THE DISRUPTION DILEMMA: VALUING THE DISRUPTORS & DISRUPTED

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The Disruptive Economy

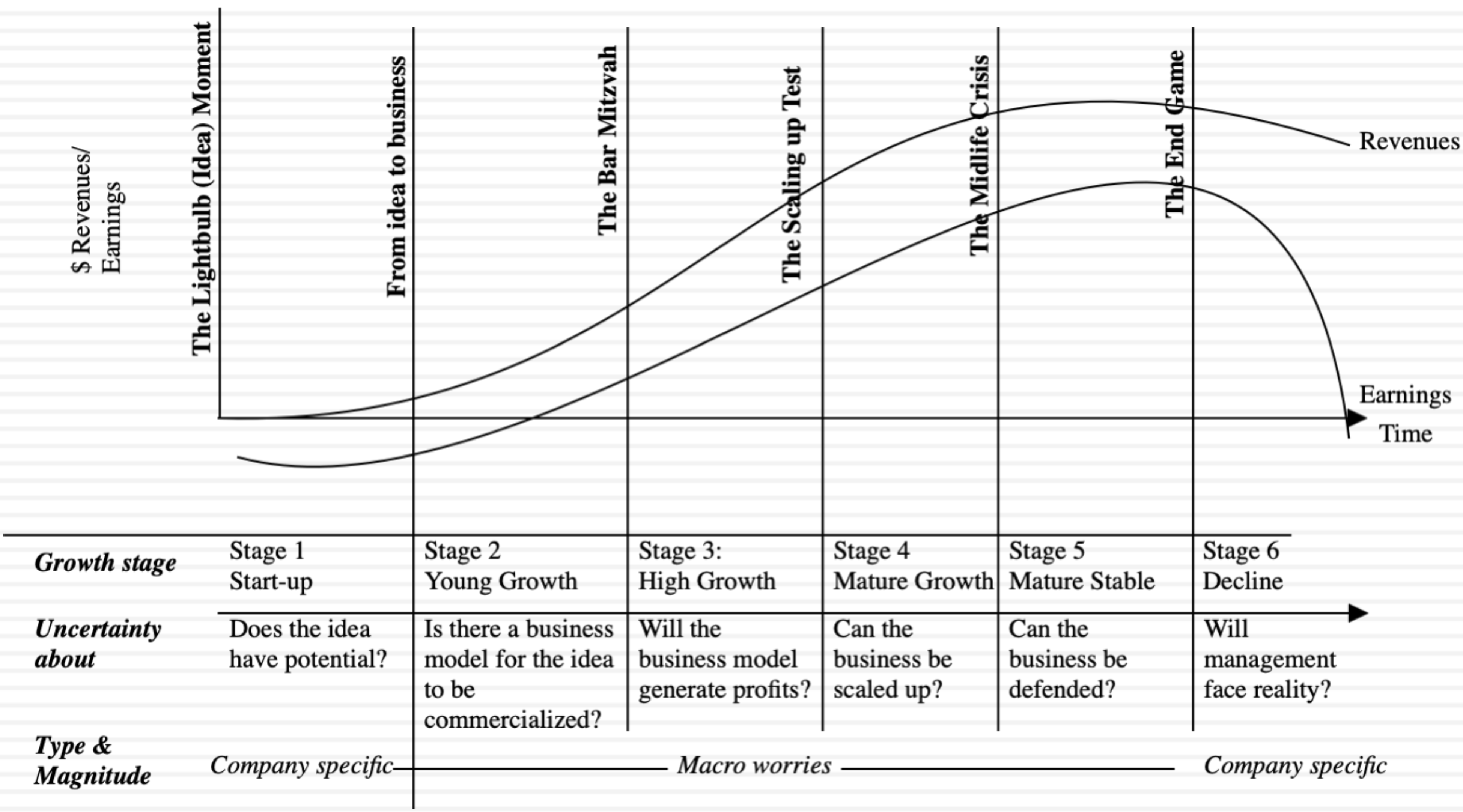
- We live in disruptive times: It is true that we live in an age where the status quo is being challenged and upended by upstarts and disruptors.
- Leading to change at every level: The resulting change at both the macro and micro level has made investors nervous, but not nervous enough to stop investing.
- And questioning of current practices: It has however put existing investing metrics and valuation practices under stress, leading some to question whether they are useful.
- Conviction that this is unique: Much as we would like to believe that we are facing more change and disruption than people in other generations, it depends on your frame of reference.

And we deal with uncertainty as humans always have…

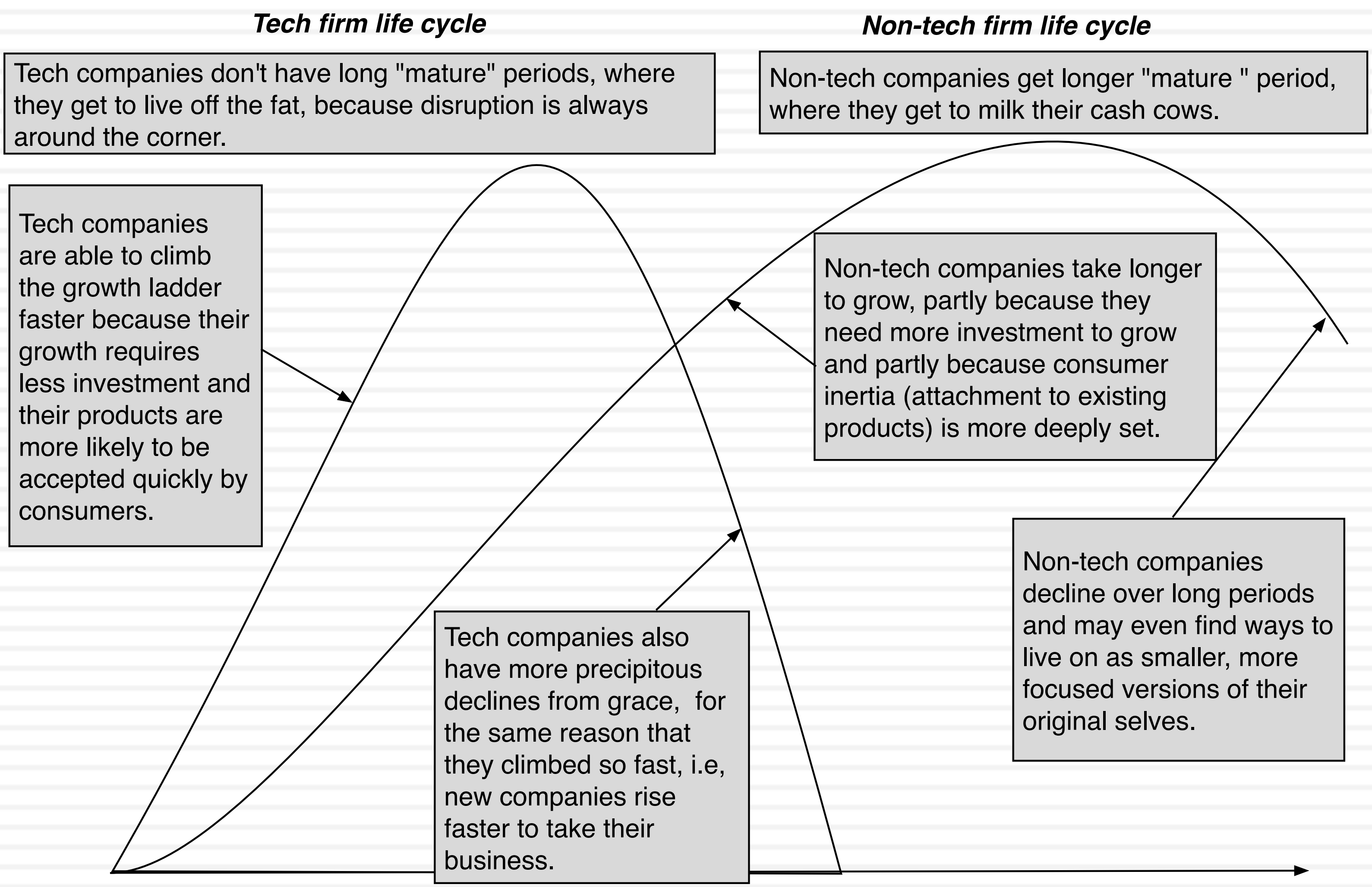
- Divine Intervention: Praying for intervention from a higher power is the oldest and most practiced risk management system of all.
- Paralysis & Denial: When faced with uncertainty, some of us get paralyzed. Accompanying the paralysis is the hope that if you close your eyes to it, the uncertainty will go away
- Mental short cuts (rules of thumb): Behavioral economists note that investors faced with uncertainty adopt mental short cuts that have no basis in reality. And here is the clincher. More intelligent people are more likely to be prone to this.
- Herding: When in doubt, it is safest to go with the crowd.. The herding instinct is deeply engrained and very difficult to fight.
- Outsourcing: Assuming that there are experts out there who have the answers does take a weight off your shoulders, even if those experts have no idea of what they are talking about.

Categorizing and Responding to uncertainty

The Evolution of Uncertainty



With an added complication…



Forecasting in the face of uncertainty. A test:

- In which of these two cities would you find it easier to forecast the weather?

Weather changeability for Honolulu, Hawaii

Temperature	Last Month	Last Year
Average change in high temperature day-to-day	1.7°	1.2°
Average change in low temperature day-to-day	1.5°	2.0°

Precipitation	Last Month	Last Year
Chance of dry day after a precip day	67%	81%
Chance of precip day after a dry day	7%	13%

Weather changeability for Epping, North Dakota

Temperature	Last Month	Last Year
Average change in high temperature day-to-day	8.5°	7.7°
Average change in low temperature day-to-day	7.1°	8.6°

Precipitation	Last Month	Last Year
Chance of dry day after a precip day	50%	65%
Chance of precip day after a dry day	38%	20%

But the payoff is greatest where there is the most uncertainty…

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Further changeability analysis »

Weather forecast accuracy for Honolulu, Hawaii

Last Month

MeteoGroup	**88.44%**
Persistence	**81.80%**
CustomWeather	**78.23%**
The Weather Channel	73.12%
AccuWeather	69.89%
Weather Underground	62.10%
National Weather Service	48.39%
Foreca	44.35%
WeatherBug	32.26%

Last Year

MeteoGroup	**88.50%**
CustomWeather	**85.87%**
AccuWeather	**81.82%**
The Weather Channel	81.56%
Persistence	80.44%
Weather Underground	67.07%
National Weather Service	59.90%
Foreca	57.52%
WeatherBug	37.09%

Weather changeability for Epping, North Dakota

Temperature	Last Month	Last Year
Average change in high temperature day-to-day	8.5°	7.7°
Average change in low temperature day-to-day	7.1°	8.6°

Precipitation	Last Month	Last Year
Chance of dry day after a precip day	50%	65%
Chance of precip day after a dry day	38%	20%

Further changeability analysis »

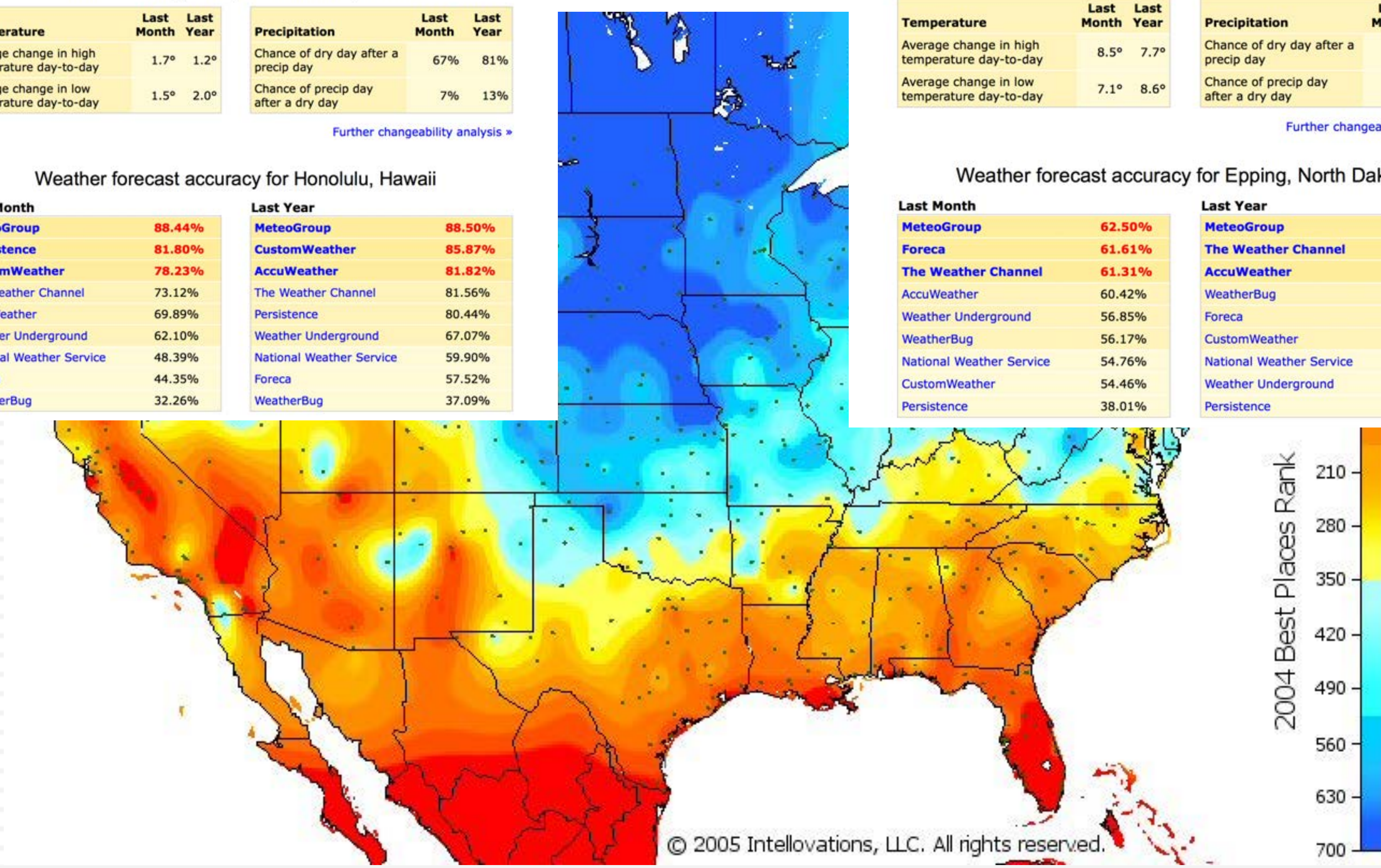
Weather forecast accuracy for Epping, North Dakota

Last Month

MeteoGroup	**62.50%**
Foreca	**61.61%**
The Weather Channel	**61.31%**
AccuWeather	60.42%
Weather Underground	56.85%
WeatherBug	56.17%
National Weather Service	54.76%
CustomWeather	54.46%
Persistence	38.01%

Last Year

MeteoGroup	**66.97%**
The Weather Channel	**66.73%**
AccuWeather	**64.86%**
WeatherBug	64.80%
Foreca	62.75%
CustomWeather	62.70%
National Weather Service	62.64%
Weather Underground	61.38%
Persistence	44.09%



The Two Sides of Disruption

When there are winners, there will also be losers…

The Disruptor and Disrupted

- The Disruption Dance: There are two sides to disruption, the disruptor (who challenges the status quo with a new way of doing things) and the disrupted (which is targeted by the disruptor).
- Characteristics of Disruptors: While anyone can be a disruptor, you generally are more likely to be the disruptor, if you have nothing to lose. Disruptors tend to be
  - Younger businesses, often with younger management & employees
  - With no or very little to gain from the status quo
- Characteristics of Disrupted: In general, businesses are more likely to be disrupted if they are
  - Large, with established practices
  - Inefficient, either because of inertia, design or regulations.
  - Tied to the status quo, but unhappy with it at the same time.

The Five Stages of being Disrupted: Taxi Cabs and Uber

Stage of disruption	The Disrupted
1. Denial and Delusion	In the first year or two of Uber's existence, there were many in the conventional car service and taxi cab businesses, who were convinced that not only was this a passing phase, but that no customer in his right mind would want to miss the comfort, convenience and safety of a yellow cab experience. (Irony alert!)
2. Failure and False Hope	With each misstep by a ride sharing company, whether it be an employee with a loose tongue or a assault by an Uber driver, the hope that this misstep will put an end to the ride sharing business rises among taxi operators and regulators.
3. Imitation and Institutional Inertia	In the mistaken belief that all that separated the ride sharing companies from conventional car service is an app, taxi operators turned to putting apps in the hands of drivers and customers. At the same time, any attempts to introduce flexibility into the existing car service business are fought by politicians, regulators and some of the operators who benefit from the current structure.
4. Regulation, Rule Rigging and Legal Challenges	This seems to be the place where car service companies madetheir stand, aided and abetted by regulators, courts and politics. By restricting or even banning ride sharing, they are slowing it's growth but it is the customers who ultimately will determine the winner in this game, and they are voting with their dollars.
5. Acceptance and Adjustment	A portion of the conventional car service business adjusted to the new reality, sometimes because they realize that it is a fight that is unwinnable and sometimes because the financial hill is getting steeper to climb.

Valuing a Disruptor

- No history, large losses, small or no revenues: In general, valuing disruptors is difficult because they tend to be small, money losing and with little or no history.
- Business model in flux: With many disruptors, there is no workable business model in place (yet).
- No models: There are no grown up examples that you can use as your basis for valuation.
- Disruption is easy, making money on disruption is hard: There is always the risk that while disruption may succeed, many disruptors (especially early ones) do not benefit from the disruption.

A Key Tool: Story Telling

Favored Tools
- Accounting statements
- Excel spreadsheets
- Statistical Measures
- Pricing Data

Favored Tools
- Anecdotes
- Experience (own or others)
- Behavioral evidence

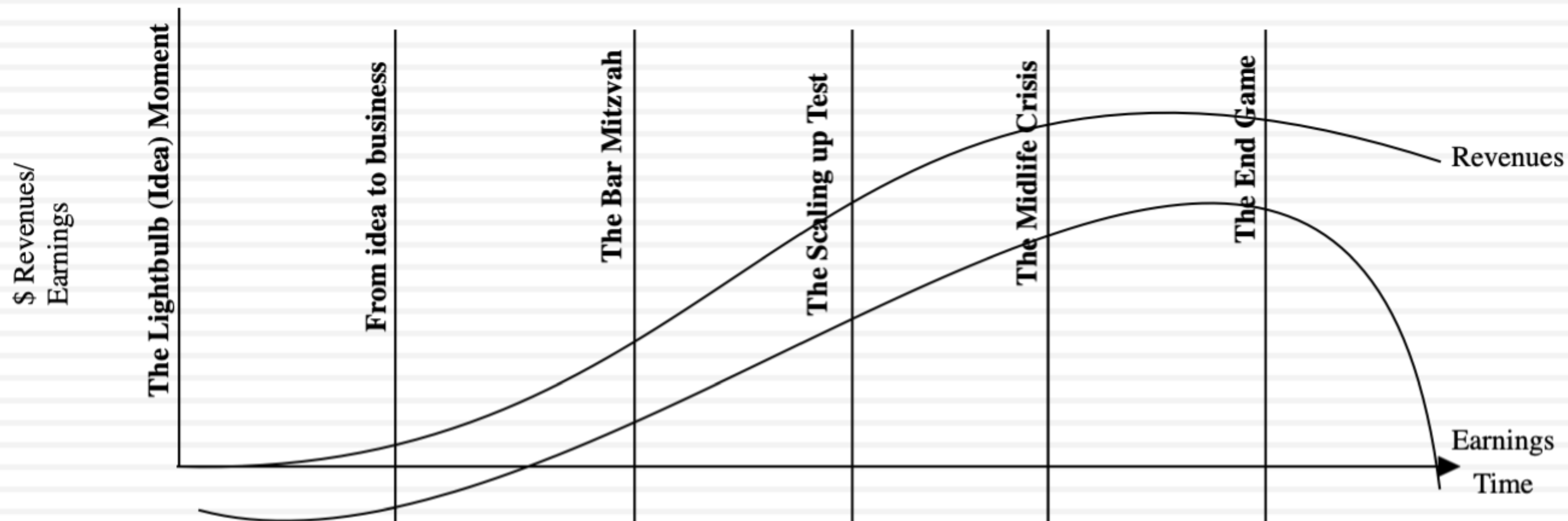
A Good Valuation

The Numbers People ⟷ The Narrative People

Illusions/Delusions
1. Precision: Data is precise
2. Objectivity: Data has no bias
3. Control: Data can control reality

Illusions/Delusions
1. Creativity cannot be quantified
2. If the story is good, the investment will be.
3. Experience is the best teacher

Story versus Numbers: The Life Cycle



Growth stage	Stage 1 Start-up	Stage 2 Young Growth	Stage 3: High Growth	Stage 4 Mature Growth	Stage 5 Mature Stable	Stage 6 Decline
All Narrative → ***All Numbers***						
Narrative drivers	How big is the narrative?	How plausible is the narrative?	How profitable is the narrative?	How scalable is the narrative?	How sustainable is the narrative?	Is there a happy ending?

The Steps

Step 1: Develop a narrative for the business that you are valuing
In the narrative, you tell your story about how you see the business evolving over time.

Step 2: Test the narrative to see if it is possible, plausible and probable
There are lots of possible narratives, not all of them are plausible and only a few of them are probable.

Step 3: Convert the narrative into drivers of value
Take the narrative apart and look at how you will bring it into valuaton inputs starting with potential market size down to cash flows and risk. By the time you are done, each part of the narrative should have a place in your numbers and each number should be backed up a portion of your story.

Step 4: Connect the drivers of value to a valuation
Create an intrinsic valuation model that connects the inputs to an end-value the business.

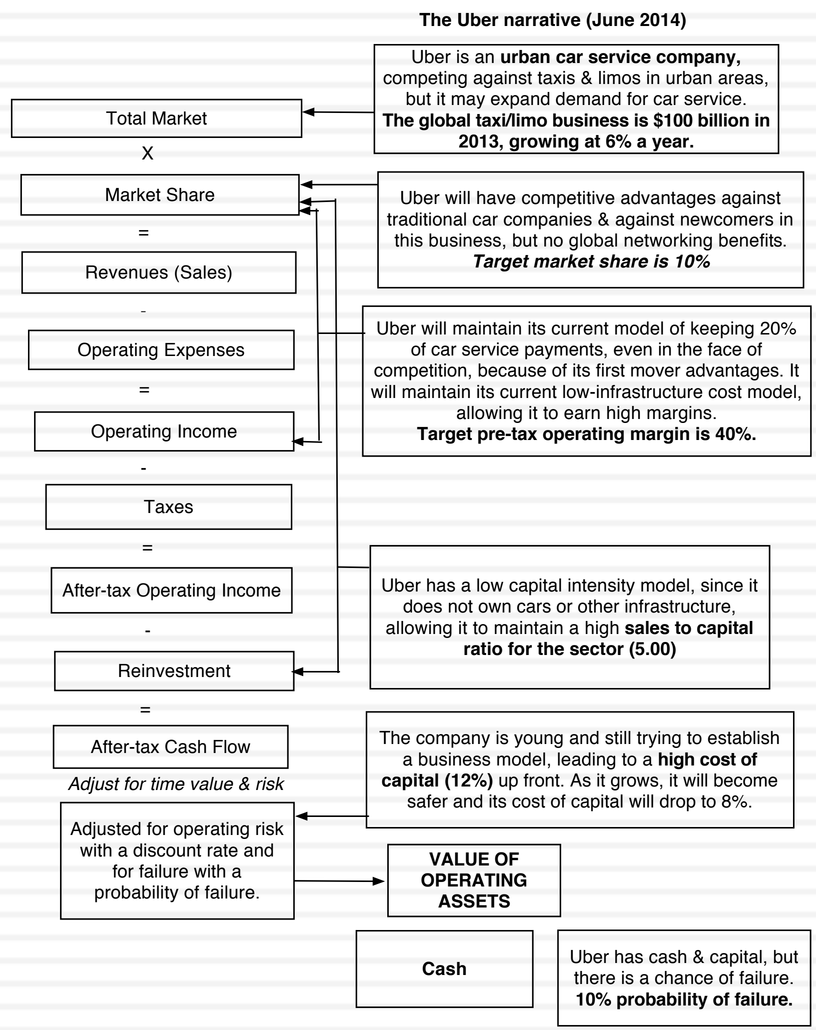
Step 5: Keep the feedback loop open
Listen to people who know the business better than you do and use their suggestions to fine tune your narrative and perhaps even alter it. Work out the effects on value of alternative narratives for the company.

My Story for Uber in June 2014

In June 2014, my initial narrative for Uber was that it would be

1. An urban car service business: I saw Uber primarily as a force in urban areas and only in the car service business.
2. Which would expand the business moderately (about 40% over ten years) by bringing in new users.
3. With local networking benefits: If Uber becomes large enough in any city, it will quickly become larger, but that will be of little help when it enters a new city.
4. Maintain its revenue sharing (20%) system due to strong competitive advantages (from being a first mover).
5. And its existing low-capital business model, with drivers as contractors and very little investment in infrastructure.

Connecting Stories to Inputs



And inputs to value

Uber: Intrinsic valuation - June 8, 2014 (in US $)

Stable Growth (after year 10)
Expected growth rate = 2.50%
Cost of capital = 8%
Return on capital= 25%
Reinvestment Rate= 2.5%/25% = 10%

Terminal Value$_{10}$= 793/(.08-025) = $14,418

Term yr
EBIT (1-t) $881
- Reinv 88
FCFF $793

Global taxi market is $100 billlion currently, expected to grow 6% a year for next ten years.

Uber will keep 20% of the gross cab receipts as its revenues

Uber's market share of this market will increase to 10% over the next 10 years.

Uber's operating expenses will amount to 60% of its revenues. (Operating margin=40%)

Uber will pay a tax rate of 30% on its income, increasing to 40% over the next 10 years

Uber will generate $5 in incremental revenues for every dollar of incremental capital.

	1	2	3	4	5	6	7	8	9	10
Overall market	$106,000	$112,360	$119,102	$126,248	$133,823	$141,852	$150,363	$159,385	$168,948	$179,085
Share of market (gross)	3.63%	5.22%	6.41%	7.31%	7.98%	8.49%	8.87%	9.15%	9.36%	10.00%
Revenues as percent of gross	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Annual Revenue	$769	$1,173	$1,528	$1,846	$2,137	$2,408	$2,666	$2,916	$3,163	$3,582
Operating margin	7.00%	10.67%	14.33%	18.00%	21.67%	25.33%	29.00%	32.67%	36.33%	40.00%
Operating Income	$54	$125	$219	$332	$463	$610	$773	$953	$1,149	$1,433
Effective tax rate	31%	32%	33%	34%	35%	36%	37%	38%	39%	40%
- Taxes	$17	$40	$72	$113	$162	$220	$286	$362	$448	$573
After-tax operating income	$37	$85	$147	$219	$301	$390	$487	$591	$701	$860
Sales/Capital Ratio	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
- Reinvestment	$94	$81	$71	$64	$58	$54	$52	$50	$49	$84
Free Cash Flow to the Firm	-$57	$4	$76	$156	$243	$336	$435	$541	$652	$776

Based on the investment of $1.2 billion made by investors, the imputed value for Uber's operating assets, in June 2014 ,was $17 billion.

Discount back the cash flows (including terminal value) at the cumulated cost of capital.

Value of operating assets = $6,595

Adust for probability of failure (10%)
Expected value = $6,595 (.9) = $5,895

Cost of capital for first 5 years = Top decile of US companies = 12%

Cost of capital declines from 12% to 8% from years 6 to 10.

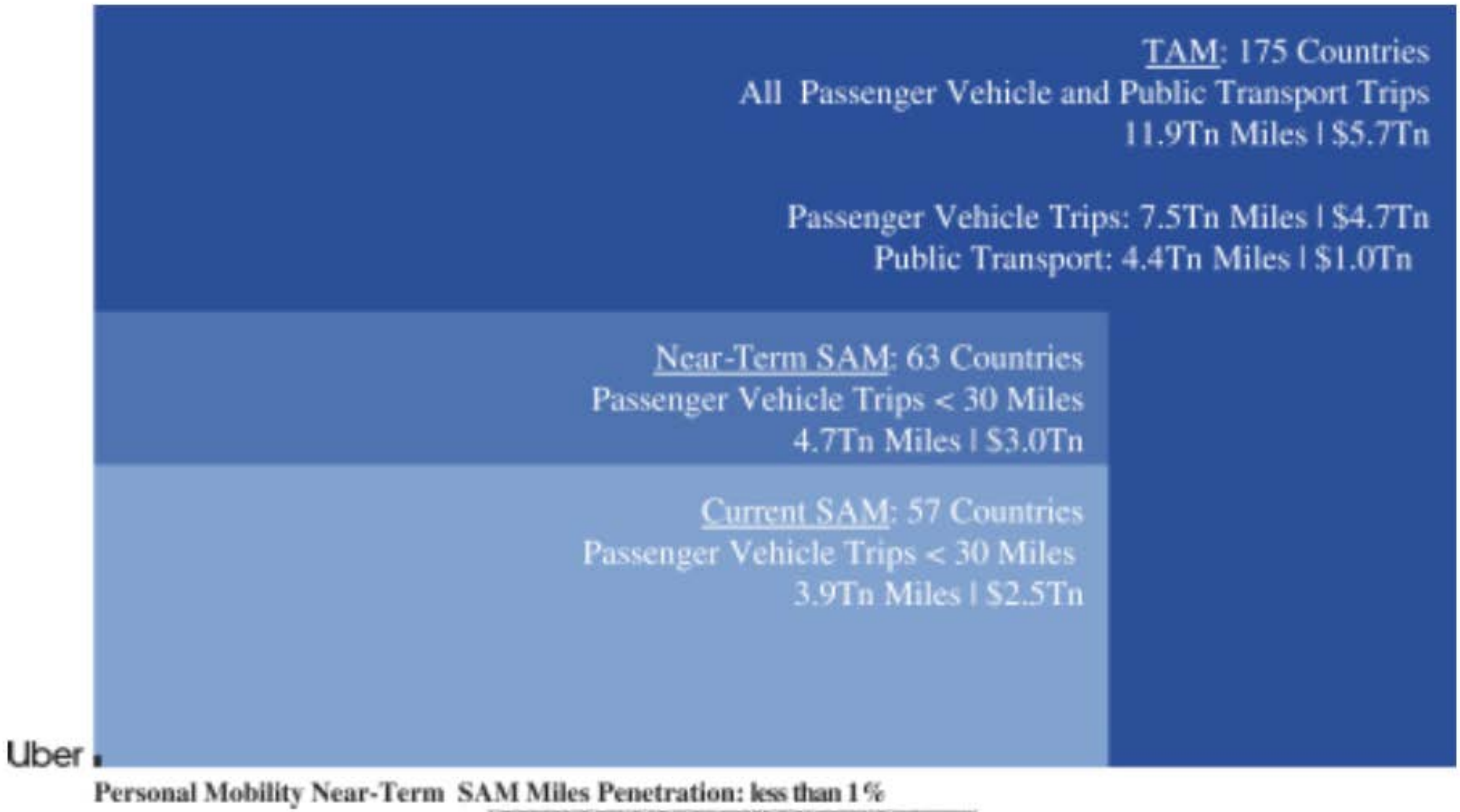
And your story will change over time…

Narrative Break/End	Narrative Shift	Narrative Change (Expansion or Contraction)
Events, external (legal, political or economic) or internal (management, competitive, default), that can cause the narrative to break or end.	Improvement or deterioration in initial business model, changing market size, market share and/or profitability.	Unexpected entry/success in a new market or unexpected exit/failure in an existing market.
Your valuation estimates (cash flows, risk, growth & value) are no longer operative	Your valuation estimates will have to be modified to reflect the new data about the company.	Valuation estimates have to be redone with new overall market potential and characteristics.
Estimate a probability that it will occur & consequences	Monte Carlo simulations or scenario analysis	Real Options

Uber in 2019: An IPO is announced, with a prospectus

- Big and dense: To get a sense of where Uber stands now, just ahead of its IPO, I started with the prospectus, which weighing in at 285 pages, not counting appendices, and filled with pages of details, can be daunting.
- Disclosure's dark side: It is a testimonial to how information disclosure requirements have had the perverse consequence of making the disclosures useless, by drowning investors in data and meaningless legalese.
  - There are many who have latched on to the statement that "we may not achieve profitability" that Uber makes in the prospectus (on page 27) as an indication of its worthlessness, but I view it more as evidence that lawyers should never be allowed to write about investing risk.

The Bigger the market…



Uber

Uber: Personal Mobility Player?

Uber is primarily a ride sharing company, with ambtions of being a global logistics player. Its revenue growth has been astonishing, though it is starting to slow, but it remains a big money loser, as it searches for a business model that delivers more stickiness. In this story, Uber uses a combination of economies of scale and a more capital intensive business model to create a pathway to profitability. Along the way, it will become a less risky company, though its losses leave it exposed to a 5% chance of failure.

The Assumptions

	Base year	*Years 1-5*	*Years 6-10*	*After year 10*	*Story link*
Total Market	$400,000	Grow 10.39% a year		Grows 2.75% a year	Global logistics
Gross Market Share	12.45%	6.71%>30%		30%	Global Network benefits
Revenue Share	20.13%	Unchanged		20.13%	Market dominance keeps billing share high.
Operating Margin	-24.39%	-24.39% ->20%		15.00%	Full employee & more regulations
Reinvestment	NA	Sales to capital ratio of 4.00		Reinvestment rate = 7.5%	Low capital investment model
Cost of capital	NA	9.97%	9,97%->8.24%	8.24%	At 75th percentile of US firms
Risk of failure	5% chance of failure, if pricing meltdown leads to capital being cut off				Cash on hand + Capital access

The Cash Flows

	Total Market	*Market Share*	*Revenues*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$ 441,560	14.20%	$ 12,627	$ (2,369)	$ 650	$ (3,019)
2	$ 487,438	15.96%	$ 15,661	$ (2,057)	$ 759	$ (2,816)
3	$ 538,083	17.71%	$ 19,189	$ (1,441)	$ 882	$ (2,323)
4	$ 593,990	19.47%	$ 23,281	$ (438)	$ 1,023	$ (1,461)
5	$ 655,705	21.22%	$ 28,017	$ 1,050	$ 1,184	$ (134)
6	$ 723,833	22.98%	$ 33,485	$ 3,139	$ 1,367	$ 1,771
7	$ 799,039	24.73%	$ 39,787	$ 5,292	$ 1,576	$ 3,716
8	$ 882,059	26.49%	$ 47,037	$ 5,292	$ 1,813	$ 3,479
9	$ 973,705	28.24%	$ 55,365	$ 6,229	$ 2,082	$ 4,147
10	$1,074,873	30.00%	$ 64,915	$ 7,303	$ 2,387	$ 4,915
Terminal year	$1,101,745	30.00%	$ 66,537	$ 7,485	$ 936	$ 6,550

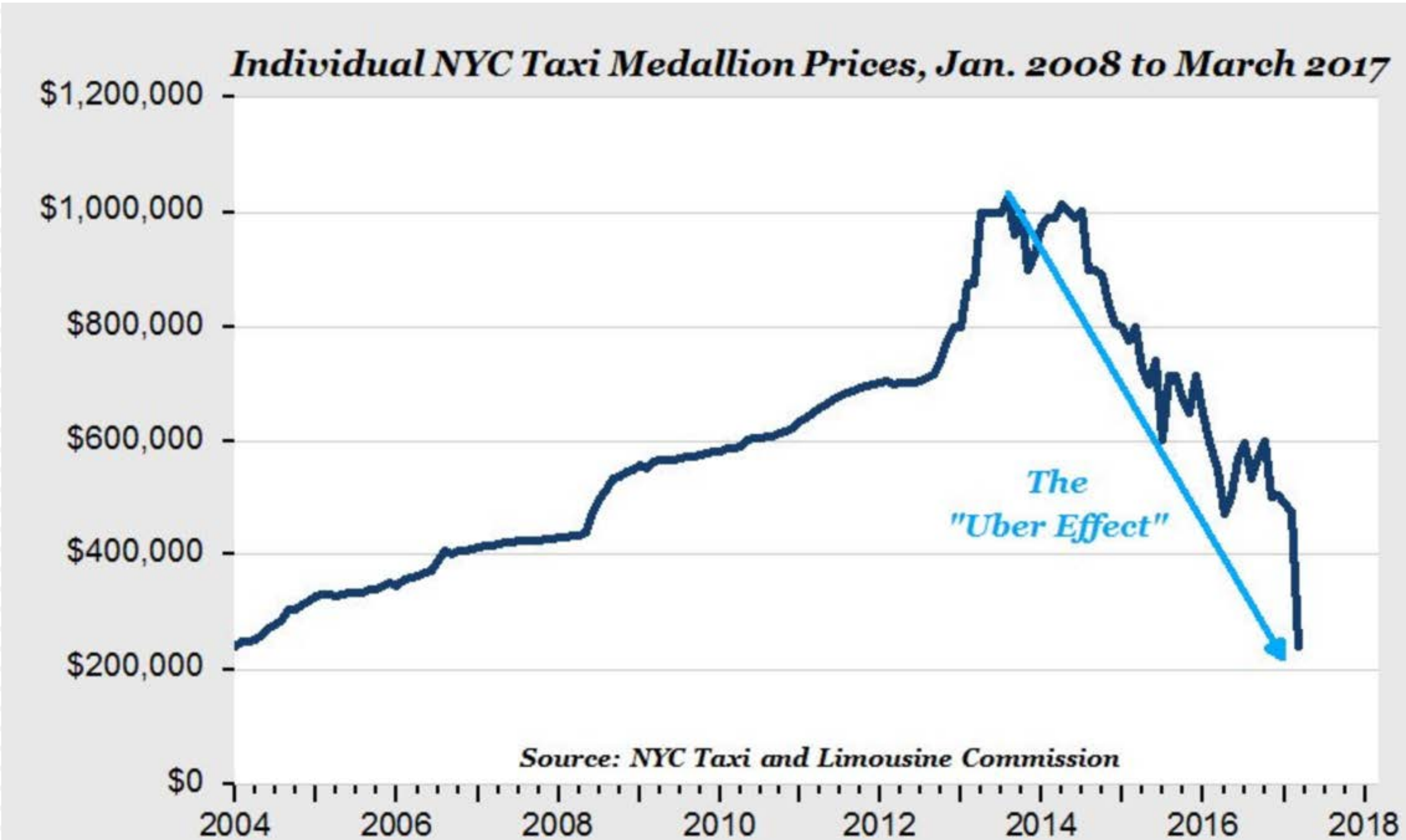
The Value

Terminal value	$ 114,108
PV(Terminal value)	$ 46,258
PV (CF over next 10 years)	$ 501
Value of operating assets =	$ 46,759
Probability of failure	5%
Value in case of failure	$ -
Adjusted Value for operating assets	$ 44,421
+ Cash on hand	$ 6,406
+ Cross holdings	$ 8,700
+ IPO Proceeds	$ 9,000
- Debt	$ 6,869
Value of equity	$ 61,658
Value per share	$ 27.67

Dealing with the Disrupted

- When valuing companies that are being disrupted, you have to use both intrinsic value and pricing tools more flexibly, often changing established practices.
- In discounted cash flow valuation, this will require
  - Telling stories that are dark and with no good ending
  - Allowing revenues to decline over time and margins to shrink
  - Ending your valuation with a liquidation rather than a terminal value, or having a terminal value with a negative growth rate.
- In pricing, you will need to adjust your pricing metric for the characteristics of your company. You have to be able to estimate what the PE or EV/EBITDA should be for a risky, negative growth firm. You can use either:
  - Intrinsic multiple models (where you link the multiple to company characteristics)
  - Statistical tools, where you compare PE ratios for companies in a sector, controlling for differences in growth and risk.

Winners and Losers: Uber's Rise = Taxi Cab's Fall



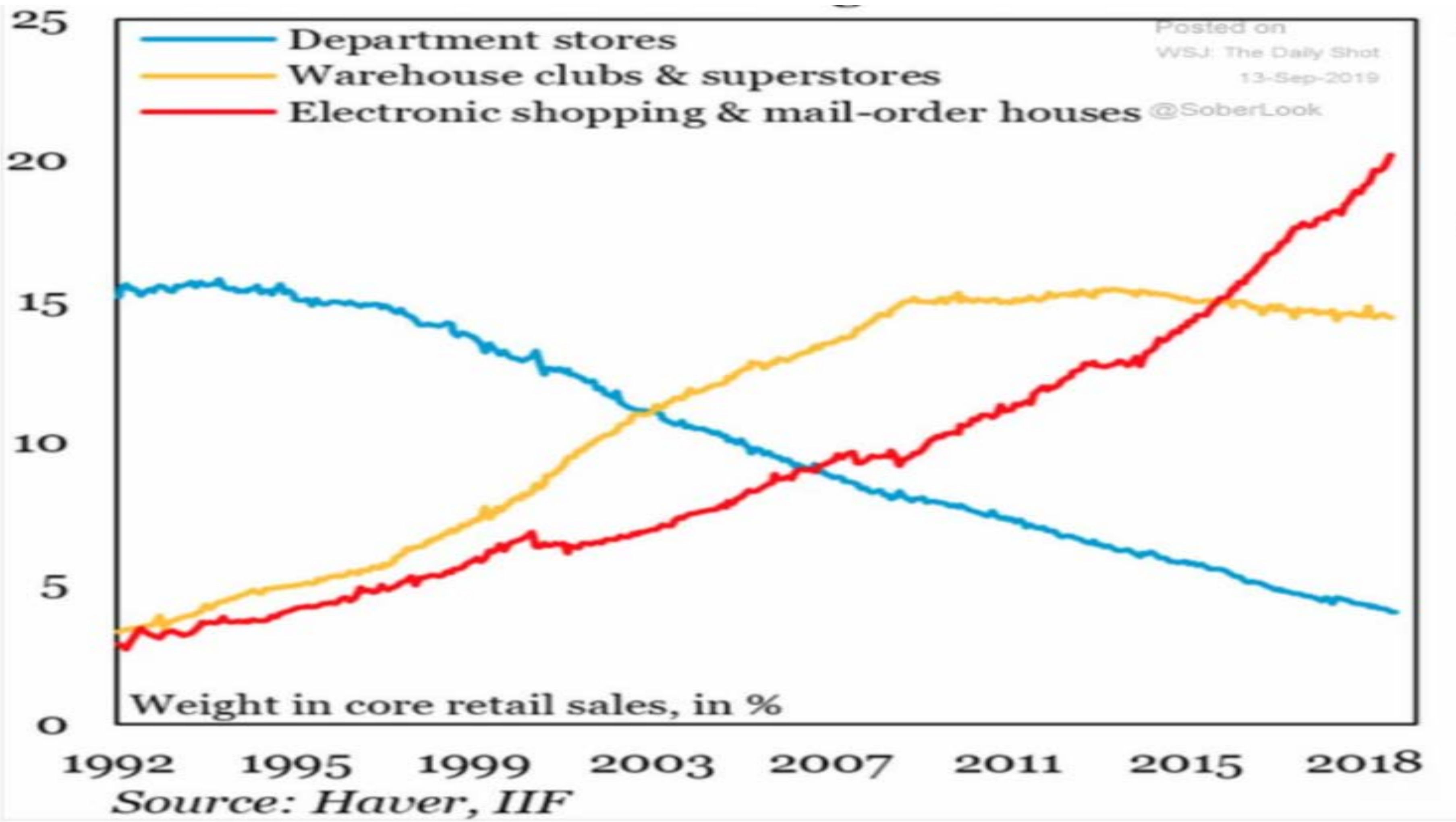
Valuing the Disrupted: A More Depressing Exercise

- Long history, but not relevant: Disrupted companies often have long and profitable histories. Those histories, though, may not be useful in valuing these companies.
- Mean reversion will fail you: Any valuation built on extrapolation of the past will find these companies to be:
  - Under valued, if you use intrinsic value models
  - Under priced, based upon pricing metrics (PE, EV/EBITDA)
- Value Traps: Investing in them on the basis of extrapolating the past will give you value traps that will continue to look cheap and get even cheaper, the longer you hold them.

To value the disrupted, be ready to break the rules, but not first principles…

- Revenues may, and often will, shrink: While we almost automatically assume that revenues and earnings will grow, at least in the near term, that assumption can be a dangerous one.
- Margins will continue to come under pressure: By the same token, there will be no quick bounceback in margins to historical levels.
- And how management reacts to disruption can have a significant effect on value: Management can go into denial and continue to do what they have always done, which will accelerate value destruction, or learn to live with disruption, which may lead to a much smaller company.

The Disruption of Retail…



And a valuation of JC Penney in 2016…

JC Penney in 2016: Road to Nowhere?

Declining business: Revenues expected to drop by 3% a year fo next 5 years, and then contine to drop in perpetuity..

	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate		-3.00%	-3.00%	-3.00%	-3.00%	-3.00%	-3.40%	-4.04%	-4.62%	-4.92%	-5.00%	-5.00%
Revenues	$ 12,522	$ 12,146	$ 11,782	$ 11,428	$ 11,086	$ 10,753	$ 10,387	$ 9,968	$ 9,508	$ 9,040	$ 8,588	$ 8,158
EBIT (Operating) margin	1.32%	1.82%	2.31%	2.80%	3.29%	3.79%	4.28%	4.77%	5.26%	5.76%	6.25%	6.25%
EBIT (Operating income)	$ 166	$ 221	$ 272	$ 320	$ 365	$ 407	$ 444	$ 476	$ 501	$ 520	$ 537	$ 510
Tax rate	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%	36.00%	37.00%	38.00%	39.00%	40.00%	40.00%
EBIT(1-t)	$ 108	$ 143	$ 177	$ 208	$ 237	$ 265	$ 284	$ 300	$ 310	$ 317	$ 322	$ 306
- Reinvestment		$ (188)	$ (182)	$ (177)	$ (171)	$ (166)	$ (183)	$ (210)	$ (230)	$ (234)	$ (226)	$ (127)
FCFF		$ 331	$ 359	$ 385	$ 409	$ 431	$ 467	$ 509	$ 540	$ 552	$ 548	$ 433
NOL	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Cost of capital		9.00%	9.00%	9.00%	9.00%	9.00%	8.80%	8.60%	8.40%	8.20%	8.00%	8.00%
Cumulated discount factor		0.9174	0.8417	0.7722	0.7084	0.6499	0.5974	0.5501	0.5074	0.4690	0.4342	
PV(FCFF)		$ 304	$ 302	$ 297	$ 290	$ 280	$ 279	$ 280	$ 274	$ 259	$ 238	

PV(Terminal value)	$ 3,136.70
PV (CF over next 10 years)	$ 2,802.95
Sum of PV	$ 5,939.65
Probability of failure =	20.00%
Proceeds if firm fails =	$2,969.82
Value of operating assets =	$ 5,345.68

High debt load and poor earnings put survival at risk. Based on bond rating, 20% chance of failure and liquidation will bring in 50% of book value

Margins improve gradually to median for US retail sector (6.25%)

As stores shut down, cash released from real estate.

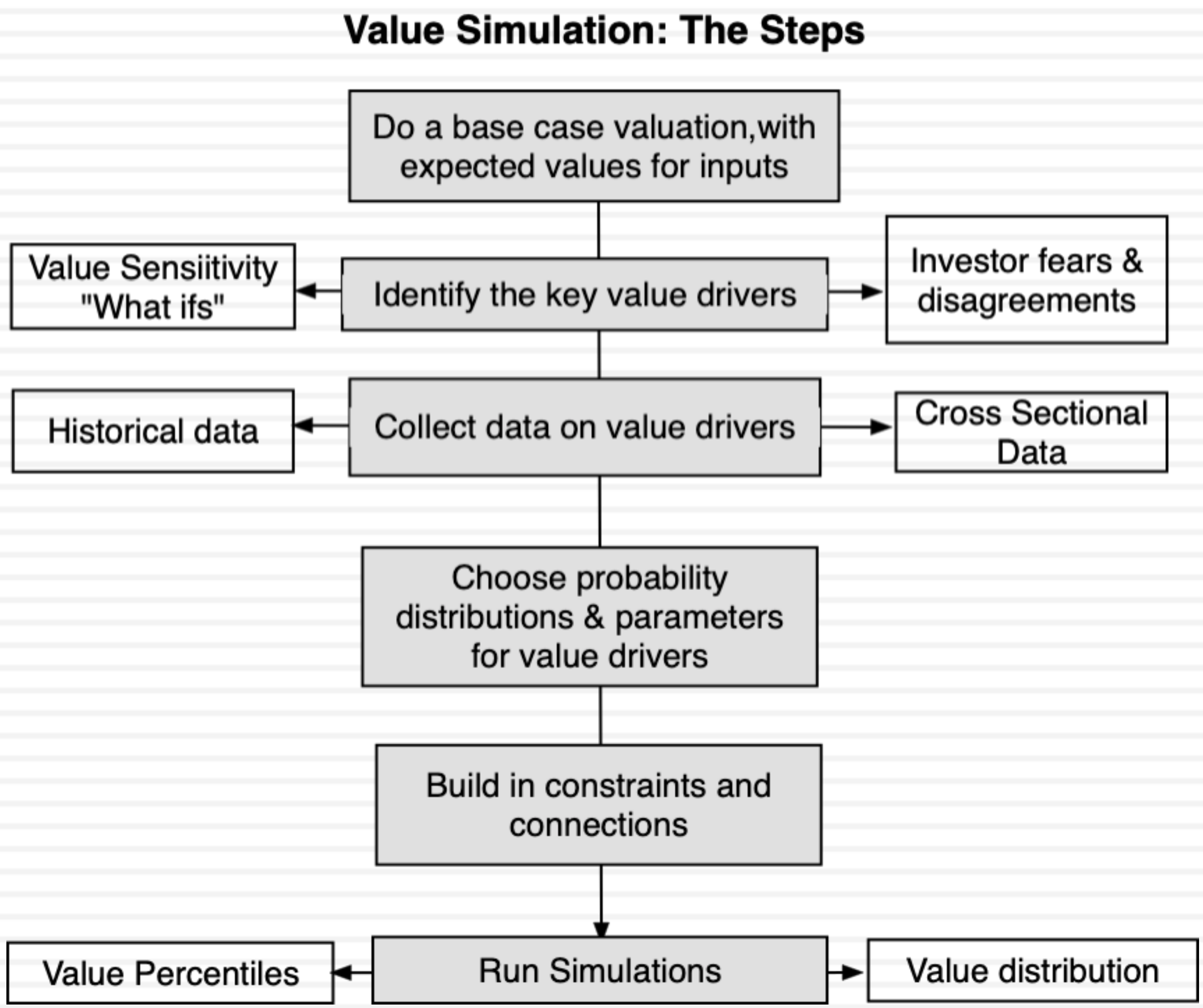
The cost of capital is at 9%, higher because of high cost of debt.

Facing up to Uncertainty

Facing up to uncertainty

- Uncertainty abounds: When valuing disruptors or the disrupted, there will be considerable uncertainty about the future. That uncertainty will be immune to more data collection or bigger models.
- From Denial to Acceptance: Rather than hide from that reality, it is healthiest to face up to the uncertainty in both your inputs and your output.
- Learn to live with it: Doing so will not make uncertainty go away but will make you recognize how much of your company's value is not in your hands and depends on the market's fickle nature.

The not-so-revolutionary way to deal with uncertainty: Monte Carlo Simulations



Twitter Pre-IPO Valuation: October 27, 2013

Starting numbers

	Last 10K	Trailing 12 month
Revenues	$316.93	$534.46
Operating income	-$77.06	-$134.91
Adjusted Operating Income		$7.67
Invested Capital		$955.00
Adjusted Operatng Margin		1.44%
Sales/ Invested Capital		0.56
Interest expenses	$2.49	$5.30

Revenue growth of 51.5% a year for 5 years, tapering down to 2.5% in year 10

Pre-tax operating margin increases to 25% over the next 10 years

Sales to capital ratio of **1.50** for incremental sales

Stable Growth
g = 2.5%; Beta = 1.00;
Cost of capital = 8%
ROC= **12**%;
Reinvestment Rate=2.5%/12% = 20.83%

Terminal Value$_{10}$= 1466/(.08-.025) = $26,657

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Revenues	$ 810	$1,227	$1,858	$2,816	$4,266	$6,044	$7,973	$9,734	$10,932	$11,205
Operating Income	$ 31	$ 75	$ 158	$ 306	$ 564	$ 941	$1,430	$1,975	$ 2,475	$ 2,801
Operating Income after tax	$ 31	$ 75	$ 158	$ 294	$ 395	$ 649	$ 969	$1,317	$ 1,624	$ 1,807
- Reinvestment	$ 183	$ 278	$ 421	$ 638	$ 967	$1,186	$1,285	$1,175	$ 798	$ 182
FCFF	$(153)	$ (203)	$ (263)	$ (344)	$ (572)	$ (537)	$ (316)	$ 143	$ 826	$ 1,625

Operating assets	$9,705
+ Cash	321
+ IPO Proceeds	1295
- Debt	214
Value of equity	11,106
- Options	713
Value in stock	10,394
/ # of shares	582.46
Value/share	$17.84

Terminal year (11)

EBIT (1-t)	$ 1,852
- Reinvestment	$ 386
FCFF	$ 1,466

Cost of capital = 11.12% (.981) + 5.16% (.019) = 11.01%

Cost of capital decreases to 8% from years 6-10

Cost of Equity
11.12%

Cost of Debt
(2.5%+5.5%)(1-.40)
= 5.16%

Weights
E = 98.1% D = 1.9%

Riskfree Rate:
Riskfree rate = 2.5%

+

Beta
1.40

X

Risk Premium
6.15%

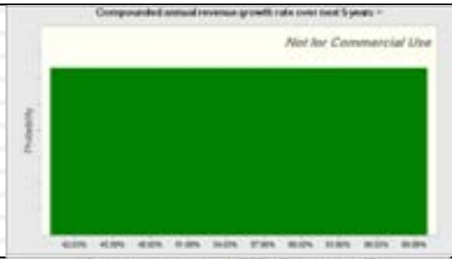
75% from US(5.75%) + 25% from rest of world (7.23%)

90% advertising (1.44) + 10% info svcs (1.05)

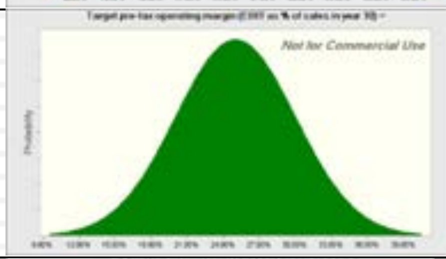
D/E=1.71%

Twitter in October 2013: A Simulation

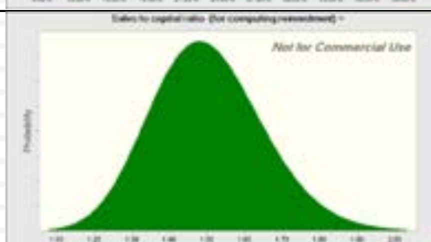
Revenue Growth Rate
Distribution: Uniform
Expected Value = 55%
Minimum Value: 40%
Maximum Value: 70%



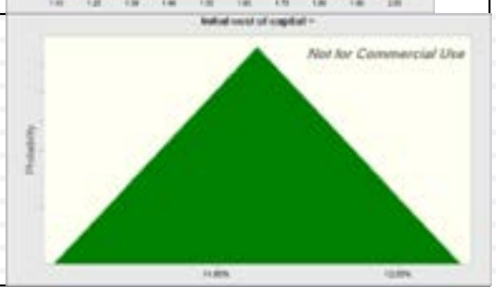
Target Operating Margin
Distribution: Normal
Expected Value = 25%
Standard Deviation = 5%

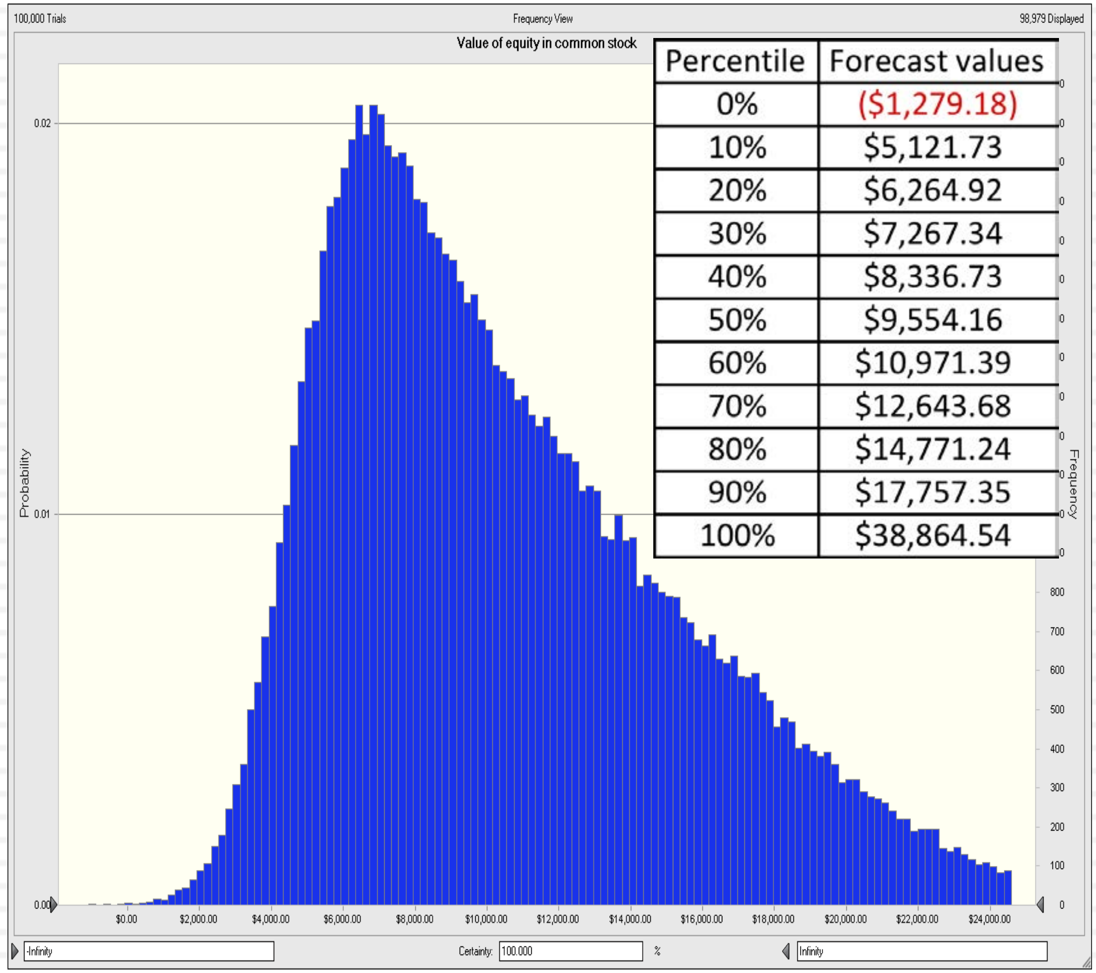


Sales to Capital Ratio
Distribution: Lognormal
Expected value: 1.50
Standard deviation: 0.15



Cost of Capital
Distribution: Triangular
Expected value: 11.22%
Minimum value: 10.02%
Maximum value: 12.22%



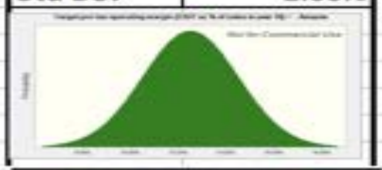


Percentile	Forecast values
0%	($1,279.18)
10%	$5,121.73
20%	$6,264.92
30%	$7,267.34
40%	$8,336.73
50%	$9,554.16
60%	$10,971.39
70%	$12,643.68
80%	$14,771.24
90%	$17,757.35
100%	$38,864.54

Investing Payoff? Amazon in October 2018

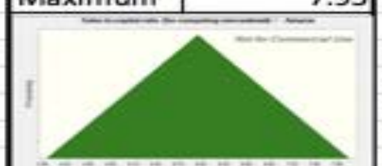
Revenue Growth Rate	
Minimum	5.00%
Maximum	25.00%

Operating Margin	
Mean	12.50%%
Std Dev	2.00%

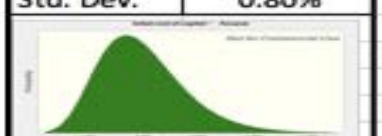


Correlation = 0.40

Sales/Invested Capital	
Minimum	3.95
Likeliest	5.95
Maximum	7.95



Cost of Capital	
Location	5.00%
Mean	7.97%
Std. Dev.	0.80%

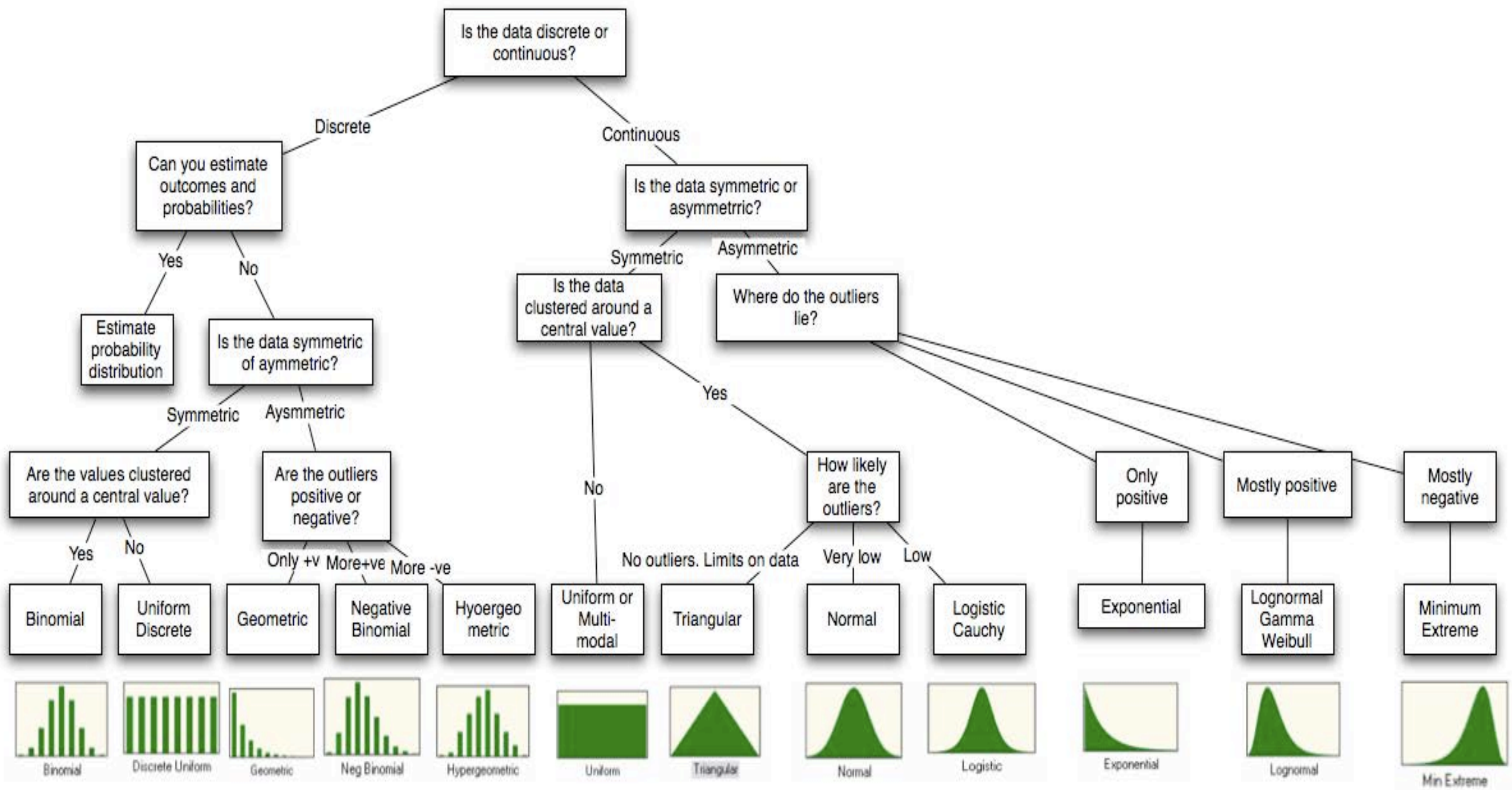


Base Case	$1,255.09
Mean	$1,343.67
Median	$1,241.98

Amazon: Simulated Values in September 2018

Percentiles	Value/Share
0%	$234.29
10%	$705.19
20%	$832.65
30%	$957.69
40%	$1,092.41
50%	$1,241.97
60%	$1,411.82
70%	$1,605.37
80%	$1,837.98
90%	$2,152.15
100%	$3,887.62

Distributional Awareness…

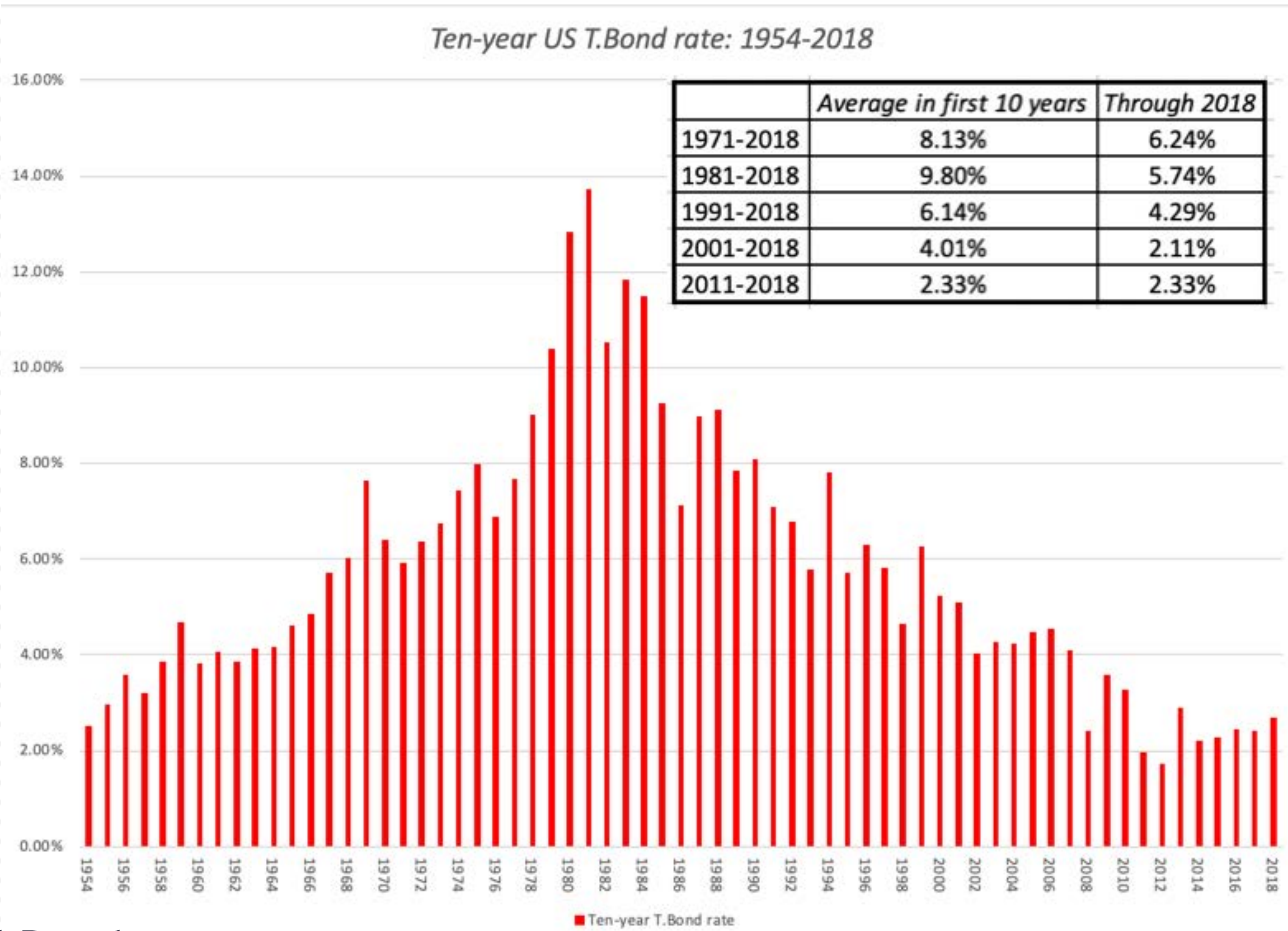


Macro Change and Disruption

I. Macro Input Shifts

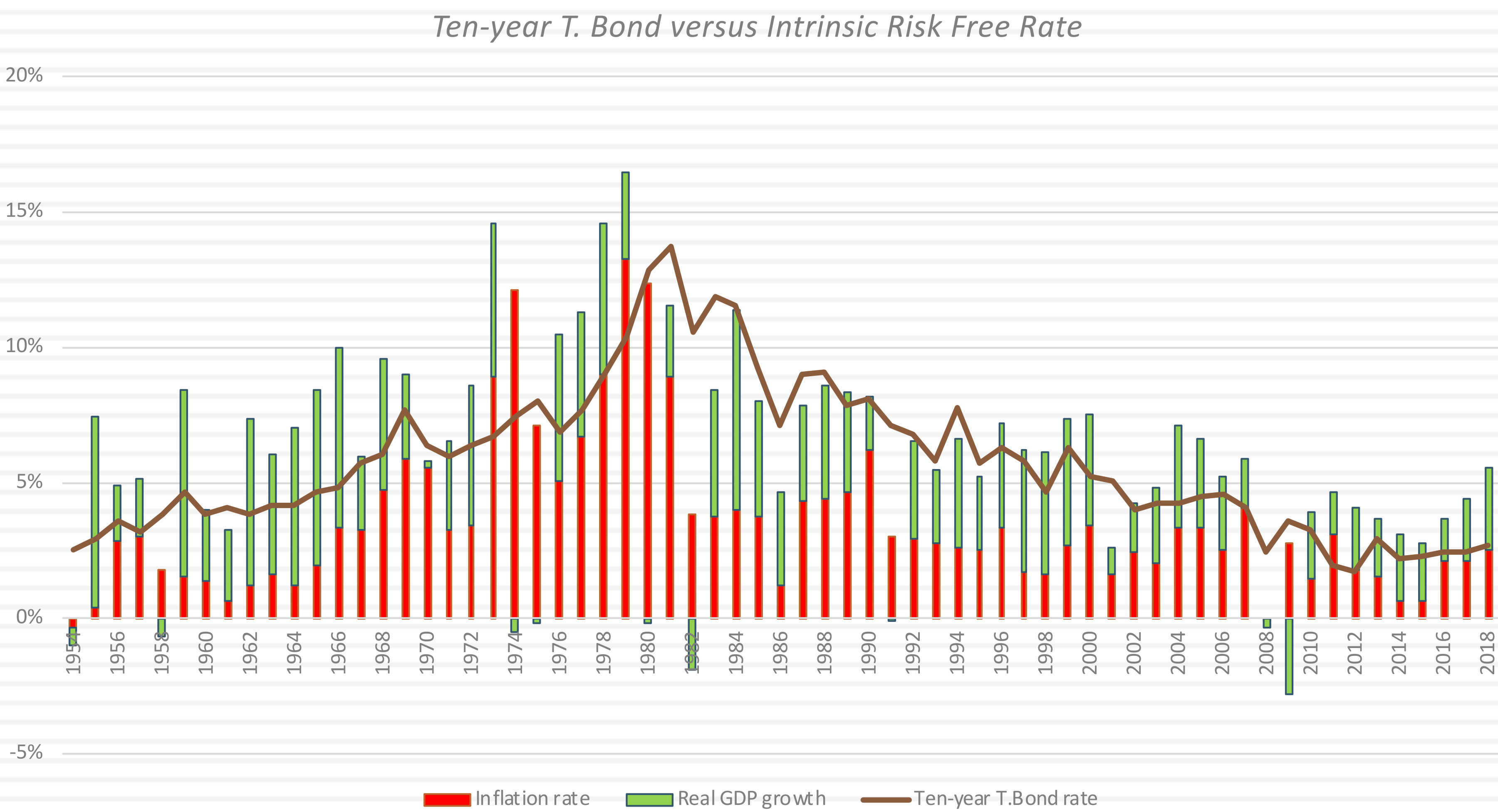
- When valuing companies or assets, there are macro inputs that have an effect on value (risk free rates, risk premiums and exchange rates, to name just three) that we use.
- When the current values of these inputs deviate from what we ”expect them to be”, we become uncomfortable and then take actions to make the discomfort go away by normalizing them, with normal often reflecting either a blind trust in mean reversion or personal experience.

1a. Risk free Rates

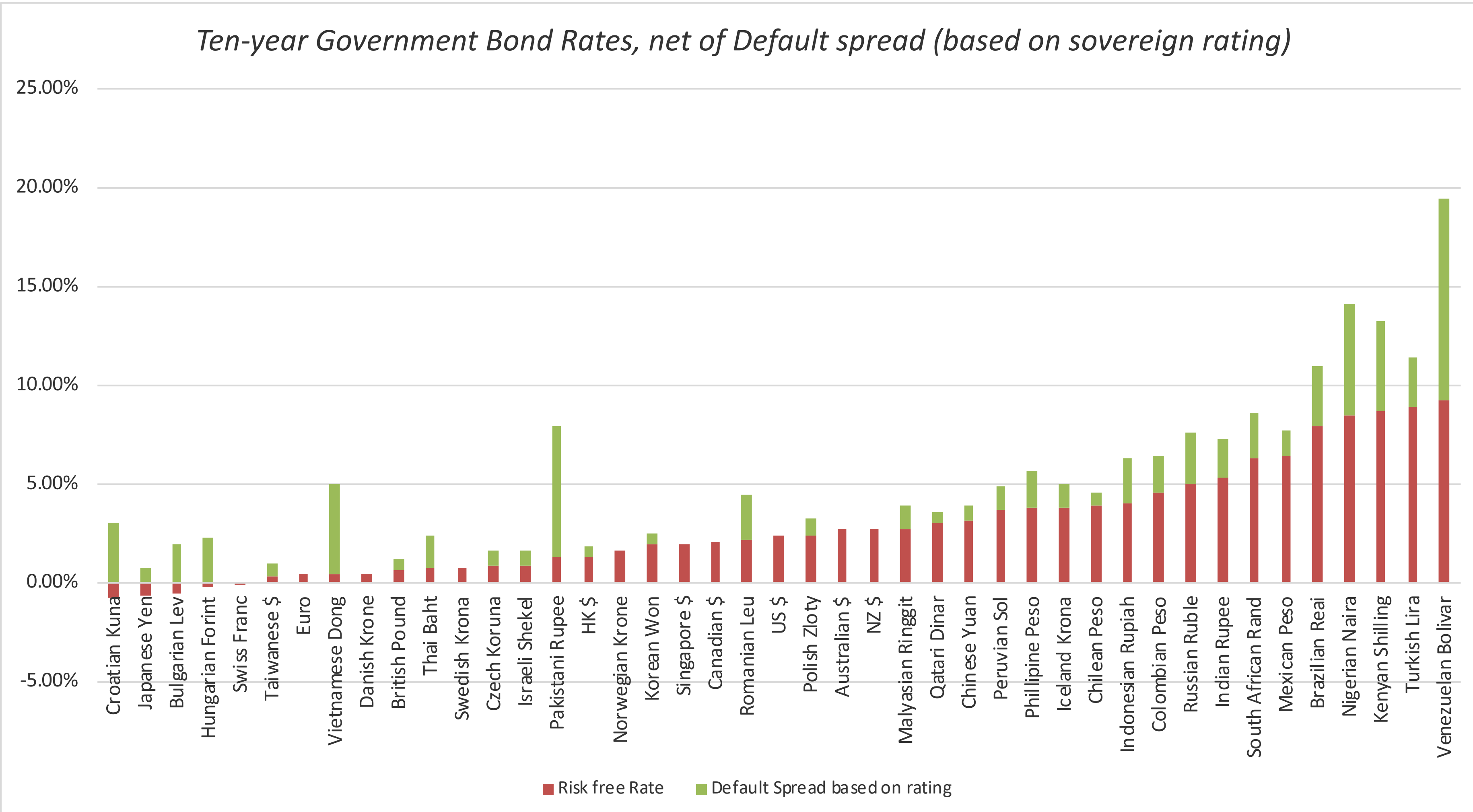


	Average in first 10 years	*Through 2018*
1971-2018	8.13%	6.24%
1981-2018	9.80%	5.74%
1991-2018	6.14%	4.29%
2001-2018	4.01%	2.11%
2011-2018	2.33%	2.33%

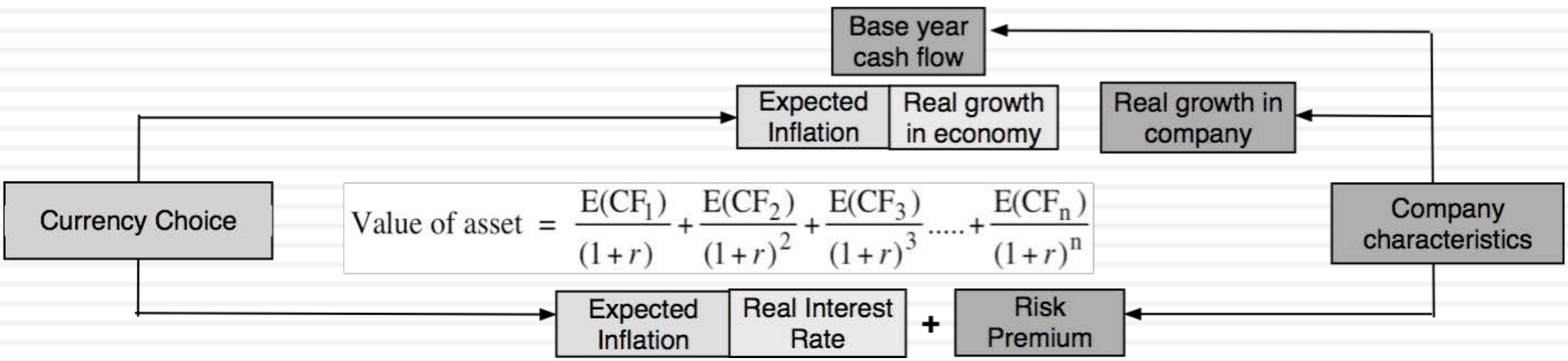
An intrinsic risk free rate…



Negative Risk free Rates: A New Age?



The Currency Effect



Heineken: September 2019 (in Euros)

Cash flows from existing assets

	LTM	2013-2018
Revenues	€ 23,119	Growth rate = 3.22%
Operating Margin	14.86%	14.44%
Sales/Invested Capital	0.71	0.79
ROIC	7.46%	8.32%
Effective Tax Rate	29.70%	27.00%

The Payoff from growth

Revenues will grow 3.22% a year for next 5 years, tapering down to -0.5% growth in year 10

Operatng margin (per-tax) will drop to 14.00%

Sales/Invested Capital will stay at five-year average of 0.79.

Maturty and Closure

Stable Growth
g = -0.5%;
Cost of capital = 5%
ROC= 5%;
Reinvestment Rate=-.5%/5% = -10%

Terminal Value = 2972/(.05-..-(.005)) = 54,034

Euro Cashflows

	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate	3.22%	3.22%	3.22%	3.22%	3.22%	2.48%	1.73%	0.99%	0.24%	-0.50%	-0.50%
Revenues	€ 23,863	€ 24,632	€ 25,425	€ 26,244	€ 27,089	€ 27,759	€ 28,240	€ 28,519	€ 28,589	€ 28,446	€ 28,304
EBIT (Operating) margin	14.38%	14.34%	14.30%	14.26%	14.21%	14.17%	14.13%	14.09%	14.04%	14.00%	14.00%
EBIT (Operating income)	€ 3,432	€ 3,532	€ 3,635	€ 3,741	€ 3,850	€ 3,934	€ 3,990	€ 4,017	€ 4,015	€ 3,982	$ 3,963
Tax rate	29.70%	29.70%	29.70%	29.70%	29.70%	28.76%	27.82%	26.88%	25.94%	25.00%	$ 0
EBIT(1-t)	€ 2,413	€ 2,483	€ 2,556	€ 2,630	€ 2,707	€ 2,802	€ 2,880	€ 2,937	€ 2,973	€ 2,987	$ 2,972
- Reinvestment	€ 942	€ 973	€ 1,004	€ 1,036	€ 1,070	€ 849	€ 609	€ 353	€ 88	€ (181)	$ (297)
FCFF	€ 1,471	€ 1,511	€ 1,552	€ 1,594	€ 1,637	€ 1,953	€ 2,271	€ 2,584	€ 2,885	€ 3,168	$ 3,269

PV(Terminal value)	€ 36,390.85
PV (CF over next 10 years)	€ 15,300.34
Value of operating assets =	€ 51,691.19
- Debt	€ 19,709.52
- Minority interests	€ 1,069.00
+ Cash	€ 1,751.60
+ Non-operating assets	€ 1,401.00
Value of equity	€ 34,065.26
Number of shares	571.10
Estimated value /share	€ 59.65
Price	€ 93.25
Price as % of value	56.33%

Discount at Euro Cost of Capital (WACC) = 7.66% (.599) + 1.13% (0.401) = 5.04%

The Risk in the Cash flows

On September 1, 2019, Heineken was trading at 93.25 Euros/share

Cost of Equity
7.66%

Cost of Debt
(-0.5%+2%)(1-.25) = 1.13%

Weights
E = 59.9% D = 40.1%

Riskfree Rate:
Euro Risk free rate = -0.50%

+

Beta = 1.20

X

Unlevered beta of alcoholic beverage business = 0.80

Firm's D/E Ratio: 66.98%

ERP = 6.83%			
Region	*Revenues*	*Weight*	*ERP*
Europe	10348	50.24%	6.90%
North America	5920	28.74%	5.75%
Asia	2919	14.17%	7.22%
Latin America & Caribbean	781	3.79%	10.53%
Africa & Mid East	631	3.06%	9.30%
Total	**20599**	**100.00%**	**6.83%**

1b. Risk Premiums

- If investors are risk averse, they need inducement to invest in risky assets. That inducement takes the form of a risk premium, a premium you would demand over and above the riskfree asset to invest in a risky asset.
- Every risky asset market has a "risk" premium that determines how individual assets in that market are priced.
  - In an equity market, that risk premium for dealing with the volatility of equities and bearing the residual risk is the equity risk premium.
  - In the bond market, the risk premium for being exposed to default risk is the default spread.
  - In real asset markets, there are equivalent (though less widely publicized markets).

There is a lot of history… But can it be trusted?

	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2018	7.93%	6.26%	6.11%	4.66%
Std Error	2.09%	2.22%		
1969-2018	6.34%	4.00%	5.01%	3.04%
Std Error	2.38%	2.71%		
2009-2018	13.00%	11.21%	12.48%	11.00%
Std Error	3.71%	5.50%		

- 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

A forward looking, dynamic alternative?

Base year cash flow (last 12 mths)
Dividends (TTM): 52.25
+ Buybacks (TTM): 84.40
= Cash to investors (TTM): **136.65**

Expected cashflow growth in next 5 years
Cash flow growth = Top down analyst estimate of earnings growth for S&P 500 = 4.12%

	Last 12 months	1	2	3	4	5	Terminal Year
Expected Earnings	148.34	154.46	160.83	167.46	174.37	181.56	186.43
Expected Dividends + Buybacks =	136.65	$142.28	$148.15	$154.26	$160.62	$167.25	171.73

Earnings and Cash flows grow @2.68% (set equal to risk free rate) a year forever.

S&P 500 on 1/1/19= **2506.85**

$$2506.85 = \frac{142.28}{(1+r)} + \frac{148.15}{(1+r)^2} + \frac{154.26}{(1+r)^3} + \frac{160.62}{(1+r)^4} + \frac{167.25}{(1+r)^5} + \frac{167.25\ (1.0268)}{(r-.0268)(1+r)^5}$$

The last term in this equation is the expected index level at the end of year 5 (capturing price appreciaiton)

Solve for r

r = Implied Expected Return on Stocks = 8.64%

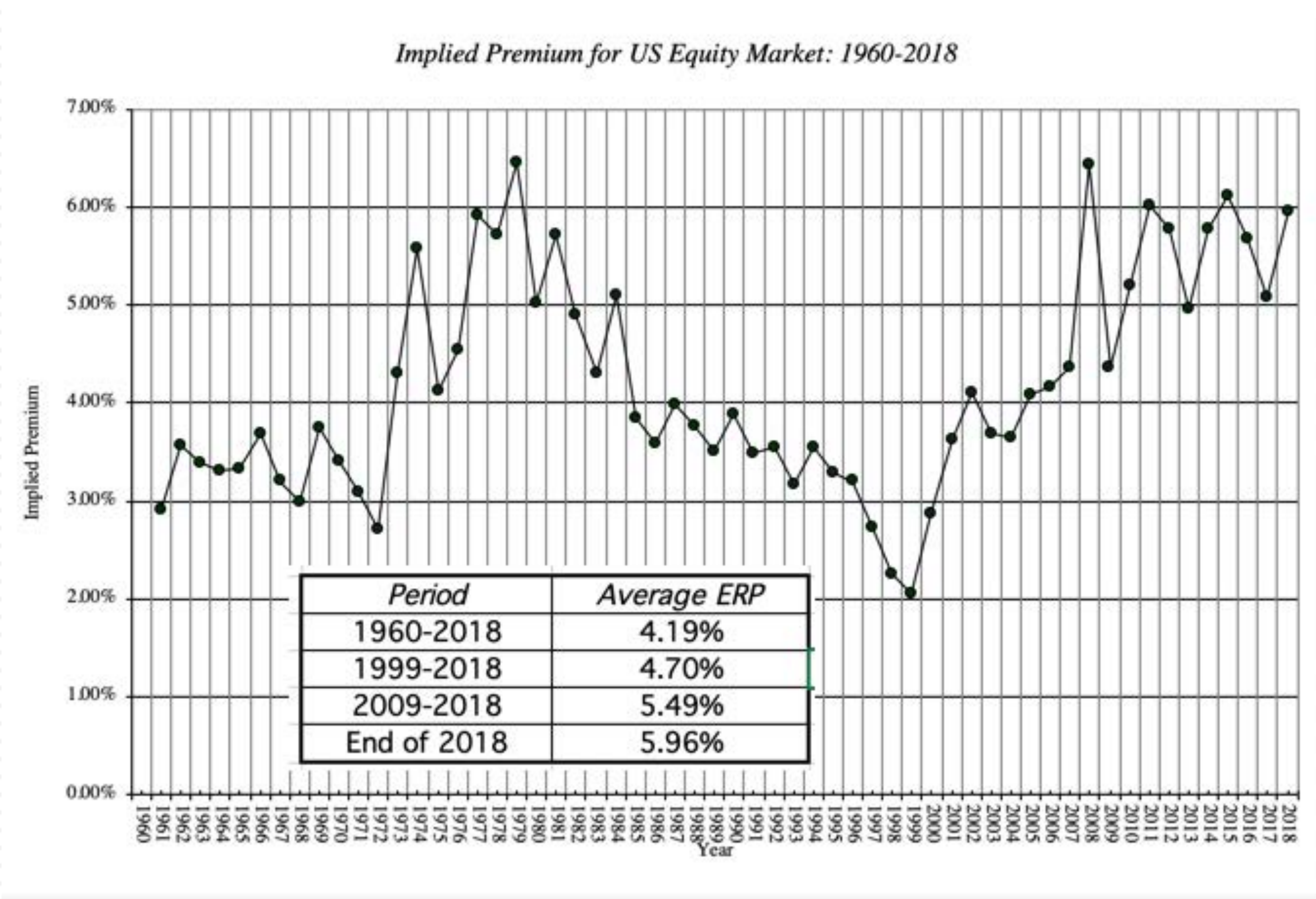
Minus

Risk free rate = T.Bond rate on 1/1/19= 2.68%

Equals

Implied Equity Risk Premium (1/1/19) = 8.64% - 2.68% = **5.96%**

Implied Premiums in the US: 1960-2018

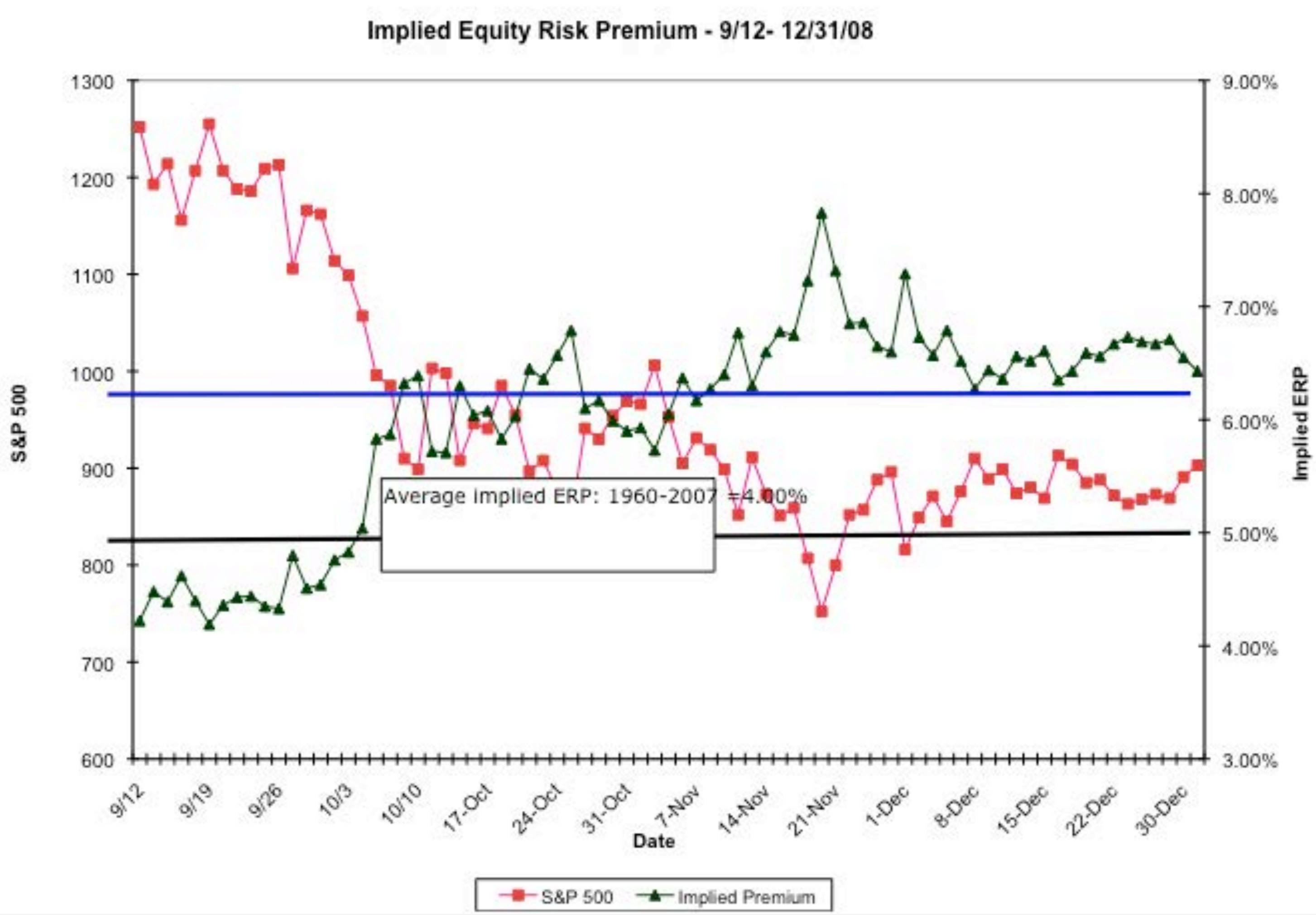


Period	Average ERP
1960-2018	4.19%
1999-2018	4.70%
2009-2018	5.49%
End of 2018	5.96%

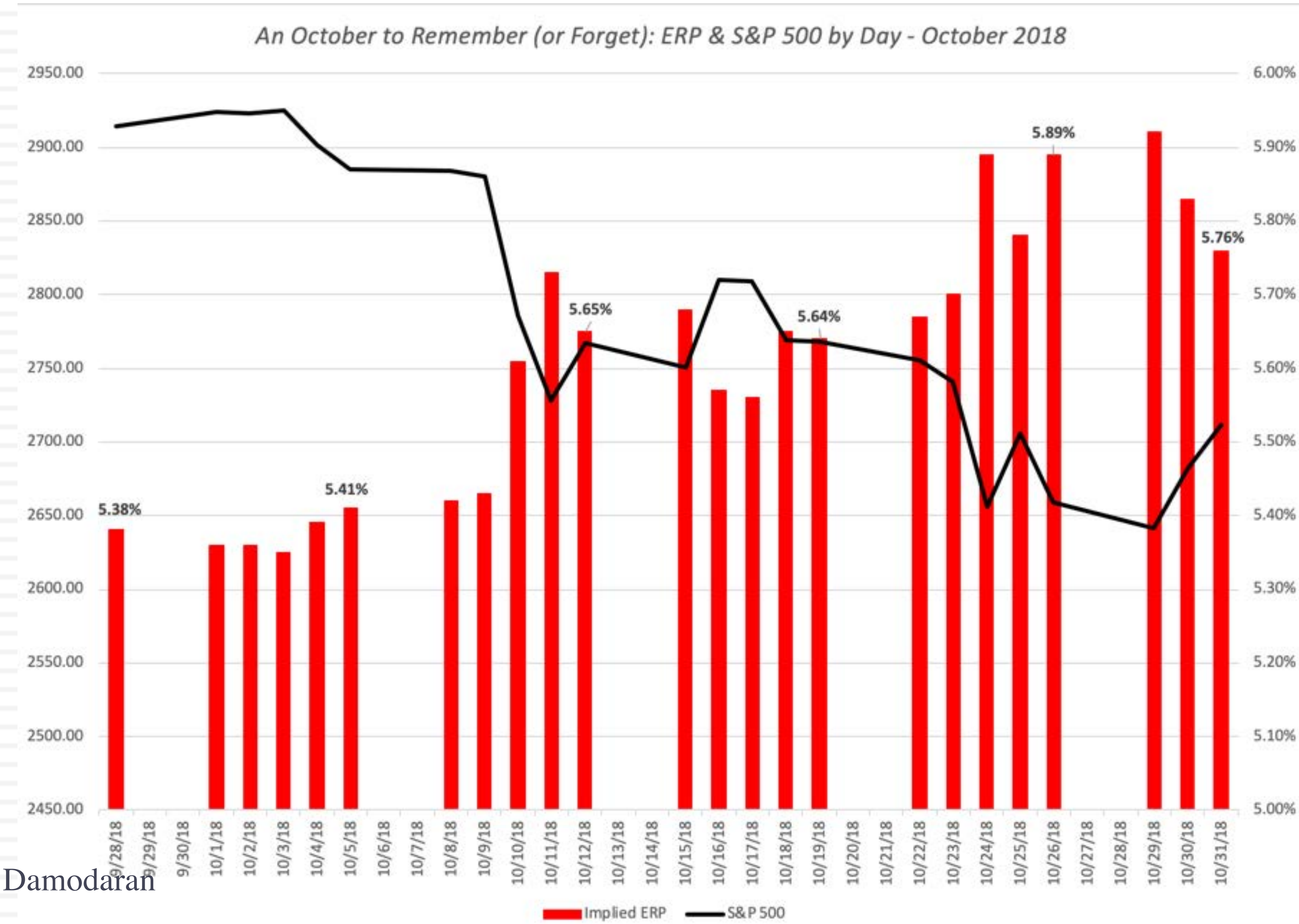
II. Market/Macro Crises

- If investors are risk averse, they need inducement to invest in risky assets. That inducement takes the form of a risk premium, a premium you would demand over and above the riskfree asset to invest in a risky asset.
- Every risky asset market has a “risk” premium that determines how individual assets in that market are priced.
  - In an equity market, that risk premium for dealing with the volatility of equities and bearing the residual risk is the equity risk premium.
  - In the bond market, the risk premium for being exposed to default risk is the default spread.
  - In real asset markets, there are equivalent (though less widely publicized markets).
- During a crises, the price of risk will rise and tracking it can provide a measure of how much the market is being affected by the crisis.

The Anatomy of a Crisis: Implied ERP from September 12, 2008 to January 1, 2009



And in October 2018



III. Macro Events

- In some cases, the macro uncertainty is about a specific event (trade war, Brexit, election) and how it will play out on individual company valuations.
- When that type of uncertainty exists, investors and analysts have to find better ways of dealing for that in valuation than just adjusting the discount rate, since the effects will not only be in the cash flows but vary across companies.
- You can try to incorporate all of this risk into an expected cash flow and value the company, but since the value will depend on how the event will unfold, it is better to value the company under different scenarios.

Scenario Analysis

- Scenario analysis is best employed when the outcomes of a project are a function of the macro economic environment and/or competitive responses.
- There are a couple of ways in which you can structure scenario analysis
  - Best-case, Worst-case analyses: In its lease useful form, you value a company under best and worst case scenarios, where you set all the inputs at their most optimistic and most pessimistic levels. You then use the resulting wide range (which will almost certainly be wide enough to cover almost any price) as protective cover.
  - Plausible scenarios: Here, you define what you feel are the most plausible scenarios (allowing for the interaction across variables) and value the company under these scenarios. To complete the analysis, you then attach probabilities to the scenarios and value the company.

easyJet: March 2019 (in British Pounds)

Cash flows from existing assets

		easyJet	
	Global Industry	*Last 12 months*	*2014-18*
Revenue Growth	8.01%	16.86%	6.73%
Pre-tax operating margin	9.47%	10.04%	11.23%
Sales to capital ratio	1.07	1.72	1.65
Return on invested capital	8.48%	13.89%	15.12%

The Payoff from growth

Revenues will grow 5% a year for next 5 years, tapering down to 0.64% growth in year 10

Operatng margin (pre-tax) will drop to 8%, close to Euro average.

Sales/Invested Capital will remain at 1.72 (2018 levels)

Maturty and Closure

Stable Growth
g = 0.53%;
Cost of capital = 6.00%
ROC= 6.00%;
Reinvestment Rate=g/ROC
= 0.53%/6% = 8.83%

Terminal Value = 457/(.06-..0053) = £ 8520

Cashflows

	Base year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	Terminal year
Revenue growth rate		5.00%	5.00%	5.00%	5.00%	5.00%	4.13%	3.26%	2.38%	1.51%	0.64%	0.64%
Revenues	£5,898.00	£6,192.90	£6,502.55	£6,827.67	£7,169.06	£7,527.51	£7,838.24	£8,093.46	£8,286.41	£8,411.70	£8,465.53	£8,519.71
EBIT (Operating) margin	10.09%	9.67%	9.26%	8.84%	8.42%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
EBIT (Operating income)	£595.30	£599.14	£601.87	£603.38	£603.54	£602.20	£627.06	£647.48	£662.91	£672.94	£677.24	£681.58
Tax rate	19.70%	19.70%	19.70%	19.70%	19.70%	19.70%	20.76%	21.82%	22.88%	23.94%	25.00%	25.00%
EBIT(1-t)	£478.03	£481.11	£483.30	£484.52	£484.64	£483.57	£496.88	£506.20	£511.24	£511.83	£507.93	£511.18
- Reinvestment		£170.06	£178.56	£187.49	£196.87	£206.71	£179.19	£147.17	£111.27	£72.25	£31.04	£54.53
FCFF		£311.05	£304.74	£297.03	£287.78	£276.86	£317.69	£359.02	£399.97	£439.58	£476.89	£456.66

PV(Terminal value)	£ 5,171.75
PV (CF over next 10 years)	£ 2,634.17
Value of operating assets =	£ 7,805.92
- Debt	£ 1,515.19
- Minority interests	£ -
+ Cash	£ 1,373.00
+ Non-operating assets	£ -
Value of equity	£ 7,663.73
- Value of options	£0.00
Value of equity in common stock	£7,663.73
Number of shares	395.47
Estimated value /share	£ 19.38

Discount at Cost of Capital (WACC) = 5.47% (.77) + 3.09 (1-.25) (.23) = 4.74%

The Risk in the Cash flows

On March 15, 2019, easyJet was trading at £ 12.57 per share.

Cost of Equity
5.47%

Cost of Debt
0.64%+ 0.56% + 1.89% = 3.09%

Weights
E = 77% D = 23%

Riskfree Rate:
£ Risk free Rate = 1.20% - 0.56% = 0.64%

\+

Beta = 0.73

X

D/E Ratio: 30.5%

Business	Revenues	EV/Sales	Estimated Value	Unlevered Beta
Air Transport	$ 614.00	1.3758	$ 844.72	0.5942
Company	$ 614.00		$ 844.72	0.5942

ERP = 6.63%			
Country	***Revenues***	***Weight***	***ERP***
United Kingdom	2,577.0	43.69%	6.22%
Southern Europe	1926	32.66%	6.02%
Northern Europe	1395	23.65%	8.25%
Total	5898	100.00%	6.63%

Brexit's Consequences

	No Deal Brexit	Bad Deal Brexit	Soft or No Brexit
Restructuring cost (up front)	£500 million	£300 million	$0
Revenue growth	3.00%	5.00%	5.00%
Operating Margin	6.00%	7.00%	8.00%
Sales to Capital Ratio	1.73	1.73	1.73

	No Deal Brexit	Delayed & Messy Brexit	Soft or No Brexit
Probability	25%	50%	25%
Value Per Share	£12.02	£15.70	£19.38

Expected Value per share = .25 (£12.02) + .50 (£15.70) + .25 (£19.38) = £15.70

The Bottom Line

- Much as we would like to believe otherwise, disruption is neither new nor novel. It is part of how economies evolve and change.
- Disruption does create uncertainty but more importantly, it changes the underlying structure of businesses and entire economies.
- Those structural changes imply that investing, valuing or managing companies assuming that mean reversion always works and that mechanical models/ metrics are the answer is dangerous.