MY VALUATION JOURNEY: HAVE FAITH, YOU MUST!

January 2021

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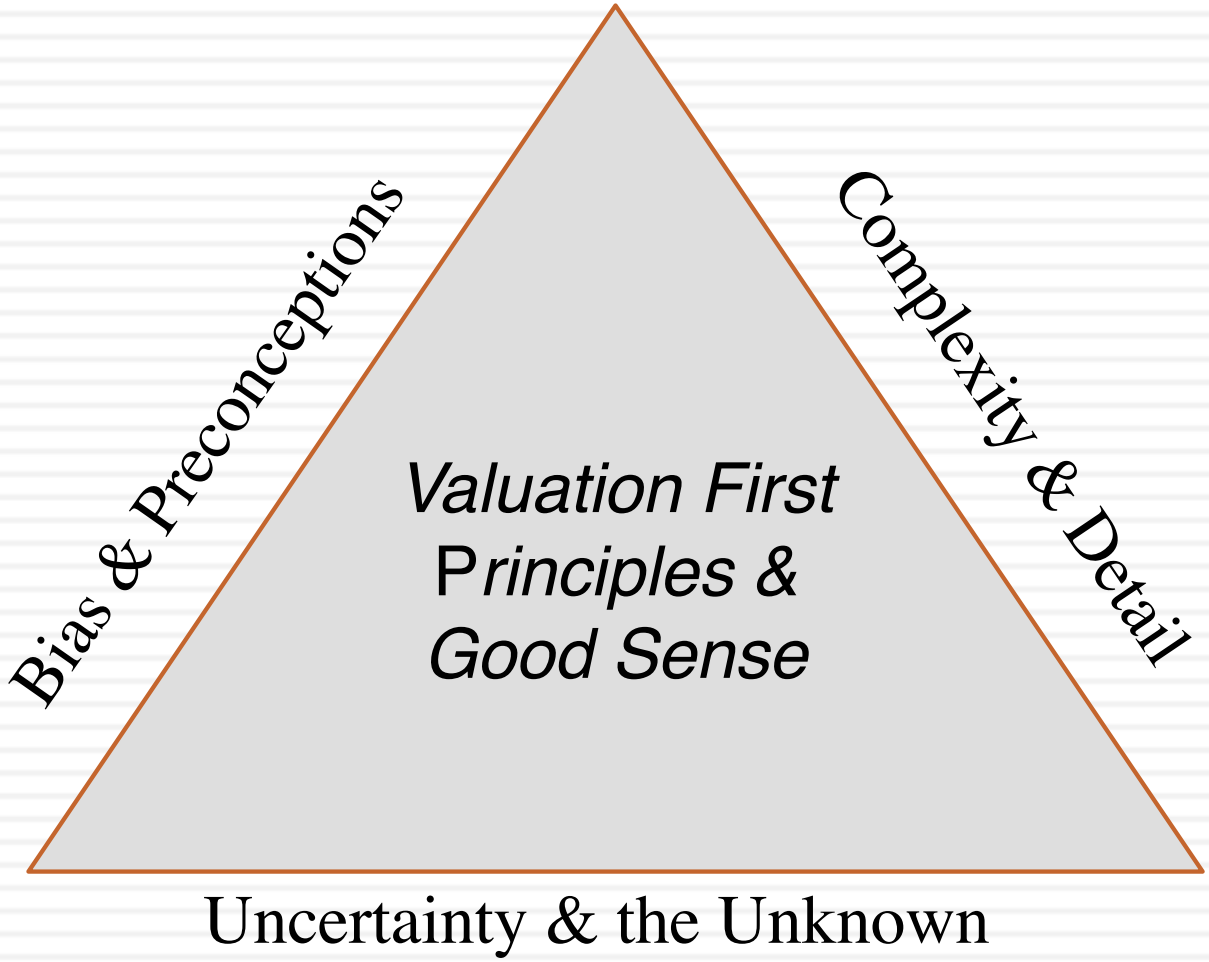
I. Your biggest challenges in valuation



Valuation Bias

- Preconceptions and priors: When you start on the valuation of a company, you almost never start with a blank slate. Instead, your valuation is shaped by your prior views of the company in question.
  - Corollary 1: The more you know about a company, the more likely it is that you will be biased, when valuing the company.
  - Corollary 2: The "closer" you get to the management/owners of a company, the more biased your valuation of the company will become.
- Value first, valuation to follow: In principle, you should do your valuation first before you decide how much to pay for an asset. In practice, people often decide what to pay and do the valuation afterwards.

Sources of bias

- The power of the subconscious: We are human, after all, and as a consequence are susceptible to
  - Herd behavior: For instance, there is the "market price" magnet in valuation, where estimates of intrinsic value move towards the market price with each iteration.
  - Hindsight bias: If you know the outcome of a sequence of events, it will affect your valuation. (That is why teaching valuation with cases is an exercise in futility)
- The power of suggestion: Hearing what others think a company is worth will color your thinking, and if you view those others as more informed/smarter than you are, you will be influenced even more.
- The power of money: If you have an economic stake in the outcome of a valuation, bias will almost always follow.
  - Corollary 1: Your bias in a valuation will be directly proportional to who pays you to do the valuation and how much you get paid.
  - Corollary 2: You will be more biased when valuing a company where you already have a position (long or short) in the company.

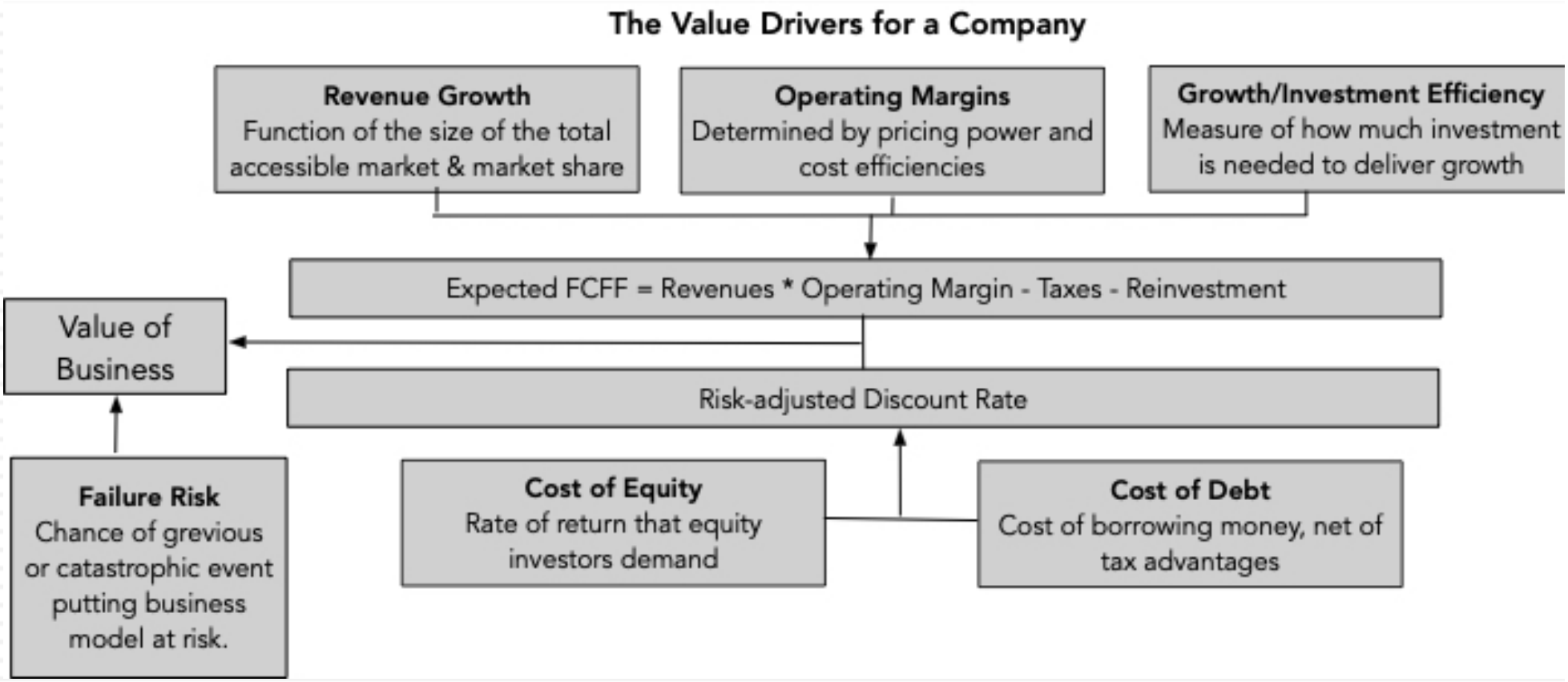
II. Don't assume that D+CF = DCF

- 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.

The drivers of value..



DCF as a tool for intrinsic valuation

Value of growth
The future cash flows will reflect expectations of how quickly earnings will grow in the future (as a positive) and how much the company will have to reinvest to generate that growth (as a negative). The net effect will determine the value of growth.
Expected Cash Flow in year t = E(CF) = Expected Earnings in year t - Reinvestment needed for growth

Cash flows from existing assets
The base earnings will reflect the earnings power of the existing assets of the firm, net of taxes and any reinvestment needed to sustain the base earnings.

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

Steady state
The value of growth comes from the capacity to generate excess returns. The length of your growth period comes from the strength & sustainability of your competitive advantages.

Risk in the Cash flows
The risk in the investment is captured in the discount rate as a beta in the cost of equity and the default spread in the cost of debt.

The **Chimera DCF** mixes dollar cash flows with peso discount rates, nominal cash flows with real costs of capital and cash flows before debt payments with costs of equity, violating basic consistency rules

In a **Dreamstate DCF**, you build amazing companies on spreadsheets, making outlandish assumptions about growth and operating margins over time.

In a **Dissonant DCF**, assumptions about growth, risk and cash flows are not consistent with each other, with little or no explanation given for the mismatch.

In a **Trojan Horse DCF**, Just as the Greeks used a wooden horse to smuggle soldiers into Troy, analysts use the Trojan Horse of cash flows to smuggle in a pricing (in the form of a terminal value, estimated by using a multiple).

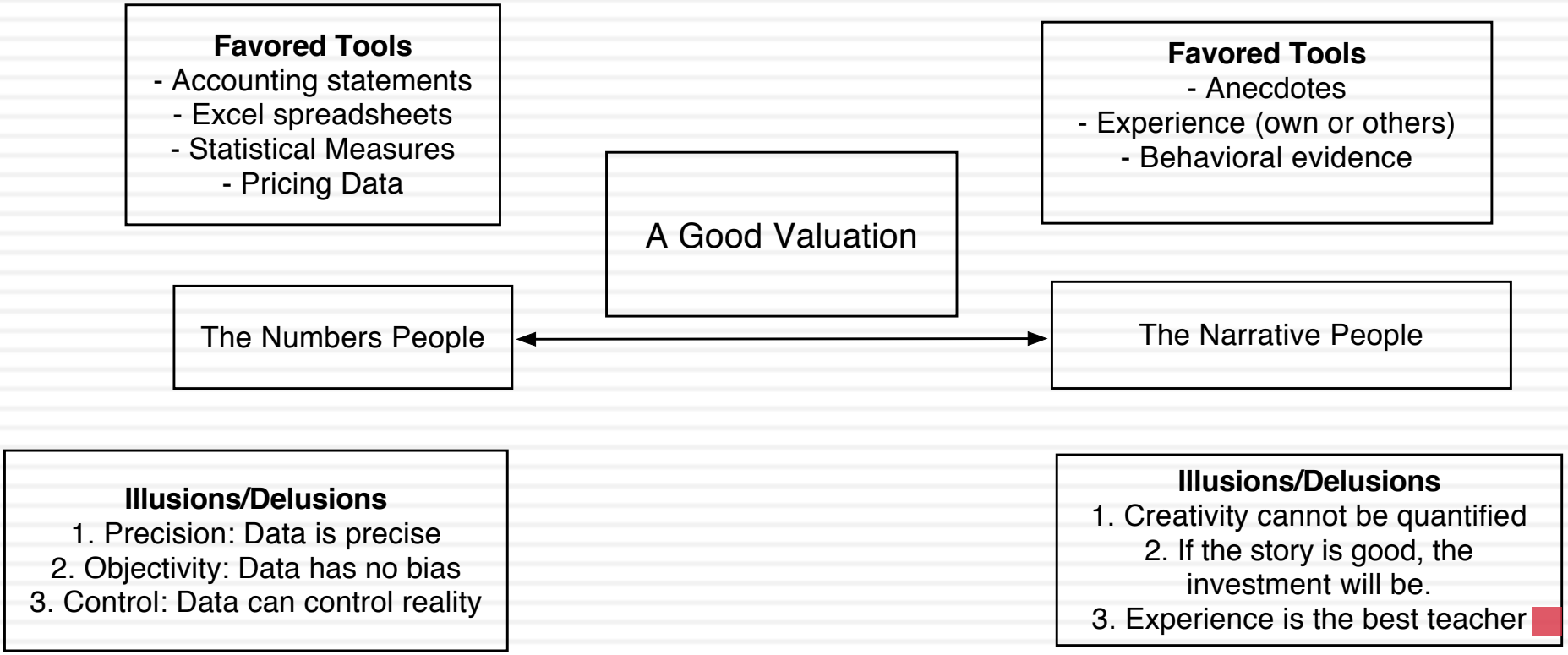
A **Kabuki DCF** is a work of art, where analyst and rule maker (or court) go through the motions of valuation, with the intent of developing models that are legally or accounting-rule defensible rather than yielding reasonable values.

D+CF ≠ DCF

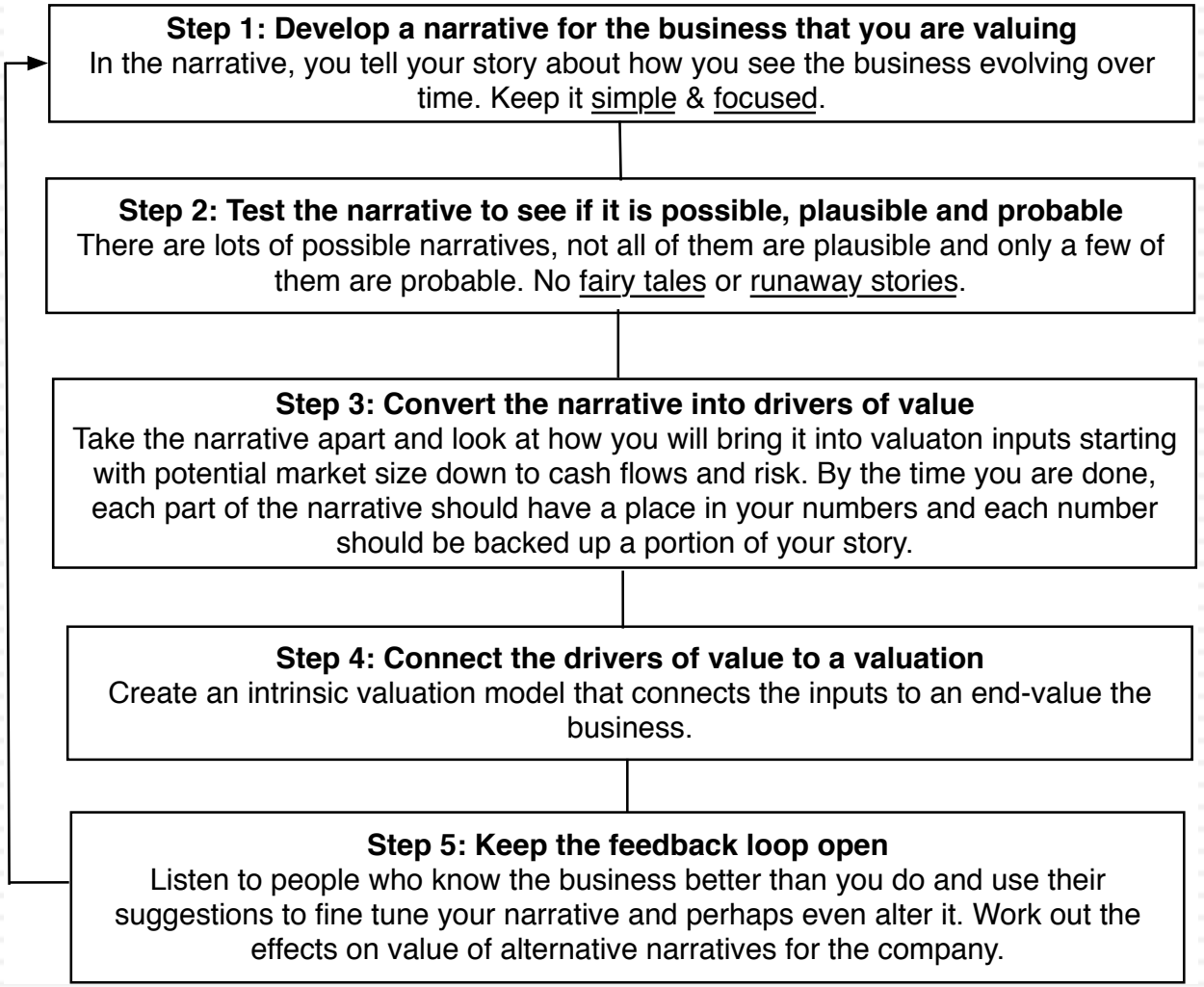
In a **Robo DCF**, the analyst builds a valuation almost entirely from the most recent financial statements and automated forecasts.

A **Mutant DCF** is a collection of numbers where items have familiar names (free cash flow, cost of capital) but the analyst putting it together has neither a narrative nor a sense of the basic principles of

III. Don't mistake modeling for valuation



From story to numbers and beyond..



Airbnb	Nov-20

The Story

Airbnb has brought the sharing economy to housing, connecting home owners (hosts) who own units or houses that they want to rent with renters (guests) online, collecting a percentage of the transaction revenues from both sides of the transaction. Its low capital intensity model and extended reach has allowed it to expand not only to expand to almost every part of the world (220 countries) but also provide an unmatched range of offerings. The growth in gross bookings has started to slow down, as the company gets bigger, and the COVID shut downs made 2020 a regressive year. That said, as its competitors in the hotel business have been damaged far more by the crisis, Airbnb will be able to recover quickly from the crisis, and continue on its growth path. Economies of scale will allow for only mild improvements in revenues as a % of gross billings, but the brokerage-based business will generate high margins, in steady state, and require relatively little reinvestment.

The Assumptions

	Base year	In 2021	Years 2-5	Years 6-10	After year 10	Link to story
Gross Bookings & Growth Rate	$ 26,491,803.00	40.00%	25.00%	→	2.00%	Growth continues, as hotels scale back growth plans after COVID shock.
Revenues as % of Gross Bookings	13.69%	12.65%	→	→	14.00%	Mild economies of scale allow slight increase in percent over time
Operating margin (b)	-13.69%	-10.0%	→	→	25.00%	Higher margins than the hotel business, but lower than ad driven businesses.
Tax rate	25.00%	0.00%	→	→	25.00%	Global/US marginal tax rate, after NOLs are used up.
Reinvestment (c)		Sales to Capital =		2.00	20.00%	Low capital intensity business
Return on capital	-25.61%	Marginal ROIC =		65.81%	10.00%	Networking benefits allow for high value growth
Cost of capital (d)			6.50%	→ 7.23%	7.23%	Cost of capital moves up over time.

The Cash Flows

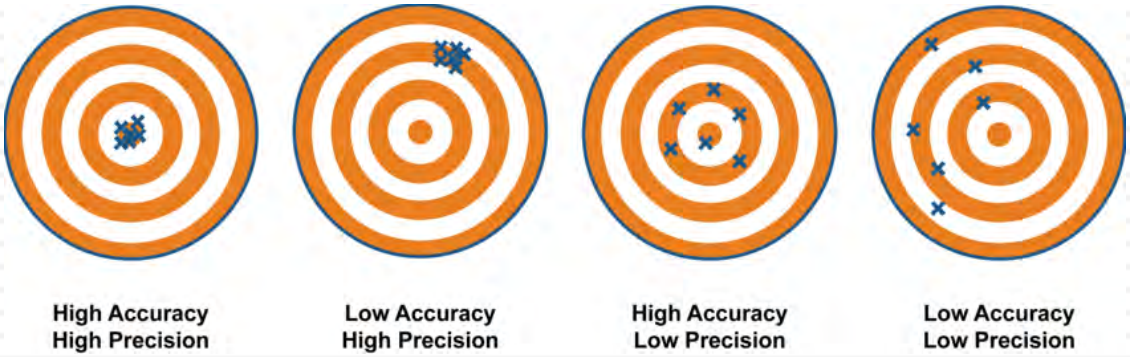
	Gross Bookings	Revenues	Operating Margin	EBIT (1-t)	Reinvestment	FCFF
1	$ 37,088,524.20	$ 4,691,698	-10.00%	$ (469,170)	$ 532,984	$ (1,002,153)
2	$ 46,360,655.25	$ 5,989,797	-3.00%	$ (179,694)	$ 649,049	$ (828,743)
3	$ 57,950,819.06	$ 7,565,479	0.50%	$ 37,827	$ 787,841	$ (750,014)
4	$ 72,438,523.83	$ 9,554,641	4.00%	$ 382,186	$ 994,581	$ (612,395)
5	$ 90,548,154.79	$ 12,065,542	7.50%	$ 777,799	$ 1,255,450	$ (477,651)
6	$ 109,019,978.36	$ 14,674,089	9.52%	$ 1,047,952	$ 1,304,274	$ (256,322)
7	$ 126,245,134.94	$ 17,163,026	13.39%	$ 1,723,792	$ 1,244,469	$ 479,323
8	$ 140,384,590.06	$ 19,274,804	17.26%	$ 2,495,269	$ 1,055,889	$ 1,439,380
9	$ 149,649,973.00	$ 20,748,969	21.13%	$ 3,288,271	$ 737,082	$ 2,551,189
10	$ 152,642,972.46	$ 21,370,016	25.00%	$ 4,006,878	$ 310,524	$ 3,696,354
Terminal year	$ 155,695,831.91	$ 21,797,416	25.00%	$ 4,087,016	$ 817,403	$ 3,269,612

The Value

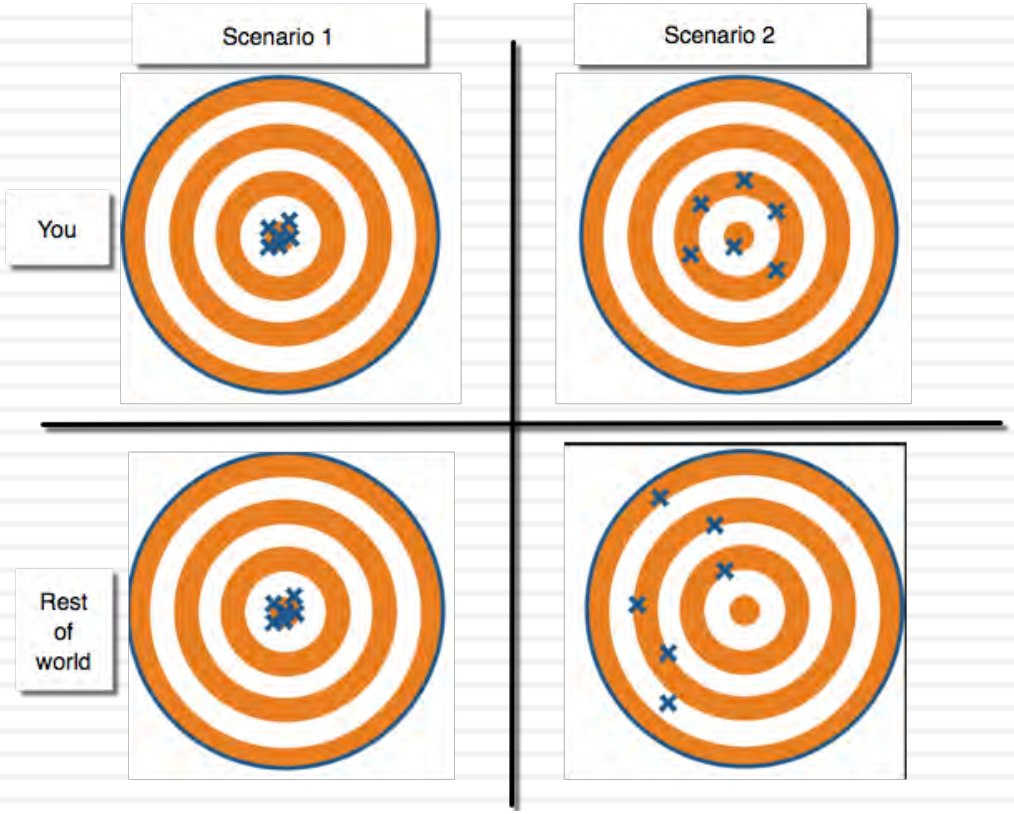
Terminal value	$ 62,516,491		
PV(Terminal value)	$ 32,633,194		
PV (CF over next 10 years)	$ 1,234,582		
Value of operating assets =	$ 33,867,776		
Adjustment for distress	$ 1,693,389	Probability of failure =	10.00%
- Debt & Minority Interests	$ 2,192,381		
+ IPO Proceeds	$ 3,000,000	Based upon early news stories. May change as final offering details are set.	
+ Cash & Other Non-operating assets	$ 4,495,211		
Value of equity	**$ 37,477,217**		
- Value of equity options	$ 1,351,835		
Number of shares	935,298.09	Filler for the moment. Will update when final prospectus is filed	
Value per share	$ 38.62	Stock was trading at =	$35.00

IV. Don't mistake precision for accuracy.. And accuracy for payoff..

Better accurate than precise



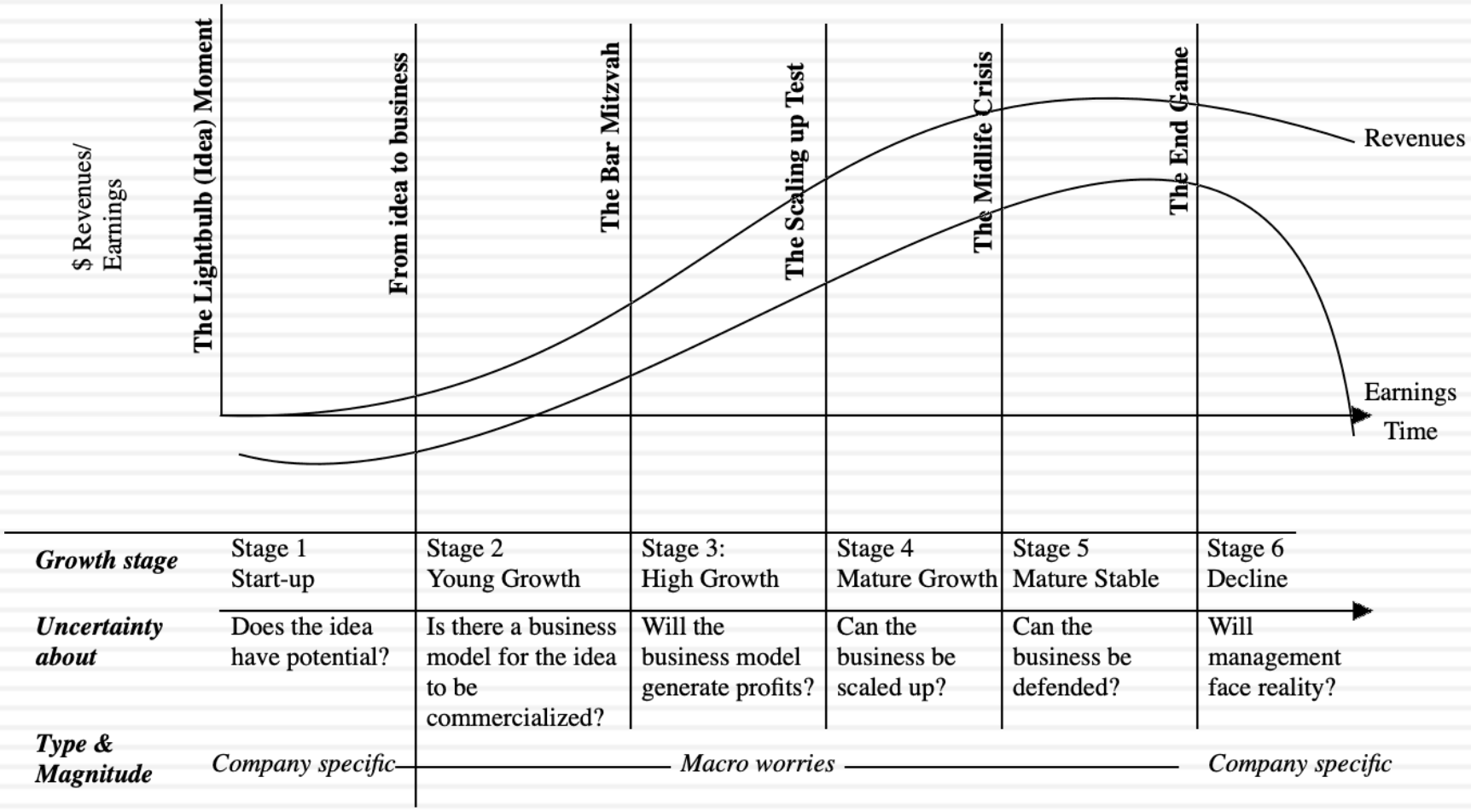
It's all relative



The sources of uncertainty

- Estimation versus Economic uncertainty
  - Estimation uncertainty reflects the possibility that you could have the "wrong model" or estimated inputs incorrectly within this model.
  - Economic uncertainty comes the fact that markets and economies can change over time and that even the best medals will fail to capture these unexpected changes.
- Micro uncertainty versus Macro uncertainty
  - Micro uncertainty refers to uncertainty about the potential market for a firm's products, the competition it will face and the quality of its management team.
  - Macro uncertainty reflects the reality that your firm's fortunes can be affected by changes in the macro economic environment.
- Discrete versus continuous uncertainty
  - Discrete risk: Risks that lie dormant for periods but show up at points in time. (Examples: A drug working its way through the FDA pipeline may fail at some stage of the approval process or a company in Venezuela may be nationalized)
  - Continuous risk: Risks changes in interest rates or economic growth occur continuously and affect value as they happen.

A Life Cycle View



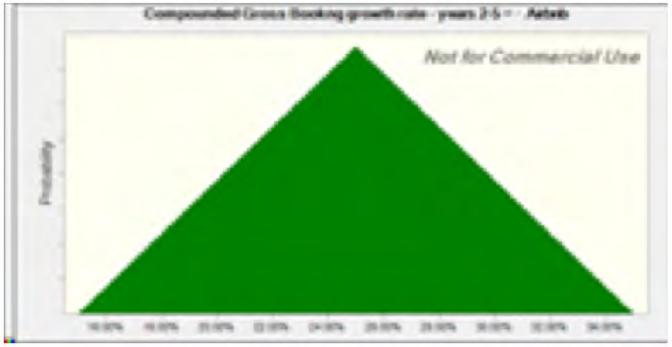
And the dark side will beckon..

- With young start up companies, you will be told that it is "too difficult" or even "impossible" to value these companies, because there is so little history and so much uncertainty in the future.
- Instead, you will be asked to come over to the "dark side", where
  - You will see value metrics that you have never seen before
  - You will hear "macro" stories, justifying value
  - You will be asked to play the momentum game
- While all of this behavior is understandable, none of it makes the uncertainty go away. You have a choice. You can either hide from uncertainty or face up to it.

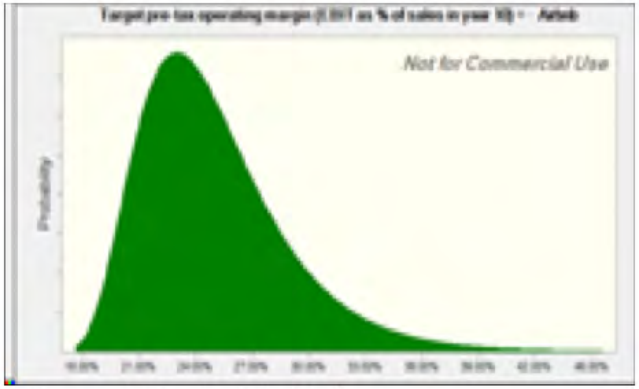
A sobering reminder: You will be "wrong" and it is okay

- No matter how careful you are in getting your inputs and how well structured your model is, your estimate of value will change both as new information comes out about the company, the business and the economy.
- As information comes out, you will have to adjust and adapt your model to reflect the information. Rather than be defensive about the resulting changes in value, recognize that this is the essence of risk.
- Remember that it is not just your value that is changing, but so is the price, and the price will change a great deal more than the value.

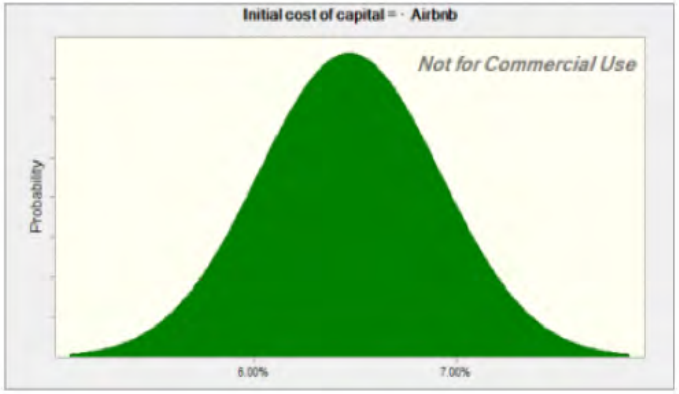
Growth rate in Gross Bookings: 2022-2025
Expected = 25%, Max = 35%, Min = 15%



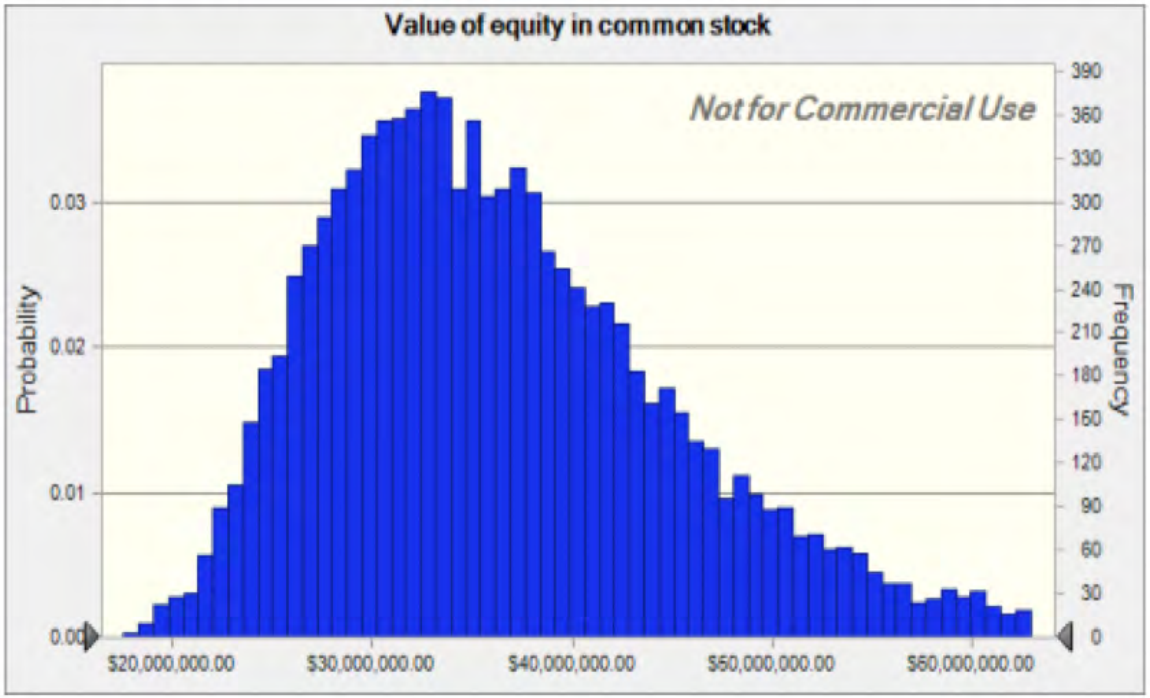
Target Operating Margin in year 10
Expected = 25%, Std Dev = 4%



Cost of Capital (initial)
Expected = 6.50%, Std Dev = 0.45%



Airbnb IPO: Simulation of Equity Value in November 2020



Percentile	*Forecast values*
0%	$17,591,165
10%	$26,150,864
20%	$28,790,133
30%	$30,952,251
40%	$32,981,840
50%	$35,114,898
60%	$37,463,932
70%	$40,181,915
80%	$43,595,272
90%	$49,120,328
100%	$100,382,037

V. Don’t mistake price for value!

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

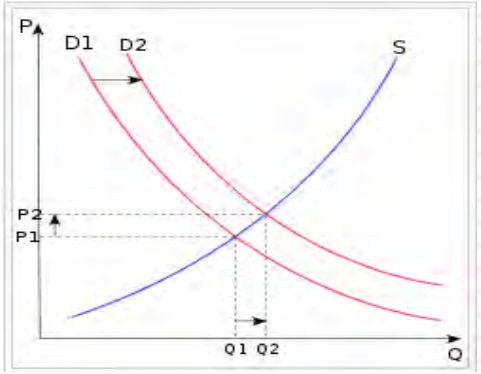
INTRINSIC VALUE

Value

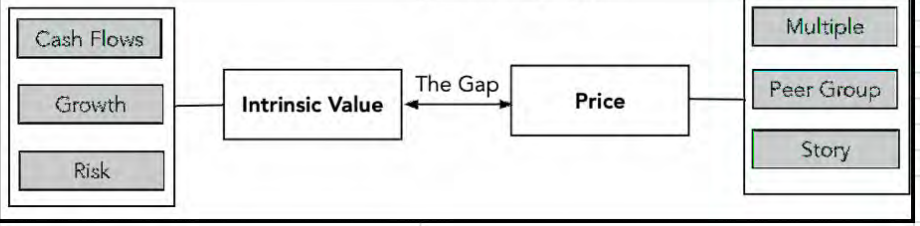
THE GAP
Is there one?
If so, will it close?
If it will close, what will cause it to close?

Price

PRICE



In the market? What's your game?

	Value	Price
What drives it	Cash flows, Growth and Risk	Demand and supply, which brings in mood and momentum and other behavioral factors on top of fundamentals
How to estimate it	Forecast cash flows and adjust for risk, either by risk adjusting the cash flows or the discount rate.	Assess what other people are paying for similar assets/investments, by scaling the price they are paying to a common metric (multiple)
What causes change	Change in the fundamentals at the company level (earnings, cash flows, growth and risk) or at the macro level (interest rates, risk premiums)	Changes in fundamentals matter, but are often drowned out by swings in mood and momentum caused by "incremental news stories".
Investment Philosophy	Invest in assets that trade at prices less than value, and make money as price moves to value.	Buy assets at low prices and sell them at higher prices, i.e., trade the assets.
Key ingredients	Valuation skills, Patience, Faith	Gauge mood and momentum well and get timing right.
A Picture		

Classifying Assets: Value versus Price

	To value	To price
Assets	Can be valued based upon expected cashflows, with higher cashflows & lower risk = higher value.	Can be priced against similar assets, after controlling for cash flows and risk.
Commodity	Can be valued, based upon utilitarian demand and supply, but with long lags in both.	Can be priced against its own history (normalized price over time)
Currency	Cannot be valued	Can be priced against other currencies, with greater acceptance & more stable purchasing power = higher price.
Collectible	Cannot be valued	Can be priced based upon scarcity and desirability.

The determinants of price

Mood and Momentum
Price is determined in large part by mood and momentum, which, in turn, are driven by behavioral factors (panic, fear, greed).

Liquidity & Trading Ease
While the value of an asset may not change much from period to period, liquidity and ease of trading can, and as it does, so will the price.

The Market Price

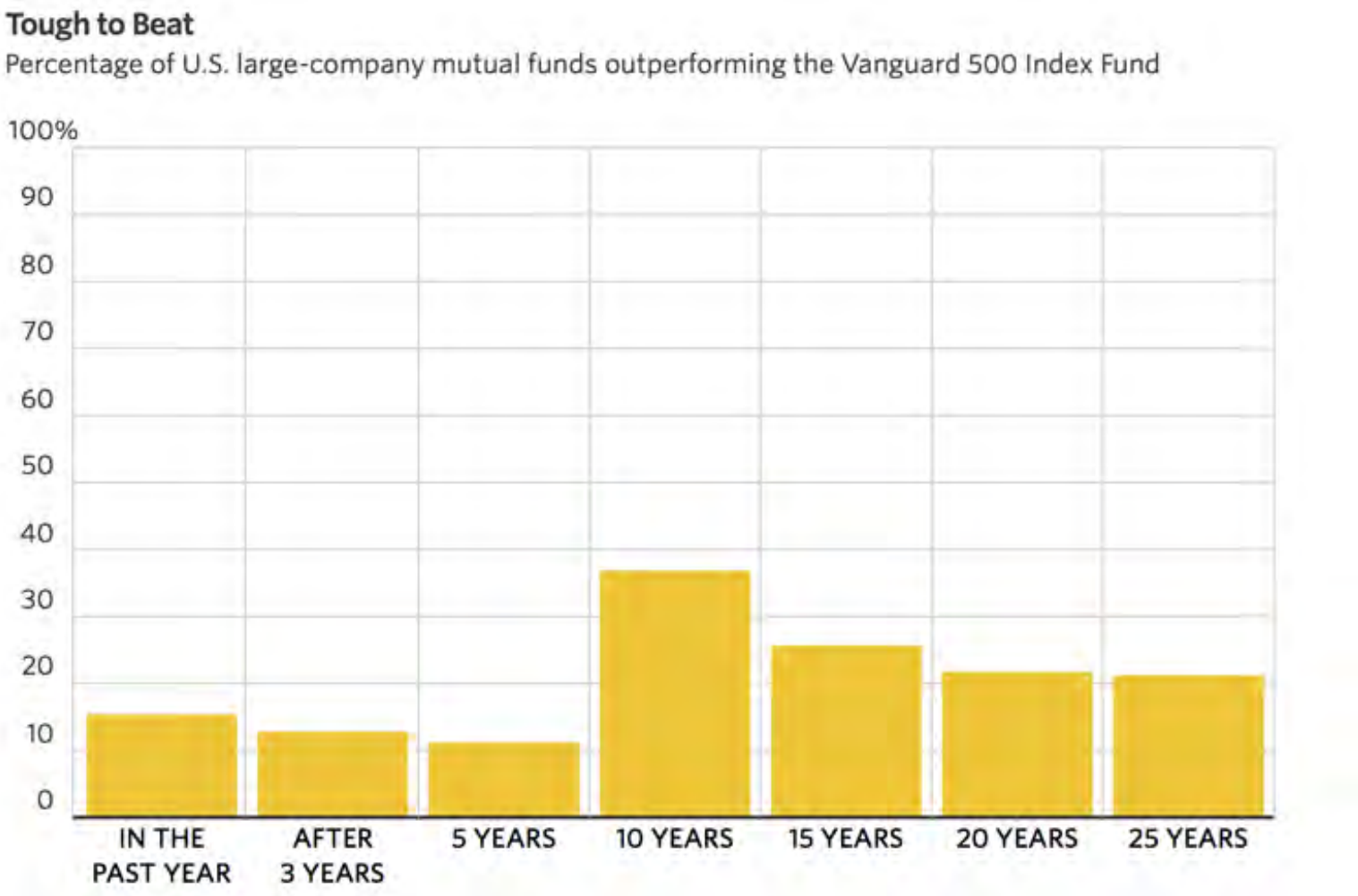
Incremental information
Since you make money on price changes, not price levels, the focus is on incremental information (news stories, rumors, gossip) and how it measures up, relative to expectations

Group Think
To the extent that pricing is about gauging what other investors will do, the price can be determined by the "herd".

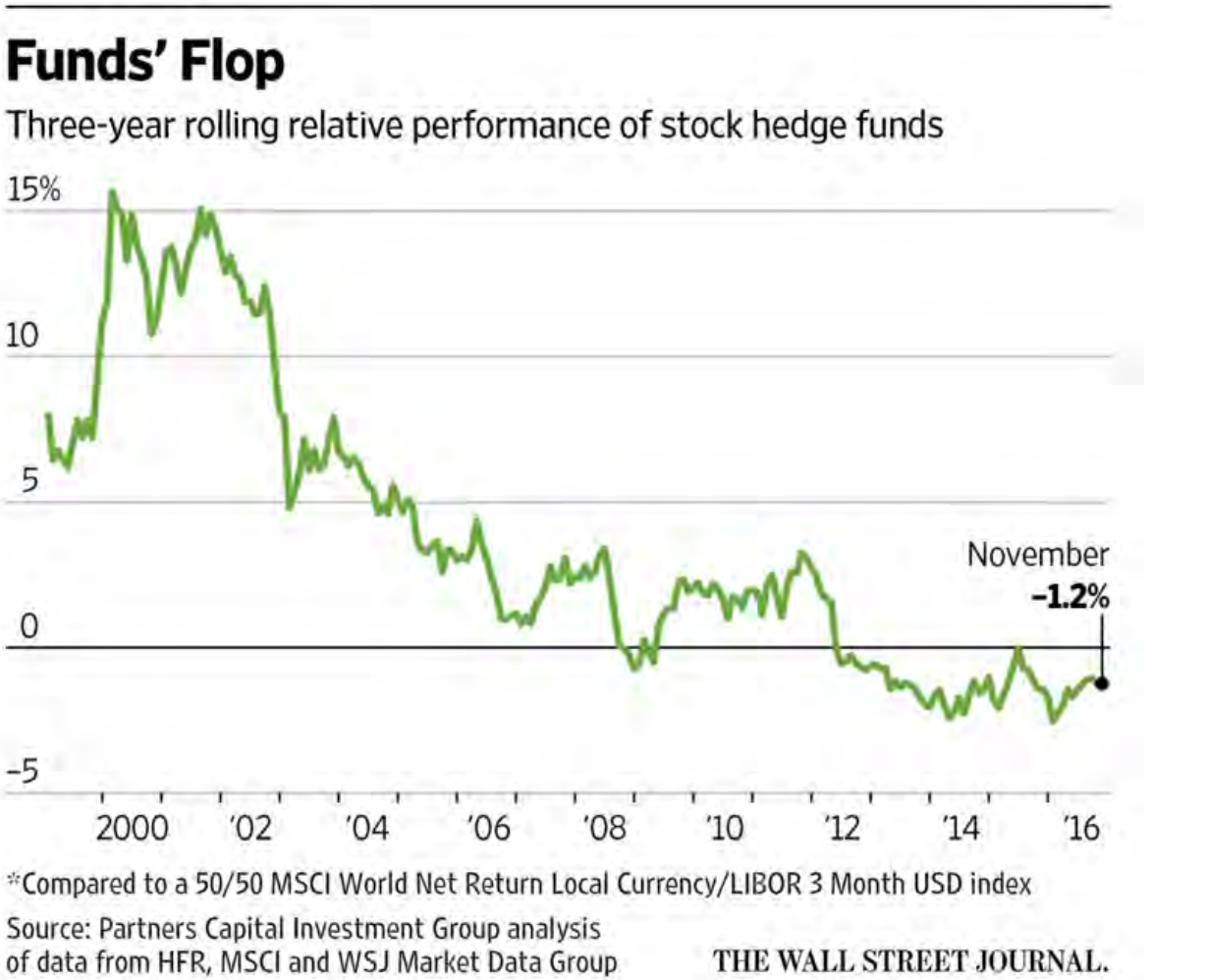
VI. Investing is an act of faith..

- When investing, we are often told that if you are virtuous (careful in your research, good at valuation, have a long time horizon), you will be rewarded (with high returns).
  - That pitch is amplified by anecdotal evidence of righteous ones, i.e., those who have followed the path to success.
  - Those who chose not to be virtuous are labeled as "speculators", viewed as shallow and deserving of the fate that awaits them.
- If you have faith in investing, you will be tested. And you will sometimes fail.. And that's okay…

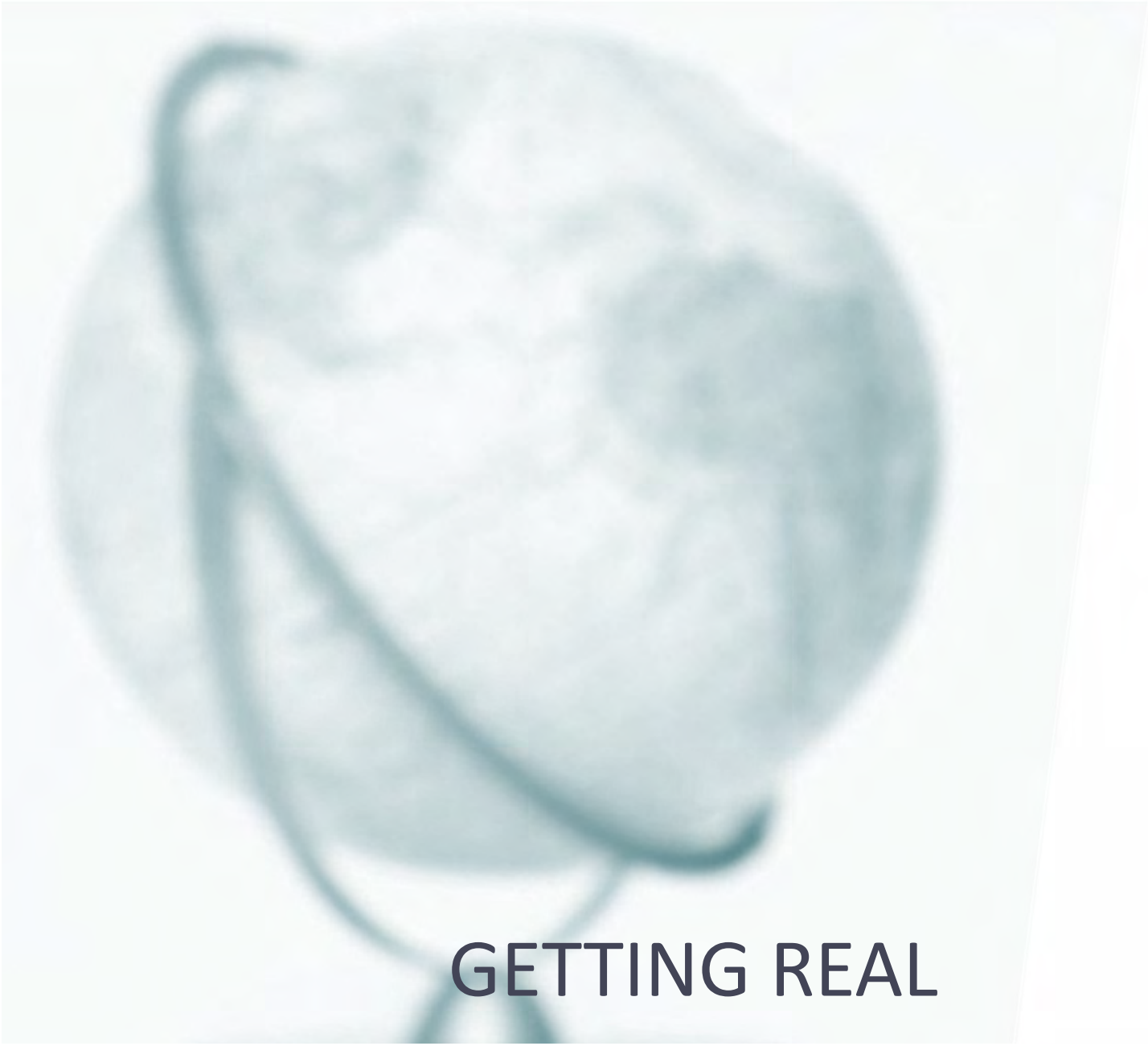
Active Investing is a loser's game



And the ”smart” money does not stay smart for very long



Follow the yellow brick road..

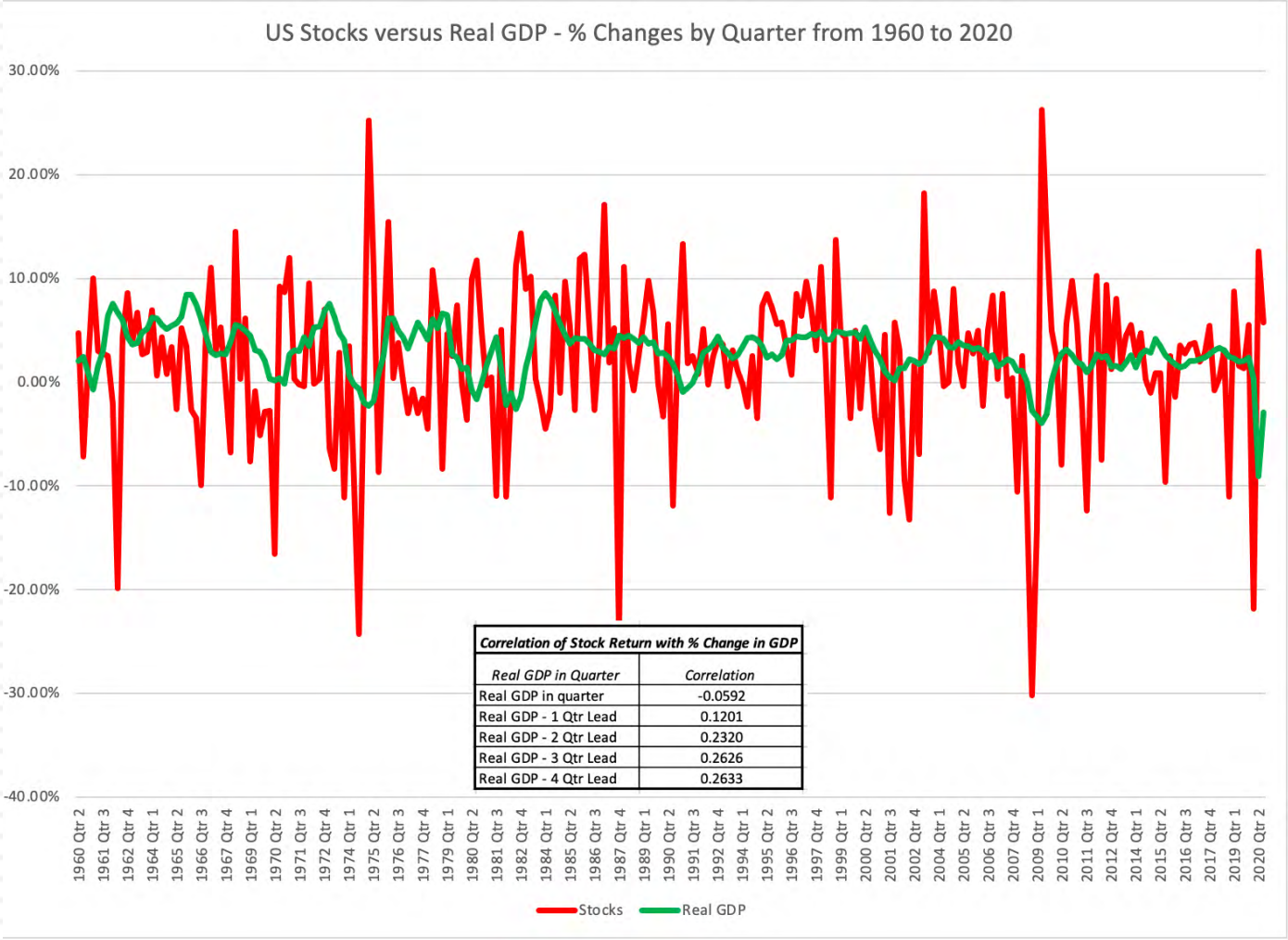


GETTING REAL

Market Worries

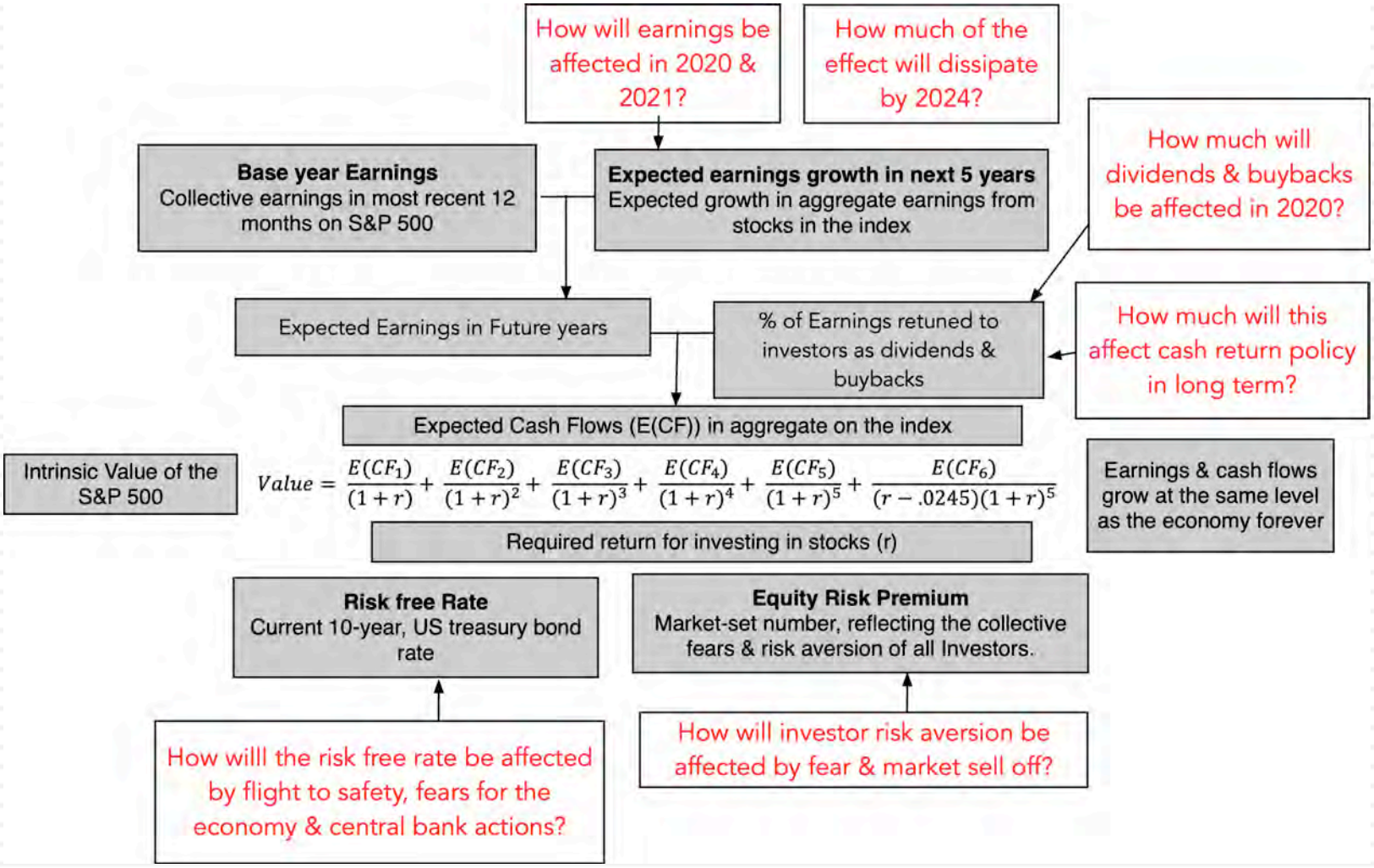
- Disconnect from economic news: For some, the skepticism comes from the disconnect with macroeconomic numbers that are abysmal, as unemployment claims climb into the tens of millions and consumer confidence hovers around historic lows. I will spend the first part of this section arguing that this reflects 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	-0.0592
Real GDP - 1 Qtr Lead	0.1201
Real GDP - 2 Qtr Lead	0.2320
Real GDP - 3 Qtr Lead	0.2626
Real GDP - 4 Qtr Lead	0.2633

Value Drivers for the Index



1. Earnings

Estimated S&P 500 Earnings (Ed Yardeni)		
Year	Earnings on Index	
2019		163
2020	-23.31%	125
2021	24.00%	155
2022	16.13%	180

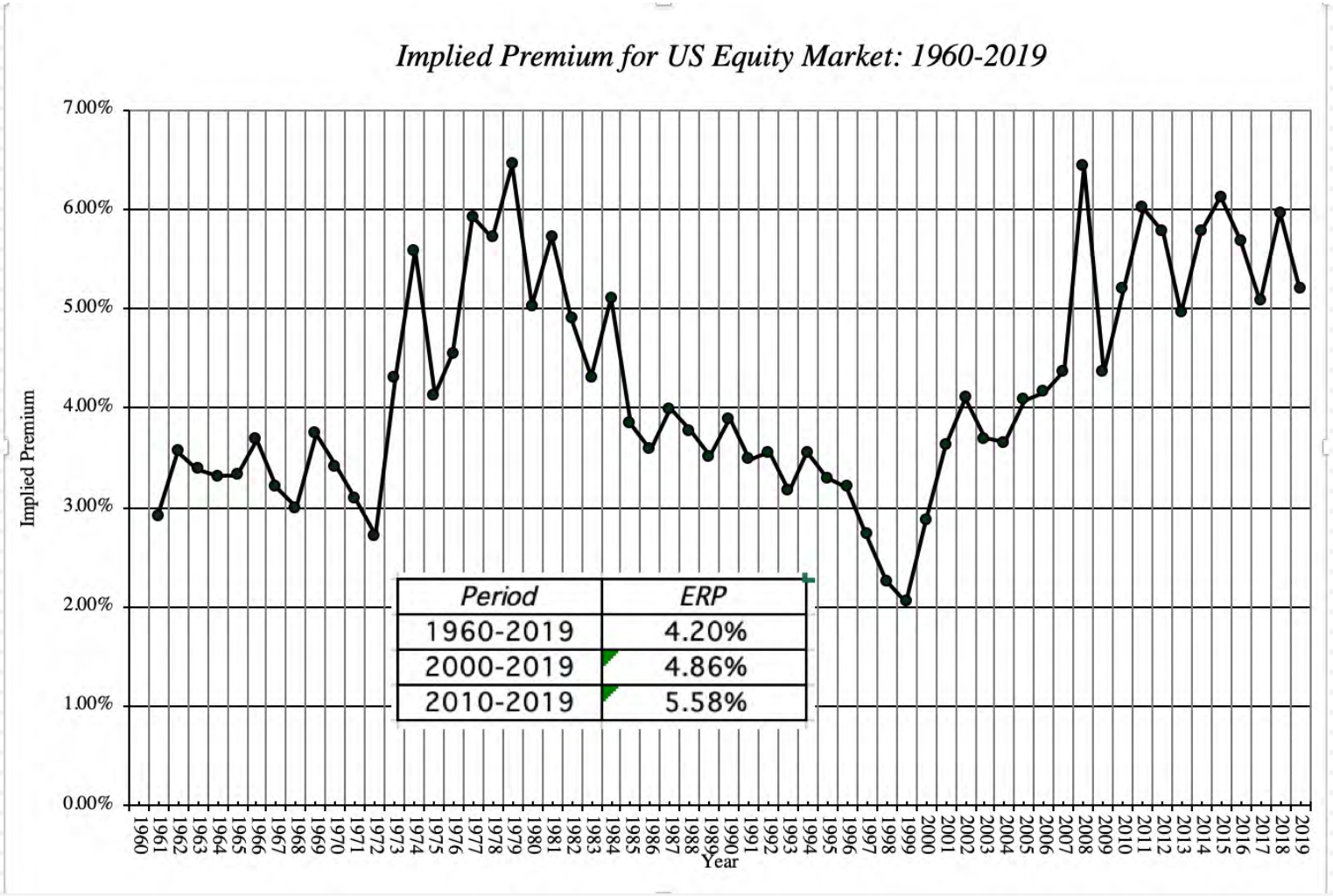
Bottom-up Estimates (Analyst Consensus on 10/5/20		
Year	Earnings on Index	
2019		162.97
2020	-20.10%	130.21
2021	27.65%	166.21
2022	14.76%	190.75

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

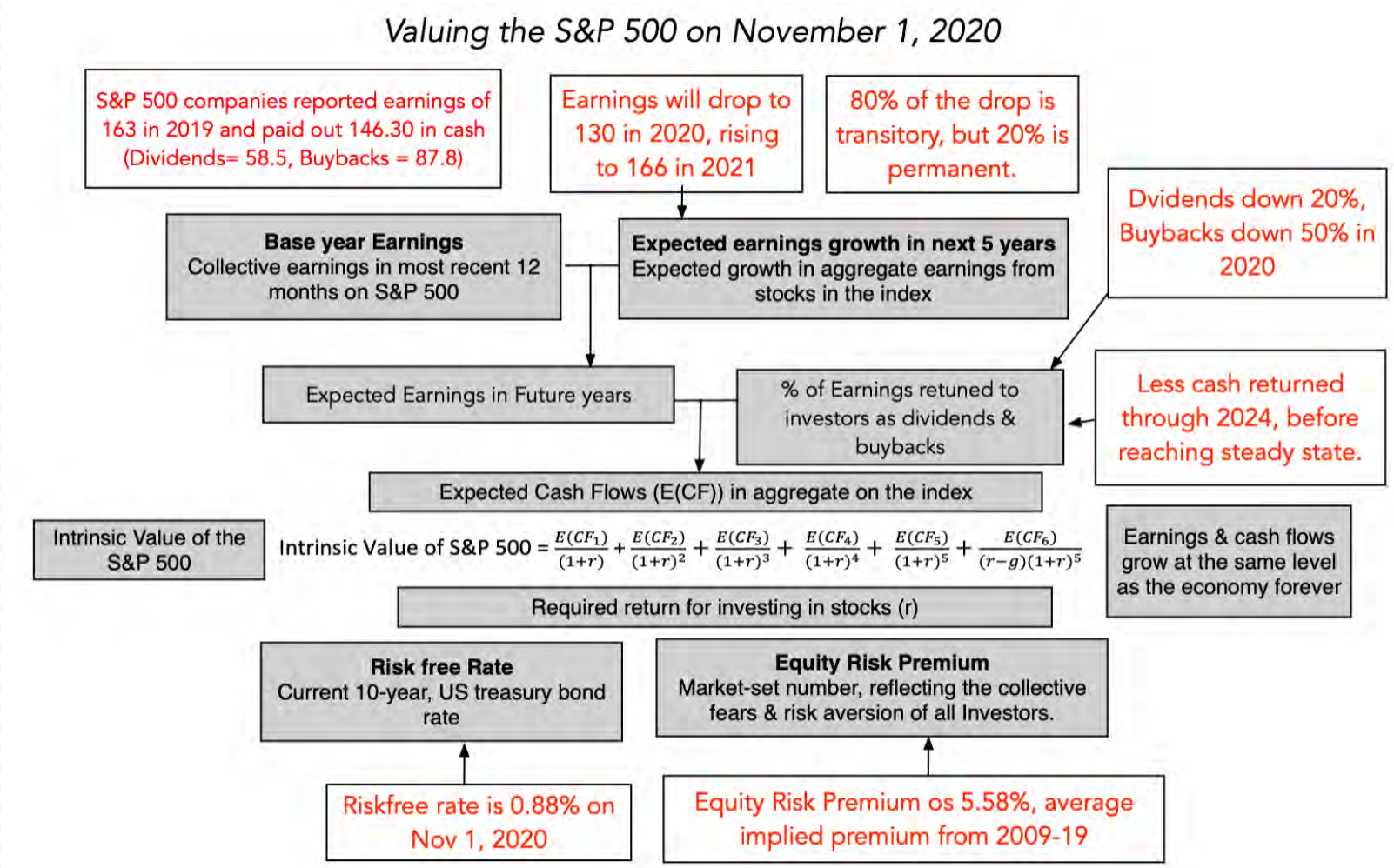
	S&P 500					
Year	Market value	Earnings	Dividends	Buybacks	Cash Returned as % of Earnings	Cash Returned as % of Market Cap
2001	1148.09	38.85	15.74	14.34	77.43%	2.62%
2002	879.82	46.04	15.96	13.87	64.78%	3.39%
2003	1111.91	54.69	17.88	13.70	57.74%	2.84%
2004	1211.92	67.68	19.01	21.59	59.99%	3.35%
2005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

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%

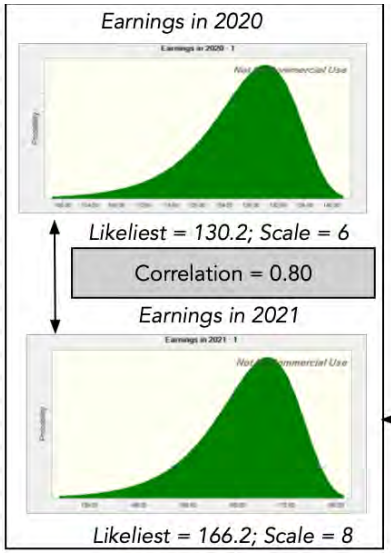
0.88%+5.58% = 6.46%

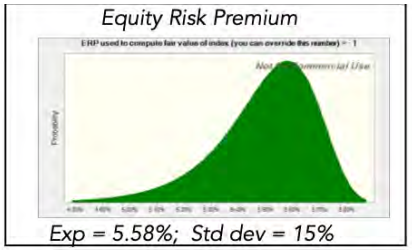
ERP stays at 5.58%, average from 2009-19

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





Correlation =-.5

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

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