CRISIS AS CRUCIBLE: COVID LESSONS LEARNED, UNLEARNED, AND RELEARNED

ASWATH DAMODARAN

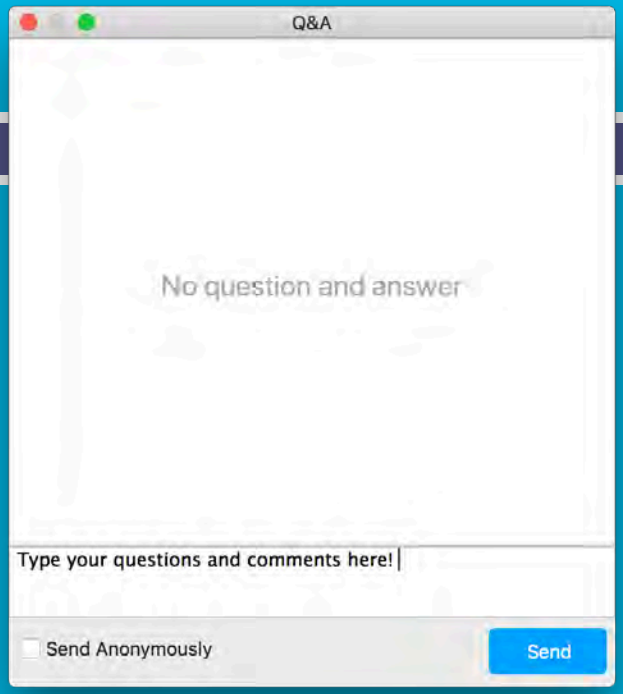
Kerschner Family Chair Professor of Finance,
Stern School of Business at New York University

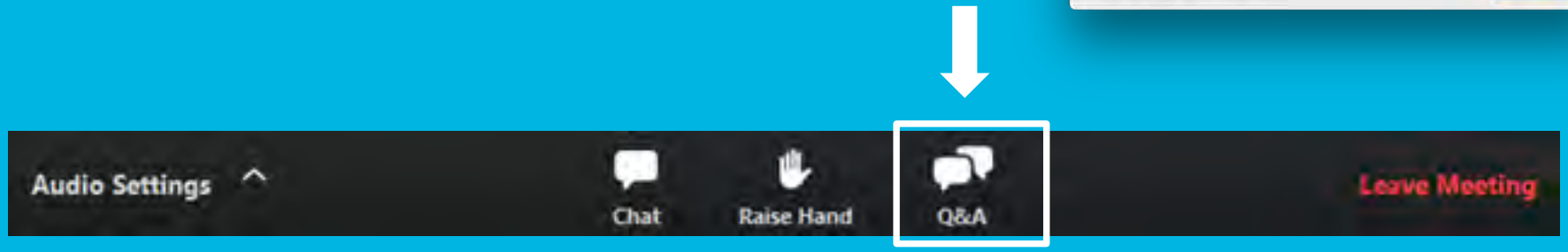
10 November 2020, 2:00–3:00 p.m. ET

Moderated by Kim Shannon, CFA,
Sionna Investment Managers

CFA Institute

Use **Q&A** to submit questions for the presenters





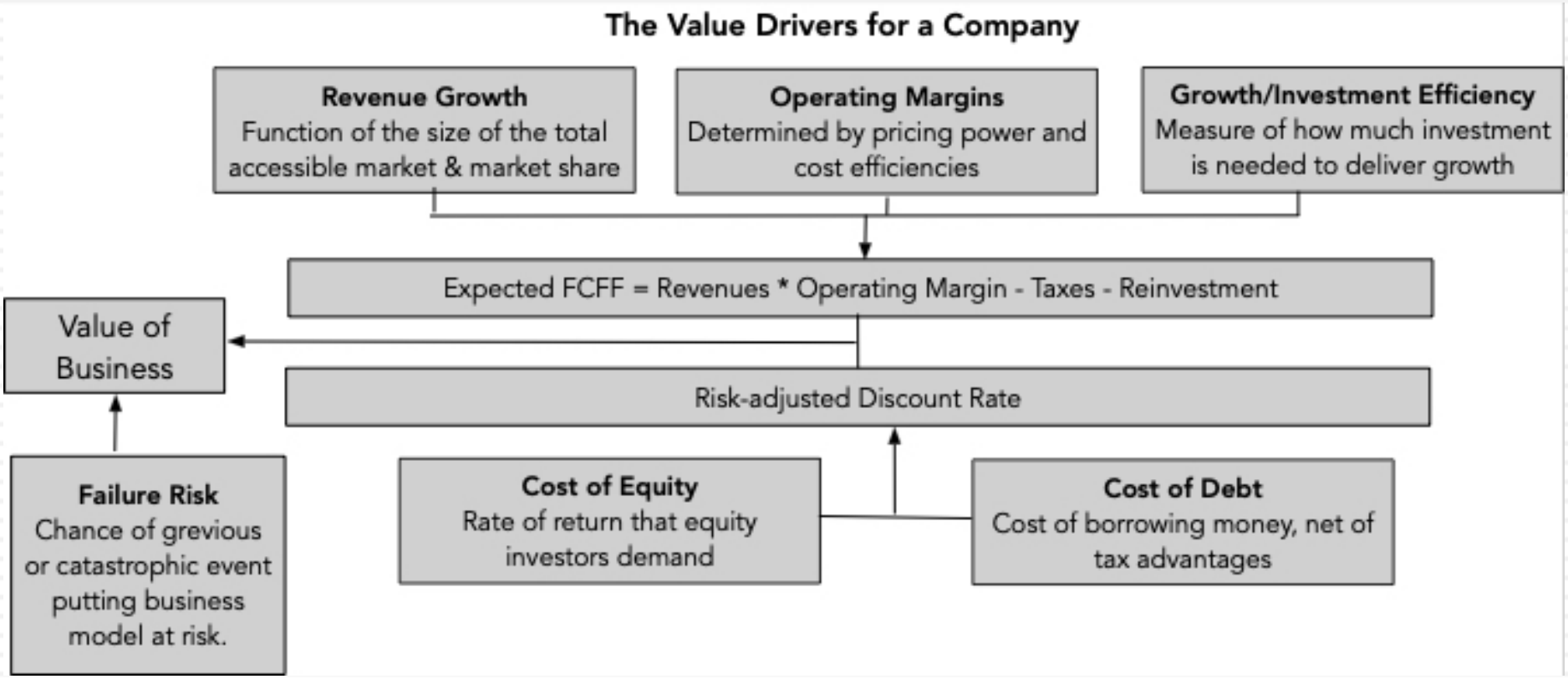
CRISIS AS A CRUCIBLE: LESSONS LEARNED, UNLEARNED & RELEARNED!

Investment Regrets and Disagreement

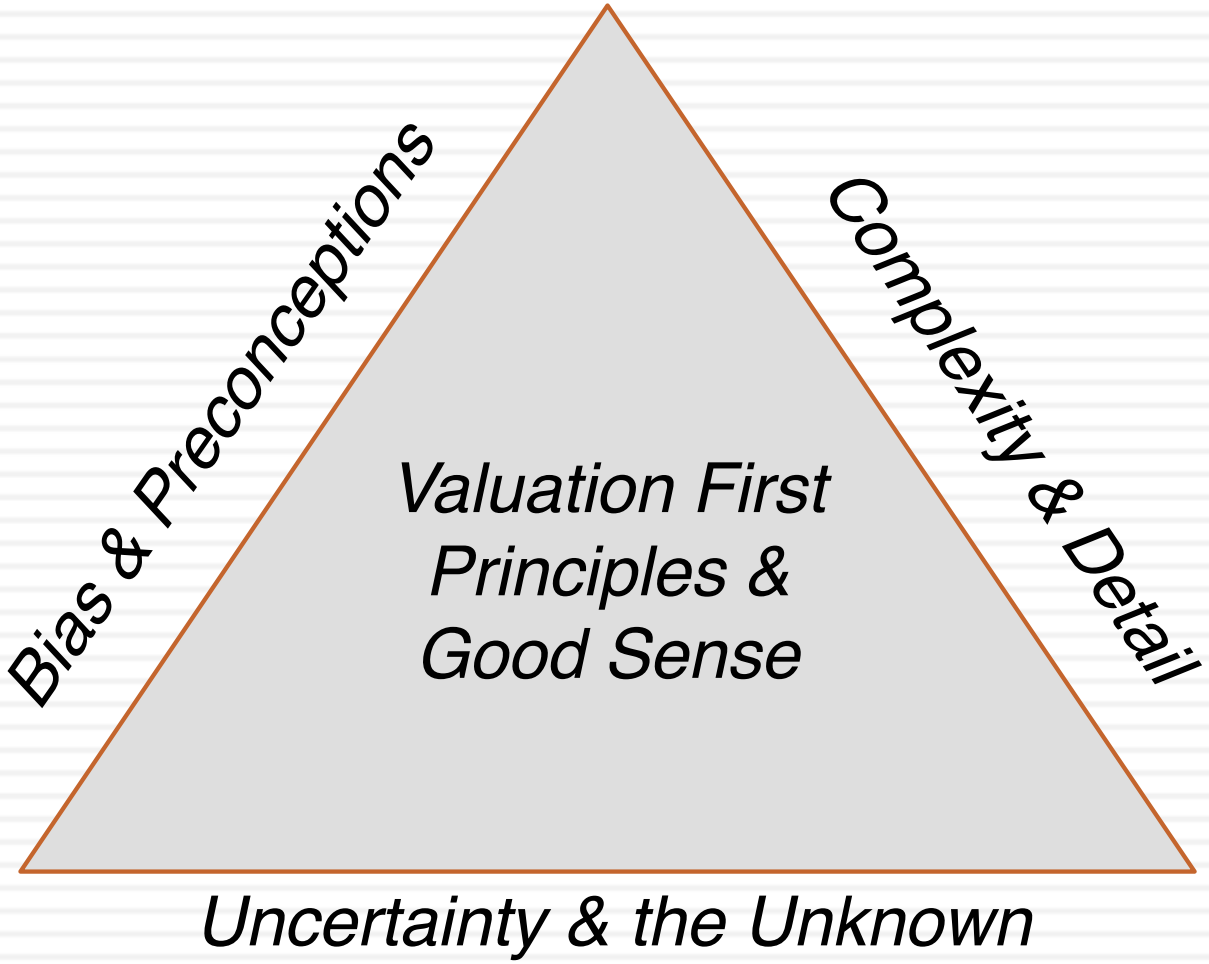
The Lead in

Valuation 101

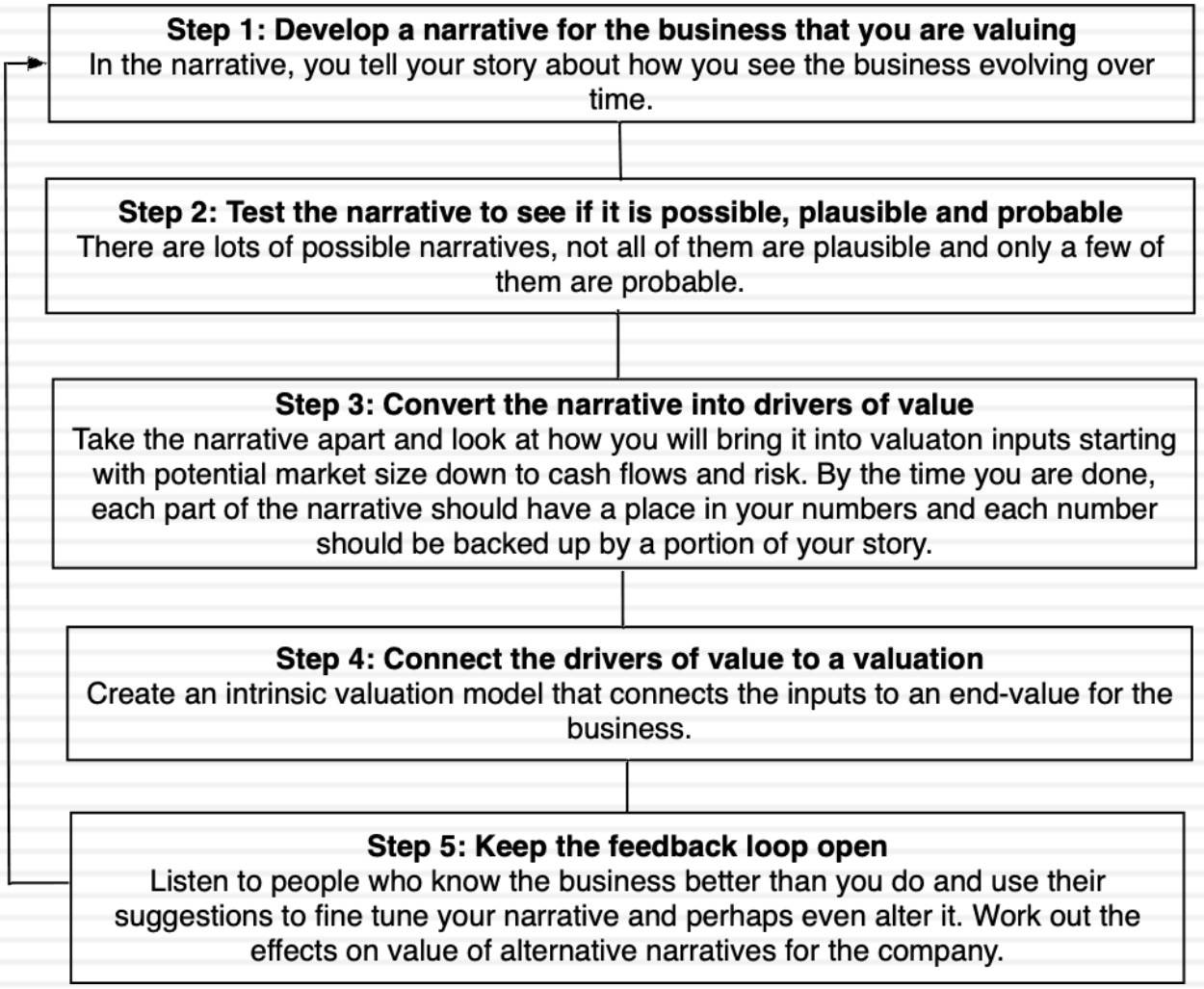
The Basics of Value



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, delivering $100 billion in revenues in year 10. In the face of stronger competition, Tesla's brand name and battery 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 & Minority 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

	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

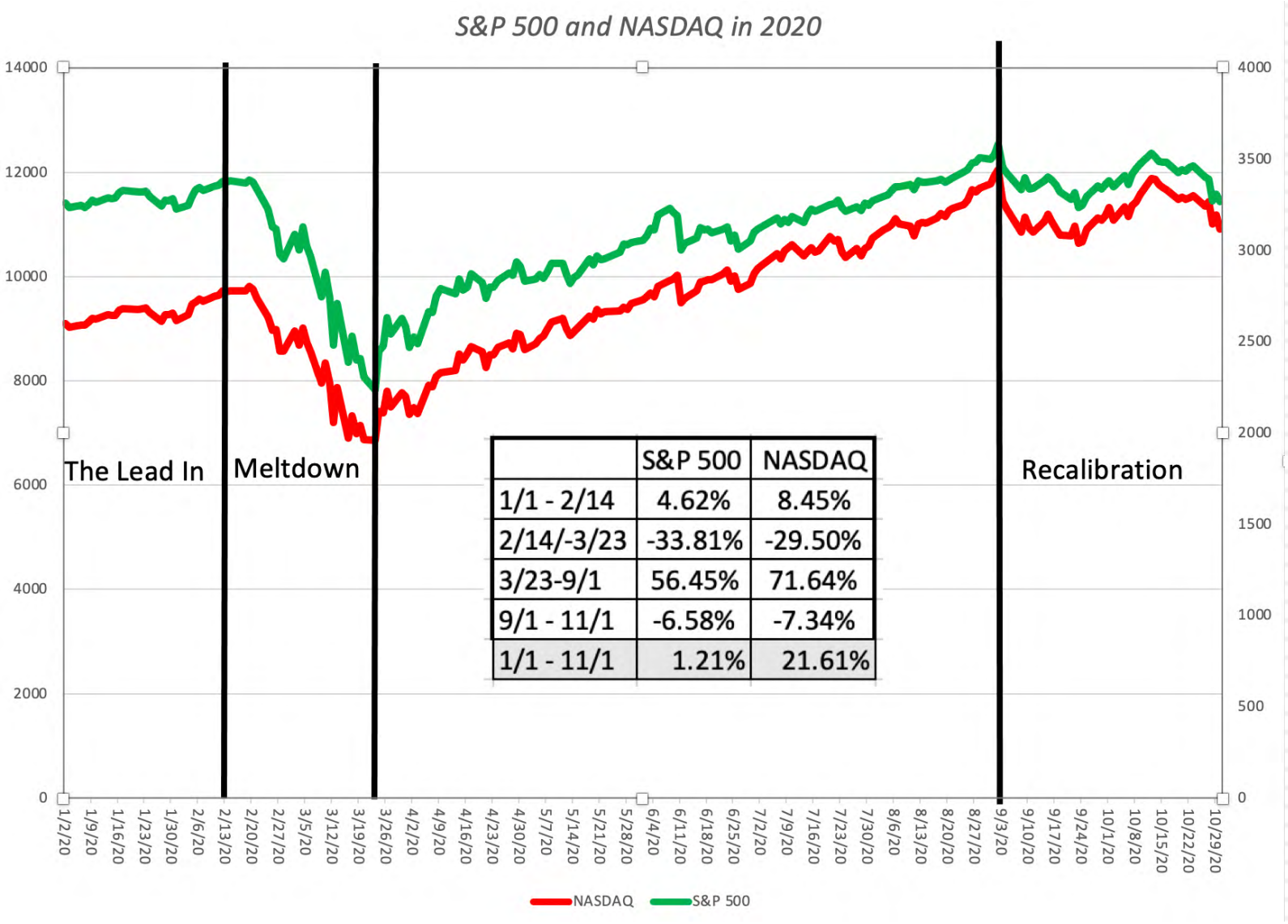
The Value

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 & Minority 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

A COVID Break

Crisis times?

The COVID Crisis: US Equities, from February 14 to November 1, 2020



	S&P 500	NASDAQ
1/1 - 2/14	4.62%	8.45%
2/14/-3/23	-33.81%	-29.50%
3/23-9/1	56.45%	71.64%
9/1 - 11/1	-6.58%	-7.34%
1/1 - 11/1	1.21%	21.61%

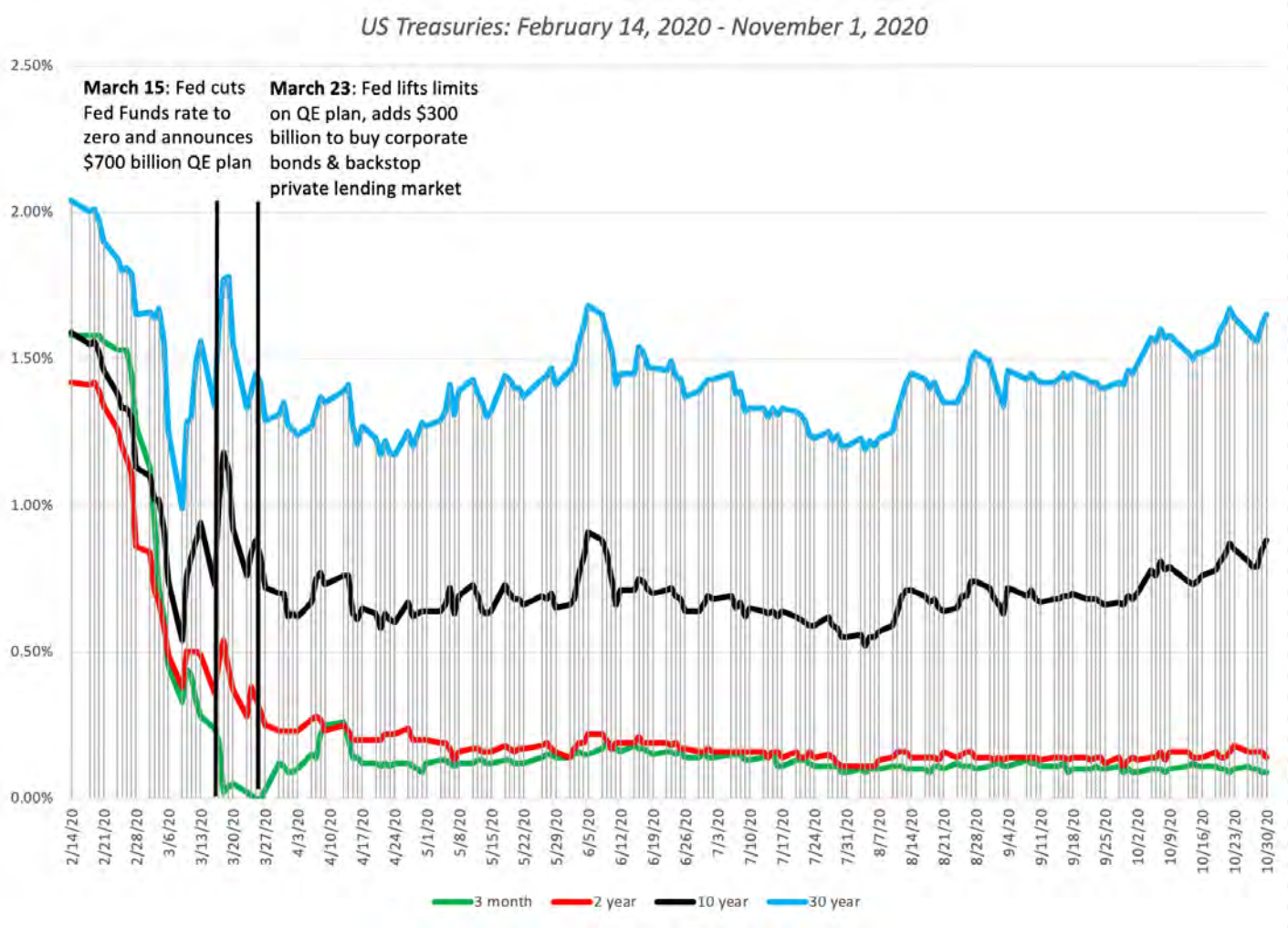
The Darkest Days: Damage assessment on March 20, 2020

				% 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%

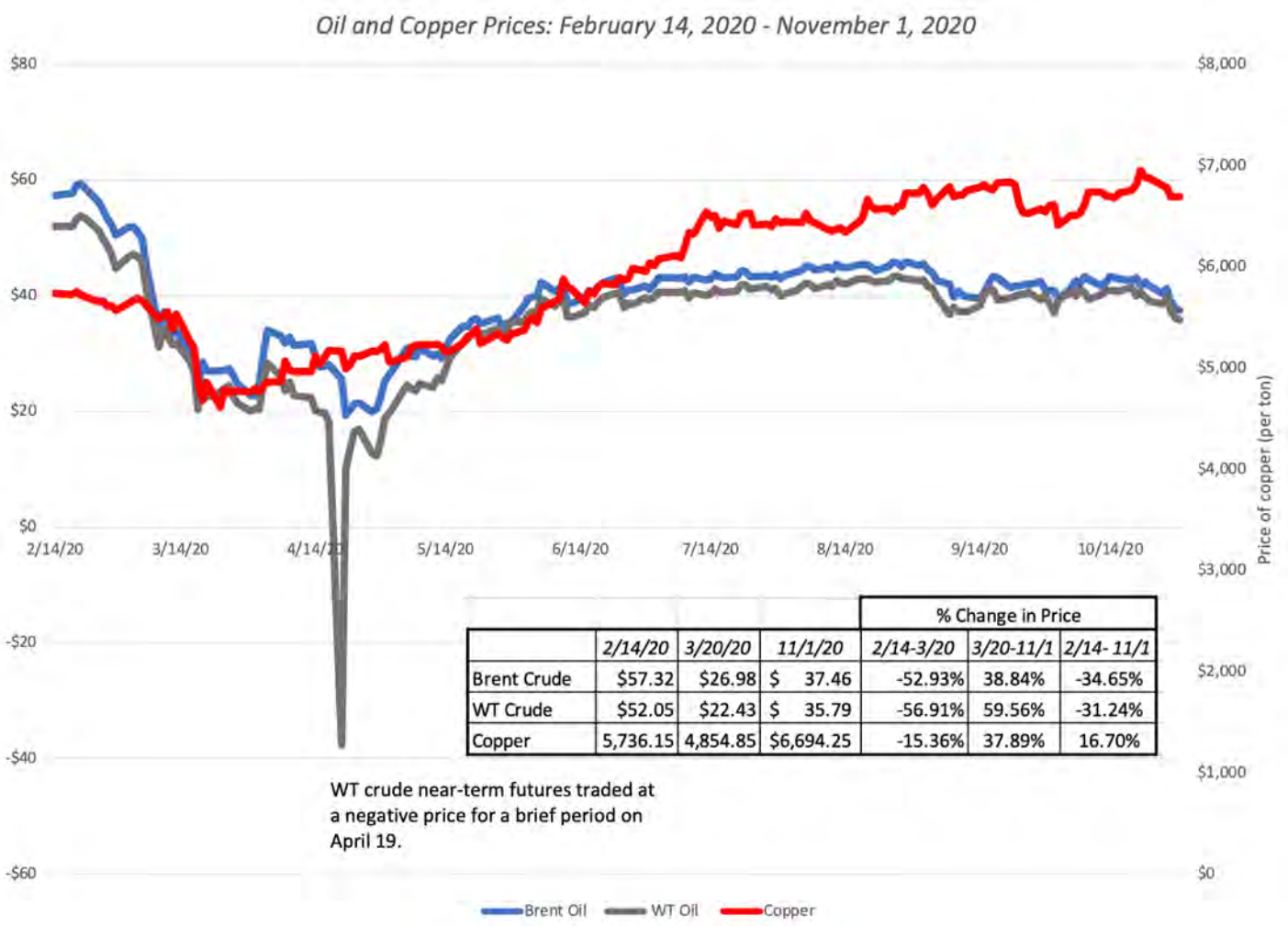
Macro Review: Equity Indices

			Levels			% Change				
	Index	*Country/Region*	*14-Feb*	*20-Mar*	*1-Nov*	*10/24-11/1*	*10/1-11/1*	*2/14-3/20*	*3/20-11/1*	*2/14 - 11/1*
Americas	S&P 500	US	3374	2305	3270	0.74%	-3.09%	-31.68%	41.87%	-3.08%
	NASDAQ	US	9712	6880	10845	-0.30%	-4.31%	-29.16%	57.64%	11.67%
	TSX	Canada	17848	11852	15580	0.22%	-2.94%	-33.59%	31.45%	-12.71%
	IPC Mexico	Mexico	45000	34270	36802	0.51%	-4.44%	-23.84%	7.39%	-18.22%
	iBovespa	Brazil	114381	67069	91322	-2.72%	-7.22%	-41.36%	36.16%	-20.16%
Europe	FTSE 100	UK	7409	5191	5577	1.13%	-2.59%	-29.94%	7.44%	-24.73%
	DAX	Germany	13744	8929	11556	1.53%	-3.62%	-35.03%	29.42%	-15.92%
	CAC 40	France	6069	4131	4595	1.77%	-2.90%	-31.93%	11.23%	-24.29%
	S&P Europe 350	Europe	1731	1181	1357	0.15%	-5.53%	-31.77%	14.94%	-21.58%
Asia	Nikkei 225	Japan	23688	16553	22977	1.39%	-0.85%	-30.12%	38.81%	-3.00%
	Shanghai 50	China	2895	2628	3252	-0.44%	-1.17%	-9.22%	23.73%	12.31%
	Hang Seng	Hong Kong	27816	22805	24107	1.32%	-1.46%	-18.01%	5.71%	-13.33%
	Sensex	India	41258	29916	39615	0.23%	-1.10%	-27.49%	32.42%	-3.98%
Australia & NZ	ASX 200	Australia	7133	4825	5927	0.40%	-3.32%	-32.36%	22.85%	-16.90%
	NZX 50	New Zealand	11835	9202	12020	0.42%	-2.12%	-22.25%	30.62%	1.56%
Africa	FTSE/JSE TOP 40	South Africa	52050	36302	47473	1.94%	-3.77%	-30.26%	30.77%	-8.79%
	NSE-All Share	Nigeria	27756	22198	30428	-0.17%	5.91%	-20.02%	37.07%	9.63%

Macro Review: US Treasuries



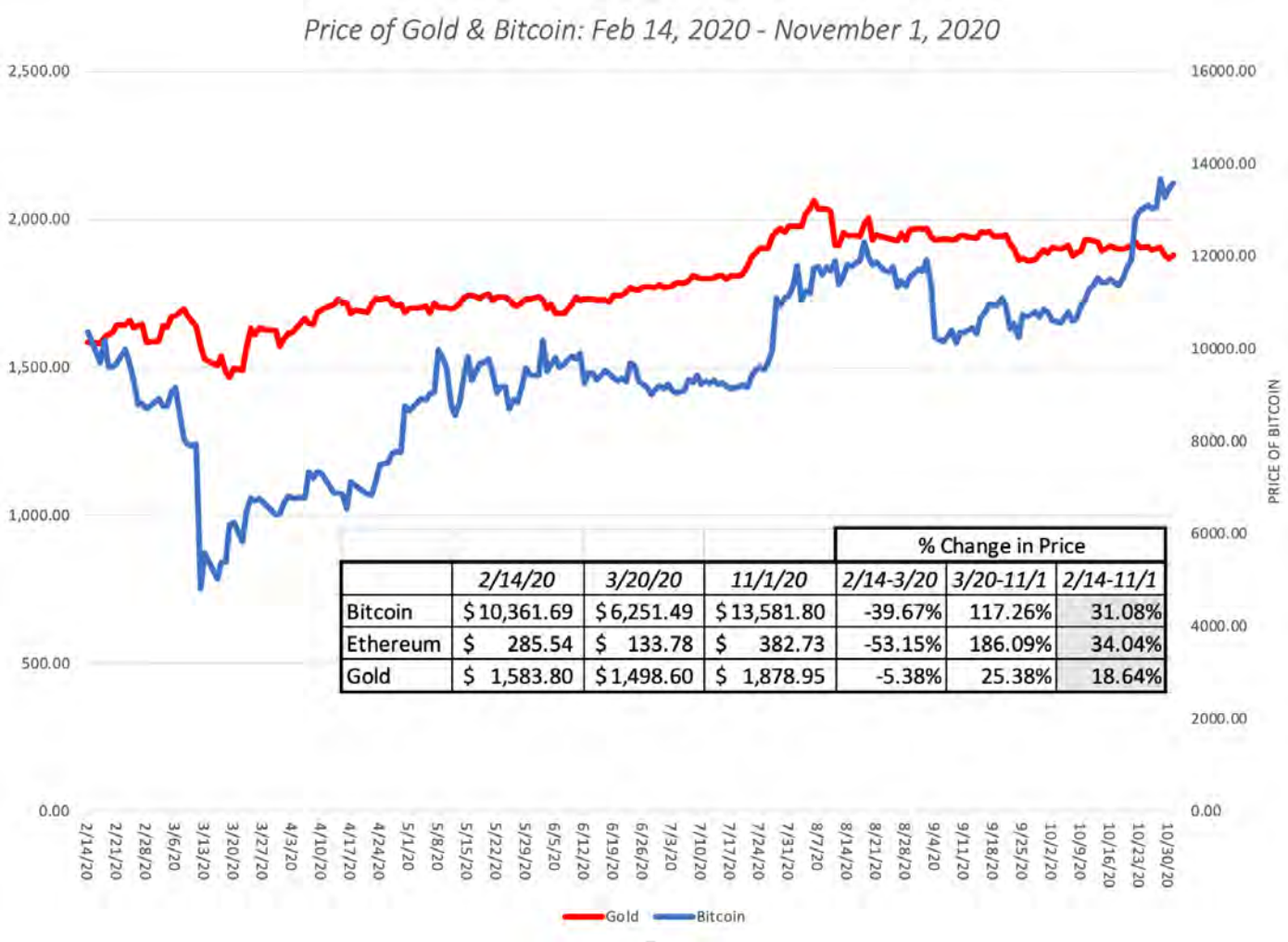
Macro Review: Oil & Copper



				% Change in Price		
	2/14/20	*3/20/20*	*11/1/20*	*2/14-3/20*	*3/20-11/1*	*2/14- 11/1*
Brent Crude	$57.32	$26.98	$ 37.46	-52.93%	38.84%	-34.65%
WT Crude	$52.05	$22.43	$ 35.79	-56.91%	59.56%	-31.24%
Copper	5,736.15	4,854.85	$6,694.25	-15.36%	37.89%	16.70%

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*	*11/1/20*	*2/14-3/20*	*3/20-11/1*	*2/14-11/1*
Bitcoin	$ 10,361.69	$ 6,251.49	$ 13,581.80	-39.67%	117.26%	31.08%
Ethereum	$ 285.54	$ 133.78	$ 382.73	-53.15%	186.09%	34.04%
Gold	$ 1,583.80	$ 1,498.60	$ 1,878.95	-5.38%	25.38%	18.64%

Global Equities: By Region (in US $)

		Market Cap ($ Millions)				$ Change in Market Cap				% Change in Market Cap			
Sub Region	Number of firms	2/14/20	3/20/20	8/28/20	11/1/20	2/14 - 3/20	3/20- 9/1	9/1-11/1	2/14 - 11/1	2/14 - 3/20	3/20- 9/1	9/1-11/1	2/14 - 11/1
Africa	775	$ 551,313	$ 347,724	$ 453,676	$ 450,891	$ (203,590)	$ 105,953	$ (2,785)	$ (100,422)	-36.93%	30.47%	-0.61%	-18.22%
Australia & NZ	1,544	$ 1,460,485	$ 867,789	$ 1,457,249	$ 1,377,797	$ (592,696)	$ 589,460	$ (79,452)	$ (82,688)	-40.58%	67.93%	-5.45%	-5.66%
Canada	2,396	$ 2,069,846	$ 1,263,949	$ 2,025,929	$ 1,874,426	$ (805,897)	$ 761,980	$ (151,503)	$ (195,420)	-38.94%	60.29%	-7.48%	-9.44%
China	6,293	$ 13,955,224	$ 12,367,237	$ 16,742,877	$ 16,405,890	$ (1,587,987)	$ 4,375,641	$ (336,988)	$ 2,450,666	-11.38%	35.38%	-2.01%	17.56%
EU & Environs	5,190	$ 13,195,783	$ 8,955,805	$ 12,849,117	$ 12,356,947	$ (4,239,979)	$ 3,893,312	$ (492,170)	$ (838,836)	-32.13%	43.47%	-3.83%	-6.36%
Eastern Europe & Russia	494	$ 820,322	$ 495,278	$ 630,915	$ 543,773	$ (325,044)	$ 135,637	$ (87,142)	$ (276,549)	-39.62%	27.39%	-13.81%	-33.71%
India	3,314	$ 2,189,647	$ 1,510,005	$ 2,137,221	$ 2,074,926	$ (679,642)	$ 627,215	$ (62,295)	$ (114,721)	-31.04%	41.54%	-2.91%	-5.24%
Japan	3,732	$ 5,857,677	$ 4,367,763	$ 5,806,406	$ 5,793,928	$ (1,489,914)	$ 1,438,644	$ (12,479)	$ (63,749)	-25.44%	32.94%	-0.21%	-1.09%
Latin America & Caribbear	1,164	$ 2,420,178	$ 1,418,615	$ 1,889,419	$ 1,764,617	$ (1,001,563)	$ 470,804	$ (124,802)	$ (655,561)	-41.38%	33.19%	-6.61%	-27.09%
Middle East	1,430	$ 3,072,356	$ 2,555,641	$ 3,130,835	$ 3,056,482	$ (516,716)	$ 575,194	$ (74,353)	$ (15,875)	-16.82%	22.51%	-2.37%	-0.52%
Small Asia	8,625	$ 4,993,589	$ 3,496,975	$ 5,048,960	$ 4,995,842	$ (1,496,614)	$ 1,551,985	$ (53,118)	$ 2,253	-29.97%	44.38%	-1.05%	0.05%
UK	1,130	$ 2,899,163	$ 1,826,761	$ 2,506,942	$ 2,306,805	$ (1,072,402)	$ 680,181	$ (200,137)	$ (592,358)	-36.99%	37.23%	-7.98%	-20.43%
United States	6,357	$ 33,844,978	$ 22,773,956	$ 35,589,058	$ 33,525,453	$ (11,071,022)	$ 12,815,102	$ (2,063,605)	$ (319,524)	-32.71%	56.27%	-5.80%	-0.94%
Global	42,445	$ 87,330,562	$ 62,247,496	$ 74,920,290	$ 87,744,240	$ (25,083,065)	$ 12,672,794	$ 12,823,950	$ 413,679	-28.72%	20.36%	17.12%	0.47%

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	8/28/20	11/1/20	2/14 - 3/20	3/20- 9/1	9/1-11/1	2/14 - 11/1	2/14 - 3/20	3/20- 9/1	9/1-11/1	2/14 - 11/1
Communication Services	2,079	$ 7,291,713	$ 5,460,948	$ 7,920,931	$ 7,605,693	$ (1,830,765)	$ 2,459,983	$ (315,238)	$ 313,980	-25.11%	45.05%	-3.98%	4.31%
Consumer Discretionary	5,945	$10,153,097	$ 7,068,864	$11,850,184	$12,063,642	$ (3,084,232)	$ 4,781,319	$ 213,459	$ 1,910,546	-30.38%	67.64%	1.80%	18.82%
Consumer Staples	2,847	$ 7,168,482	$ 5,729,650	$ 7,641,382	$ 7,237,898	$ (1,438,832)	$ 1,911,731	$ (403,484)	$ 69,416	-20.07%	33.37%	-5.28%	0.97%
Energy	1,654	$ 5,922,675	$ 3,847,829	$ 4,991,620	$ 4,444,401	$ (2,074,846)	$ 1,143,792	$ (547,220)	$ (1,478,274)	-35.03%	29.73%	-10.96%	-24.96%
Financials	4,356	$14,234,754	$ 9,514,353	$12,061,179	$11,412,865	$ (4,720,402)	$ 2,546,827	$ (648,315)	$ (2,821,889)	-33.16%	26.77%	-5.38%	-19.82%
Health Care	3,955	$ 8,905,753	$ 6,857,601	$ 9,949,643	$ 9,527,764	$ (2,048,152)	$ 3,092,042	$ (421,879)	$ 622,012	-23.00%	45.09%	-4.24%	6.98%
Industrials	7,560	$10,081,864	$ 6,865,944	$ 9,922,741	$ 9,576,177	$ (3,215,919)	$ 3,056,797	$ (346,564)	$ (505,687)	-31.90%	44.52%	-3.49%	-5.02%
Information Technology	5,577	$13,560,982	$ 9,707,739	$15,984,270	$14,992,176	$ (3,853,242)	$ 6,276,531	$ (992,094)	$ 1,431,194	-28.41%	64.65%	-6.21%	10.55%
Materials	5,705	$ 4,976,622	$ 3,514,149	$ 5,380,546	$ 5,200,887	$ (1,462,473)	$ 1,866,397	$ (179,658)	$ 224,265	-29.39%	53.11%	-3.34%	4.51%
Real Estate	1,842	$ 1,836,062	$ 1,353,453	$ 1,679,779	$ 1,585,009	$ (482,609)	$ 326,326	$ (94,769)	$ (251,053)	-26.29%	24.11%	-5.64%	-13.67%
Utilities	917	$ 3,196,558	$ 2,325,395	$ 2,884,510	$ 2,879,452	$ (871,163)	$ 559,115	$ (5,058)	$ (317,106)	-27.25%	24.04%	-0.18%	-9.92%
Global	42,445	$87,330,562	$62,247,496	$74,920,290	$87,744,240	$(25,083,065)	$12,672,794	$12,823,950	$ 413,679	-28.72%	20.36%	17.12%	0.47%

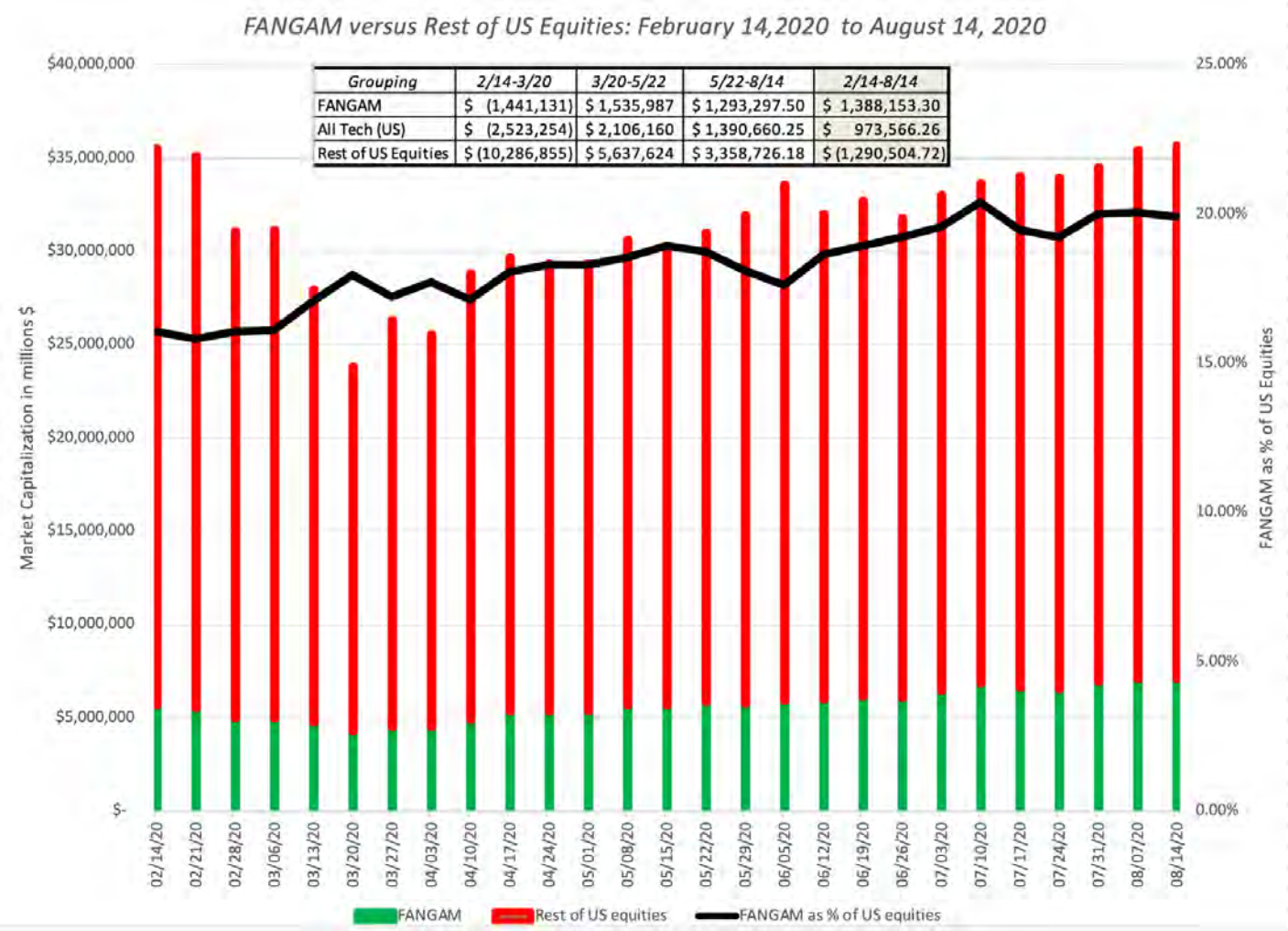
The Unifying Theory: The Resilience of Risk Capital

Value Transfers

		Returns (2/14/20 - 11/1/20)			Returns (2/14/20 - 11/1/20)	
Grouping	*Risk On*	*% Change*	*$ Change (billions)*	*Risk Off*	*% Change*	*$ Change (billions)*
PE	High PE	6.07%	$313.00	Low PE	-3.23%	-$57.00
PBV	High PBV	13.96%	$3,387.00	Low PBV	-16.21%	-$204.00
Dividend Yield	No or low Dividends	5.20%	$1,546.00	High Dividend Yields	-16.06%	-$1,448.00
Corporate Age	Young companies	19.26%	$466.00	Old companies	-13.96%	-$3,807.00
Growth	High growth	64.12%	$2,049.00	Low growth	-27.62%	-$2,218.00
Size	Small Market Cap	100.40%	$4,119.00	Large Market Cap	-1.50%	-$1,150.00
Debt	High debt	-18.62%	-$459.00	Low debt	20.81%	$526.00

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…

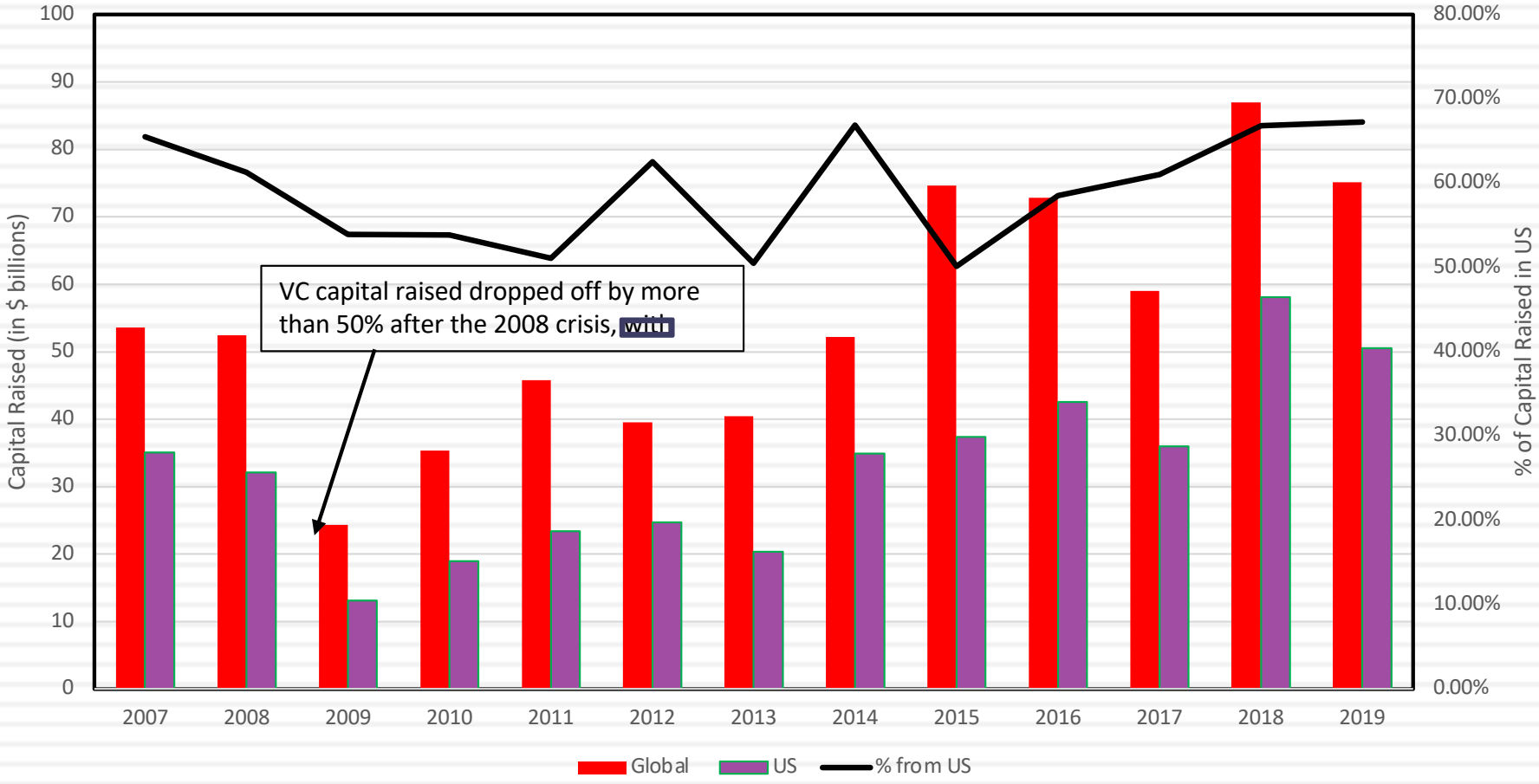


The Resilience of Risk Capital

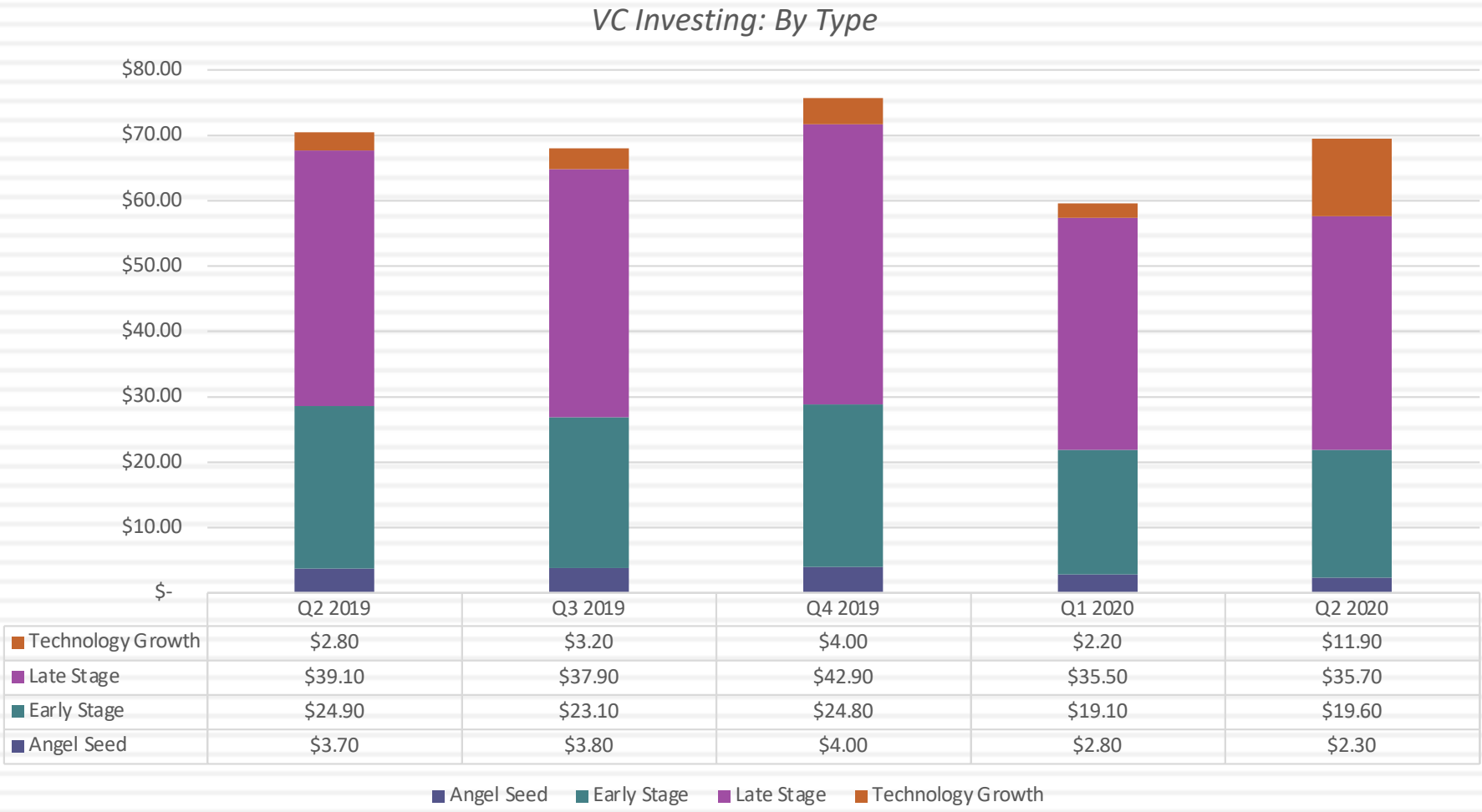
- Risk capital is capital invested in the riskiest investments. When investors get scared, a common by-product of crises, risk capital usually dries up, making it difficult for young cash-burning companies and aging, debt-laden companies to survive.
- With equity, risk capital shows up in private companies 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

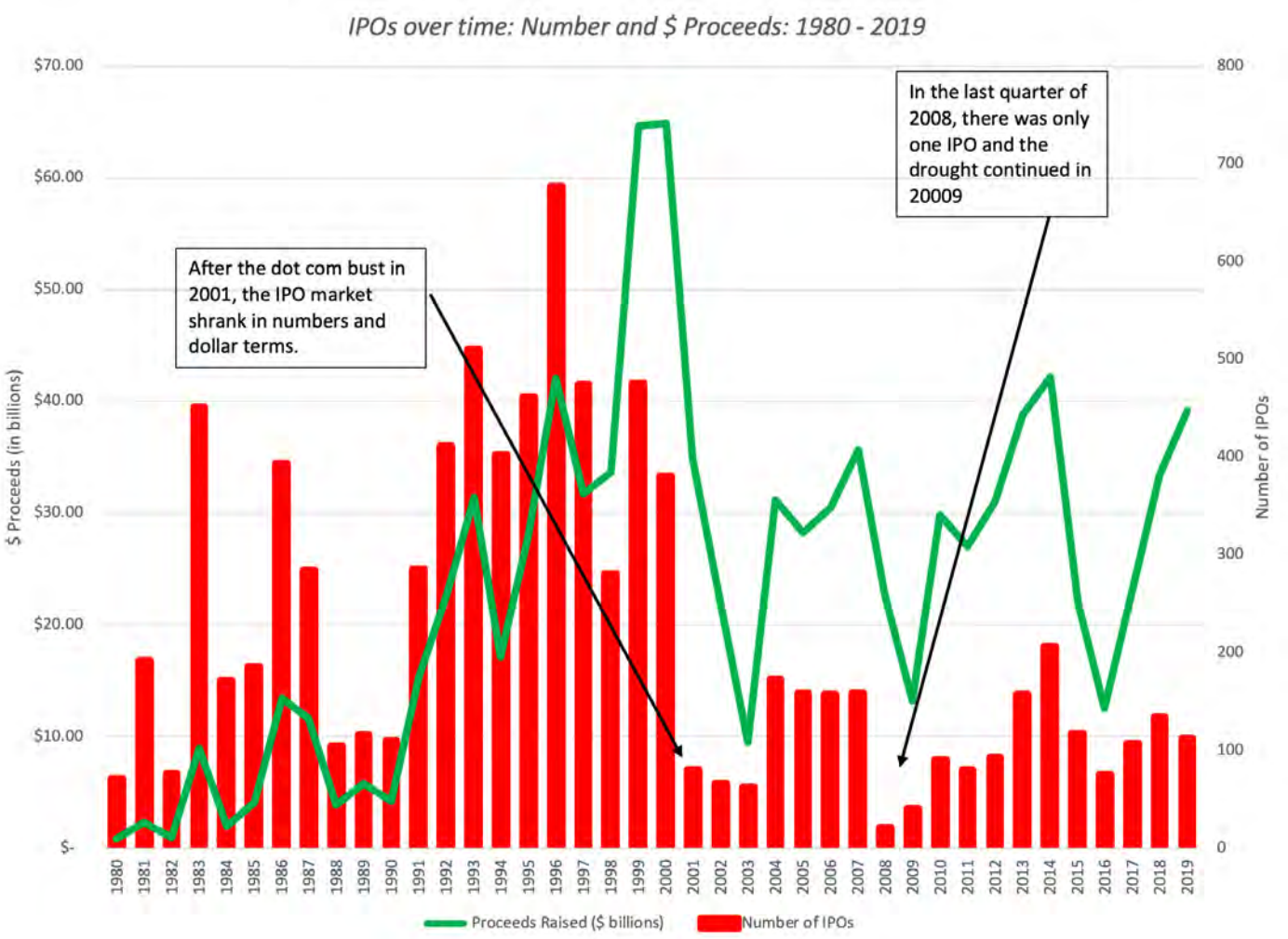


Venture Capital: The COVID effect

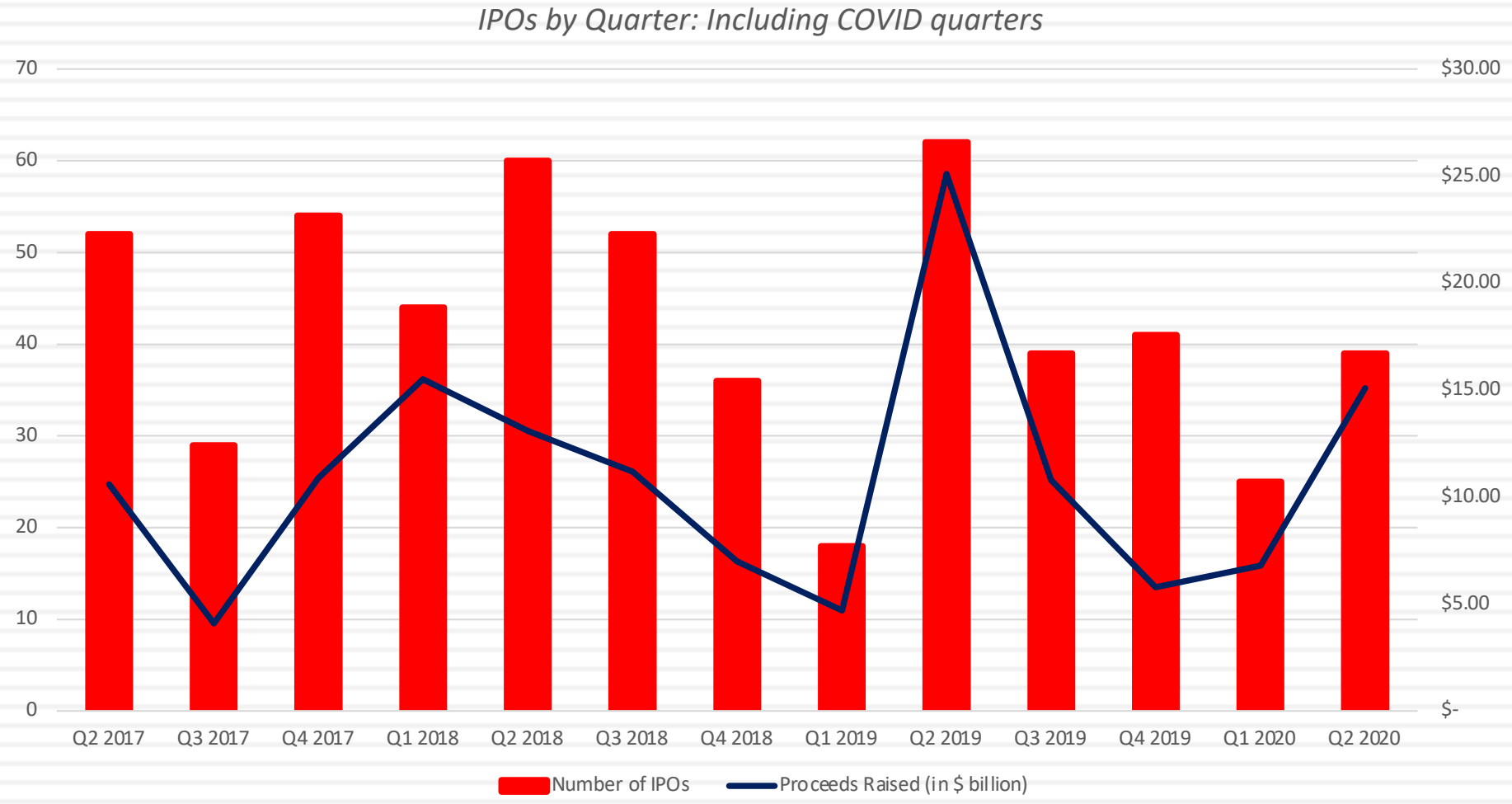


	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020
Technology Growth	$2.80	$3.20	$4.00	$2.20	$11.90
Late Stage	$39.10	$37.90	$42.90	$35.50	$35.70
Early Stage	$24.90	$23.10	$24.80	$19.10	$19.60
Angel Seed	$3.70	$3.80	$4.00	$2.80	$2.30

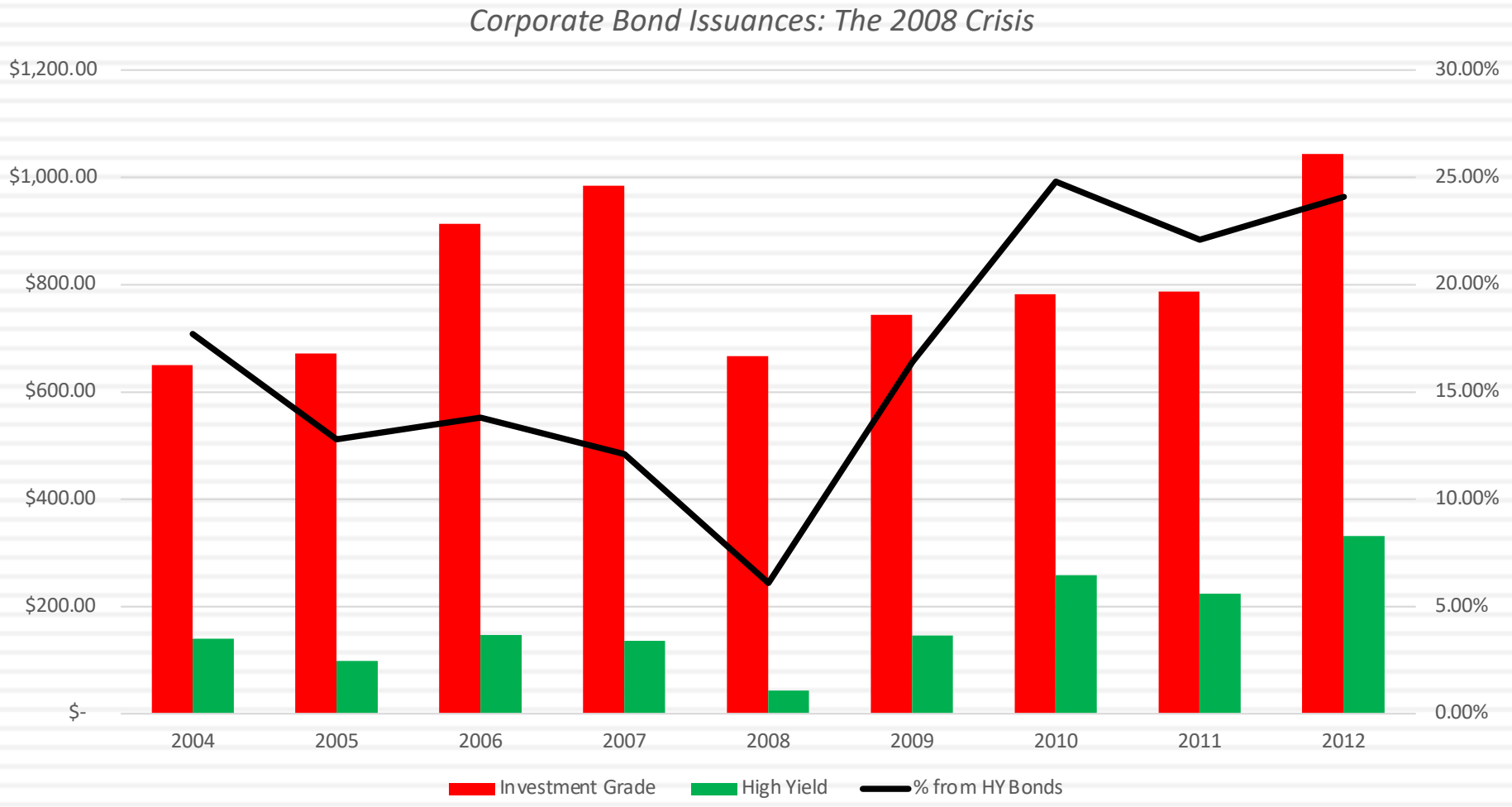
IPOs: A Historical Perspective



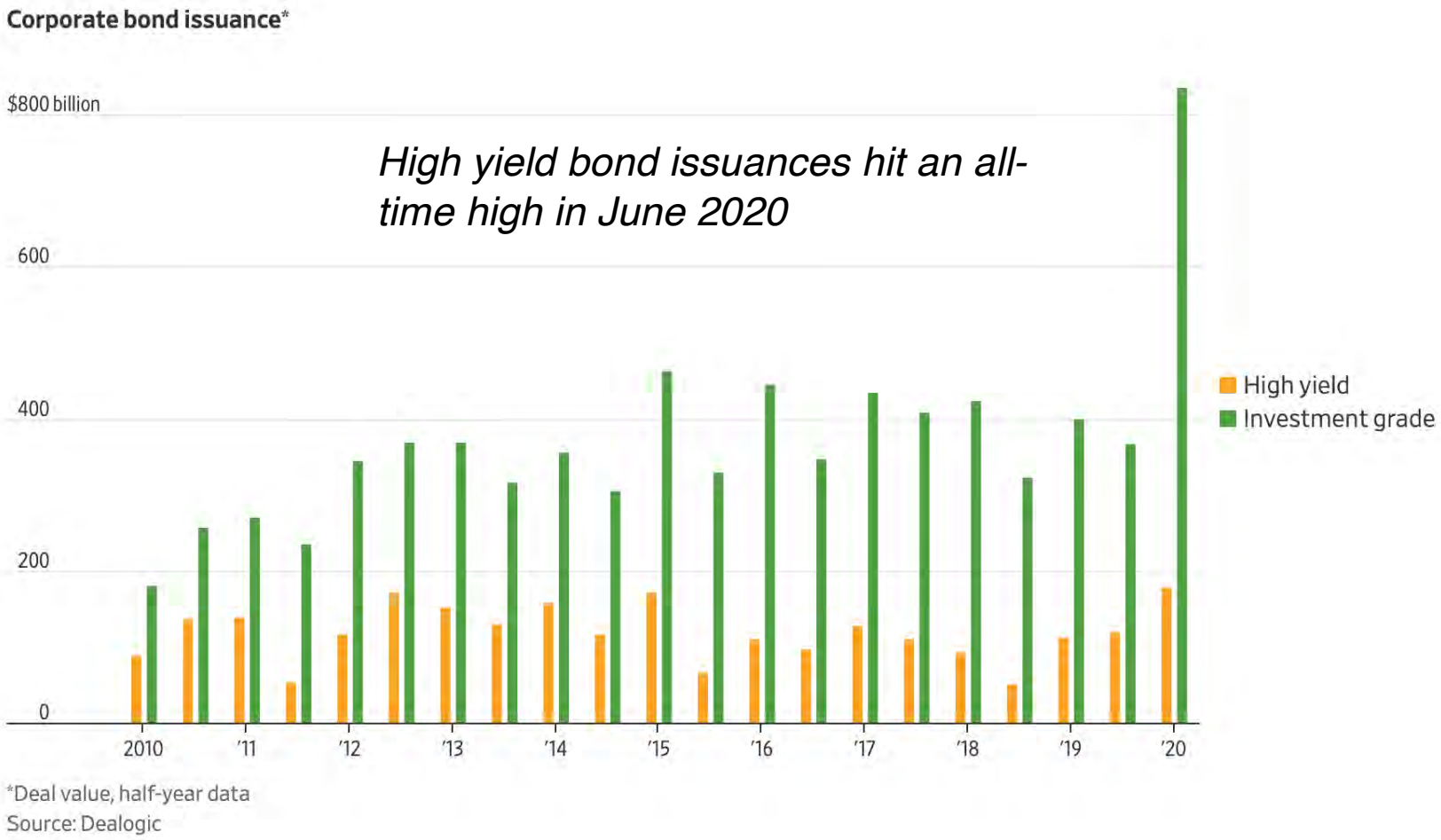
IPOs: The COVID effect



Corporate Bond Issuance: The 2008 Crisis



Corporate Bond Issuance: The COVID effect



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

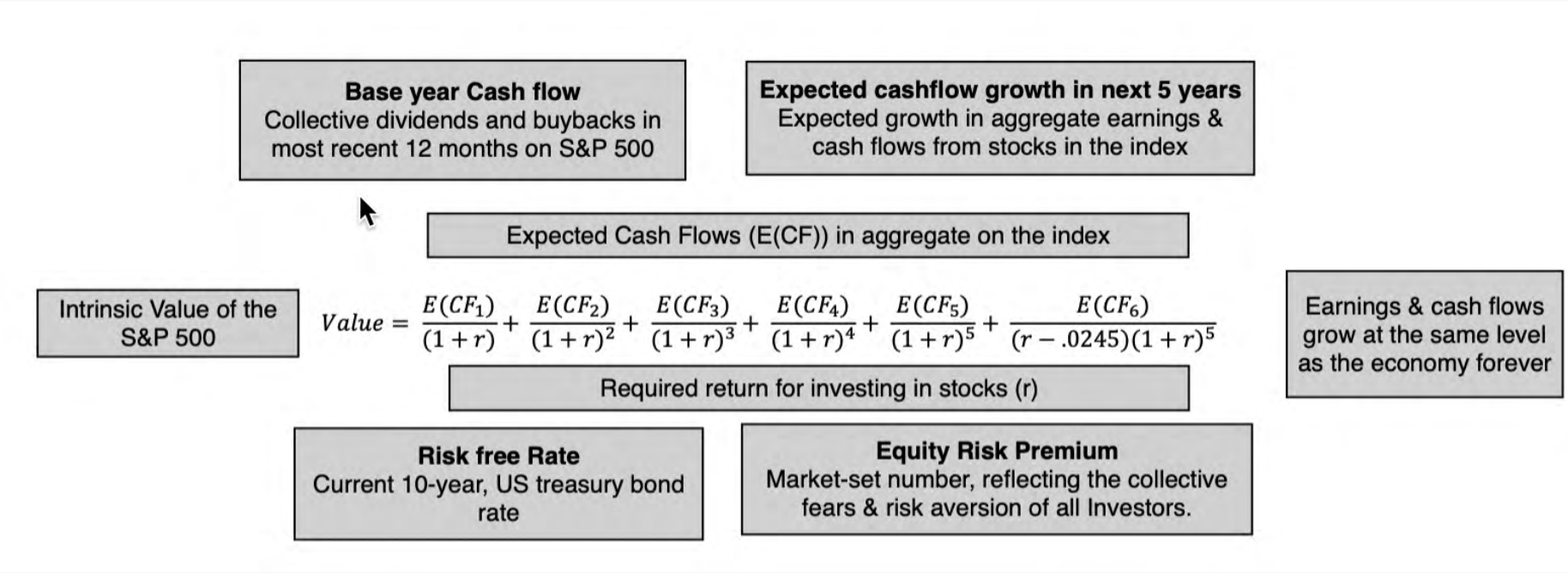
What's different?

- 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!

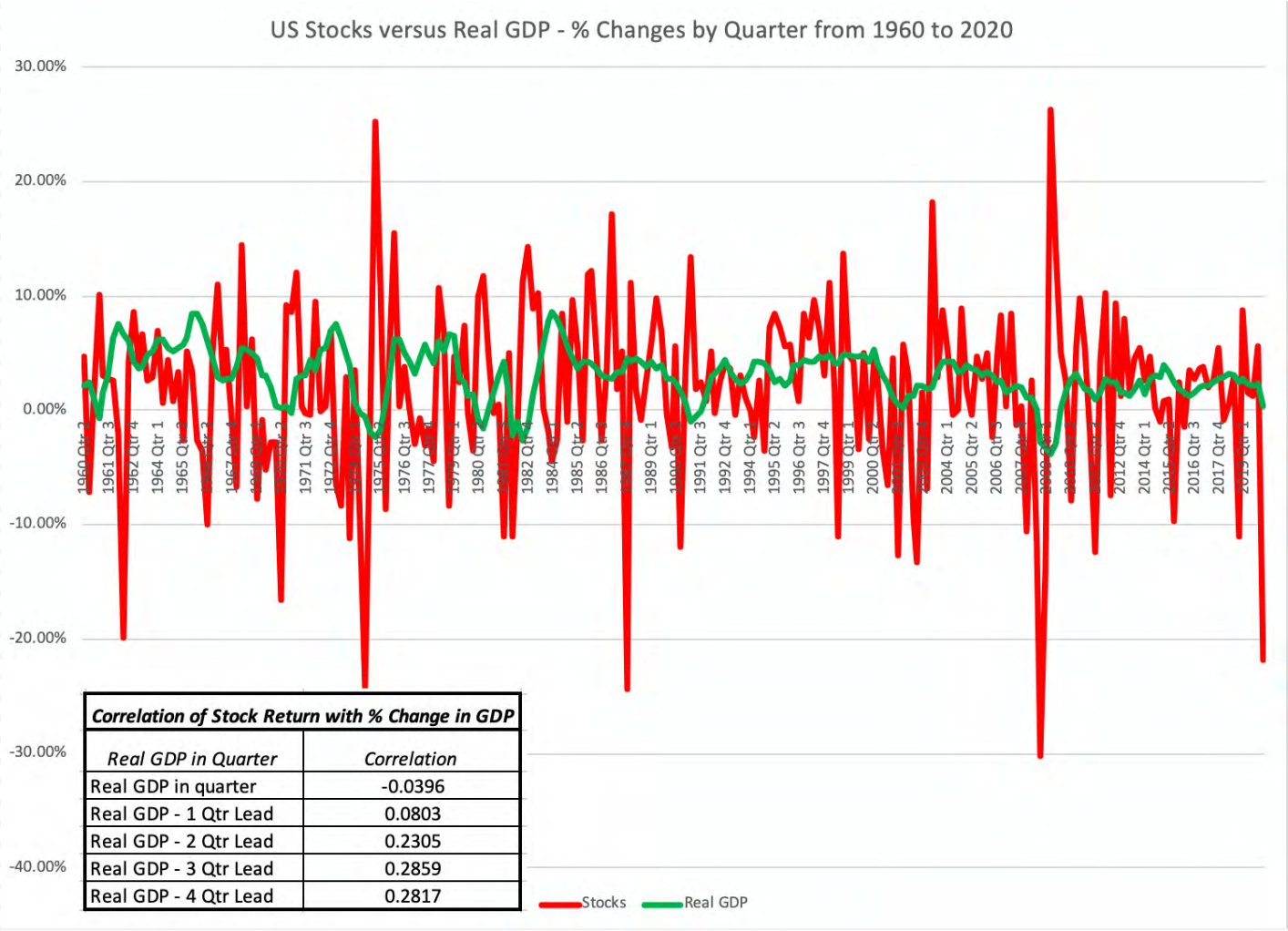
Valuing the market: Fundamentals



Do fundamentals matter?

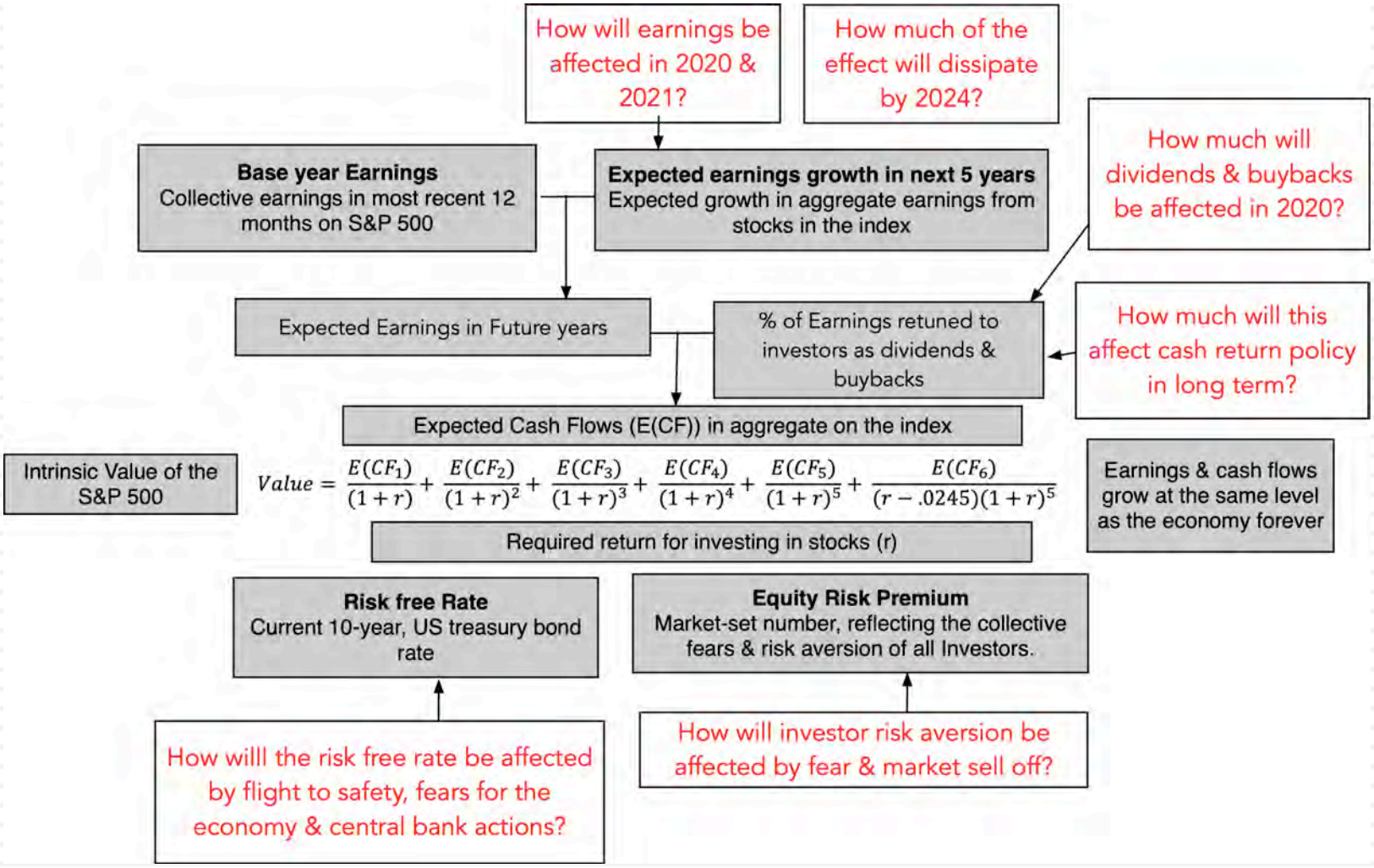
- Disconnect from economic news: For some, the skepticism comes from the disconnect with macroeconomic numbers that are abysmal, as unemployment claims climb into the tens of millions and consumer confidence hovers around historic lows. I will spend the first part of this section arguing that this reflects 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 Estimates (October 2020)

Top Down Estimates (Yardeni on 10/5/20)

Year	Earnings on Index	
2019		163
2020	-23.31%	125
2021	24.00%	155
2022	16.13%	180

Bottom-up Estimates (Analyst Consensus on 10/5/20

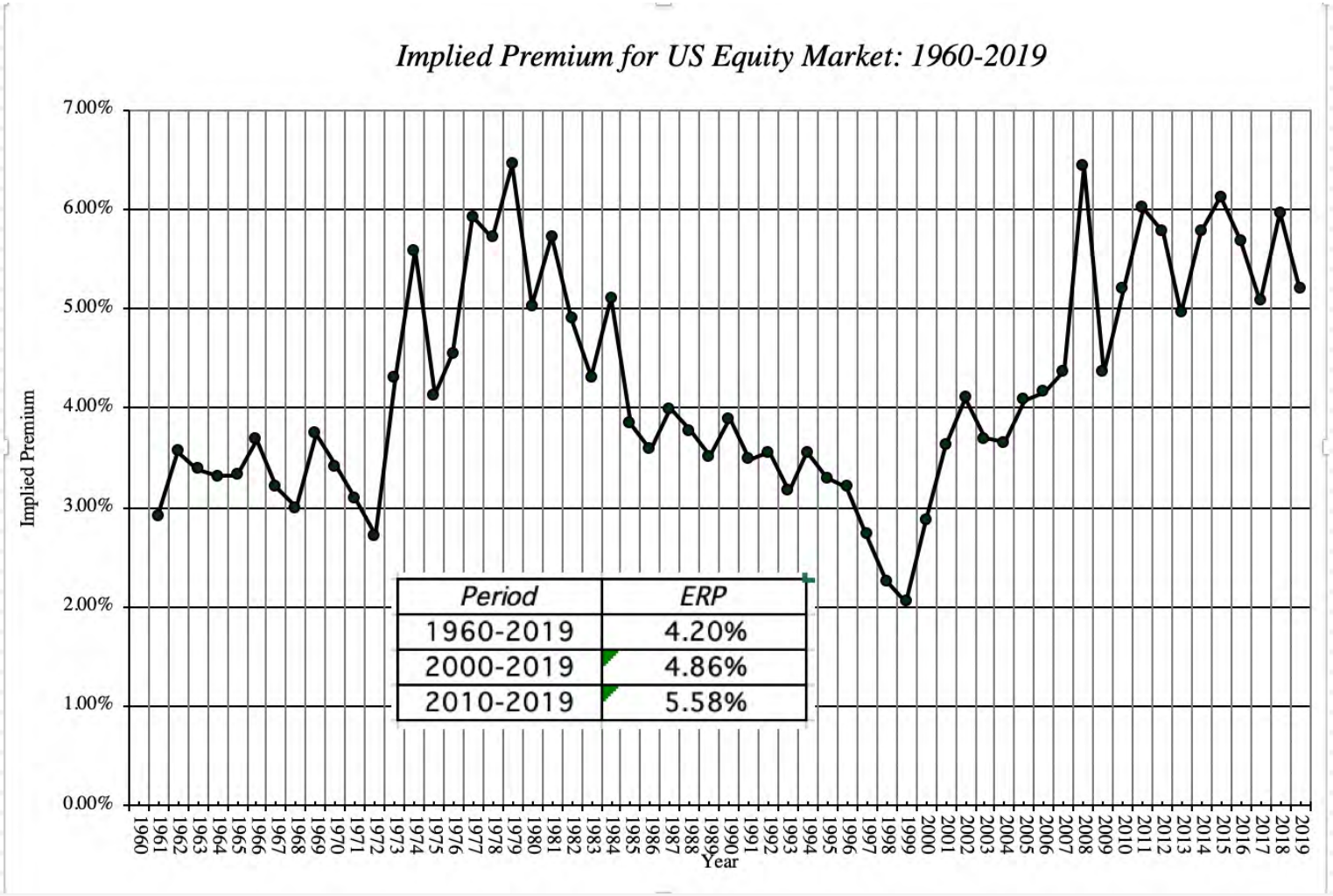
Year	Earnings on Index	
2019		162.97
2020	-20.10%	130.21
2021	27.65%	166.21
2022	14.76%	190.75

Firm	Strategist	2020 S&P Target
Bank of America Merrill Lynch	Savita Subramanian	$125.00
Barclays	Maneesh Deshpande	$137.00
BMO	Brian Belski	$130.00
BTIG	Julian Emanuel	$127.00
Canaccord Genuity	Tony Dwyer	$125.00
CFRA	Sam Stovall	$129.84
Citigroup	Tobias Levkovich	$131.50
Credit Suisse	Jonathan Golub	$125.00
Deutsche Bank	Binky Chadha	$133.00
Goldman Sachs	David Kostin	$130.00
JPMorgan Chase	Dubravko Lakos-Bujas	$136.00
Morgan Stanley	Mike Wilson	$130.00
Oppenheimer	John Stoltzfus	Suspended
RBC	Lori Calvasina	Suspended
UBS	Keith Parker	$126.00
Wells Fargo Investment Institute	Darrell Cronk	$130.00
	High Value	$137.00
	Low Value	$125.00
	Median	$130.00

2. Cash Flows

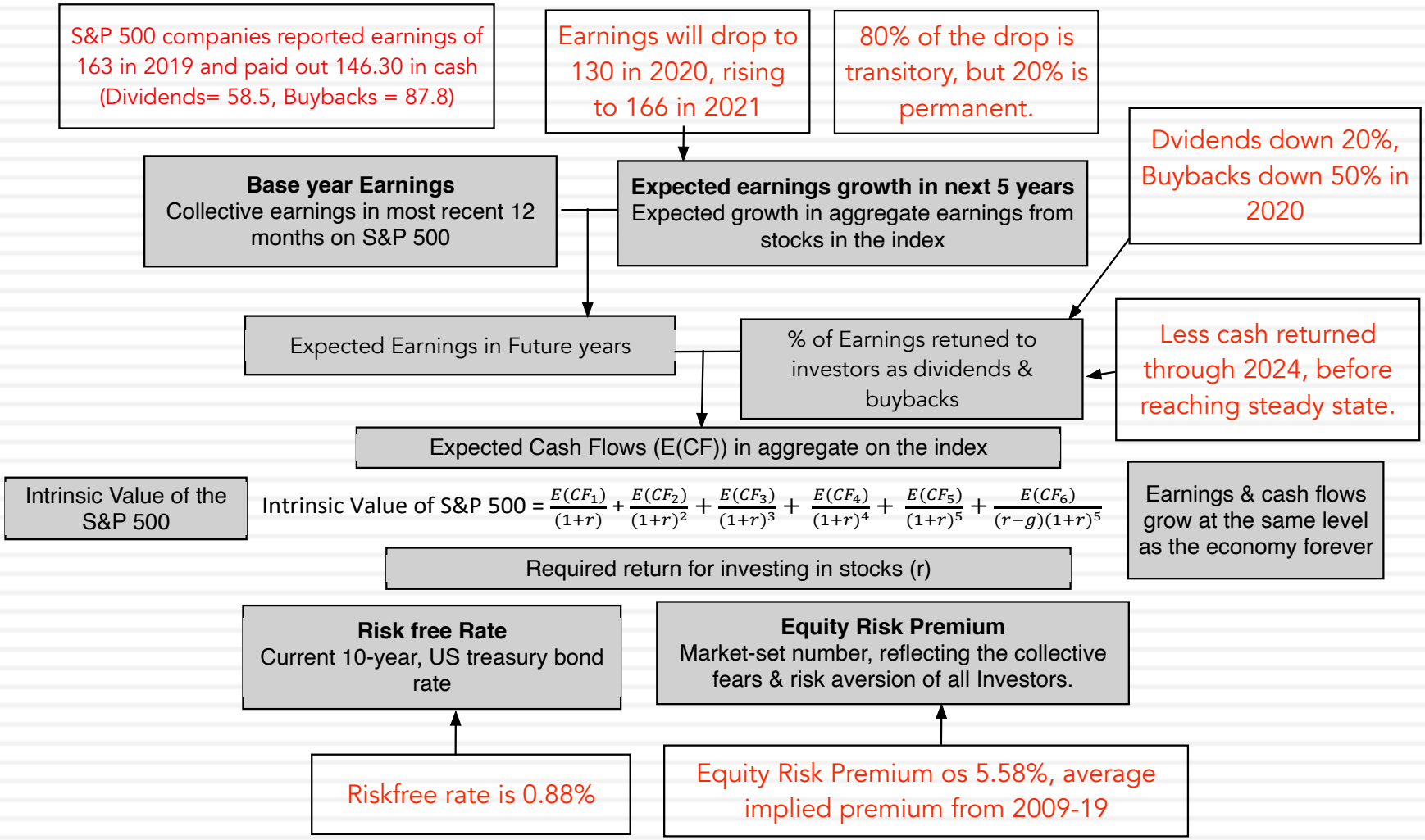
	S&P 500					
Year	Market value	Earnings	Dividends	Buybacks	Cash Returned as % of Earnings	Cash Returned as % of Market Cap
2001	1148.09	38.85	15.74	14.34	77.43%	2.62%
2002	879.82	46.04	15.96	13.87	64.78%	3.39%
2003	1111.91	54.69	17.88	13.70	57.74%	2.84%
2004	1211.92	67.68	19.01	21.59	59.99%	3.35%
2005	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: November 1, 2020

Earnings drop to 130 in 2020, rise to 166 in 2021 and 191 in 2022 & 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	169.29	151.24	130.21	97.66	-23.09%	-35.43%
2021	175.83	156.34	166.21	129.92	-5.47%	-16.90%
2022	182.61	161.60	173.14	140.81	-5.19%	-12.87%
2023	189.66	167.04	180.36	152.39	-4.90%	-8.77%
2024	196.98	172.66	187.89	164.69	-4.62%	-4.62%
2025	200.92	176.12	191.65	167.99	-4.62%	-4.62%

Growth rate in perpetuity capped at riskfree rate (2.00%)

After year 5, risk free rate rises to 2% & ERP drops back to 4.82%, the long term average.

	Last 12 months	1	2	3	4	5	*Terminal Year*
Expected Earnings	$163.00	130.21	166.21	173.14	180.36	187.89	191.65
Expected cash payout (dividends + buybacks)	89.75%	75.00%	78.16%	81.33%	84.49%	87.65%	87.65%
Expected Dividends + Buybacks =	$146.30	$97.66	$129.92	$140.81	$152.39	$164.69	167.99
Expected Terminal Value =						$3,481.65	
Present Value =		$ 91.73	$ 114.63	$ 116.70	$ 118.64	$2,666.40	
Intrinsic Value of Index =		3108.09					

Riskfree rate for next 5 years is T.Bond rate of 0.88%

0.88%+5.58% = 6.46%

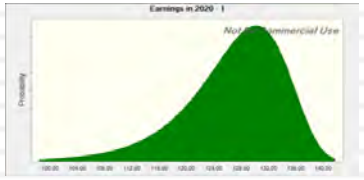
ERP stays at 5.58%, average from 2009-19

$$\text{Intrinsic Value of S\&P 500} = \frac{97.66}{1.0646} + \frac{129.92}{1.0646^2} + \frac{140.81}{1.0646^3} + \frac{152.39}{1.0646^4} + \frac{164.69}{1.0646^5} + \frac{167.99}{(.0682-.02)*1.0646^5} = 3108$$

At the start of trading on November 1, 2020, the S&P 500 was trading at 3270

Facing up to uncertainty

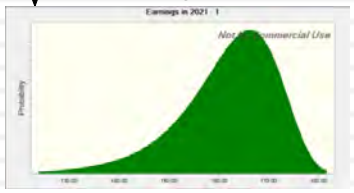
Earnings in 2020



Likeliest = 130.2; Scale = 6

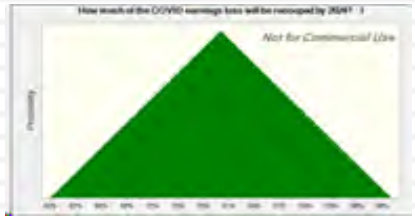
Correlation = 0.80

Earnings in 2021



Likeliest = 166.2; Scale = 8

% of Lost Earnings recouped by 2024



Min = 60%; Max = 100%

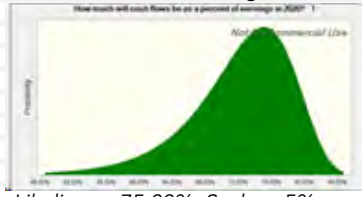
Correlation =-.5

If earnings are lower than expected, less cash will be returned

Equity Risk Premium

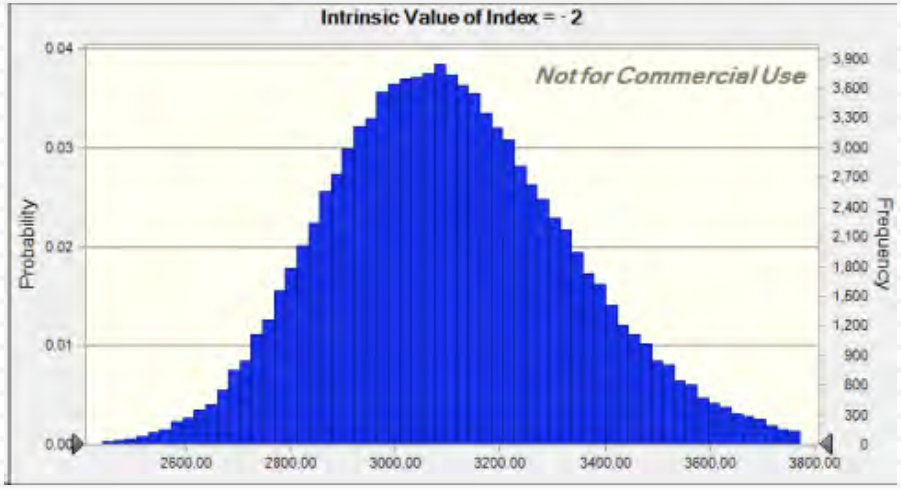
Exp = 5.58%; Std dev = 15%

Cashflow as % of Earnings in 2020



Likeliest = 75.00%; Scale = 5%

Percentile	*Forecast values*
0%	2203.59
10%	2817.08
20%	2906.30
30%	2973.67
40%	3033.43
50%	3091.51
60%	3150.60
70%	3217.16
80%	3299.18
90%	3415.91
100%	4495.29



Valuation after COVID: Individual Companies

Keep it simple!

During a crisis, the price of risk is a moving target.. And intrinsic value can change a lot..

- Mechanical: Much of valuation has become mechanical, with rules driving the process, rather than mechanics.
  - Accounting influences: Accounting's entry into valuation has made it more rule driven.
  - More powerful tools: it is easier to build large, mechanical models than it used to be.
- Backward looking: As access to data has improved, models have become more backward looking, with years of past data driving the forecasts.
- & Mean reverting: We assume that things revert back to the way they used to be, which for better or worse, is the US in the 20th century.
- Static: And in most valuations, costs of capital are not just based upon all of the above, but are kept fixed over the valuation time horizon, and changes in intrinsic values over time are viewed with suspicion.

Discount Rates

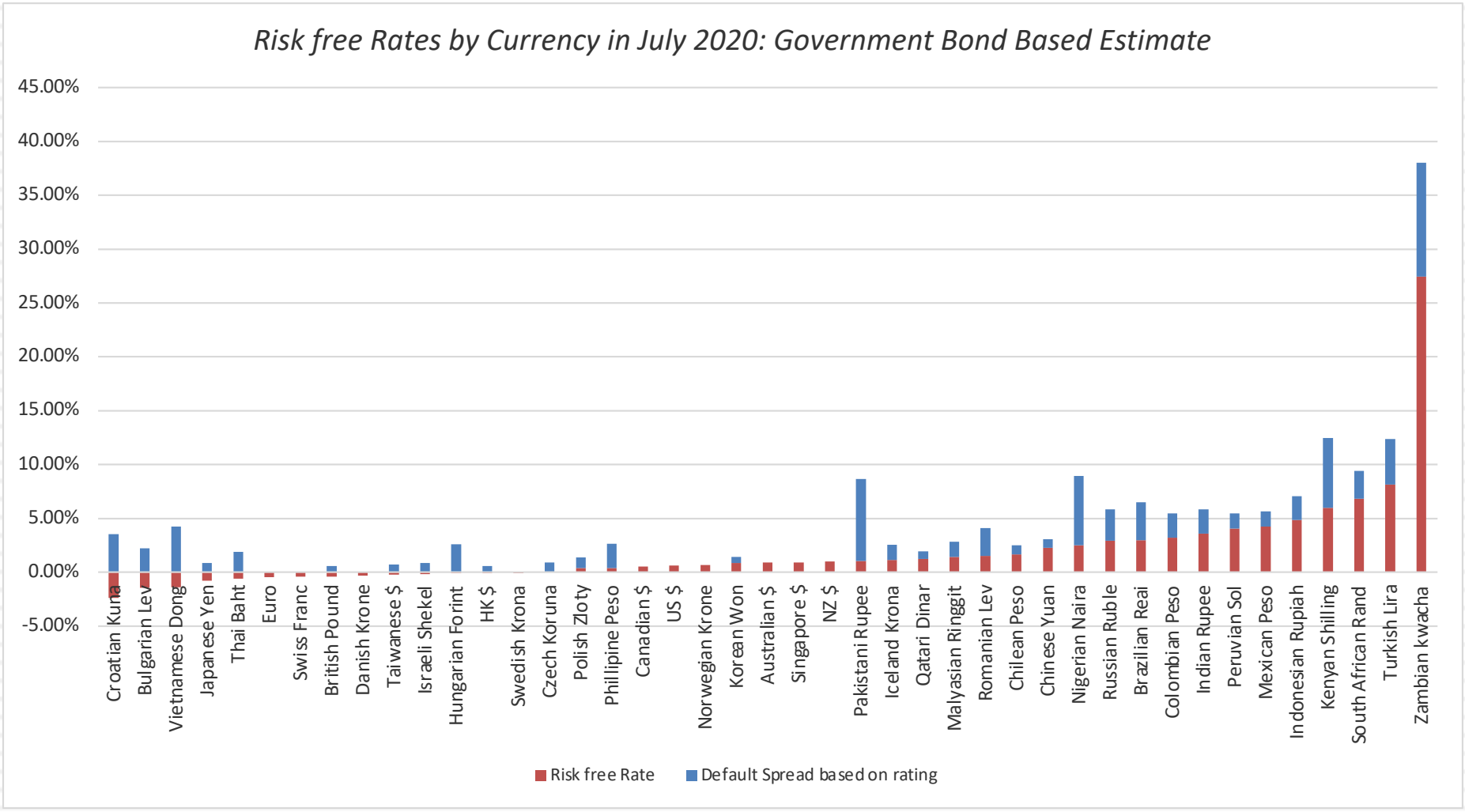
Expectation of cash flows across all scenarios, good and bad. Incorporates all risks that affect the asset / business.

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

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

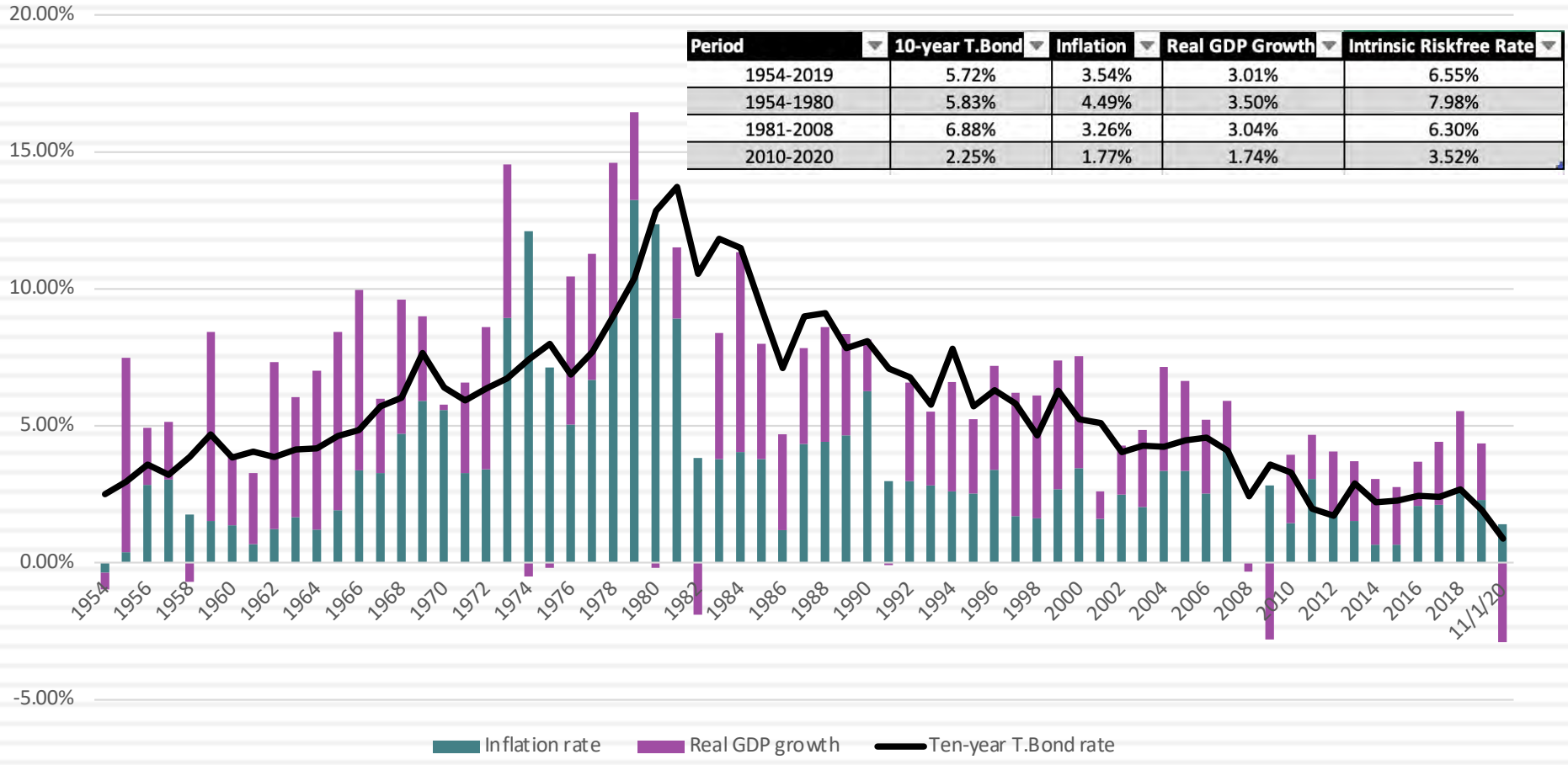
Risk free rates will vary across currencies!



And across time… especially in a crisis..and for good reason

Ten-year T. Bond Rates over time

Period	10-year T.Bond	Inflation	Real GDP Growth	Intrinsic Riskfree Rate
1954-2019	5.72%	3.54%	3.01%	6.55%
1954-1980	5.83%	4.49%	3.50%	7.98%
1981-2008	6.88%	3.26%	3.04%	6.30%
2010-2020	2.25%	1.77%	1.74%	3.52%

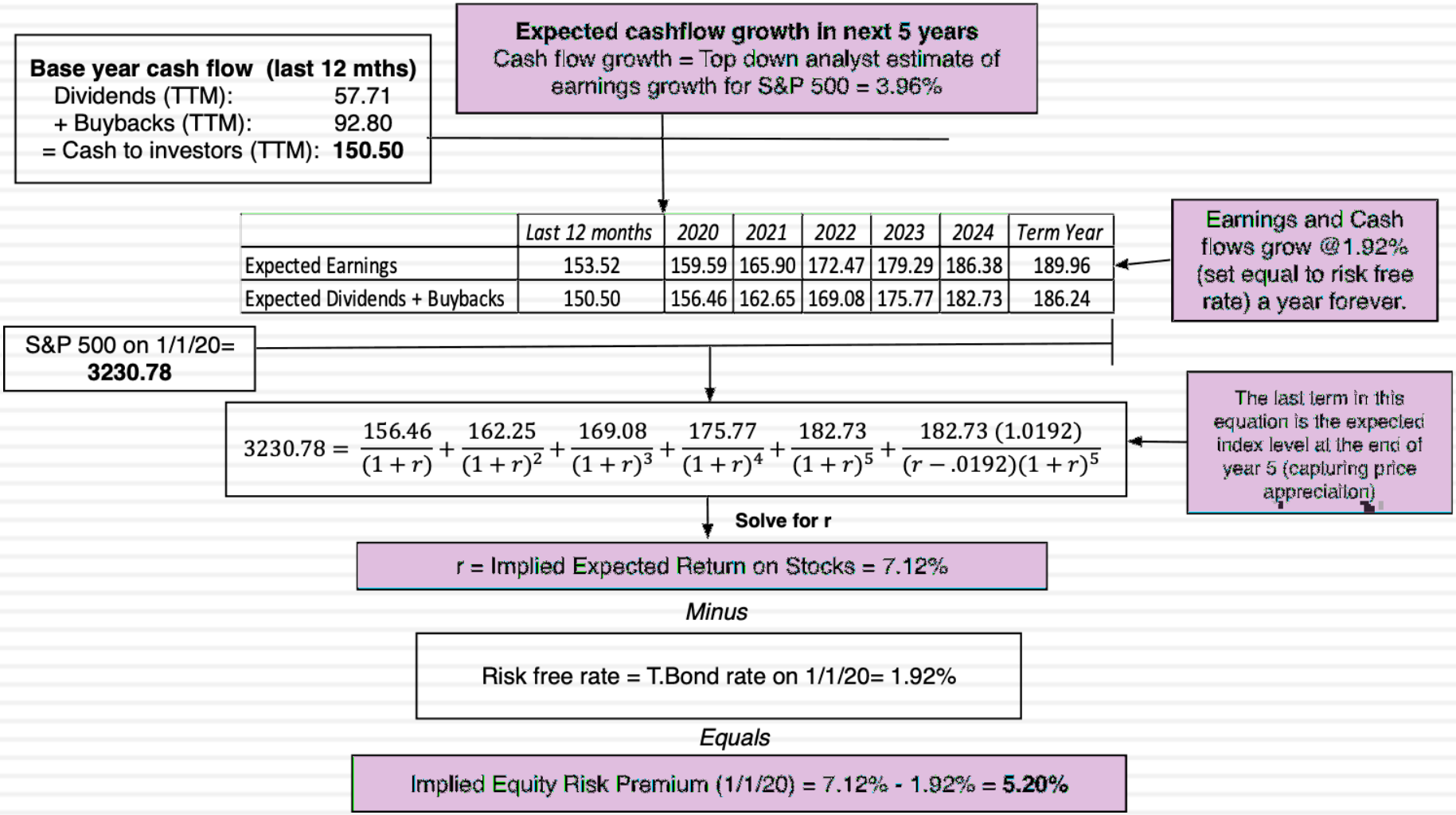


Equity Risk Premiums cannot be backward looking..

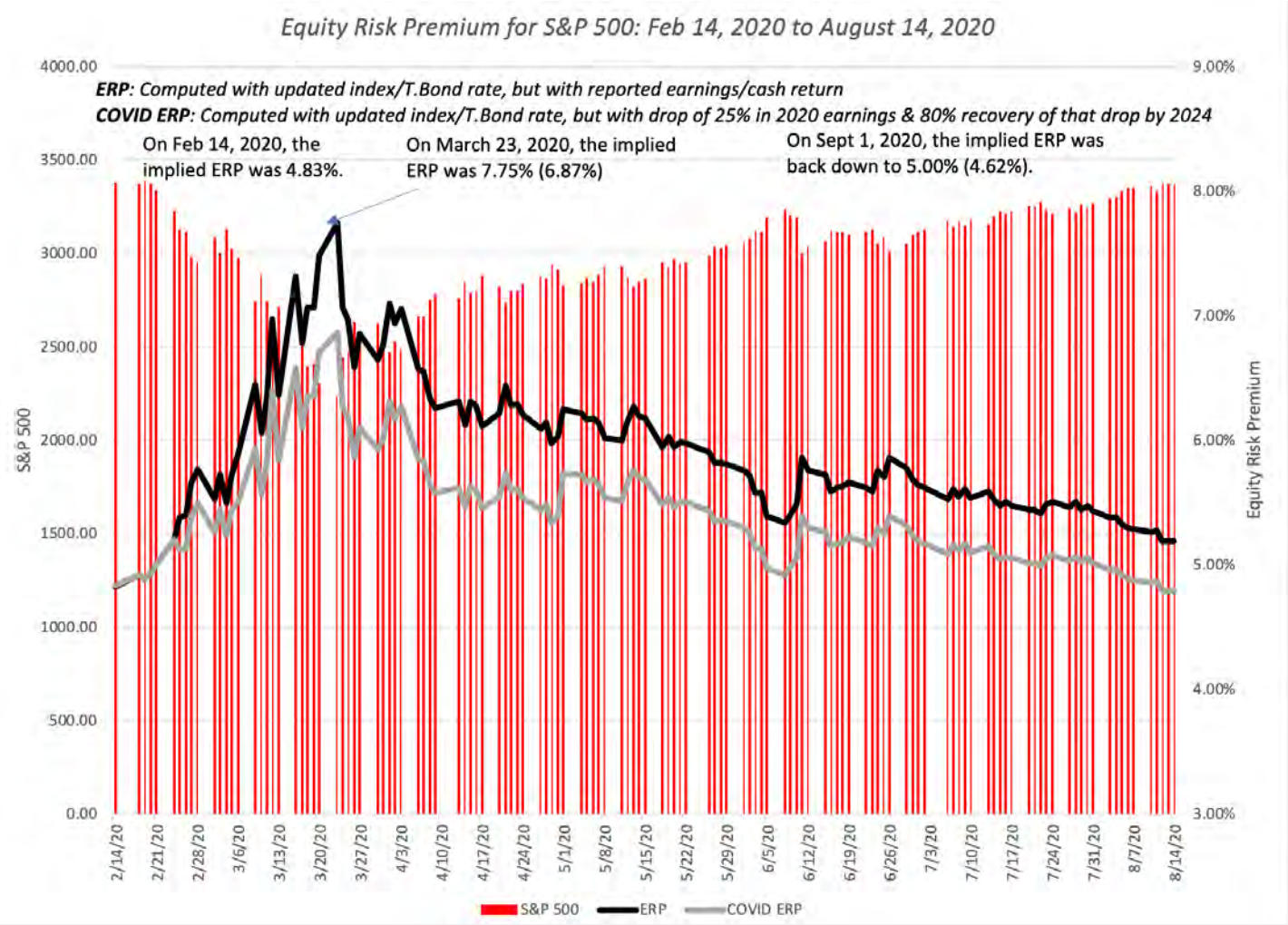
	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2019	8.18%	6.43%	6.35%	4.83%
Std Error	2.08%	2.20%		
1970-2019	7.26%	4.50%	5.93%	3.52%
Std Error	2.38%	2.73%		
2010-2019	13.51%	9.67%	12.93%	9.31%
Std Error	3.85%	4.87%		

- 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...



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%

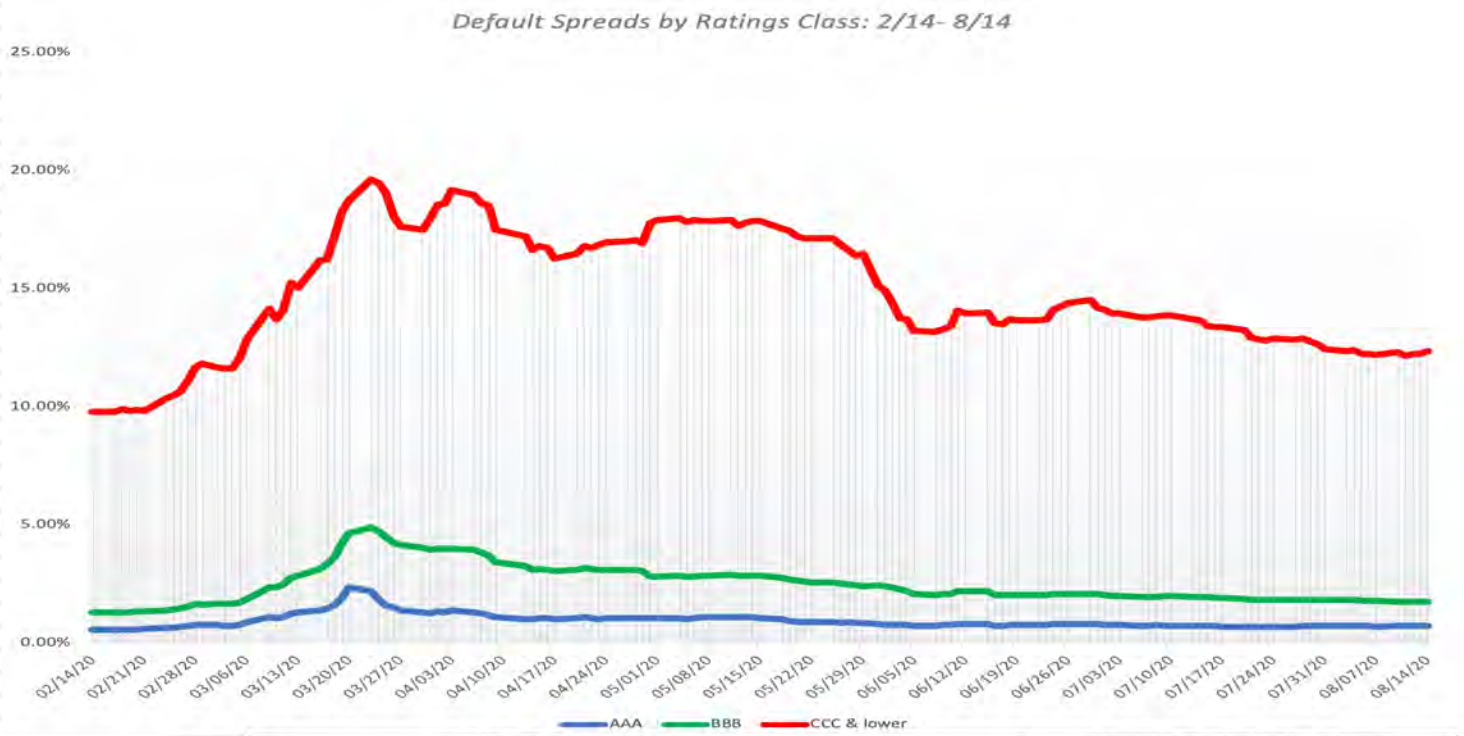
Bangladesh	8.75%	12.60%	10.52%
Cambodia	10.63%	16.08%	13.32%
China	5.89%	7.30%	6.26%
Fiji	8.75%	12.60%	10.52%
Hong Kong	5.69%	7.12%	6.12%
India	7.08%	9.49%	8.46%
Indonesia	7.08%	9.49%	8.03%
Japan	5.89%	7.30%	6.26%
Korea	5.69%	6.92%	5.96%
Laos	NA	8.21%	6.99%
Macao	5.80%	7.12%	6.12%
Malaysia	6.38%	8.21%	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%

When a crisis hits, the dark side beckons…

- During a crisis, you will be told that you can no longer value companies with fundamentals, and that you have to play the trading game.
  - 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, they are right.
  - If your notion of valuation is more dynamic and forward-looking, it is precisely at times like these that you need to go back to basics.
- More importantly, your story for the company matters more than ever before, since the numbers can no longer be used as a crutch.

How crises affect stories…

- Stories can expand: For some companies, a crisis can expand stories
  - By allowing them to reach new customers and devise new business models that have staying power (Zoom, Peloton)
  - By being in the right place at the right time (Moderna)
  - By handicapping or damaging the competition (Tesla, Airbnb)
- Stories can contract: For other companies, a crisis can shrink stories
  - By making their markets smaller (cruise lines definitely, airlines maybe)..
  - By being in the wrong place at the wrong time (commodity companies)
- And the risk of failure becomes real and un-ignorable: And for all companies, a crisis can increase the likelihood of failure (story break).

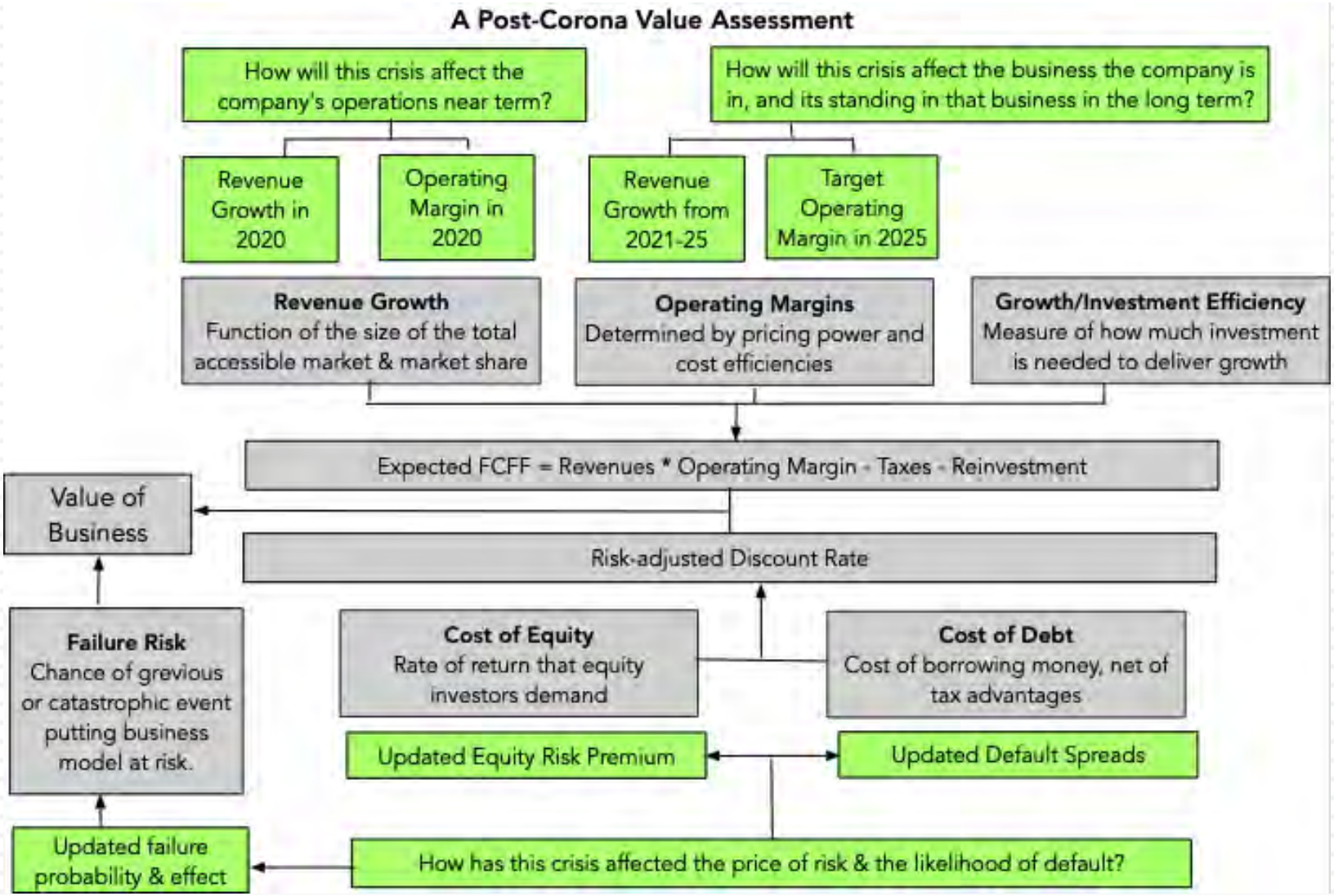
A Roadmap to Story Telling & Valuation in a crisis

1. Separate the near term from the long term: During a crisis, the near-term effects are likely to be both large and unpredictable (negative for most companies, but positive for a few). Estimate the near term effects on earnings and cash flows, using all of the information you have and bringing in views on how the macro economy will evolve.
2. Revisit your story for the company: Evaluate how your story for the company has changed as a result of the crisis, and play out its effect on your long term value inputs (revenue growth, margins and reinvestment)
3. Bring in failure risk: For your story to play out, the company has to survive. Incorporate, as best as you can, the likelihood that your company will not make it through.

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 & Minority 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						Mar-20
The Streaming Story						
With its technology and ease of use, Zoom is uniquely positioned to take advantage of a boom in online business/other meetings, driven partly by increased comfort on the part of managers with the technology and partly by costs. The Corona Virius will accelerate this shift to online meetings, increasing the overall market size, and while competitors will emerge, the networking benefits that Zoom builds up will allow it to keep a significant market share. Along the way, Zoom's margins will converge on the lofty margins earned by business and applidation software companies and the cost of capital will decline to reflect the fact that once mature it will be a diversified business services company, giving it the cost of capital of a mature company (at today's riskfree rate of 0.67%).						
The Assumptions						
	Base year	*Years 1-5*	*Years 6-10*		*After year 10*	*Link to story*
Revenues (a)	$ 623	50.00%	→ 0.67%		0.67%	
Operating margin (b)	9.70%	9.70%	→ 22.25%		22.25%	
Tax rate	25.00%	25.00%	→ 25.00%		25.00%	
Reinvestment (c)		Sales to capital ratio	3.25	RIR =	6.70%	
Return on capital	23.66%	Marginal ROIC =	74.66%		10.00%	
Cost of capital (d)		7.39%	→ 6.00%		6.00%	
The Cash Flows						
	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$ 934	12.21%	$ 114	$ 86	$ 96	$ (10)
2	$ 1,401	14.72%	$ 206	$ 155	$ 144	$ 11
3	$ 2,102	17.23%	$ 362	$ 272	$ 215	$ 56
4	$ 3,152	19.74%	$ 622	$ 467	$ 323	$ 144
5	$ 4,729	22.25%	$ 1,052	$ 789	$ 485	$ 304
6	$ 6,626	22.25%	$ 1,474	$ 1,106	$ 584	$ 522
7	$ 8,632	22.25%	$ 1,921	$ 1,441	$ 617	$ 824
8	$ 10,393	22.25%	$ 2,313	$ 1,734	$ 542	$ 1,193
9	$ 11,488	22.25%	$ 2,556	$ 1,917	$ 337	$ 1,580
10	$ 11,565	22.25%	$ 2,573	$ 1,930	$ 24	$ 1,906
Terminal year	$ 11,643	22.25%	$ 2,591	$ 1,943	$ 130	$ 1,813
The Value						
Terminal value			$ 34,011			
PV(Terminal value)			$ 17,331			
PV (CF over next 10 years)			$ 3,721			
Value of operating assets =			$ 21,052			
Adjustment for distress			$ -		Probability of failure =	0.00%
- Debt & Minority Interests			$ 119			
+ Cash & Other Non-operating assets			$ 855			
Value of equity			$ 21,789			
- Value of equity options			$ 868			
Number of shares			276.40			
Value per share			$ 75.69		Stock was trading at =	$113.75

Boeing						Mar-20

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	*Years 1-5*	*Years 6-10*		*After year 10*	*Link to story*
Revenues (a)	$ 76,559	15.00%	→ 2.00%		2.00%	
Operating margin (b)	-2.75%	-2.75%	→ 9.60%		9.60%	
Tax rate	25.00%	25.00%	→ 25.00%		25.00%	
Reinvestment (c)		Sales to capital ratio	3.79	RIR =	20.00%	
Return on capital	-10.42%	Marginal ROIC =	74.72%		10.00%	
Cost of capital (d)		9.25%	→ 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)	$ (2,019)	$ (1,426)
2	$ 79,239	4.73%	$ 3,751	$ 3,675	$ 2,726	$ 949
3	$ 91,124	9.60%	$ 8,749	$ 6,562	$ 3,135	$ 3,427
4	$ 104,793	9.60%	$ 10,061	$ 7,546	$ 3,605	$ 3,941
5	$ 120,512	9.60%	$ 11,571	$ 8,678	$ 4,146	$ 4,532
6	$ 135,455	9.60%	$ 13,005	$ 9,754	$ 3,941	$ 5,813
7	$ 148,730	9.60%	$ 14,280	$ 10,710	$ 3,501	$ 7,209
8	$ 159,439	9.60%	$ 15,308	$ 11,481	$ 2,824	$ 8,657
9	$ 166,773	9.60%	$ 16,012	$ 12,009	$ 1,934	$ 10,075
10	$ 170,108	9.60%	$ 16,333	$ 12,249	$ 880	$ 11,370
Terminal year	$ 173,510	9.60%	$ 16,659	$ 12,494	$ 2,499	$ 9,996

The Value

Terminal value	$ 181,737		
PV(Terminal value)	$ 78,764		
PV (CF over next 10 years)	$ 29,119		
Value of operating assets =	$ 107,883		
Adjustment for distress	$ 10,788	Probability of failure =	20.00%
- Debt & Minority Interests	$ 28,580		
+ Cash & Other Non-operating assets	$ 10,030		
Value of equity	$ 78,545		
- Value of equity options	$ -		
Number of shares	566.00		
Value per share	$ 138.77	Stock was trading at =	$127.68

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%