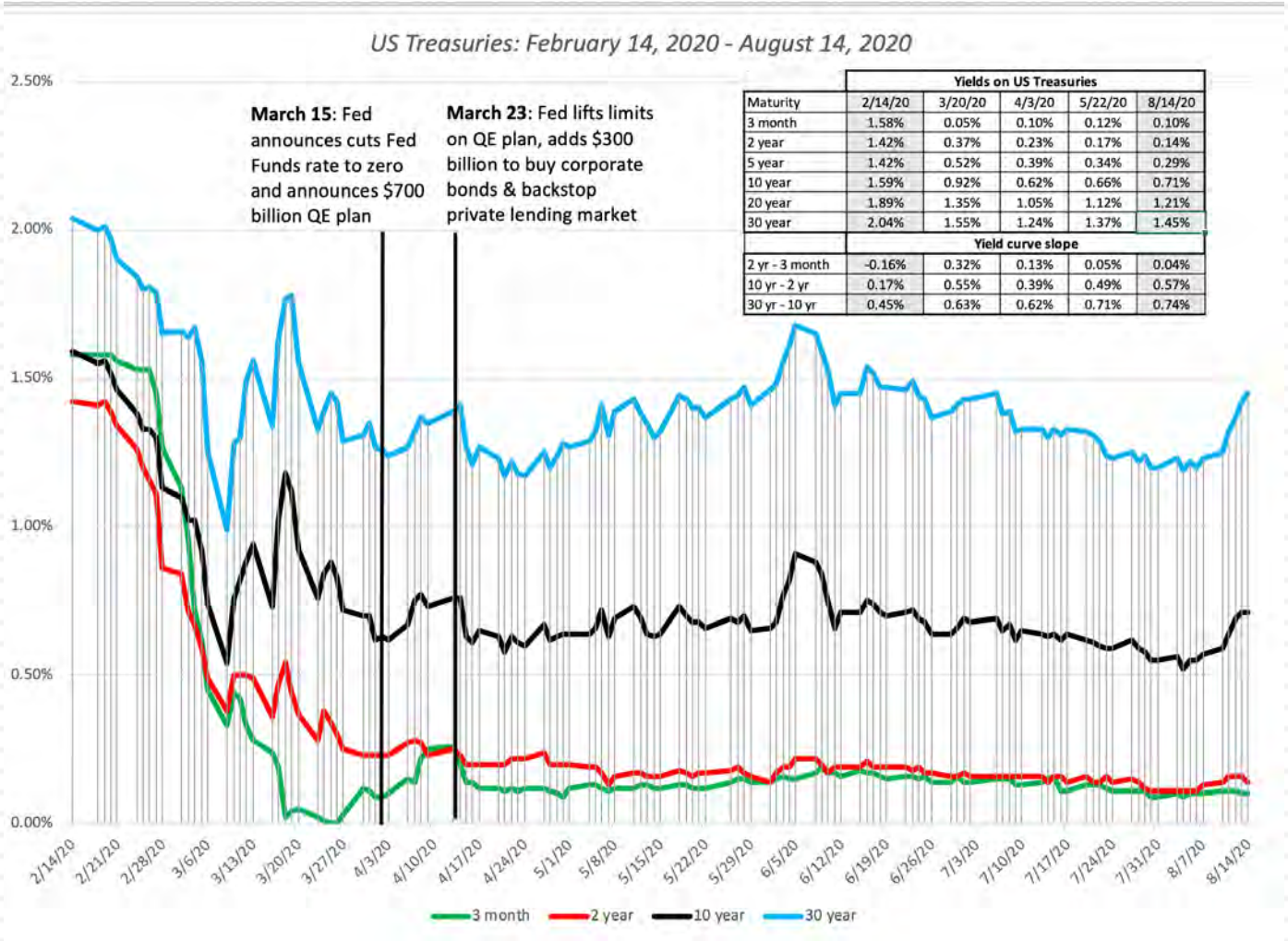
The Darkest Days: Damage assessment on March 20, 2020

				% Change	
	Index	*Country/Region*	*Level on 3/20*	*3/13-3/20*	*Last Month*
Americas	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%
Europe	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%
Asia	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%
Australia & NZ	ASX 50	Australia	4828	-12.87%	-31.97%
	NZX 50	New Zealand	9202	-6.36%	-23.79%
Africa	FTSE JSE top 40	South Africa	36302	-8.04%	-29.62%
	NSE All-Share	Nigeria	22198	-2.36%	-18.95%

Macro Review: Equity Indices

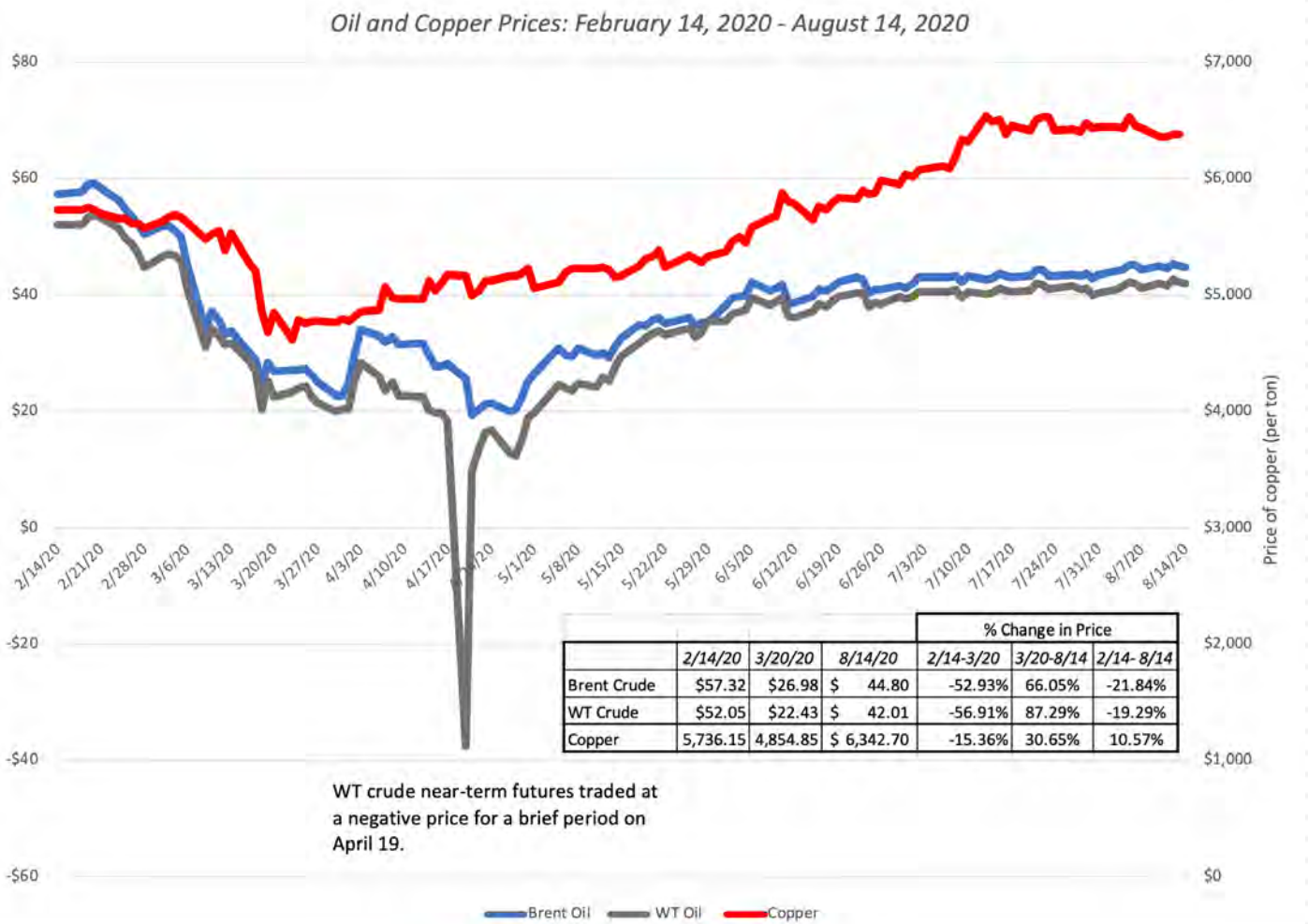
			Levels			% Change				
	Index	*Country/Region*	*14-Feb*	*20-Mar*	*14-Aug*	*8/7-8/14*	*7/14-8/14*	*2/14-3/20*	*3/20-8/14*	*2/14 - 8/14*
Americas	S&P 500	US	3374	2305	3373	-0.02%	0.64%	-31.68%	46.33%	-0.03%
	NASDAQ	US	9712	6880	11019	-0.21%	0.08%	-29.16%	60.17%	13.46%
	TSX	Canada	17848	11852	16515	-0.09%	-0.18%	-33.59%	39.34%	-7.47%
	IPC Mexico	Mexico	45000	34270	38950	0.87%	2.46%	-23.84%	13.66%	-13.44%
	iBovespa	Brazil	114381	67069	101353	0.89%	-1.38%	-41.36%	51.12%	-11.39%
Europe	FTSE 100	UK	7409	5191	6090	-1.55%	0.96%	-29.94%	17.32%	-17.80%
	DAX	Germany	13744	8929	12901	-0.71%	1.79%	-35.03%	44.48%	-6.13%
	CAC 40	France	6069	4131	4963	-1.58%	1.50%	-31.93%	20.14%	-18.22%
	S&P Europe 350	Europe	1731	1181	1463	-1.26%	1.33%	-31.77%	23.88%	-15.48%
Asia	Nikkei 225	Japan	23688	16553	23289	0.17%	4.30%	-30.12%	40.69%	-1.68%
	Shanghai 50	China	2895	2628	3289	1.44%	0.76%	-9.22%	25.15%	13.61%
	Hang Seng	Hong Kong	27816	22805	25183	-0.19%	2.66%	-18.01%	10.43%	-9.47%
	Sensex	India	41258	29916	37877	-1.13%	-0.43%	-27.49%	26.61%	-8.19%
Australia & NZ	ASX 200	Australia	7133	4825	6126	0.58%	2.02%	-32.36%	26.96%	-14.12%
	NZX 50	New Zealand	11835	9202	11452	-0.42%	-1.67%	-22.25%	24.45%	-3.24%
Africa	FTSE/JSE TOP 40	South Africa	52050	36302	52737	-0.65%	0.58%	-30.26%	45.27%	1.32%
	NSE-All Share	Nigeria	27756	22198	25200	-0.15%	0.63%	-20.02%	13.52%	-9.21%

Macro Review: US Treasuries



	Yields on US Treasuries				
Maturity	2/14/20	3/20/20	4/3/20	5/22/20	8/14/20
3 month	1.58%	0.05%	0.10%	0.12%	0.10%
2 year	1.42%	0.37%	0.23%	0.17%	0.14%
5 year	1.42%	0.52%	0.39%	0.34%	0.29%
10 year	1.59%	0.92%	0.62%	0.66%	0.71%
20 year	1.89%	1.35%	1.05%	1.12%	1.21%
30 year	2.04%	1.55%	1.24%	1.37%	1.45%
	Yield curve slope				
2 yr - 3 month	-0.16%	0.32%	0.13%	0.05%	0.04%
10 yr - 2 yr	0.17%	0.55%	0.39%	0.49%	0.57%
30 yr - 10 yr	0.45%	0.63%	0.62%	0.71%	0.74%

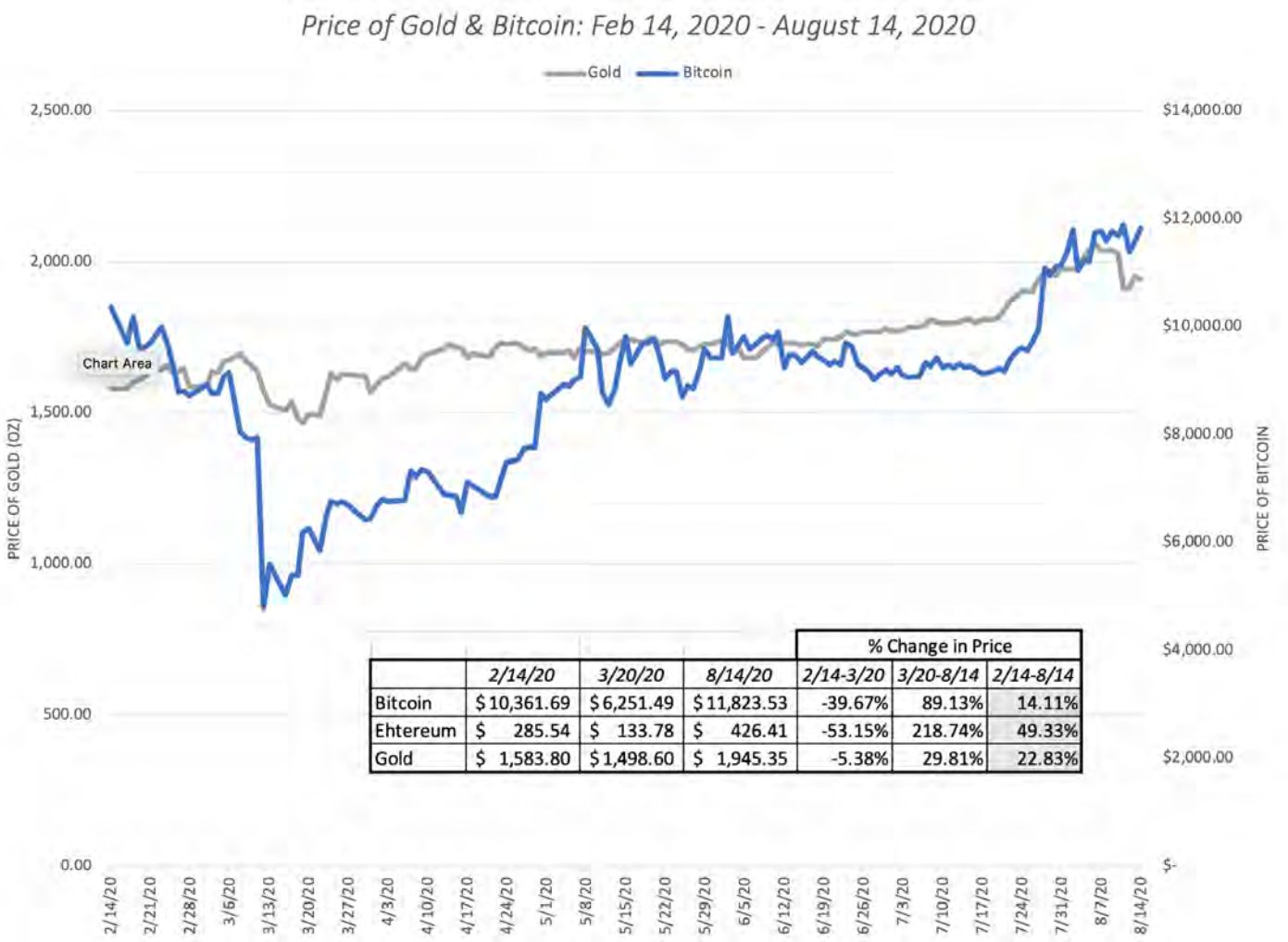
Macro Review: Oil & Copper



	2/14/20	3/20/20	8/14/20	% Change in Price 2/14-3/20	3/20-8/14	2/14- 8/14
Brent Crude	$57.32	$26.98	$ 44.80	-52.93%	66.05%	-21.84%
WT Crude	$52.05	$22.43	$ 42.01	-56.91%	87.29%	-19.29%
Copper	5,736.15	4,854.85	$ 6,342.70	-15.36%	30.65%	10.57%

WT crude near-term futures traded at a negative price for a brief period on April 19.

Macro Review: Gold & Bitcoin



				% Change in Price		
	2/14/20	*3/20/20*	*8/14/20*	*2/14-3/20*	*3/20-8/14*	*2/14-8/14*
Bitcoin	$10,361.69	$6,251.49	$11,823.53	-39.67%	89.13%	14.11%
Ehtereum	$ 285.54	$ 133.78	$ 426.41	-53.15%	218.74%	49.33%
Gold	$ 1,583.80	$1,498.60	$ 1,945.35	-5.38%	29.81%	22.83%

Global Equities: By Region

		Market Cap ($ Millions)				$ Change in Market Cap				% Change in Market Cap			
Sub Region	Number of firms	2/14/20	3/20/20	5/22/20	8/14/20	2/14 - 3/20	3/20- 5/22	5/22 - 8/14	2/14 - 8/14	2/14 - 3/20	3/20- 5/22	5/22 - 8/14	2/14 - 8/14
Africa	844	$ 580,467	$ 363,856	$ 416,477	$ 455,329	$ (216,611)	$ 52,621	$ 38,851	$ (125,139)	-37.32%	14.46%	9.33%	-21.56%
Australia & NZ	1,665	$ 1,613,977	$ 948,950	$ 1,258,699	$ 1,540,230	$ (665,027)	$ 309,749	$ 281,531	$ (73,747)	-41.20%	32.64%	22.37%	-4.57%
Canada	2,496	$ 2,229,440	$ 1,353,166	$ 1,763,631	$ 2,097,775	$ (876,274)	$ 410,465	$ 334,144	$ (131,664)	-39.30%	30.33%	18.95%	-5.91%
China	6,348	$13,996,094	$12,396,026	$13,033,689	$16,162,756	$ (1,600,069)	$ 637,663	$ 3,129,067	$2,166,661	-11.43%	5.14%	24.01%	15.48%
EU & Environs	5,563	$13,611,699	$ 9,226,315	$10,992,480	$13,077,435	$ (4,385,384)	$ 1,766,165	$ 2,084,956	$ (534,264)	-32.22%	19.14%	18.97%	-3.93%
Eastern Europe & Russia	517	$ 824,836	$ 498,861	$ 639,042	$ 686,946	$ (325,975)	$ 140,181	$ 47,904	$ (137,890)	-39.52%	28.10%	7.50%	-16.72%
India	3,333	$ 2,205,941	$ 1,520,879	$ 1,584,046	$ 2,007,518	$ (685,062)	$ 63,167	$ 423,472	$ (198,423)	-31.06%	4.15%	26.73%	-8.99%
Japan	3,807	$ 6,031,796	$ 4,458,917	$ 5,369,361	$ 5,945,226	$ (1,572,879)	$ 910,445	$ 575,865	$ (86,570)	-26.08%	20.42%	10.73%	-1.44%
Latin America & Caribbear	1,215	$ 2,424,762	$ 1,414,848	$ 1,577,197	$ 1,877,563	$ (1,009,915)	$ 162,349	$ 300,366	$ (547,200)	-41.65%	11.47%	19.04%	-22.57%
Middle East	1,504	$ 3,102,408	$ 2,578,565	$ 2,906,678	$ 3,041,760	$ (523,843)	$ 328,112	$ 135,082	$ (60,648)	-16.89%	12.72%	4.65%	-1.95%
Small Asia	8,793	$ 5,146,057	$ 3,607,804	$ 4,329,250	$ 5,173,937	$ (1,538,254)	$ 721,446	$ 844,687	$ 27,879	-29.89%	20.00%	19.51%	0.54%
UK	1,261	$ 3,067,659	$ 1,922,892	$ 2,332,401	$ 2,631,288	$ (1,144,767)	$ 409,509	$ 298,887	$ (436,371)	-37.32%	21.30%	12.81%	-14.22%
United States	6,623	$35,563,273	$23,829,663	$31,007,415	$35,651,806	$(11,733,611)	$ 7,177,752	$ 4,644,391	$ 88,533	-32.99%	30.12%	14.98%	0.25%
Global	43,970	$90,398,411	$64,120,740	$77,210,365	$90,349,568	$(26,277,671)	$13,089,625	$13,139,203	$ (48,843)	-29.07%	20.41%	17.02%	-0.05%

Global Equities: By Sector

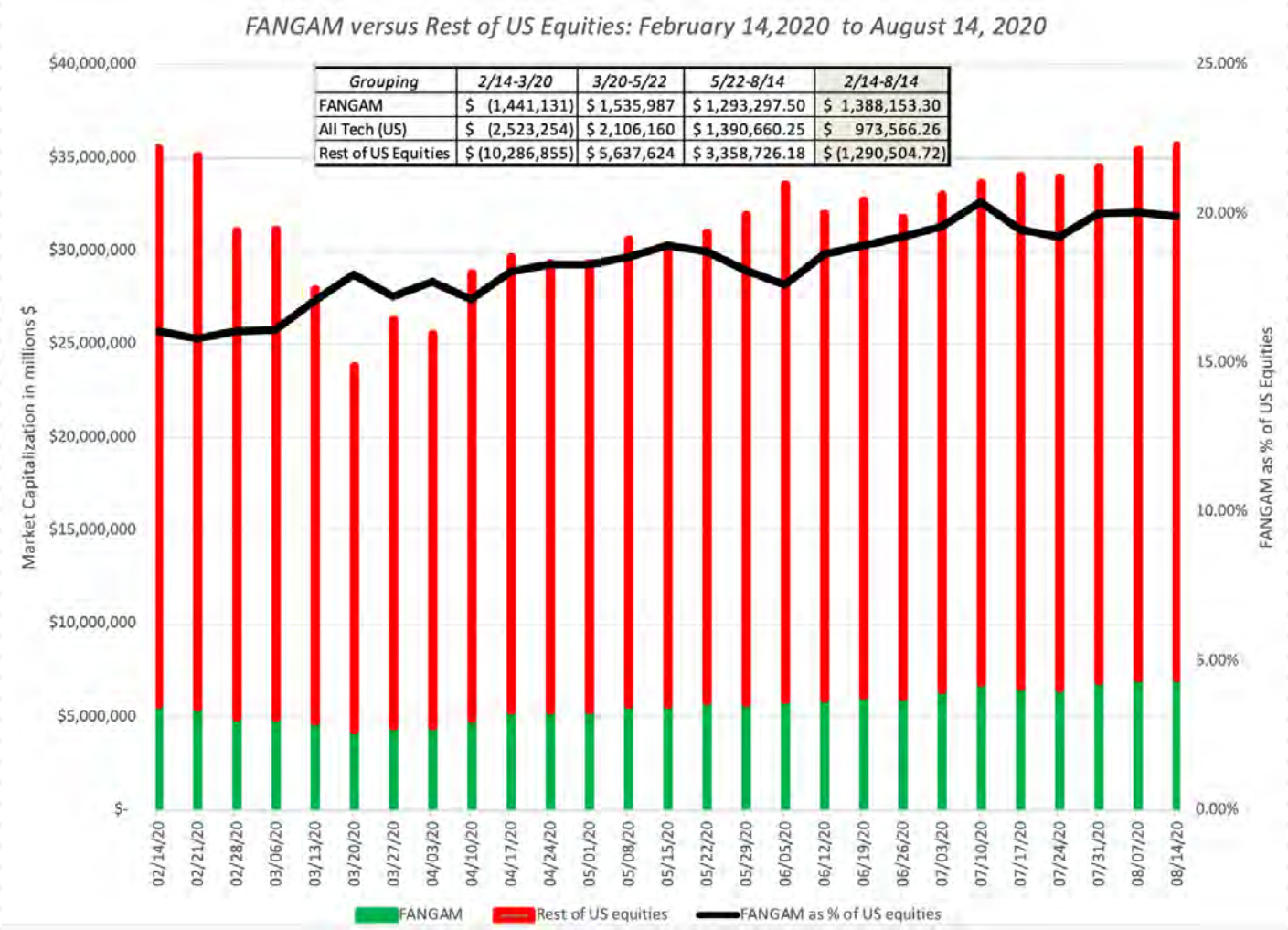
		Market Cap ($ Millions)				$ Change in Market Cap				% Change in Market Cap			
Primary Sector	Number of firms	2/14/20	3/20/20	5/22/20	8/14/20	2/14 - 3/20	3/20- 5/22	5/22 - 8/14	2/14 - 8/14	2/14 - 3/20	3/20- 5/22	5/22 - 8/14	2/14 - 8/14
Communication Services	2,094	$ 7,318,018	$ 5,480,236	$ 6,692,664	$ 7,600,357	$ (1,837,783)	$ 1,212,428	$ 907,693	$ 282,338	-25.11%	22.12%	13.56%	3.86%
Consumer Discretionary	5,961	$10,161,829	$ 7,074,627	$ 8,957,811	$11,227,438	$ (3,087,202)	$ 1,883,184	$ 2,269,627	$ 1,065,609	-30.38%	26.62%	25.34%	10.49%
Consumer Staples	2,853	$ 7,165,378	$ 5,727,389	$ 6,488,812	$ 7,453,394	$ (1,437,989)	$ 761,424	$ 964,582	$ 288,016	-20.07%	13.29%	14.87%	4.02%
Energy	1,673	$ 5,935,002	$ 3,851,638	$ 4,740,250	$ 5,008,071	$ (2,083,364)	$ 888,612	$ 267,821	$ (926,931)	-35.10%	23.07%	5.65%	-15.62%
Financials	4,887	$14,952,738	$ 9,946,720	$10,750,668	$12,561,583	$ (5,006,018)	$ 803,948	$ 1,810,915	$ (2,391,154)	-33.48%	8.08%	16.84%	-15.99%
Health Care	3,978	$ 8,914,843	$ 6,859,450	$ 8,831,226	$ 9,861,810	$ (2,055,394)	$ 1,971,777	$ 1,030,584	$ 946,967	-23.06%	28.75%	11.67%	10.62%
Industrials	7,589	$10,111,374	$ 6,886,933	$ 8,106,858	$ 9,780,741	$ (3,224,441)	$ 1,219,924	$ 1,673,884	$ (330,632)	-31.89%	17.71%	20.65%	-3.27%
Information Technology	5,589	$13,593,741	$ 9,731,172	$12,616,961	$15,171,759	$ (3,862,569)	$ 2,885,790	$ 2,554,798	$ 1,578,019	-28.41%	29.66%	20.25%	11.61%
Materials	5,738	$ 4,987,456	$ 3,522,367	$ 4,327,783	$ 5,297,134	$ (1,465,089)	$ 805,416	$ 969,351	$ 309,679	-29.38%	22.87%	22.40%	6.21%
Real Estate	2,674	$ 4,051,571	$ 2,707,513	$ 3,069,197	$ 3,472,740	$ (1,344,058)	$ 361,684	$ 403,543	$ (578,831)	-33.17%	13.36%	13.15%	-14.29%
Utilities	922	$ 3,205,899	$ 2,332,261	$ 2,627,550	$ 2,913,938	$ (873,638)	$ 295,289	$ 286,388	$ (291,961)	-27.25%	12.66%	10.90%	-9.11%
All	43,970	$90,398,411	$64,120,740	$77,210,365	$90,349,568	$(26,277,671)	$13,089,625	$13,139,203	$ (48,843)	-29.07%	20.41%	17.02%	-0.05%

The Unifying Theory: The Resilience of Risk Capital

Value Transfers

		Returns (2/14/20 - 7/17/20)			Returns (2/14/20 - 7/17/20)	
Grouping	*Risk On*	*% Change*	*$ Change (billions)*	*Risk Off*	*% Change*	*$ Change (billions)*
PE	High PE	10.81%	$674.00	Low PE	-8.31%	-$246.00
PBV	High PBV	7.98%	$1,974.00	Low PBV	-17.85%	-$340.00
Dividend Yield	No or low Dividend Yield	3.33%	$1,182.00	High Dividend Yields	-16.06%	-$1,421.00
Corporate Age	Young companies	6.59%	$176.00	Old companies	-13.01%	-$3,162.00
Growth	High growth	35.60%	$1,046.00	Low growth	-22.49%	-$1,819.00
Size	Small Market Cap	16.79%	$54.00	Large Market Cap	-4.17%	-$3,223.00
Debt	High debt	-15.49%	-$1,082.00	Low debt	12.32%	$300.00
Returns reported for firms in the highest and lowest deciles of each grouping, except for dividends, reported in quintiles.						

The Strong get stronger… The FANGAM stocks…

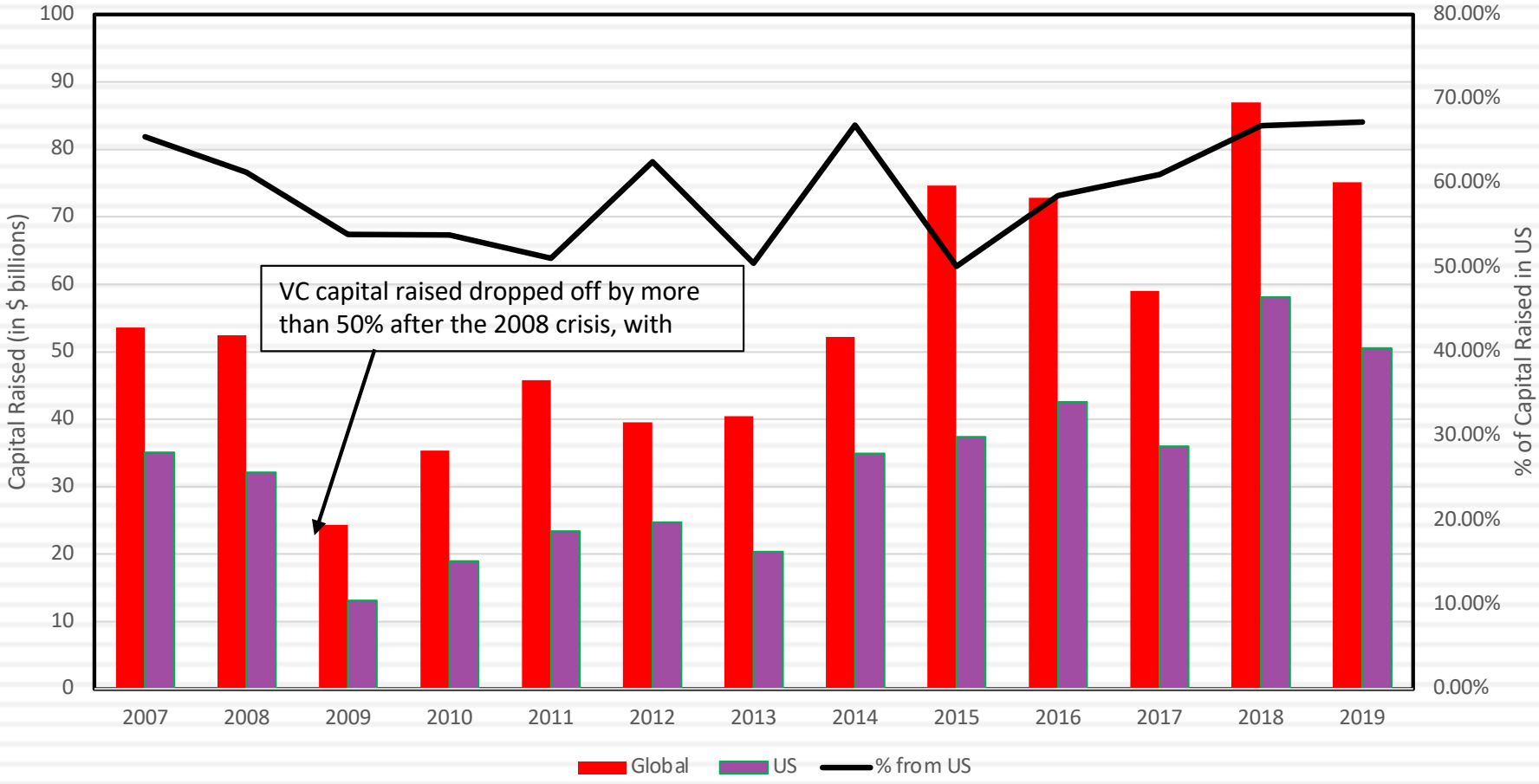


The Resilience of Risk Capital

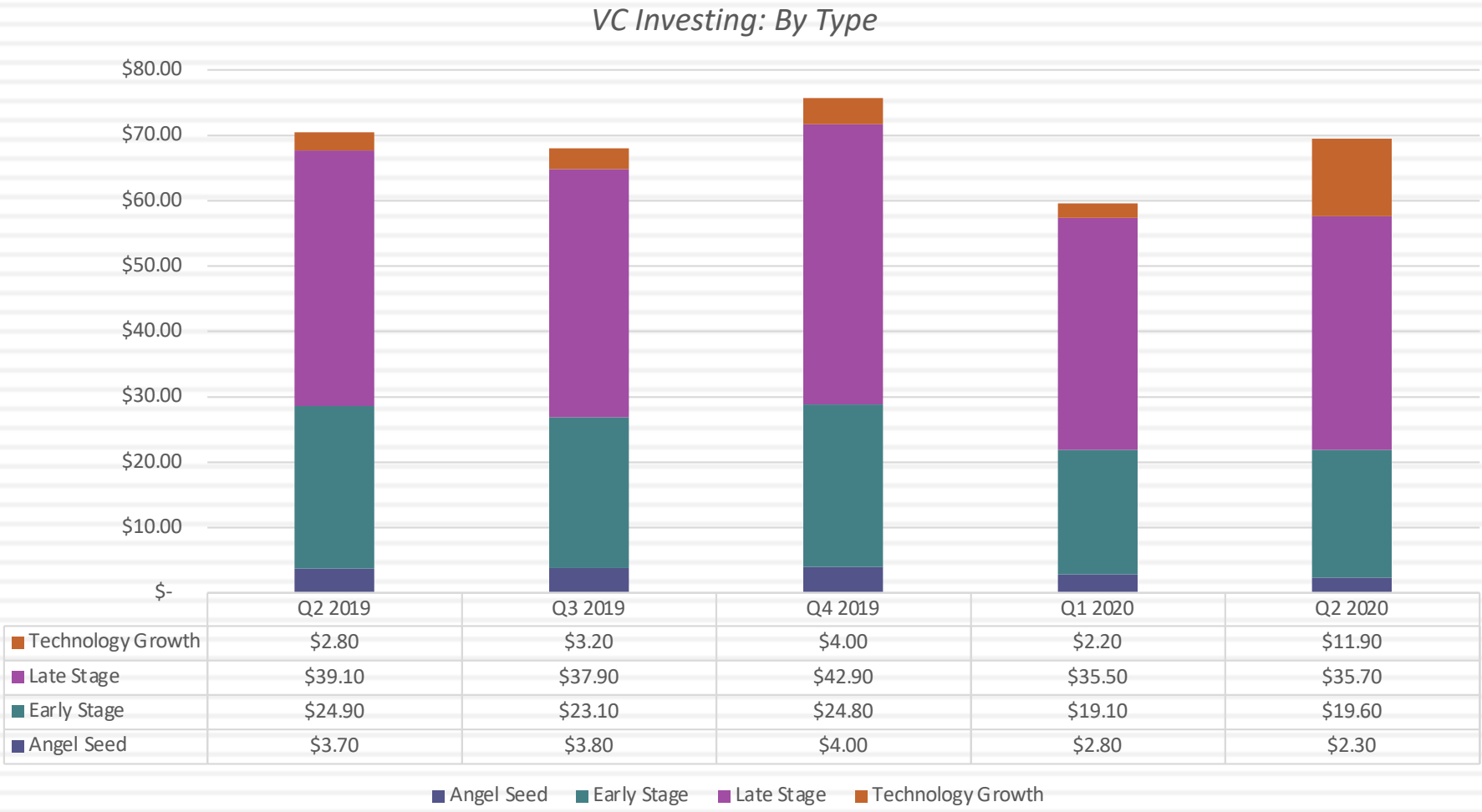
- Risk capital is capital invested in the riskiest investments. When investors get scared, a common by-product of crises, risk capital usually dries up, making it difficult for young cash-burning companies and aging, debt-laden companies to survive.
- With equity, risk capital shows up in private companies as venture capital investing and in public companies, as IPOs.
- With debt, risk capital is invested in the riskiest debt, in both public markets (as high yield, low rated bonds) and in private markets.

Venture Capital: Historical Perspective

Capital Raised by Venture Capital: US and Global: 2007-2019

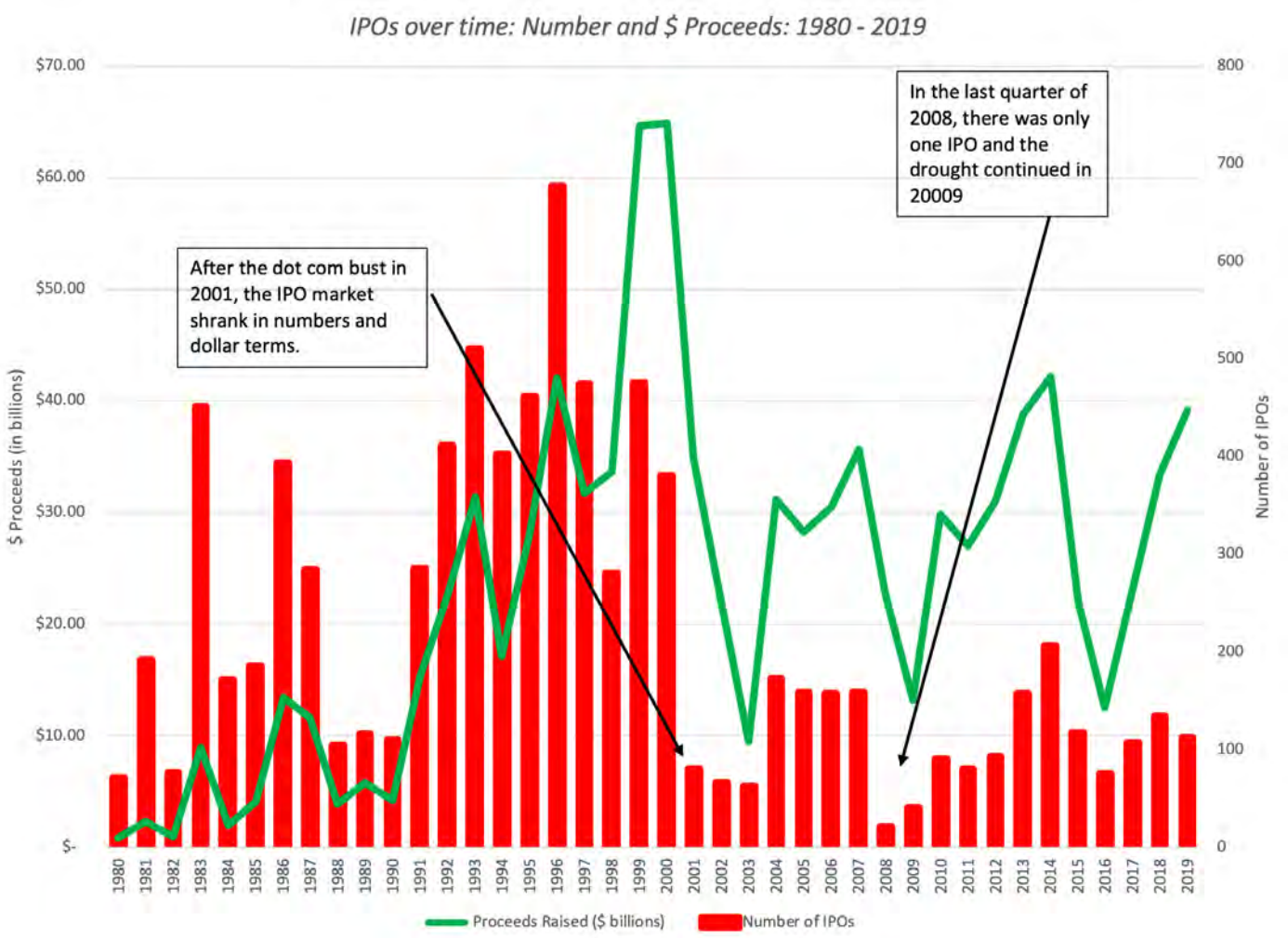


Venture Capital: The COVID effect

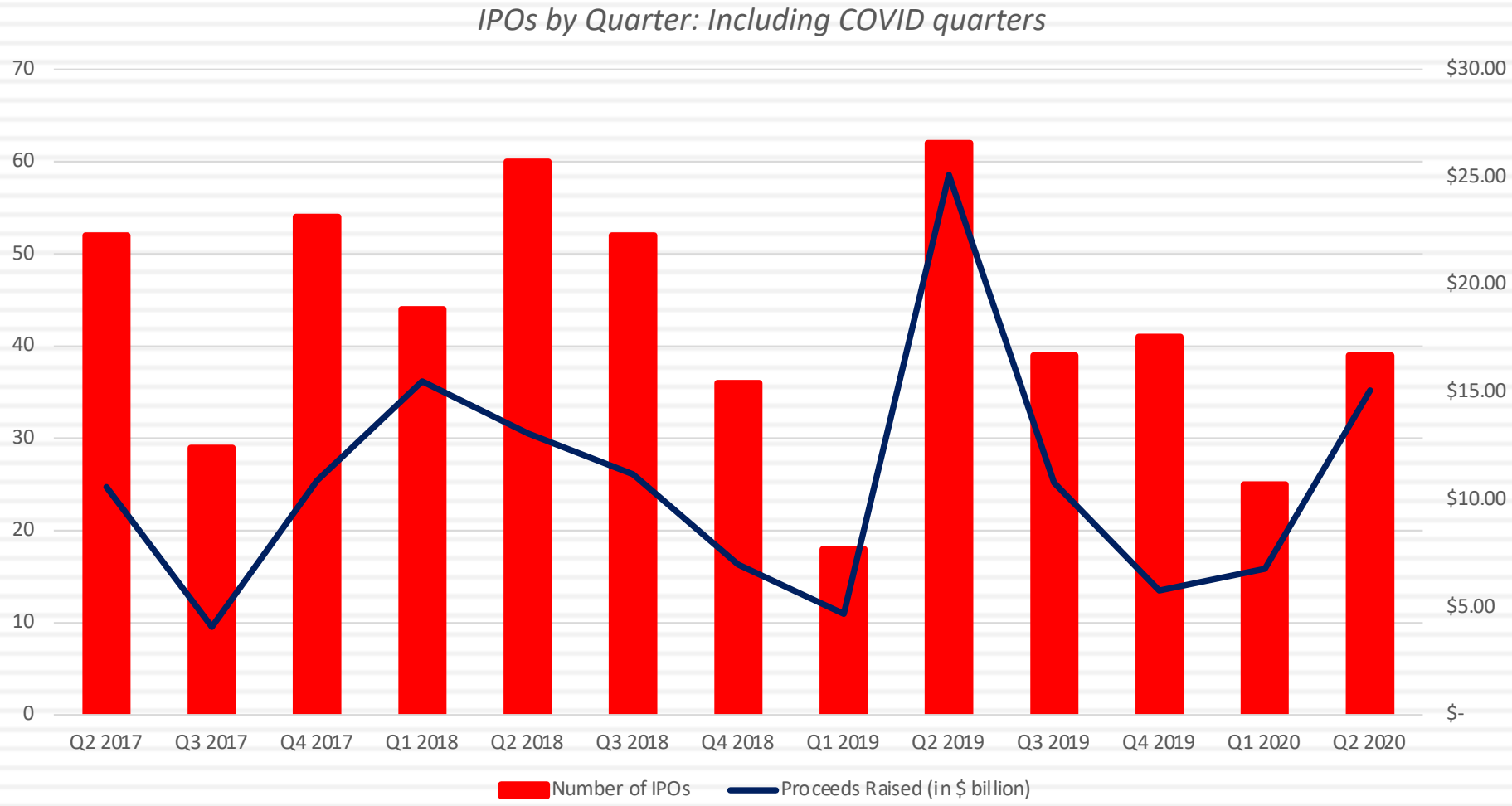


	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020
Technology Growth	$2.80	$3.20	$4.00	$2.20	$11.90
Late Stage	$39.10	$37.90	$42.90	$35.50	$35.70
Early Stage	$24.90	$23.10	$24.80	$19.10	$19.60
Angel Seed	$3.70	$3.80	$4.00	$2.80	$2.30

IPOs: A Historical Perspective



IPOs: The COVID effect



ERP : July 1, 2020

Andorra	7.08%	9.49%	8.03%	Italy	7.37%	10.04%	8.46%
Austria	5.59%	6.74%	5.81%	Jersey	5.89%	7.30%	6.12%
Belgium	5.80%	7.12%	6.12%	Liechtenstein	5.20%	6.01%	5.23%
Cyprus	8.16%	11.51%	9.64%	Luxembourg	5.20%	6.01%	5.23%
Denmark	5.20%	6.01%	5.23%	Malta	6.04%	7.56%	6.48%
Finland	5.59%	6.74%	5.81%	Netherlands	5.20%	6.01%	5.23%
France	5.69%	6.92%	5.96%	Norway	5.20%	6.01%	5.23%
Germany	5.20%	6.01%	5.23%	Portugal	7.37%	10.04%	8.46%
Greece	9.64%	14.25%	11.84%	Spain	6.77%	8.93%	7.58%
Guernsey	6.77%	8.93%	6.12%	Sweden	5.20%	6.01%	5.23%
Iceland	6.04%	7.56%	6.48%	Switzerland	5.20%	6.01%	5.23%
Ireland	6.04%	7.56%	6.48%	Turkey	9.64%	14.25%	11.84%
Isle of Man	5.69%	6.92%	5.96%	United Kingdom	5.69%	6.92%	5.96%

Canada	5.20%	6.01%	5.23%
United States	5.20%	6.01%	5.23%

Argentina	14.08%	27.97%	22.86%
Belize	11.62%	17.91%	16.25%
Bolivia	8.75%	14.25%	11.84%
Brazil	8.16%	11.51%	9.64%
Chile	5.89%	7.30%	6.26%
Colombia	7.08%	9.49%	8.03%
Costa Rica	9.64%	16.08%	13.32%
Ecuador	11.62%	24.30%	19.92%
El Salvador	11.62%	17.91%	14.79%
Guatemala	7.66%	10.58%	8.90%
Honduras	9.64%	14.25%	11.84%
Mexico	6.38%	8.21%	7.58%
Nicaragua	10.63%	17.91%	14.79%
Panama	6.77%	8.93%	7.58%
Paraguay	7.66%	10.58%	8.90%
Peru	6.38%	8.21%	6.99%
Suriname	10.63%	16.08%	14.79%
Uruguay	7.08%	9.49%	8.03%
Venezuela	22.89%	29.46%	27.14%

Country	*1/20*	*4/20*	*7/20*
Angola	11.62%	17.91%	14.79%
Benin	10.63%	16.08%	13.32%
Botswana	6.04%	7.56%	6.48%
Burkina Faso	10.63%	16.08%	13.32%
Cameroon	10.63%	16.08%	13.32%
Cape Verde	10.63%	16.08%	13.32%
Congo (DR)	12.59%	19.73%	16.25%
Congo (Rep)	14.08%	22.49%	18.46%
Côte d'Ivoire	8.75%	12.60%	10.52%
Egypt	10.63%	16.08%	13.32%
Ethiopia	9.64%	14.25%	13.32%
Gabon	12.59%	19.73%	16.25%
Ghana	11.62%	17.91%	14.79%
Kenya	10.63%	16.08%	13.32%
Mali	11.62%	17.91%	14.79%
Morocco	7.66%	10.58%	8.90%
Mozambique	14.08%	22.49%	18.46%
Namibia	8.16%	11.51%	9.64%
Niger	11.62%	17.91%	14.79%
Nigeria	10.63%	16.08%	13.32%
Rwanda	10.63%	16.08%	13.32%
Senegal	8.75%	12.60%	10.52%
South Africa	7.37%	10.58%	8.90%
Swaziland	10.63%	16.08%	13.32%
Tanzania	9.64%	14.25%	11.84%
Togo	11.62%	17.91%	14.79%
Tunisia	10.63%	16.08%	13.32%
Uganda	10.63%	16.08%	13.32%
Zambia	14.08%	27.97%	22.86%

Albania	9.64%	14.25%	11.84%
Armenia	8.75%	12.60%	10.52%
Azerbaijan	8.16%	11.51%	9.64%
Belarus	11.62%	17.91%	14.79%
Bosnia and Herzegovina	11.62%	17.91%	14.79%
Bulgaria	7.08%	9.49%	8.03%
Croatia	8.16%	11.51%	9.64%
Czech Republic	5.80%	7.12%	6.12%
Estonia	5.89%	7.30%	6.26%
Georgia	8.16%	11.51%	9.64%
Hungary	7.37%	10.04%	8.46%
Kazakhstan	7.37%	10.04%	8.46%
Kyrgyzstan	10.63%	16.08%	13.32%
Latvia	6.38%	8.21%	6.99%
Lithuania	6.38%	8.21%	6.99%
Macedonia	8.75%	12.60%	10.52%
Moldova	11.62%	17.91%	14.79%
Montenegro	9.64%	14.25%	11.84%
Poland	6.04%	7.56%	6.48%
Romania	7.37%	10.04%	8.46%
Russia	7.37%	10.04%	8.46%
Serbia	8.75%	12.60%	10.52%
Slovakia	6.04%	7.56%	6.48%
Slovenia	6.77%	8.93%	7.58%
Tajikistan	11.62%	17.91%	14.79%
Ukraine	12.59%	19.73%	14.79%
Uzbekistan	9.64%	14.25%	11.84%

Abu Dhabi	5.69%	6.92%	5.96%
Bahrain	10.63%	16.08%	13.32%
Iraq	12.59%	19.73%	16.25%
Israel	5.89%	7.30%	6.26%
Jordan	9.64%	14.25%	11.84%
Kuwait	5.69%	6.92%	5.96%
Lebanon	14.08%	27.97%	22.86%
Oman	7.66%	11.51%	10.52%
Qatar	5.80%	7.12%	6.12%
Ras Al Khaimah (Emirate of)	12.59%	19.73%	6.48%
Saudi Arabia	5.89%	7.30%	6.26%
Sharjah	6.38%	9.49%	8.03%
United Arab Emirates	5.69%	6.92%	5.96%

Region	*Weighted Average: ERP*
Africa	12.42%
Asia	6.78%
Australia & New Zealand	5.23%
Caribbean	13.37%
Central and South America	10.70%
Eastern Europe & Russia	8.42%
Middle East	7.70%
North America	5.23%
Western Europe	6.44%
Global	6.76%

Country	*PRS*	*1-Jan*	*1-Apr*	*1-Jul*
Algeria	55	11.62%	17.91%	22.86%
Brunei	80	5.59%	6.74%	6.48%
Gambia	63.5	11.62%	17.91%	14.79%
Guinea	54	15.06%	24.30%	22.86%
Guinea-Bissau	62	11.62%	17.91%	16.25%
Guyana	65	11.62%	17.91%	13.32%
Haiti	54.5	14.08%	22.49%	22.86%
Iran	58.5	11.62%	17.91%	18.46%
Korea, D.P.R.	50.3	17.03%	27.97%	22.86%
Liberia	53.5	21.71%	31.93%	22.86%
Libya	58.3	8.16%	11.51%	18.46%
Madagascar	63	10.63%	16.08%	14.79%
Malawi	57.8	11.62%	17.91%	18.46%
Myanmar	62.8	11.62%	17.91%	14.79%
Sierra Leone	59	15.06%	24.30%	18.46%
Somalia	50.5	17.03%	27.97%	22.86%
Sudan	36.3	21.71%	31.93%	27.14%
Syria	53.8	17.03%	27.97%	22.86%
Yemen, Republic	50	17.03%	27.97%	27.14%
Zimbabwe	51.3	17.03%	27.97%	22.86%

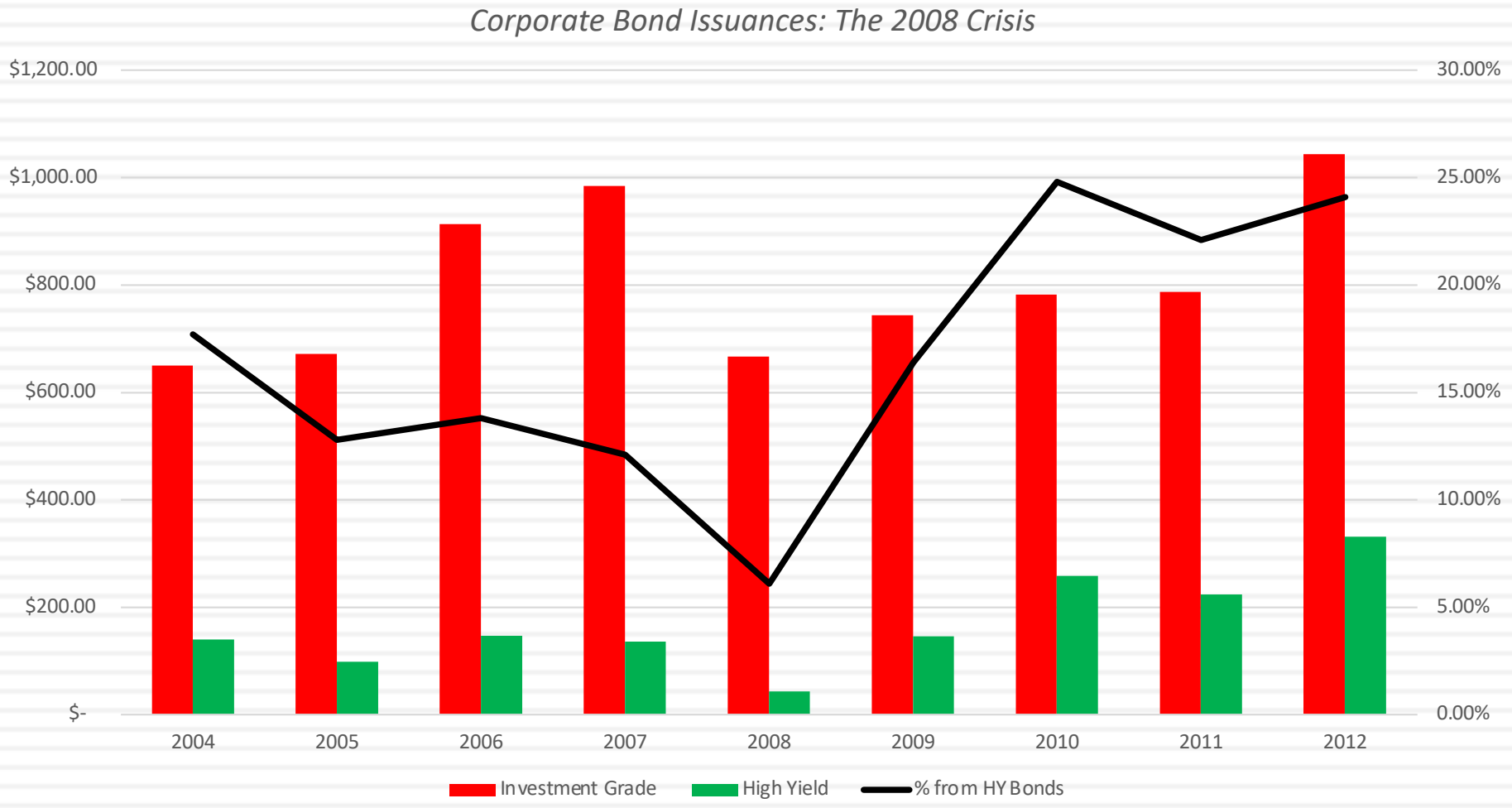
Bangladesh	8.75%	12.60%	10.52%
Cambodia	10.63%	16.08%	13.32%
China	5.89%	7.30%	6.26%
Fiji	8.75%	12.60%	10.52%
Hong Kong	5.69%	7.12%	6.12%
India	7.08%	9.49%	8.46%
Indonesia	7.08%	9.49%	8.03%
Japan	5.89%	7.30%	6.26%
Korea	5.69%	6.92%	5.96%
Laos	NA	8.21%	6.99%
Macao	5.80%	7.12%	6.12%
Malaysia	6.38%	8.21%	6.99%
Maldives	10.63%	16.08%	14.79%
Mauritius	6.77%	8.93%	7.58%
Mongolia	11.62%	17.91%	14.79%
Pakistan	11.62%	17.91%	14.79%
Papua New Guinea	10.63%	16.08%	13.32%
Philippines	7.08%	9.49%	8.03%
Singapore	5.20%	6.01%	5.23%
Solomon Islands	11.62%	17.91%	14.79%
Sri Lanka	10.63%	16.08%	13.32%
Taiwan	5.80%	7.12%	6.12%
Thailand	6.77%	8.93%	7.58%
Vietnam	8.75%	12.60%	10.52%

Australia	5.20%	6.01%	5.23%
Cook Islands	9.64%	14.25%	11.84%
New Zealand	5.20%	6.01%	5.23%

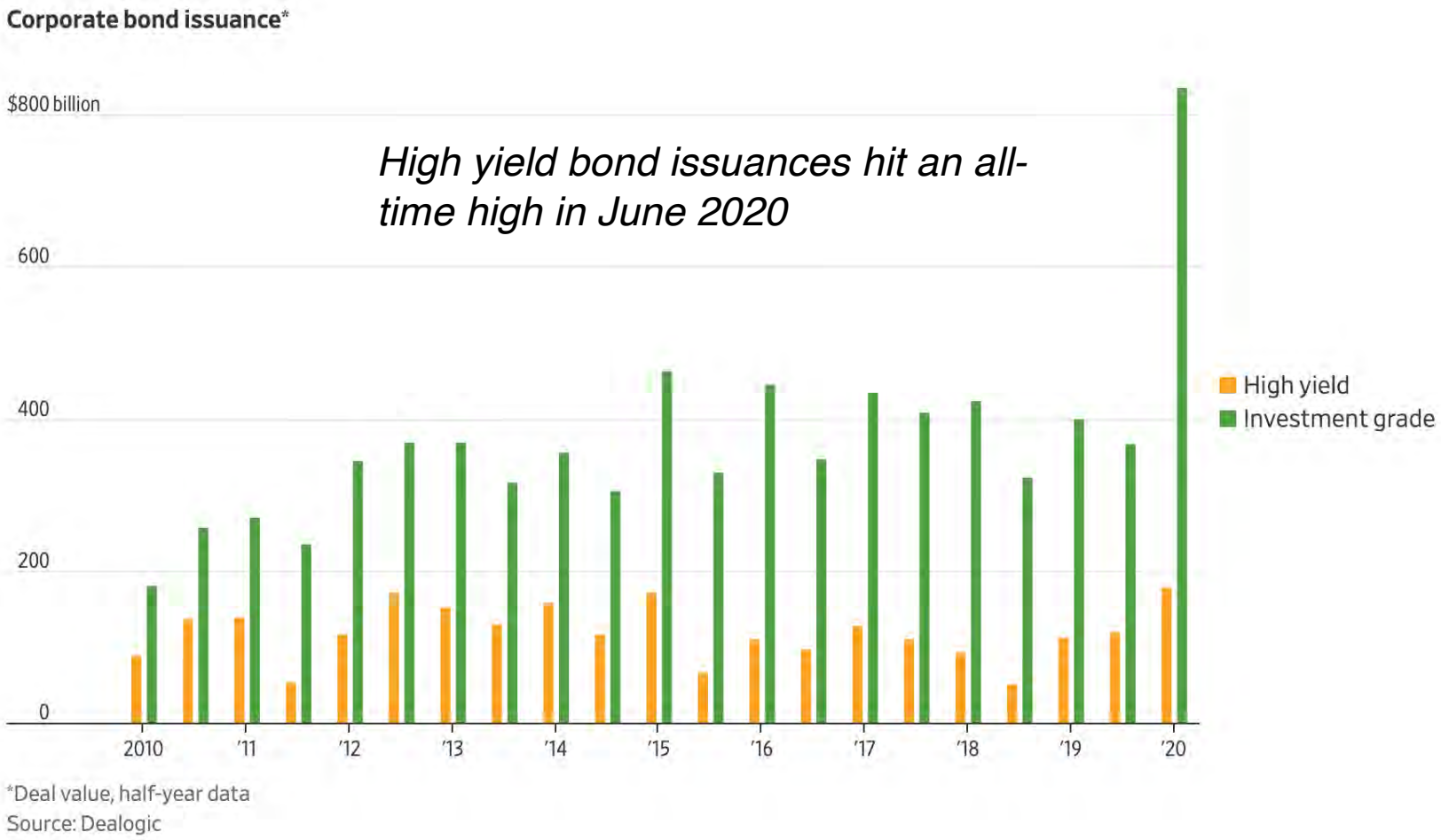
Aswath Damodaran

Blue: ERP on 7/1/20
Red: ERP on 4/1/20
Green: ERP on 1/1/20

Corporate Bond Issuance: The 2008 Crisis



Corporate Bond Issuance: The COVID effect



High yield bond issuances hit an all-time high in June 2020

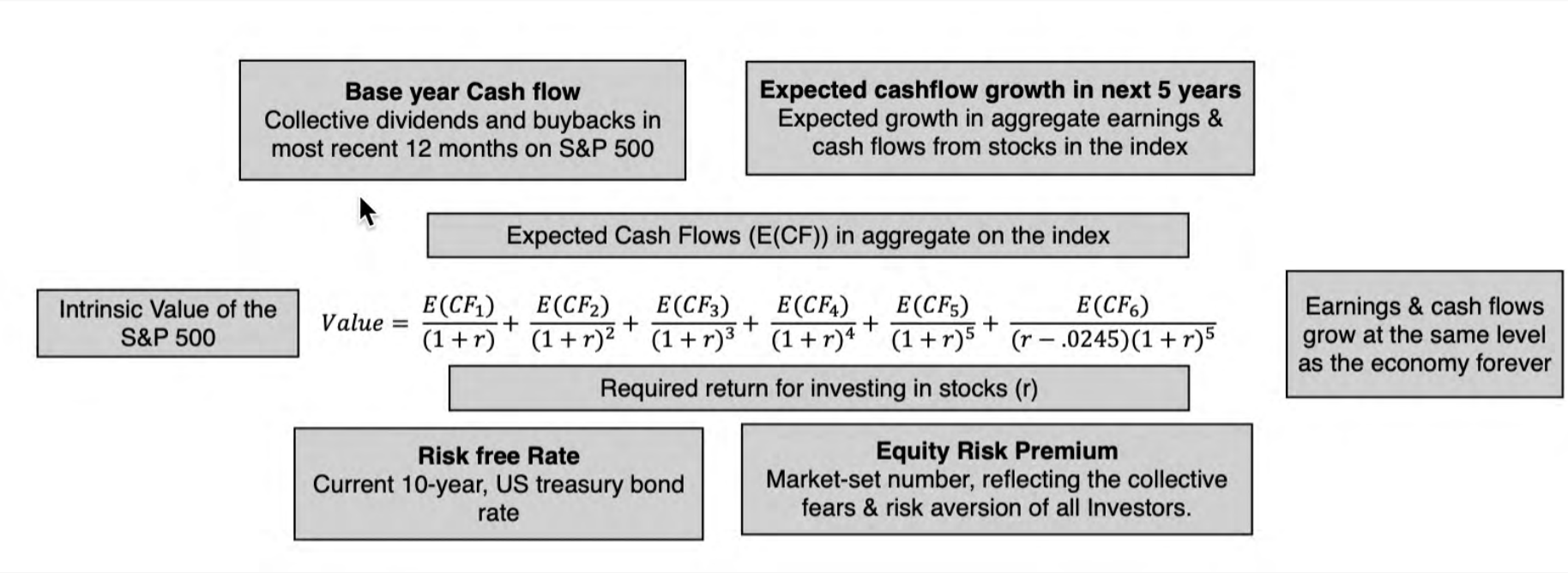
What's different?

- Crisis Origins: This crisis started at a time, when capital markets were buoyant and investors were eagerly taking on risk, with risk premiums in both equity and bond markets at close to decade-level lows, with a global economic shut down, with a cessation of most business activity.
  - With a Timer: That shut down came with a time frame, though there was uncertainty not only about when economic activity would start up again, but how vigorously it would return.
- The Fed Effect: The decisive turnaround in markets happened on March 23, which coincidentally or otherwise was the date that the Fed announced it would be a backstop in private lending markets.
- Investor Composition: Investors have become more global and more willing to use passive investment vehicles, allowing for momentum to feed on itself more easily.

Valuation after COVID: The Market

Keep it simple!

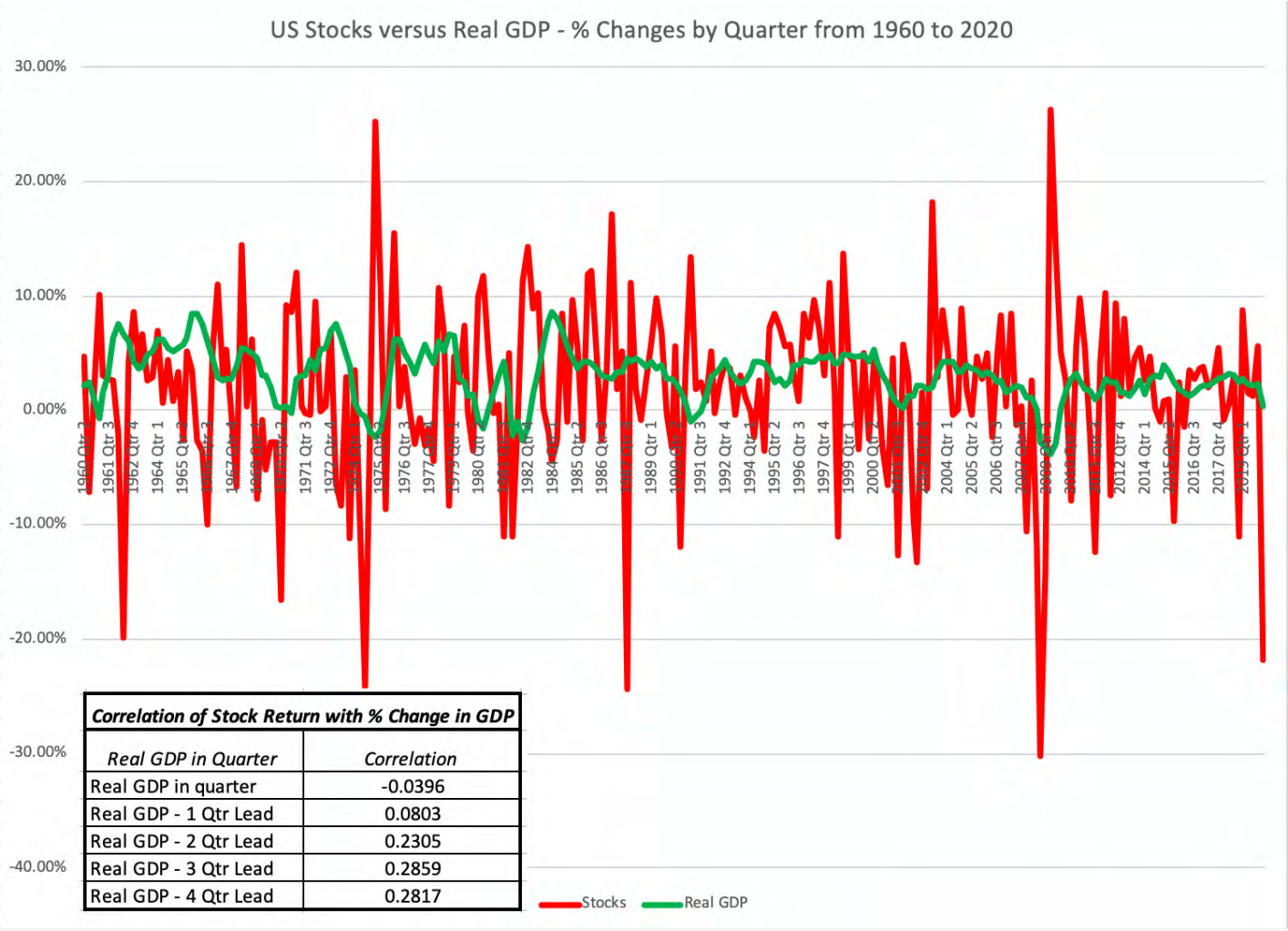
Valuing the market: Fundamentals



Do fundamentals matter?

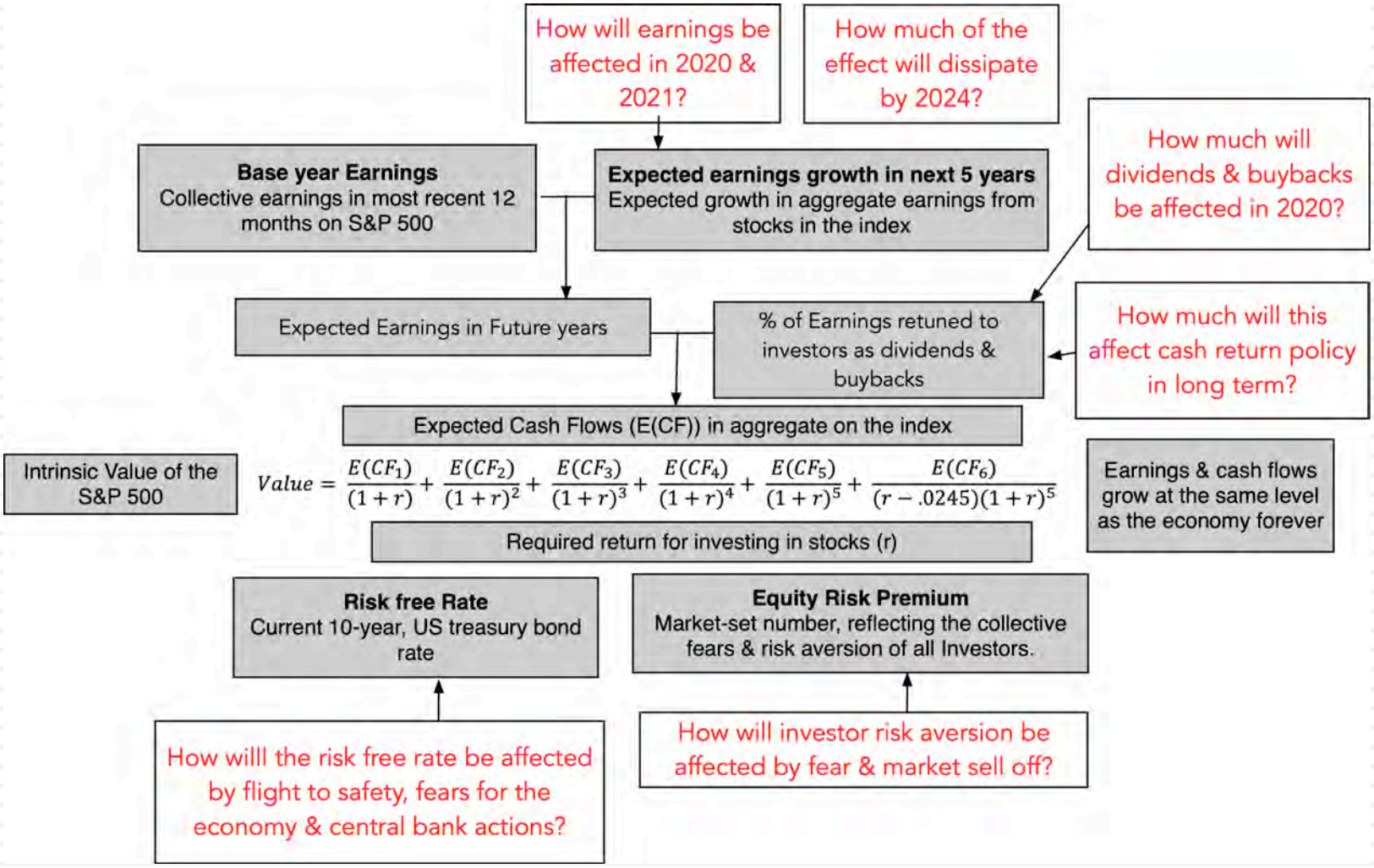
- Disconnect from economic news: For some, the skepticism comes from the disconnect with macroeconomic numbers that are abysmal, as unemployment claims climb into the tens of millions and consumer confidence hovers around historic lows. I will spend the first part of this section arguing that this reflects a fundamental misunderstanding of what markets try to do, and a misreading of history.
- In denial? For others, the question is whether markets are adequately reflecting the potential for long term damage to earnings and cash flows, as well as the cost of defaults, from this crisis. Since that answer to that question lies in the eyes of the beholder, I will provide a framework for converting your fears and hopes into numbers and a value for the market.

Explaining the disconnect…



Correlation of Stock Return with % Change in GDP	
Real GDP in Quarter	*Correlation*
Real GDP in quarter	-0.0396
Real GDP - 1 Qtr Lead	0.0803
Real GDP - 2 Qtr Lead	0.2305
Real GDP - 3 Qtr Lead	0.2859
Real GDP - 4 Qtr Lead	0.2817

Value Drivers for the Index



1. Earnings

Ed Yardeni (6/1/20)	
Year	Earnings on Index
2019	163
2020	120
2021	150

Analyst Consensus (6/1/20)	
Year	Earnings on Index
2019	162.97
2020	125.79
2021	164.04

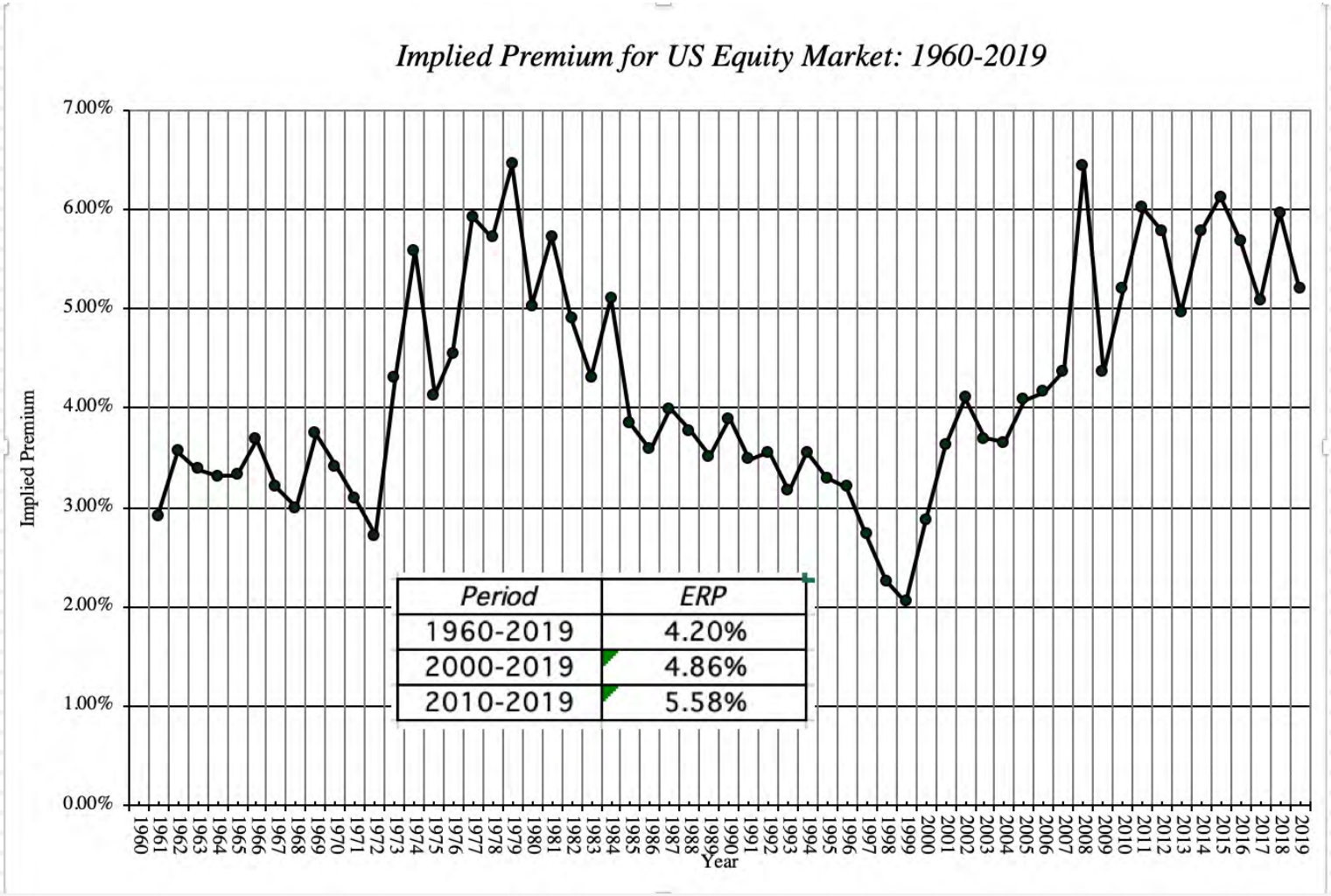
Thomson Reuters (6/1/20)	
Year	Earnings on Index
2019	162.93
2020	125.22
2021	163.67

Market Strategists Forecasts for S&P 500 Earnings in 2020		
Firm	*Strategist*	*2020 EPS Estimate*
Bank of America Merrill Lynch	Savita Subramanian	$115.00
Barclays	Maneesh Deshpande	$119.00
BMO	Brian Belski	Suspended
BTIG	Julian Emanuel	$127.00
Canaccord Genuity	Tony Dwyer	$128.00
CFRA	Sam Stovall	$162.37
Citigroup	Tobias Levkovich	$125.00
Credit Suisse	Jonathan Golub	$125.00
Deutsche Bank	Binky Chadha	$133.00
Goldman Sachs	David Kostin	$110.00
JPMorgan Chase	Dubravko Lakos-Bujas	$150.00
Morgan Stanley	Mike Wilson	$130.00
Oppenheimer	John Stoltzfus	Suspended
RBC	Lori Calvasina	$135.00
UBS	Francois Trahan	$140.00
Wells Fargo Investment Institute	Darrell Cronk	$115.00
	Average	**$129.60**
	Median	**$127.50**
	High	**$162.37**
	Low	**$110.00**

2. Cash Flows

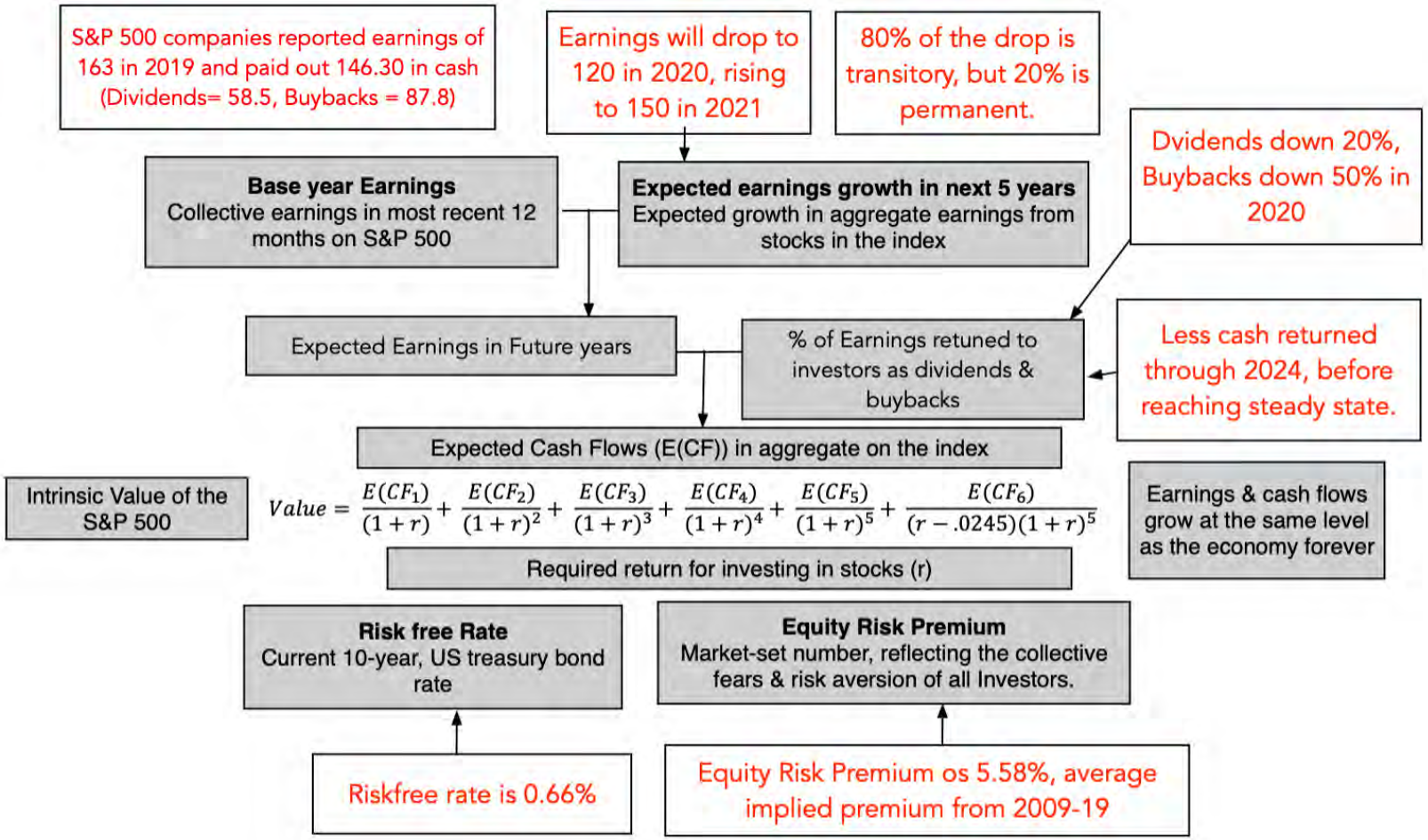
	S&P 500					
Year	Market value	Earnings	Dividends	Buybacks	Cash Returned as % of Earnings	Cash Returned as % of Market Cap
2001	1148.09	38.85	15.74	14.34	77.43%	2.62%
2002	879.82	46.04	15.96	13.87	64.78%	3.39%
2003	1111.91	54.69	17.88	13.70	57.74%	2.84%
2004	1211.92	67.68	19.01	21.59	59.99%	3.35%
2005	1248.29	76.45	22.34	38.82	80.01%	4.90%
2006	1418.30	87.72	25.04	48.12	83.40%	5.16%
2007	1468.36	82.54	28.14	67.22	115.53%	6.49%
2008	903.25	49.51	28.45	39.07	136.37%	7.47%
2009	1115.00	56.86	21.97	15.46	65.82%	3.36%
2010	1257.64	83.77	22.65	32.88	66.28%	4.42%
2011	1257.60	96.44	26.53	44.75	73.91%	5.67%
2012	1426.19	96.82	31.25	44.65	78.39%	5.32%
2013	1848.36	104.92	34.90	53.23	84.00%	4.77%
2014	2058.90	116.16	39.55	62.44	87.79%	4.95%
2015	2043.94	100.48	43.41	64.94	107.83%	5.30%
2016	2238.82	106.26	45.70	62.32	101.66%	4.82%
2017	2673.61	124.51	48.93	60.85	88.17%	4.11%
2018	2506.85	152.78	54.39	96.11	98.51%	6.00%
2019	3230.78	163.00	58.50	87.81	89.76%	4.53%
				Median	83.40%	4.82%
				High	136.37%	7.47%
				Low	57.74%	2.84%

3. Equity Risk Pricing



Period	ERP
1960-2019	4.20%
2000-2019	4.86%
2010-2019	5.58%

My Story for the Market



My Valuation of the Index: June 1, 2020

Earnings drop to 120 in 2020, rise to 150 in 2021 & recover 80% of the loss by 2024

Dividends drop by 20% & buybacks by 50% in 2020, and cash returned lower through 2024

Earnings and Cash Return: Pre- versus Post-Corona Estimates						
	Pre-Corona		*Post-Corona*		*Corona Effect*	
Year	*Earnings*	*Cash Return*	*Earnings*	*Cash Return*	*Earnings*	*Cash Return*
2020	169.18	153.93	120.00	90.71	-29.07%	-41.07%
2021	175.59	161.93	150.00	121.01	-14.57%	-25.27%
2022	182.24	170.32	160.83	137.93	-11.75%	-19.02%
2023	189.15	179.11	172.45	156.66	-8.83%	-12.54%
2024	196.32	188.32	184.91	177.37	-5.81%	-5.81%
2025	197.62	189.56	186.13	178.54	-5.81%	-5.81%

Growth rate in perpetuity capped at 0.66%

Riskfree rate is T.Bond rate of 0.66%

.066%+5.58% = 6.24%

ERP stays at 5.58%, average from 2009-19

Intrinsic Value Estimate (based on your choice of ERP) based upon post-Corona numbers							
	Last 12 months	1	2	3	4	5	*Terminal Year*
Expected Earnings	$163.00	120.00	150.00	160.83	172.45	184.91	186.13
Expected cash payout (divi	89.75%	75.59%	80.67%	85.76%	90.84%	95.93%	95.93%
Expected Dividends + Buy	$146.30	$90.71	$121.01	$137.93	$156.66	$177.37	178.54
Expected Terminal Value =						$ 3,200.86	
Present Value =		$ 85.38	$ 107.21	$ 115.03	$ 122.98	$ 2,496.27	
Intrinsic Value of Index =		2926.87					
Intrinsic PE (with 2020 E)		24.39					
Intrinsic CAPE		25.69					

$$\frac{90.71}{(1.0624)}+\frac{121.01}{(1.0624)^2}+\frac{137.93}{(1.0624)^3}+\frac{156.66}{(1.0624)^4}+\frac{177.37}{(1.0624)^5}+\frac{177.37(1.0066)}{(.0624-.0066)(1.0624)^5}=2926.87$$

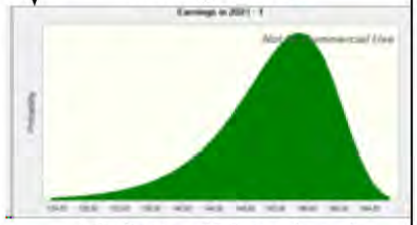
Facing up to uncertainty

Earnings in 2020

Likeliest = 127.5; Scale = 6

Correlation = 0.50

Earnings in 2021

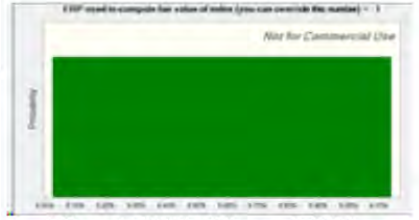


Likeliest = 155; Scale = 6

Correlation =-.25

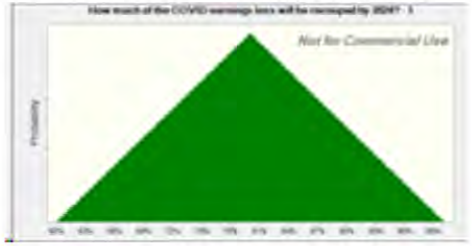
The lower earnings are in 2020, the higher the equity risk premium

Equity Risk Premium



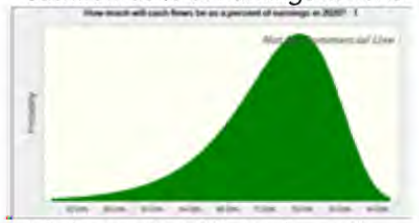
Min = 5.02%; Max = 6.14%

% of Lost Earnings recouped by 2024



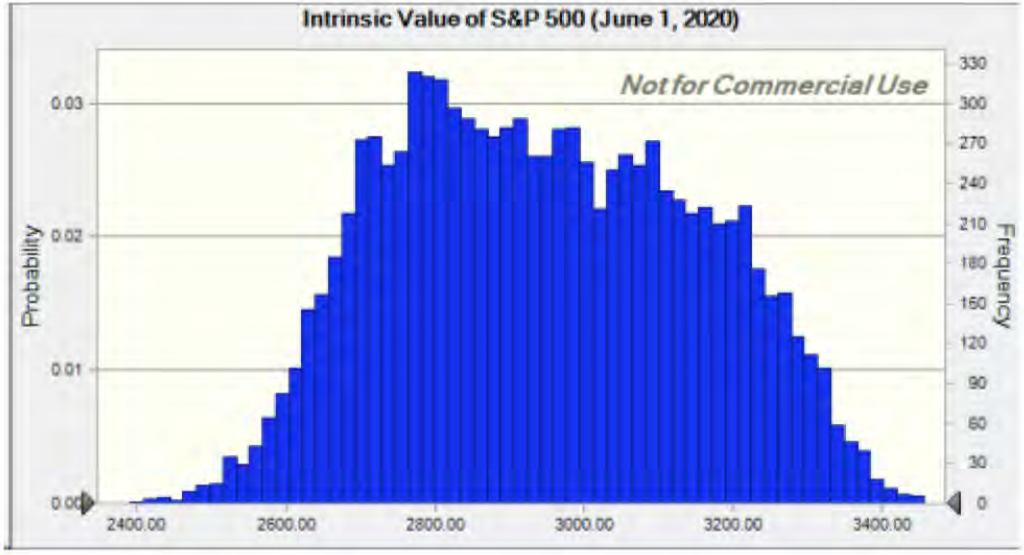
Min = 60%; Max = 100%

Cashflow as % of Earnings in 2020



Likeliest = 75.59%; Scale = 6%

Percentile	Forecast values
0%	2277.04
10%	2685.17
20%	2752.07
30%	2809.79
40%	2870.31
50%	2932.91
60%	2999.98
70%	3072.14
80%	3144.45
90%	3226.31
100%	3455.33



Valuation after COVID: Individual Companies

Keep it simple!

Risk Adjusted Value: Three Basic Propositions

- The value of a risky asset can be estimated by discounting the expected cash flows on the asset over its life at a risk-adjusted discount rate:

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

1. *The IT Proposition*: If "it" does not affect the cash flows or alter risk (thus changing discount rates), "it" cannot affect value.
2. *The DUH Proposition*: For an asset to have value, the expected cash flows have to be positive some time over the life of the asset.
3. *The DON'T FREAK OUT Proposition*: 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.

During a crisis, 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.

Discount Rates

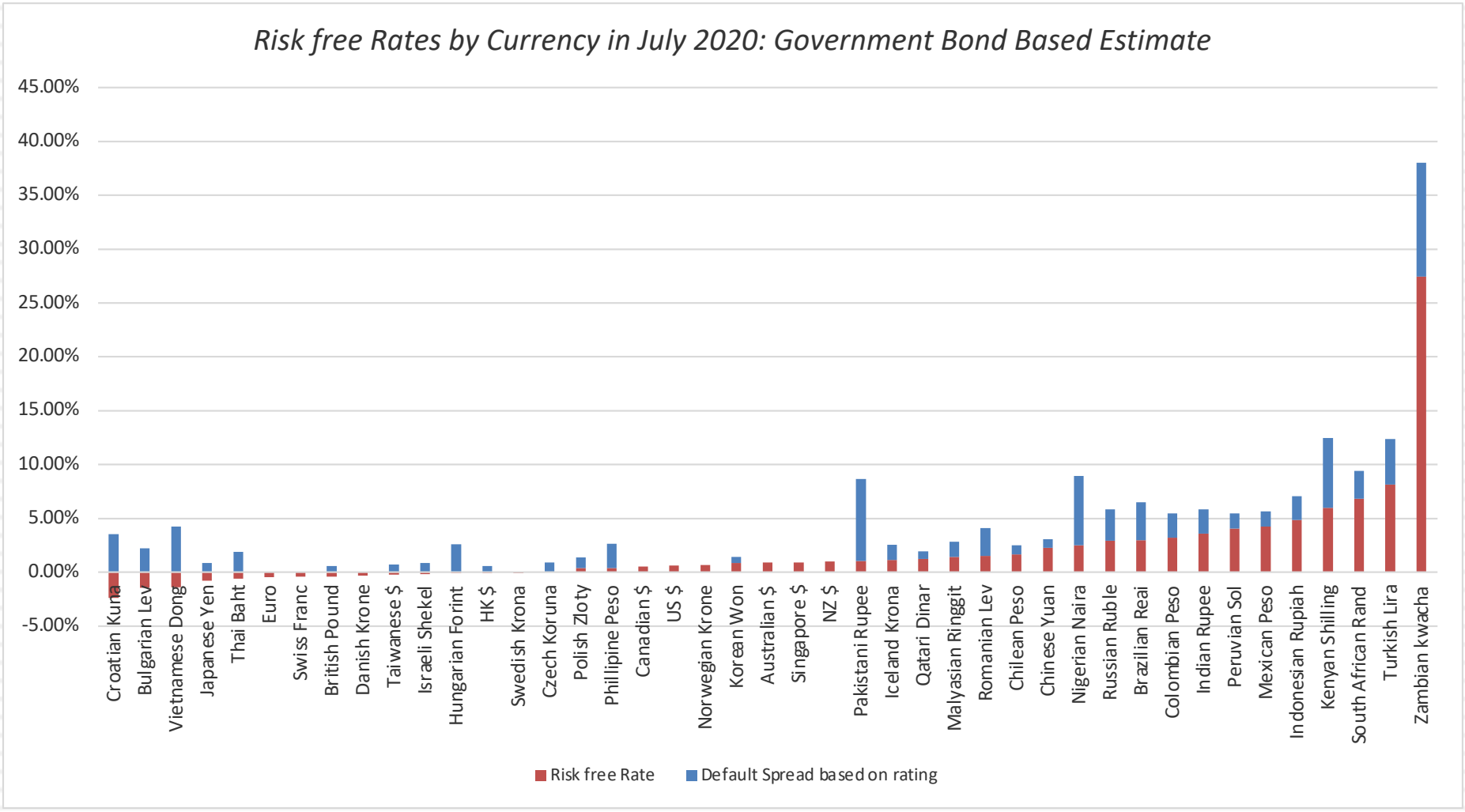
Expectation of cash flows across all scenarios, good and bad. Incorporates all risks that affect the asset / business.

$$\frac{\text{Expected Cash Flows}}{\text{Risk Adjusted Discount Rate}}$$

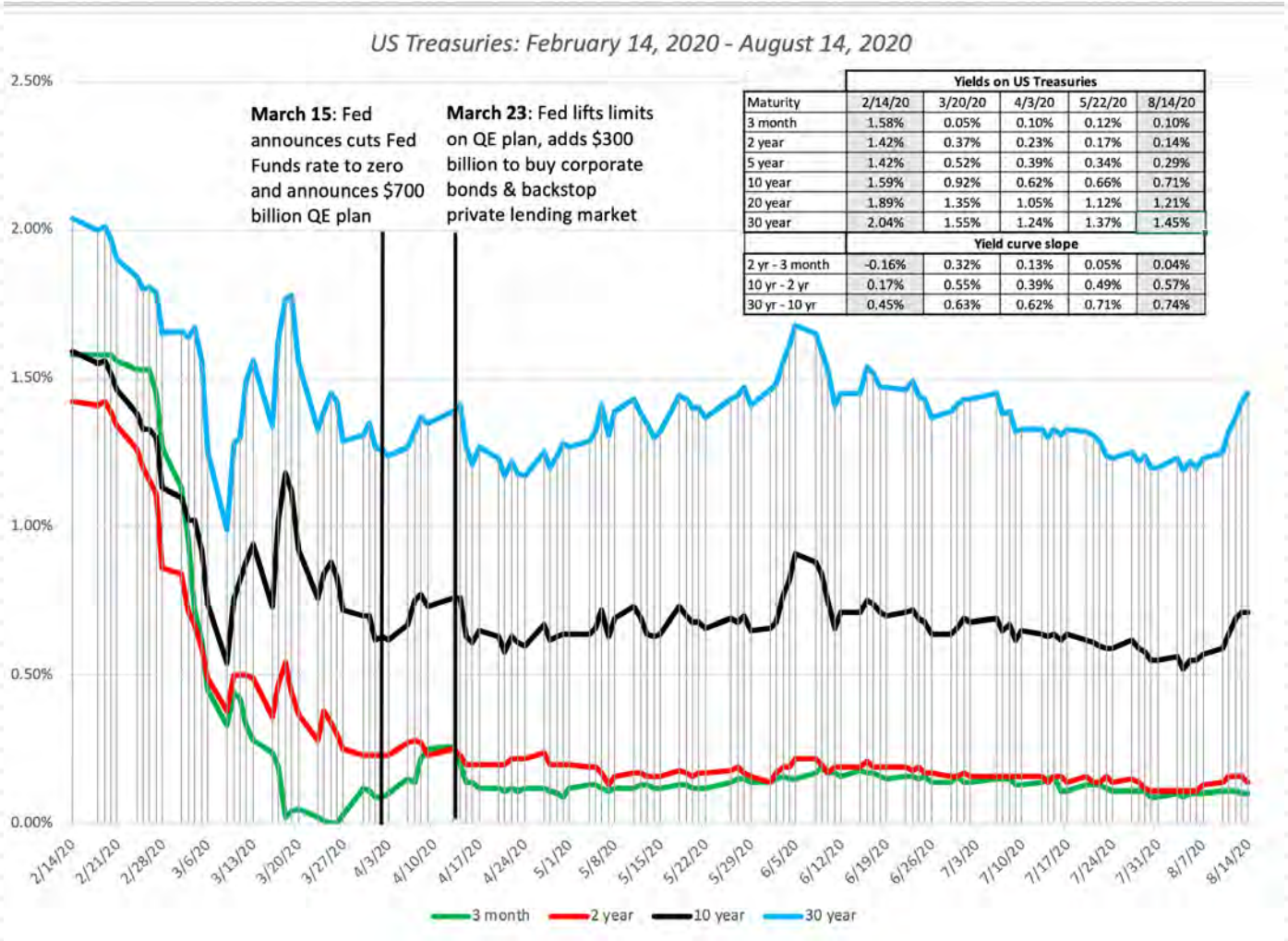
Discount rate should reflect the risk perceived by the marginal investor in the company

Risk Adjusted Cost of equity	=	Risk free rate in the currency of analysis	+	Relative risk of company/equity in questiion	X	Equity Risk Premium required for average risk equity

Risk free rates will vary across currencies!



And across time… especially in a crisis



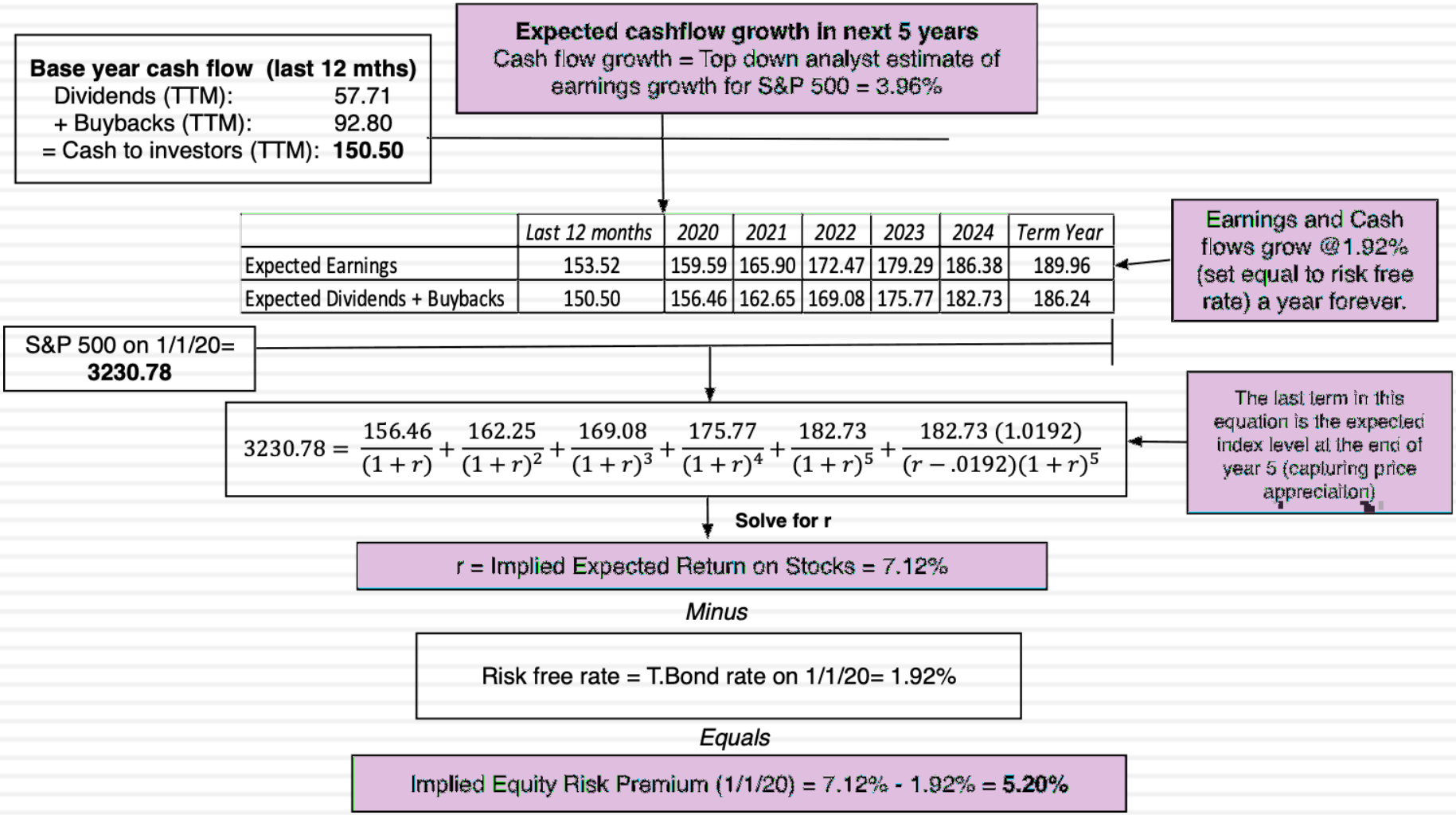
	Yields on US Treasuries				
Maturity	2/14/20	3/20/20	4/3/20	5/22/20	8/14/20
3 month	1.58%	0.05%	0.10%	0.12%	0.10%
2 year	1.42%	0.37%	0.23%	0.17%	0.14%
5 year	1.42%	0.52%	0.39%	0.34%	0.29%
10 year	1.59%	0.92%	0.62%	0.66%	0.71%
20 year	1.89%	1.35%	1.05%	1.12%	1.21%
30 year	2.04%	1.55%	1.24%	1.37%	1.45%
	Yield curve slope				
2 yr - 3 month	-0.16%	0.32%	0.13%	0.05%	0.04%
10 yr - 2 yr	0.17%	0.55%	0.39%	0.49%	0.57%
30 yr - 10 yr	0.45%	0.63%	0.62%	0.71%	0.74%

Equity Risk Premiums cannot be backward looking..

	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2019	8.18%	6.43%	6.35%	4.83%
Std Error	2.08%	2.20%		
1970-2019	7.26%	4.50%	5.93%	3.52%
Std Error	2.38%	2.73%		
2010-2019	13.51%	9.67%	12.93%	9.31%
Std Error	3.85%	4.87%		

- If you are going to use a historical risk premium, make it
  - Long term (because of the standard error)
  - Consistent with your risk free rate
  - A "compounded" average
- No matter which estimate you use, recognize that it is backward looking, is noisy and may reflect selection bias

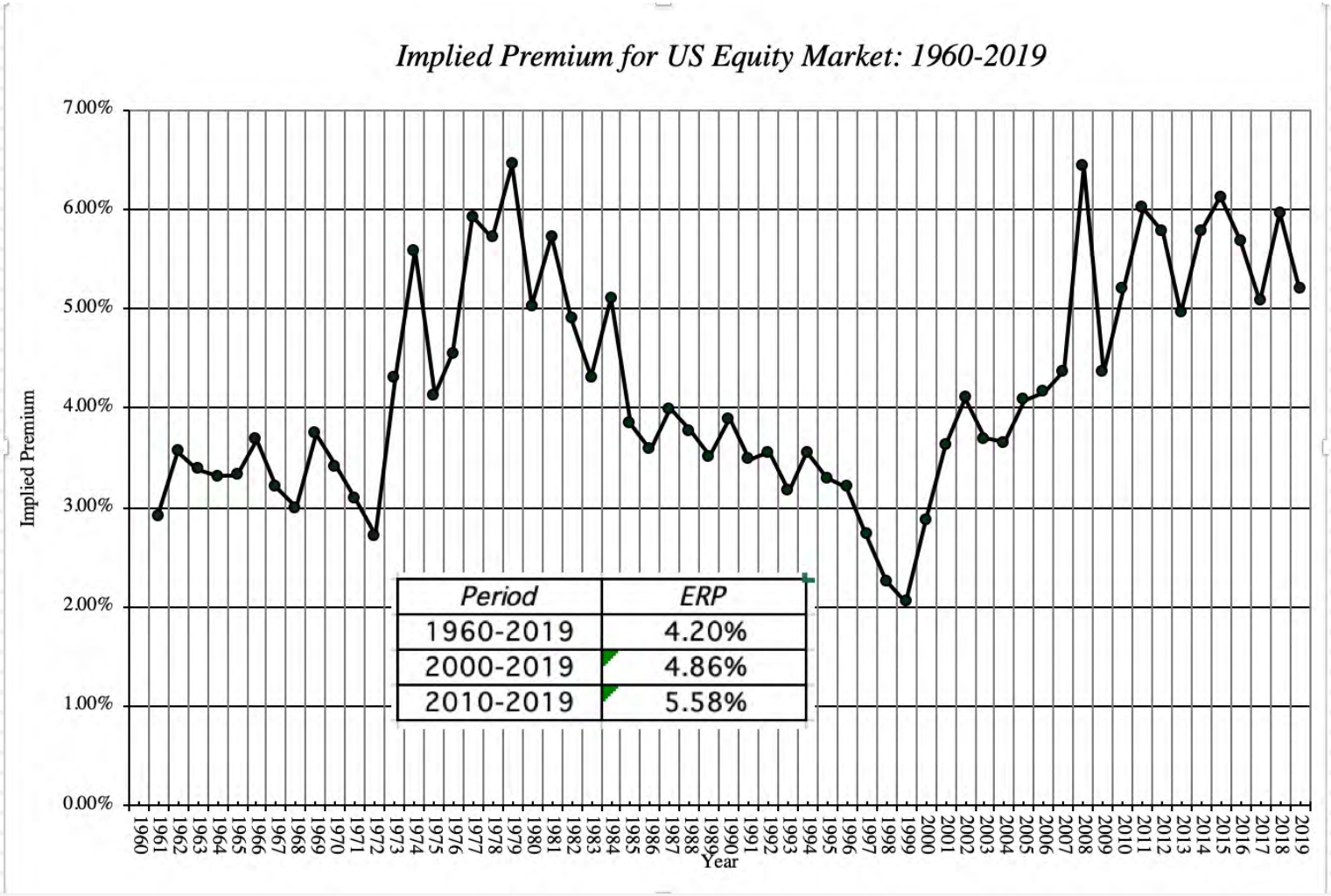
But forward looking...



	Last 12 months	2020	2021	2022	2023	2024	Term Year
Expected Earnings	153.52	159.59	165.90	172.47	179.29	186.38	189.96
Expected Dividends + Buybacks	150.50	156.46	162.65	169.08	175.77	182.73	186.24

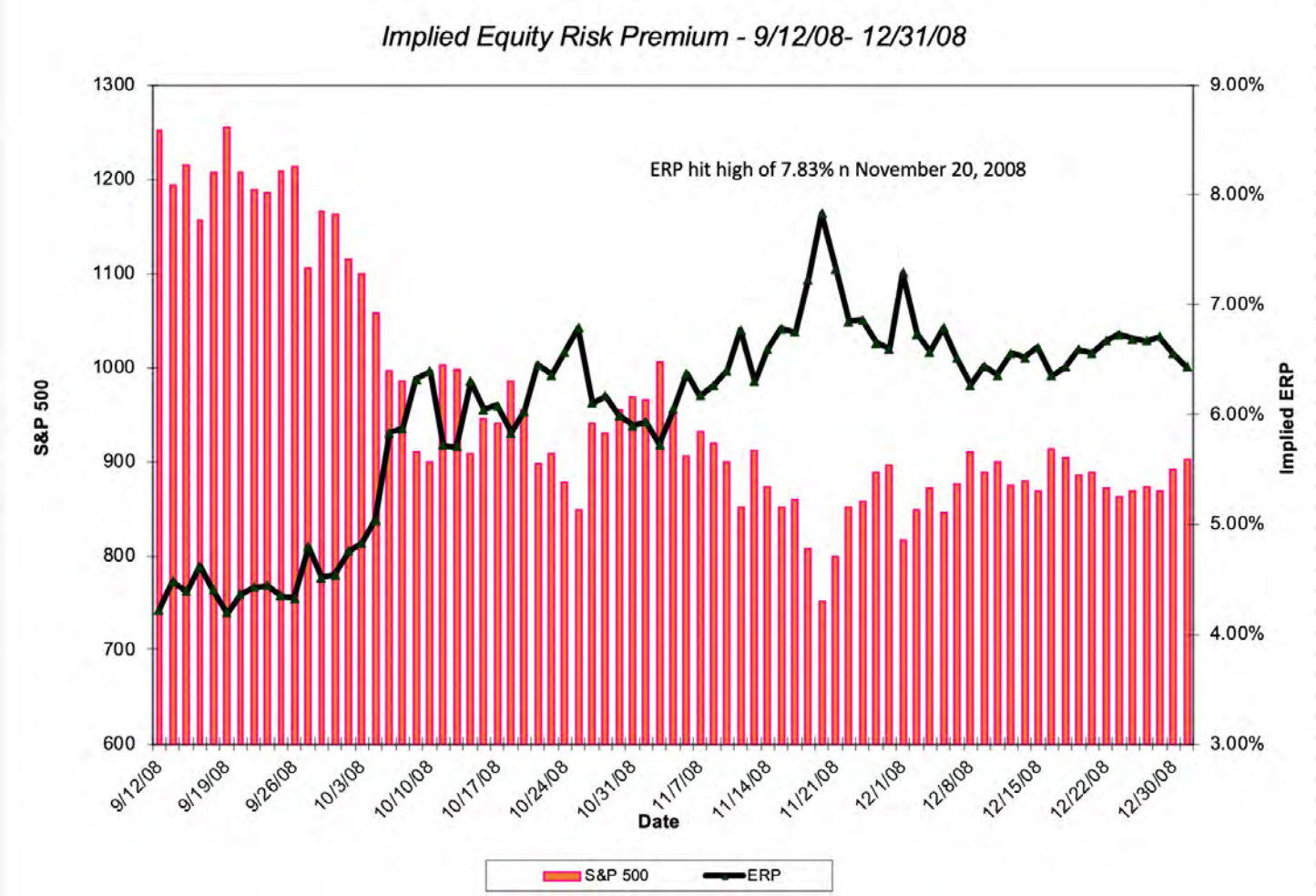
$$3230.78 = \frac{156.46}{(1+r)} + \frac{162.25}{(1+r)^2} + \frac{169.08}{(1+r)^3} + \frac{175.77}{(1+r)^4} + \frac{182.73}{(1+r)^5} + \frac{182.73\,(1.0192)}{(r-.0192)(1+r)^5}$$

Implied ERP for the S&P 500: History

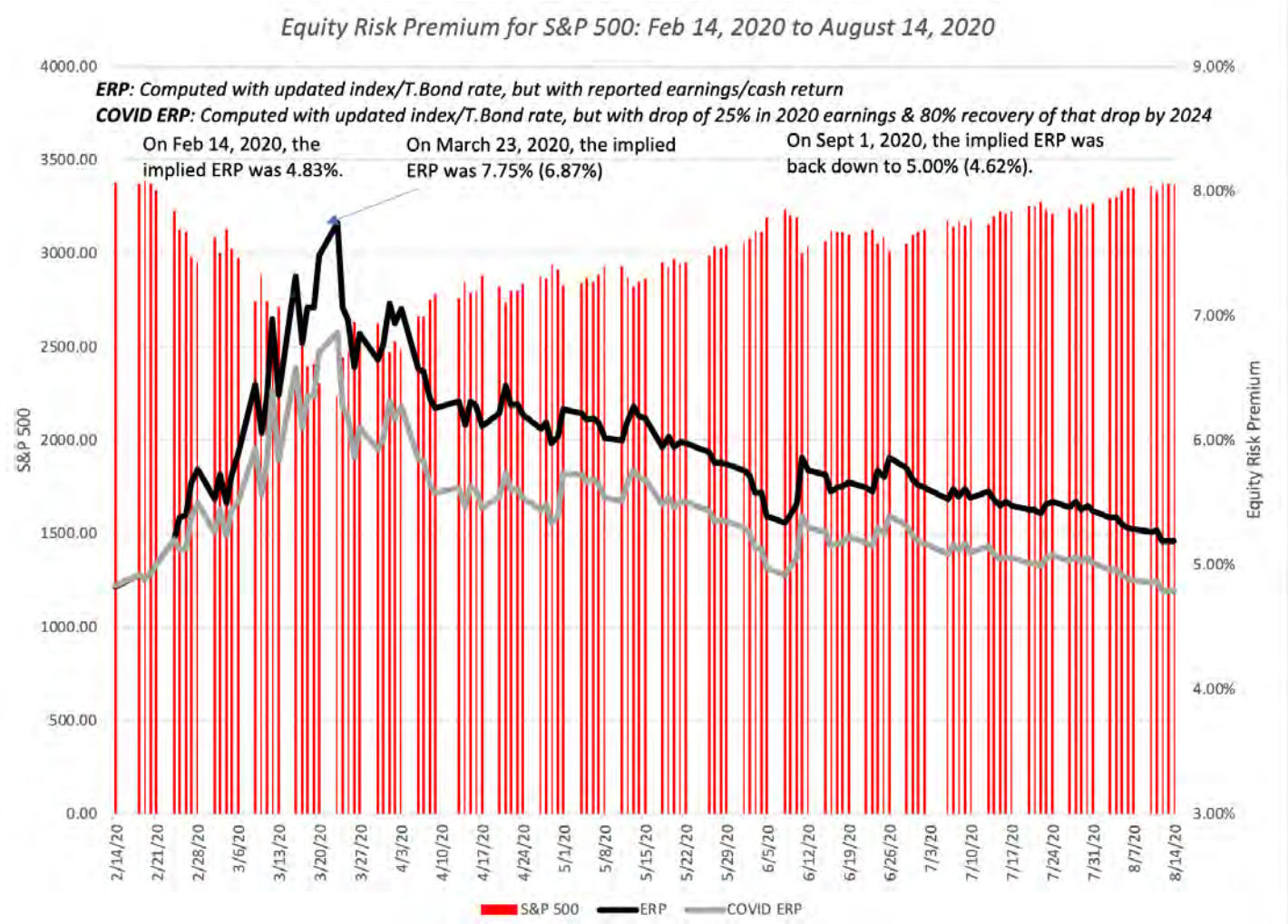


Period	ERP
1960-2019	4.20%
2000-2019	4.86%
2010-2019	5.58%

The Price of Risk: The 2008 Crisis



The Price of Risk: The COVID crisis



ERP : July 1, 2020

Andorra	7.08%	9.49%	8.03%	Italy	7.37%	10.04%	8.46%
Austria	5.59%	6.74%	5.81%	Jersey	5.89%	7.30%	6.12%
Belgium	5.80%	7.12%	6.12%	Liechtenstein	5.20%	6.01%	5.23%
Cyprus	8.16%	11.51%	9.64%	Luxembourg	5.20%	6.01%	5.23%
Denmark	5.20%	6.01%	5.23%	Malta	6.04%	7.56%	6.48%
Finland	5.59%	6.74%	5.81%	Netherlands	5.20%	6.01%	5.23%
France	5.69%	6.92%	5.96%	Norway	5.20%	6.01%	5.23%
Germany	5.20%	6.01%	5.23%	Portugal	7.37%	10.04%	8.46%
Greece	9.64%	14.25%	11.84%	Spain	6.77%	8.93%	7.58%
Guernsey	6.77%	8.93%	6.12%	Sweden	5.20%	6.01%	5.23%
Iceland	6.04%	7.56%	6.48%	Switzerland	5.20%	6.01%	5.23%
Ireland	6.04%	7.56%	6.48%	Turkey	9.64%	14.25%	11.84%
Isle of Man	5.69%	6.92%	5.96%	United Kingdom	5.69%	6.92%	5.96%

Canada	5.20%	6.01%	5.23%
United States	5.20%	6.01%	5.23%

Argentina	14.08%	27.97%	22.86%
Belize	11.62%	17.91%	16.25%
Bolivia	8.75%	14.25%	11.84%
Brazil	8.16%	11.51%	9.64%
Chile	5.89%	7.30%	6.26%
Colombia	7.08%	9.49%	8.03%
Costa Rica	9.64%	16.08%	13.32%
Ecuador	11.62%	24.30%	19.92%
El Salvador	11.62%	17.91%	14.79%
Guatemala	7.66%	10.58%	8.90%
Honduras	9.64%	14.25%	11.84%
Mexico	6.38%	8.21%	7.58%
Nicaragua	10.63%	17.91%	14.79%
Panama	6.77%	8.93%	7.58%
Paraguay	7.66%	10.58%	8.90%
Peru	6.38%	8.21%	6.99%
Suriname	10.63%	16.08%	14.79%
Uruguay	7.08%	9.49%	8.03%
Venezuela	22.89%	29.46%	27.14%

Country	*1/20*	*4/20*	*7/20*
Angola	11.62%	17.91%	14.79%
Benin	10.63%	16.08%	13.32%
Botswana	6.04%	7.56%	6.48%
Burkina Faso	10.63%	16.08%	13.32%
Cameroon	10.63%	16.08%	13.32%
Cape Verde	10.63%	16.08%	13.32%
Congo (DR)	12.59%	19.73%	16.25%
Congo (Rep)	14.08%	22.49%	18.46%
Côte d'Ivoire	8.75%	12.60%	10.52%
Egypt	10.63%	16.08%	13.32%
Ethiopia	9.64%	14.25%	13.32%
Gabon	12.59%	19.73%	16.25%
Ghana	11.62%	17.91%	14.79%
Kenya	10.63%	16.08%	13.32%
Mali	11.62%	17.91%	14.79%
Morocco	7.66%	10.58%	8.90%
Mozambique	14.08%	22.49%	18.46%
Namibia	8.16%	11.51%	9.64%
Niger	11.62%	17.91%	14.79%
Nigeria	10.63%	16.08%	13.32%
Rwanda	10.63%	16.08%	13.32%
Senegal	8.75%	12.60%	10.52%
South Africa	7.37%	10.58%	8.90%
Swaziland	10.63%	16.08%	13.32%
Tanzania	9.64%	14.25%	11.84%
Togo	11.62%	17.91%	14.79%
Tunisia	10.63%	16.08%	13.32%
Uganda	10.63%	16.08%	13.32%
Zambia	14.08%	27.97%	22.86%

Albania	9.64%	14.25%	11.84%
Armenia	8.75%	12.60%	10.52%
Azerbaijan	8.16%	11.51%	9.64%
Belarus	11.62%	17.91%	14.79%
Bosnia and Herzegovina	11.62%	17.91%	14.79%
Bulgaria	7.08%	9.49%	8.03%
Croatia	8.16%	11.51%	9.64%
Czech Republic	5.80%	7.12%	6.12%
Estonia	5.89%	7.30%	6.26%
Georgia	8.16%	11.51%	9.64%
Hungary	7.37%	10.04%	8.46%
Kazakhstan	7.37%	10.04%	8.46%
Kyrgyzstan	10.63%	16.08%	13.32%
Latvia	6.38%	8.21%	6.99%
Lithuania	6.38%	8.21%	6.99%
Macedonia	8.75%	12.60%	10.52%
Moldova	11.62%	17.91%	14.79%
Montenegro	9.64%	14.25%	11.84%
Poland	6.04%	7.56%	6.48%
Romania	7.37%	10.04%	8.46%
Russia	7.37%	10.04%	8.46%
Serbia	8.75%	12.60%	10.52%
Slovakia	6.04%	7.56%	6.48%
Slovenia	6.77%	8.93%	7.58%
Tajikistan	11.62%	17.91%	14.79%
Ukraine	12.59%	19.73%	14.79%
Uzbekistan	9.64%	14.25%	11.84%

Abu Dhabi	5.69%	6.92%	5.96%
Bahrain	10.63%	16.08%	13.32%
Iraq	12.59%	19.73%	16.25%
Israel	5.89%	7.30%	6.26%
Jordan	9.64%	14.25%	11.84%
Kuwait	5.69%	6.92%	5.96%
Lebanon	14.08%	27.97%	22.86%
Oman	7.66%	11.51%	10.52%
Qatar	5.80%	7.12%	6.12%
Ras Al Khaimah (Emirate of)	12.59%	19.73%	6.48%
Saudi Arabia	5.89%	7.30%	6.26%
Sharjah	6.38%	9.49%	8.03%
United Arab Emirates	5.69%	6.92%	5.96%

Region	*Weighted Average: ERP*
Africa	12.42%
Asia	6.78%
Australia & New Zealand	5.23%
Caribbean	13.37%
Central and South America	10.70%
Eastern Europe & Russia	8.42%
Middle East	7.70%
North America	5.23%
Western Europe	6.44%
Global	6.76%

Country	*PRS*	*1-Jan*	*1-Apr*	*1-Jul*
Algeria	55	11.62%	17.91%	22.86%
Brunei	80	5.59%	6.74%	6.48%
Gambia	63.5	11.62%	17.91%	14.79%
Guinea	54	15.06%	24.30%	22.86%
Guinea-Bissau	62	11.62%	17.91%	16.25%
Guyana	65	11.62%	17.91%	13.32%
Haiti	54.5	14.08%	22.49%	22.86%
Iran	58.5	11.62%	17.91%	18.46%
Korea, D.P.R.	50.3	17.03%	27.97%	22.86%
Liberia	53.5	21.71%	31.93%	22.86%
Libya	58.3	8.16%	11.51%	18.46%
Madagascar	63	10.63%	16.08%	14.79%
Malawi	57.8	11.62%	17.91%	18.46%
Myanmar	62.8	11.62%	17.91%	14.79%
Sierra Leone	59	15.06%	24.30%	18.46%
Somalia	50.5	17.03%	27.97%	22.86%
Sudan	36.3	21.71%	31.93%	27.14%
Syria	53.8	17.03%	27.97%	22.86%
Yemen, Republic	50	17.03%	27.97%	27.14%
Zimbabwe	51.3	17.03%	27.97%	22.86%

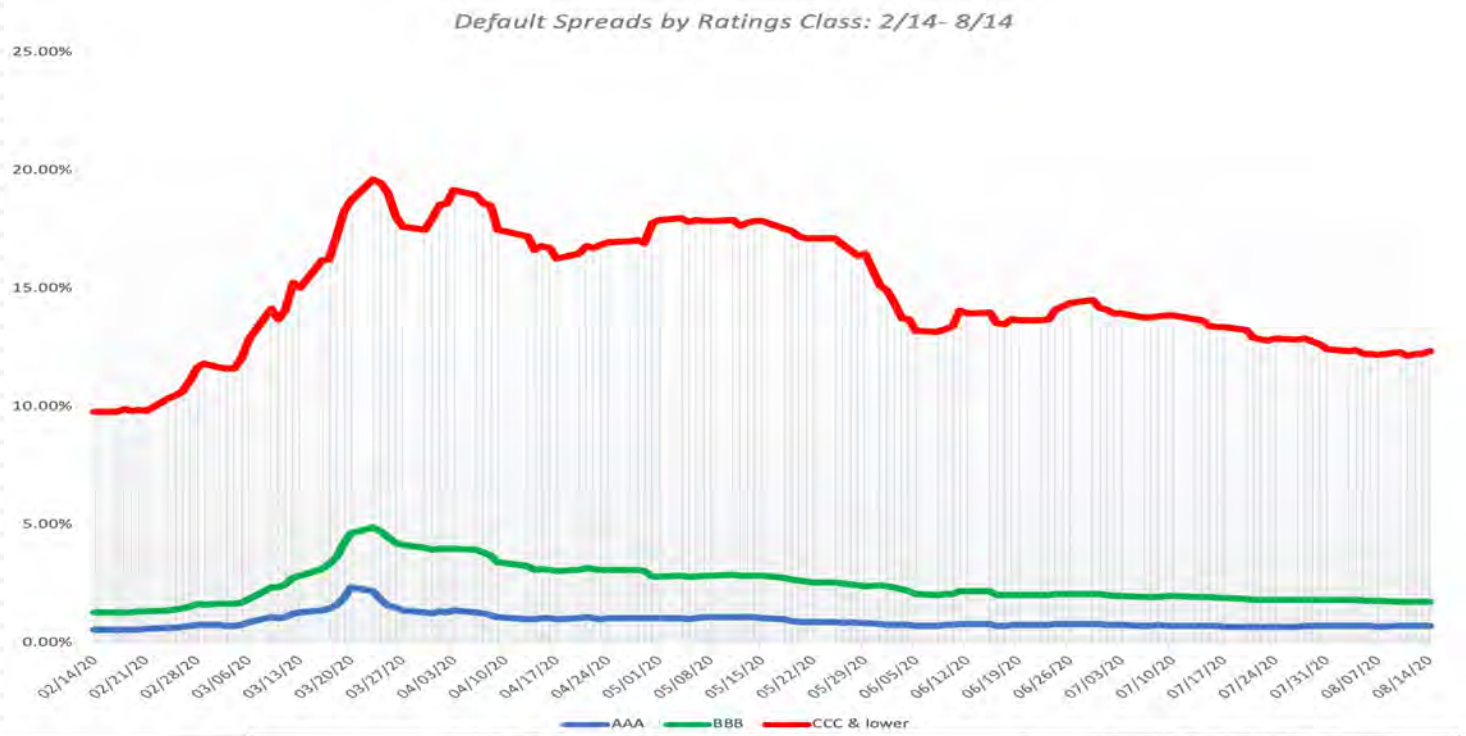
Bangladesh	8.75%	12.60%	10.52%
Cambodia	10.63%	16.08%	13.32%
China	5.89%	7.30%	6.26%
Fiji	8.75%	12.60%	10.52%
Hong Kong	5.69%	7.12%	6.12%
India	7.08%	9.49%	8.46%
Indonesia	7.08%	9.49%	8.03%
Japan	5.89%	7.30%	6.26%
Korea	5.69%	6.92%	5.96%
Laos	NA	8.21%	6.99%
Macao	5.80%	7.12%	6.12%
Malaysia	6.38%	8.21%	6.99%
Maldives	10.63%	16.08%	14.79%
Mauritius	6.77%	8.93%	7.58%
Mongolia	11.62%	17.91%	14.79%
Pakistan	11.62%	17.91%	14.79%
Papua New Guinea	10.63%	16.08%	13.32%
Philippines	7.08%	9.49%	8.03%
Singapore	5.20%	6.01%	5.23%
Solomon Islands	11.62%	17.91%	14.79%
Sri Lanka	10.63%	16.08%	13.32%
Taiwan	5.80%	7.12%	6.12%
Thailand	6.77%	8.93%	7.58%
Vietnam	8.75%	12.60%	10.52%

Australia	5.20%	6.01%	5.23%
Cook Islands	9.64%	14.25%	11.84%
New Zealand	5.20%	6.01%	5.23%

Aswath Damodaran

Blue: ERP on 7/1/20
Red: ERP on 4/1/20
Green: ERP on 1/1/20

And Default Spreads will be on the move

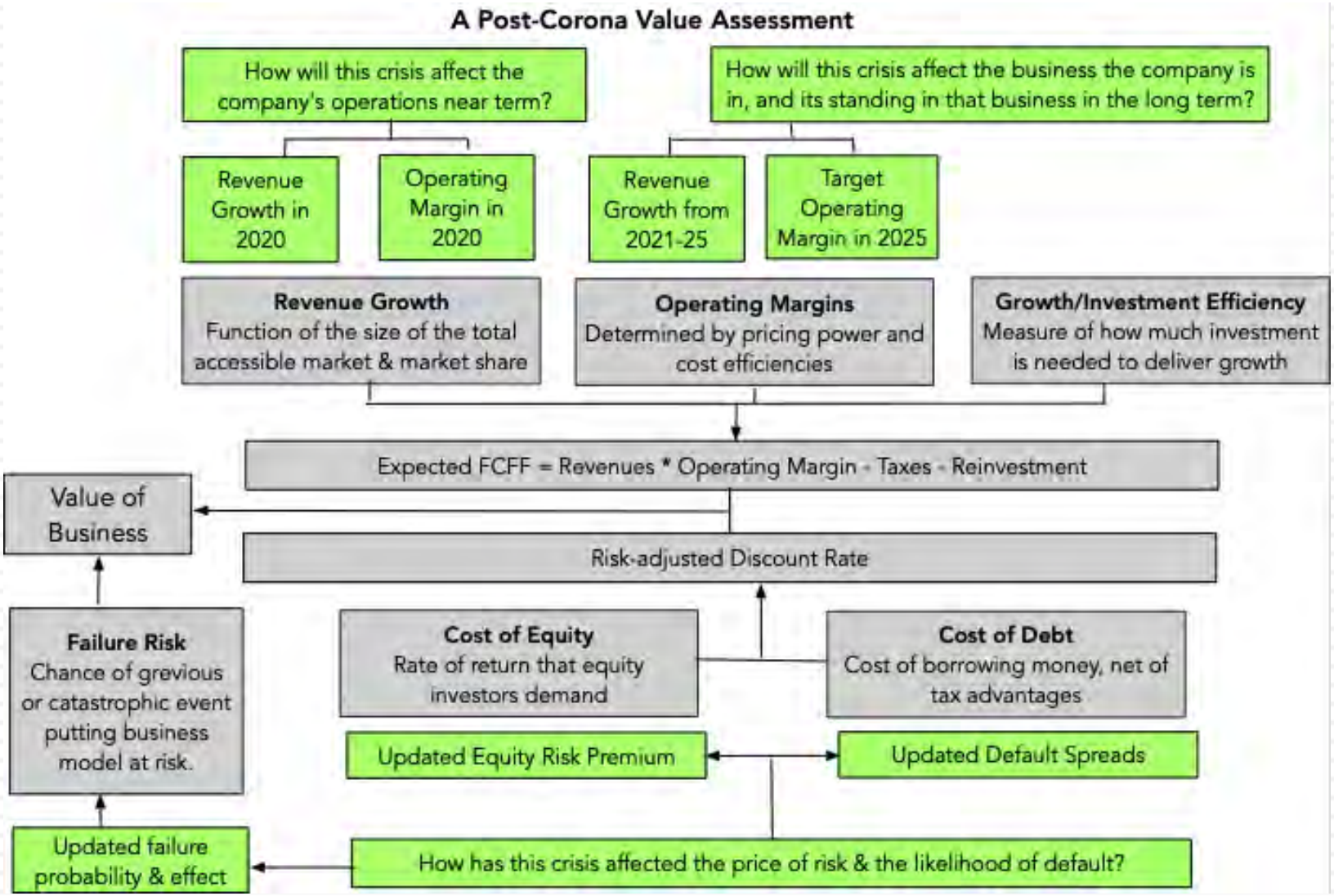


	Yields and Spreads on Corporates						Change in default spread		
	Spread over 10-yr Treasury			*Yield on Corporate*			*2/14-3/20*	*3/20-8/14*	2/14 -8/14
S&P Bond Rating	2/14/20	3/20/20	8/14/20	2/14/20	3/20/20	8/14/20			
AAA	0.69%	1.43%	0.74%	2.28%	2.35%	1.45%	0.74%	-0.69%	0.05%
AA	0.72%	2.64%	0.76%	2.31%	3.56%	1.47%	1.92%	-1.88%	0.04%
A	0.80%	3.15%	0.91%	2.39%	4.07%	1.62%	2.35%	-2.24%	0.11%
BBB	1.33%	3.73%	1.68%	2.92%	4.65%	2.39%	2.40%	-2.05%	0.35%
BB	1.93%	7.45%	3.42%	3.52%	8.37%	4.13%	5.52%	-4.03%	1.49%
B	3.40%	10.74%	5.11%	4.99%	11.66%	5.82%	7.34%	-5.63%	1.71%
CCC or lower	9.65%	17.81%	11.89%	11.24%	18.73%	12.60%	8.16%	-5.92%	2.24%

Cash Flows and Growth Rates

- The standard practice in much of valuation is to take base year numbers for your inputs (revenues, margins, reinvestment) from the most recent year and project each one based upon historical data.
- While this is always bad practice and works only for a small subset of mature companies, it will completely break down during a crisis, for two reasons:
  - The crisis will wreak havoc on near-term earnings and cashflows.
  - The crisis can change the business environment and the pathway (story) for the future.

Valuation: A Post-Corona Version



Tesla

The Payoff to Flexibility — *Jul-20*

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. As the crisis handicaps its more indebted, slower moving competitors, Tesla will consolidate its hold on the electric car market and push its production towards 2.5 million cars by 2030, it will also be able to deliver higher margins than conventional auto companies in steady state, using software sales to compliment auto sales. The drop in risk free rates has reduced its cost of capital and the chance of failure. Tesla's more flexibile investment policies will allow it to be more efficient in generating growth. While other revenue sources (green energy, driverless cars in ride sharing) will supplement revenues, it will remain at its core an electric car

The Assumptions

	Base year	*Years 1-5*	*Years 6-10*		*After year 10*	*Link to story*
Revenues (a)	$ 26,022	33.00%	→ 0.67%		0.67%	Growth in EV market & Tesla's early mover advantage work in its favor.
Operating margin (b)	4.07%	4.07%	→ 10.25%		10.25%	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 =	6.70%	Capacity build up allows for less reinvestment in the near years.
Return on capital	3.90%	Marginal ROIC =	26.47%		10.00%	Cost of entry will limit competition.
Cost of capital (d)		6.04%	→ 6.00%		6.00%	Moves to median company cost of capital

The Cash Flows

	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$ 34,609	5.31%	$ 1,836	$ 1,377	$ 2,862	$ (1,485)
2	$ 46,030	6.54%	$ 3,011	$ 2,258	$ 3,807	$ (1,549)
3	$ 61,220	7.78%	$ 4,762	$ 3,571	$ 5,063	$ (1,492)
4	$ 81,423	9.01%	$ 7,339	$ 5,505	$ 6,734	$ (1,230)
5	$ 108,293	10.25%	$ 11,100	$ 8,325	$ 8,957	$ (632)
6	$ 137,027	10.25%	$ 14,045	$ 10,534	$ 14,367	$ (3,833)
7	$ 164,526	10.25%	$ 16,864	$ 12,648	$ 13,749	$ (1,101)
8	$ 186,904	10.25%	$ 19,158	$ 14,368	$ 11,189	$ 3,179
9	$ 200,242	10.25%	$ 20,525	$ 15,394	$ 6,669	$ 8,725
10	$ 201,583	10.25%	$ 20,662	$ 15,497	$ 671	$ 14,826
Terminal year	$ 202,934	10.25%	$ 20,801	$ 15,601	$ 1,045	$ 14,555

The Value

Terminal value	$ 273,083		
PV(Terminal value)	$ 152,086		
PV (CF over next 10 years)	$ 6,497		
Value of operating assets =	$ 158,583		
Adjustment for distress	$ 7,929	Probability of failure =	10.00%
- Debt & Mnority Interests	$ 15,200		
+ Cash & Other Non-operating assets	$ 8,080		
Value of equity	$ 143,534		
- Value of equity options	$ 31,546		
Number of shares	179.50		
Value per share	$ 623.89	Stock was trading at =	$1,366.00

Zoom						5/11/20

The Story

Zoom is poised to take advantage of an explosion in the online meeting/seminar market, as the crisis changes behavior for the long term on both fronts. While there will be multiple players in the markets, some with deep pockets (Cisco's Webex, Microsoft's team and Google's whatever), Zoom will grab a dominant market shares, both because of its first mover advantages and networking benefits. As it grows, it will benefit from economies of scale and its margins will converge on those of software companis collectively. Its cost of capital reflects its business services model, but since it is young and not fully formed, there remains a chance of failure.

The Assumptions

	Base year	*Years 1-5*	*Years 6-10*		*After year 10*	*Link to story*
Revenues (a)	$ 623	55.00%	→ 2.00%		2.00%	Growing online market + Mkt share
Operating margin (b)	9.70%	9.70%	→ 22.25%		22.25%	Software company margins
Tax rate	25.00%	25.00%	→ 25.00%		25.00%	Global/US marginal tax rate
Reinvestment (c)		Sales to capital ratio	2.25	RIR =	29.34%	Drop from current level + higher than industry
Return on capital	23.64%	Marginal ROIC =	51.27%		6.82%	Low capital intensity + High margin model
Cost of capital (d)		7.72%	→ 6.82%		6.82%	Close to average company's cost of capital

The Cash Flows

	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$ 965	12.21%	$ 118	$ 88	$ 152	$ (64)
2	$ 1,496	14.72%	$ 220	$ 165	$ 236	$ (71)
3	$ 2,319	17.23%	$ 400	$ 300	$ 366	$ (66)
4	$ 3,594	19.74%	$ 710	$ 532	$ 567	$ (35)
5	$ 5,571	22.25%	$ 1,240	$ 930	$ 879	$ 51
6	$ 8,045	22.25%	$ 1,790	$ 1,342	$ 1,099	$ 243
7	$ 10,764	22.25%	$ 2,395	$ 1,796	$ 1,208	$ 588
8	$ 13,261	22.25%	$ 2,951	$ 2,213	$ 1,110	$ 1,103
9	$ 14,932	22.25%	$ 3,322	$ 2,492	$ 743	$ 1,749
10	$ 15,230	22.25%	$ 3,389	$ 2,542	$ 133	$ 2,409
Terminal year	$ 15,535	22.25%	$ 3,457	$ 2,593	$ 761	$ 1,832

The Value

Terminal value	$ 38,036		
PV(Terminal value)	$ 18,541		
PV (CF over next 10 years)	$ 3,043		
Value of operating assets =	$ 21,583		
Adjustment for distress	$ 1,727	Probability of failure =	10.00%
- Debt & Mnority Interests	$ 119		
+ Cash & Other Non-operating assets	$ 855		
Value of equity	$ 20,593		
- Value of equity options	$ 1,121		
Number of shares	276.40		
Value per share	$ 70.45	Stock was trading at =	$146.48

Boeing						03/21/20
Slip, slipping away!						
In the face of the Covid-19 pandemic, the protracted impact on the airline industry, and the struggles in the past of the 737 Max, BA faces a tough path forward over the next 5 years. With the assumption that air travel will not return to its pre- Covid-19 levels for the next 4-6 quarters, BA will have negative growth. Furthermore, given BA's debt-heavy balance sheet, there will also be limited re-investment given that that paying down the debt is the priority. Thus, risk remains high						
The Assumptions						
	Base year	*Years 1-5*	*Years 6-10*		*After year 10*	*Link to story*
Revenues (a)	$ 76,559	-15.00% →	2.00%		2.00%	Continued slowing of growth
Operating margin (b)	-2.82%	-2.82% →	11.00%		11.00%	With pressure on margins
Tax rate	25.00%	25.00% →	25.00%		25.00%	& Convergence to global tax rate
Reinvestment (c)		Sales to capital ratio	0.00	RIR =	16.67%	Business stays capital intensive
Return on capital	-9.31%	Marginal ROIC =	121.07%		12.00%	But competitive advantages fade
Cost of capital (d)		7.40% →	7.00%		7.00%	As cost of capital stays low
The Cash Flows						
	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$ 65,075	-5.00%	$ (3,254)	$ (3,254)	$ -	$ (3,254)
2	$ 60,195	4.09%	$ 2,462	$ 2,462	$ (1,952)	$ 4,414
3	$ 72,233	7.54%	$ 5,450	$ 4,434	$ 2,866	$ 1,568
4	$ 86,680	11.00%	$ 9,535	$ 7,151	$ 3,440	$ 3,711
5	$ 95,348	11.00%	$ 10,488	$ 7,866	$ 2,064	$ 5,802
6	$ 103,357	11.00%	$ 11,369	$ 8,527	$ 1,907	$ 6,620
7	$ 110,386	11.00%	$ 12,142	$ 9,107	$ 1,673	$ 7,433
8	$ 116,126	11.00%	$ 12,774	$ 9,580	$ 1,367	$ 8,214
9	$ 120,306	11.00%	$ 13,234	$ 9,925	$ 995	$ 8,930
10	$ 122,712	11.00%	$ 13,498	$ 10,124	$ 573	$ 9,551
Terminal year	$ 125,167	11.00%	$ 13,768	$ 10,326	$ 1,721	$ 8,605
The Value						
Terminal value			$ 172,104			
PV(Terminal value)			$ 85,215			
PV (CF over next 10 years)			$ 31,867			
Value of operating assets =			$ 117,082			
Adjustment for distress			$ 8,781		Probability of failure =	15.00%
- Debt & Mnority Interests			$ 28,371			
+ Cash & Other Non-operating assets			$ 10,886			
Value of equity			$ 90,816			
- Value of equity options			$ 153			
Number of shares			564.20			
Value per share			$ 160.69		Stock was trading at =	$132.40

Company	Base Year Numbers	Valuation Story	Valuation Inputs	Value per Share (Simulation)			Pricing per share	
Facebook	Revenues = $75 B	**User Base pays off**: Immense & Intense user base allows for continued ad growth & new business potential.	Rev Growth = 10%	10th:	$	267.77		
	EBIT = $27.9 B		Target Margin = 40%	25th:	$	293.89	Price =	$262.59
	Oper. margin =44.3%		Sales to capital = 2.64	Median:	$	327.68	Under/Over =	Under valued
	Rev Growth (LTM) = 13.02%		Cost of capital = 6.08%	75th:	$	364.79	% under/over	-19.86%
				90th:	$	398.85	IRR	7.16%
Amazon	Revenues = $ 322 B	**Disruption Platform rolls on**: Continue to expand into new businesses, delaying profitability to deliver higher growth.	Rev Growth = 20%	10th:		$1,479.65		
	EBIT = $16.7 B		Target Margin = 12%	25th:	$	1,969.46	Price =	$3,260.48
	Oper. margin = 7.99%		Sales to capital = 1.94	Median:	$	2,778.22	Under/Over =	Over valued
	Rev Growth (LTM) = 31.58%		Cost of capital = 6.11%	75th:	$	3,617.74	% under/over	17.36%
				90th:	$	4,295.58	IRR	5.77%
Netflix	Revenues = $ 22.6 B	**Streaming Player**: Wiith new competitors, will continue to add subscribers, but struggle to control content costs.	Value/Existing Subscriber = $446.	10th:	$	312.79		
	# Subscribers = 192.3 mil		Growth in Subscribers = 12%	25th:	$	372.49	Price =	$484.53
	Growth in LTM = 27.3%		Growth in Content Costs = 5%	Median:	$	445.53	Under/Over =	Over valued
	Cost/New Subscriber = $103		Cost of capital (Existing)= 6.5%	75th:	$	519.34	% under/over	8.75%
	Content Cost = $9.95 B		Cost of capital (New) = 7.5%	90th:	$	585.58	IRR	6.16%
Google/ Alphabet	Revenues = $166 B	**More than a Search Engine:** While the search box will continue to be the money-maker, other bets will start to pay off in growth.	Rev Growth = 8%	10th:	$	1,165.57		
	EBIT = $33.4 B		Target Margin = 24%	25th:	$	1,267.31	Price =	$1,544.61
	Oper. margin = 23.8%		Sales to capital = 2.64	Median:	$	1,406.96	Under/Over =	Over valued
	Rev Growth (LTM) = 5.22%		Cost of capital = 6.25%	75th:	$	1,551.26	% under/over	9.78%
				90th:	$	1,676.02	IRR	5.87%
Apple	Revenues = $274 B	**Cash Machine revs up**: The iPhone will keep the cash machine going up, but services business will be growth driver.	Rev Growth = 8%	10th:	$	285.67		
	EBIT = $52.6 B		Target Margin = 26%	25th:	$	312.28	Price =	$462.83
	Oper. margin = 25.9%		Sales to capital =4.00	Median:	$	350.22	Under/Over =	Over valued
	Rev Growth (LTM) = 7.07%		Cost of capital = 6.58%	75th:	$	390.66	% under/over	32.15%
				90th:	$	425.04	IRR	5.30%
Microsoft	Revenues = $143 B	**Old company Reborn:** Cloud/software business mix will continue to deliver growth with high margins.	Rev Growth = 12%	10th:	$	143.98		
	EBIT = $52.6 B		Target Margin = 40%	25th:	$	157.81	Price =	$209.70
	Oper. margin =40.1%		Sales to capital = 1.44	Median:	$	176.66	Under/Over =	Over valued
	Rev Growth (LTM) = 13.65%		Cost of capital = 7.11%	75th:	$	196.77	% under/over	18.70%
				90th:	$	214.83	IRR	6.32%