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

I. Estimation versus Economic 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 from real sources: that markets and economies can change over time and that even the best medals will fail to capture these unexpected changes.
- Estimation uncertainty can be mitigated by doing your homework, collecting more data or building better models, but economic uncertainty is here to stay.

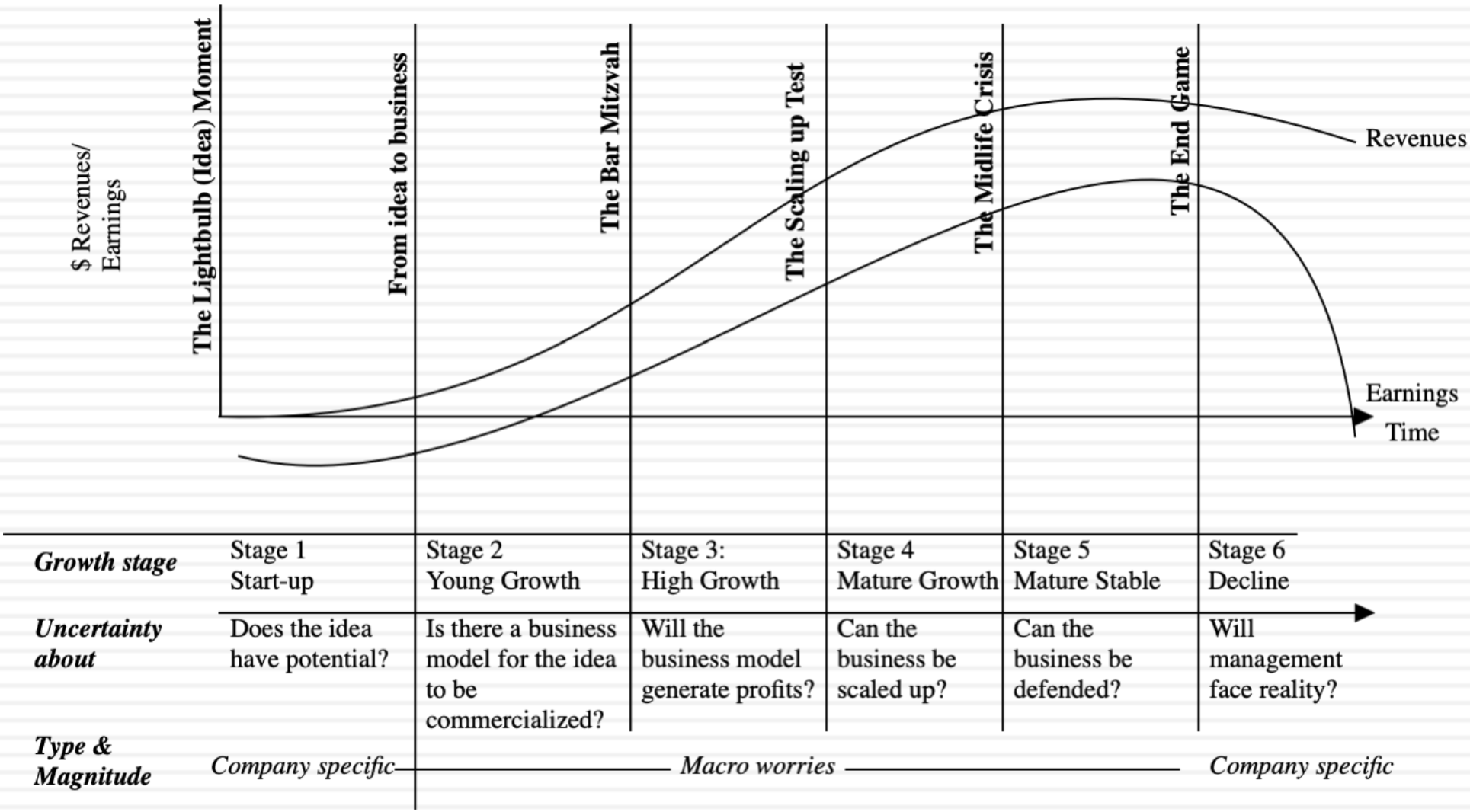
II. Micro versus Macro Uncertainty

- Micro uncertainty versus Macro uncertainty
  - Micro uncertainty refers to uncertainty about the firm you are valuing and its business model - the potential market or markets for its 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 –the strength of the economy, the level of interest rates and the price of risk (equity and debt).
- Micro uncertainty can be mitigated or even eliminated by diversifying across companies but macro uncertainty will remain even in the most diversified portfolios.

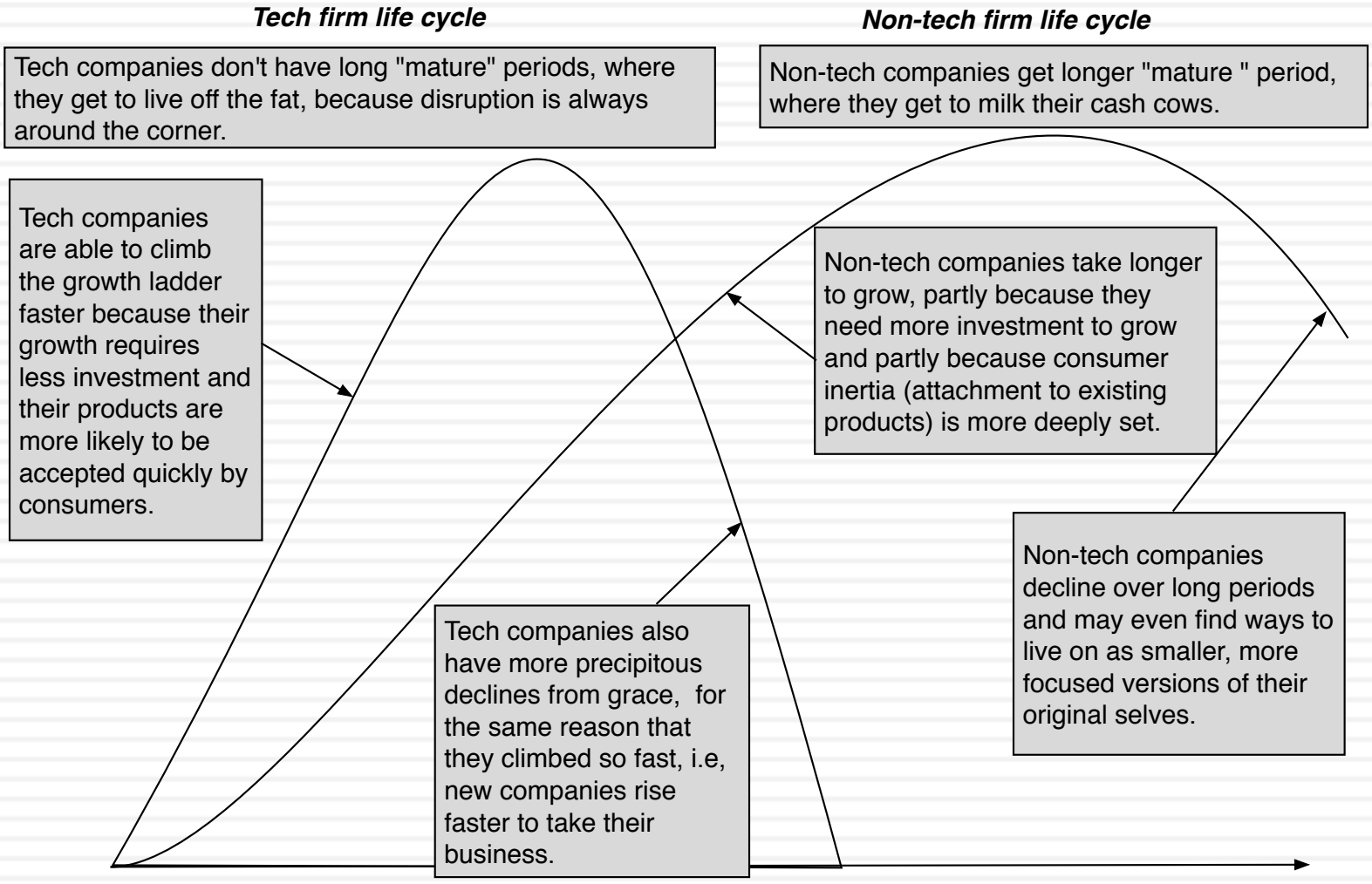
III. Discrete versus Continuous Uncertainty

- Discrete versus continuous uncertainty
  - Some events that you are uncertain about are discrete. Thus, a biotechnology firm with a new drug working its way through the FDA pipeline may see the drug fail at some stage of the approval process. In the same vein, a company in Venezuela or Argentina may worry about nationalization risk.
  - Most uncertainties, though, are continuous. Thus, changes in interest rates or economic growth occur continuously and affect value as they happen.
- In valuation, we are better at dealing with continuous risks than with discrete risks. In fact, discount rate risk adjustment models are designed for continuous risk.

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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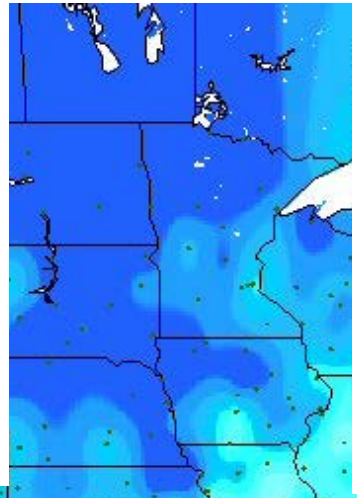
Further changeability analysis »

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%



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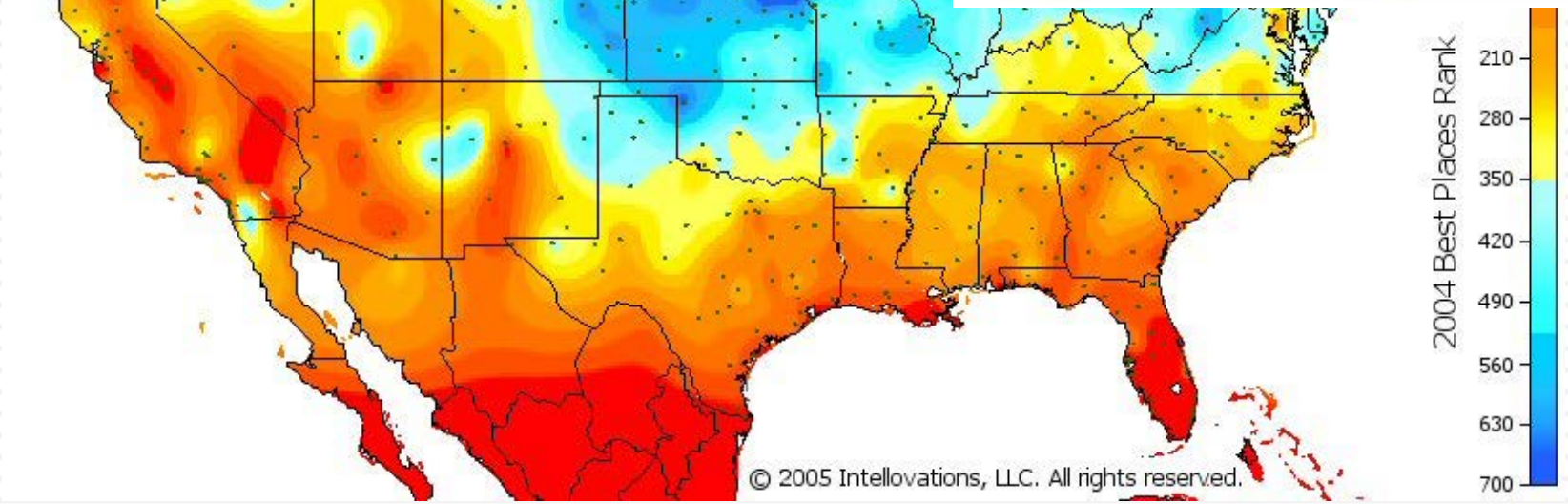
Further changeability analysis »

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.

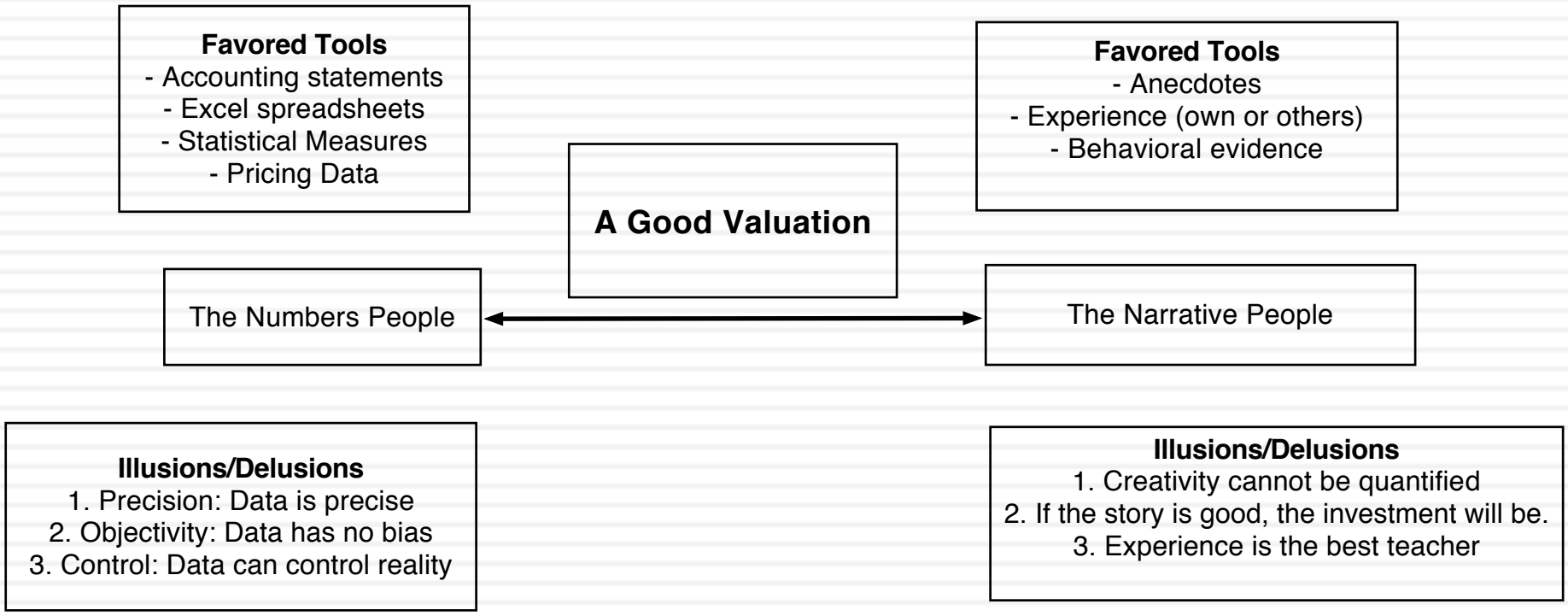
The Five Stages of being Disrupted: Taxi Cabs and Uber

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.

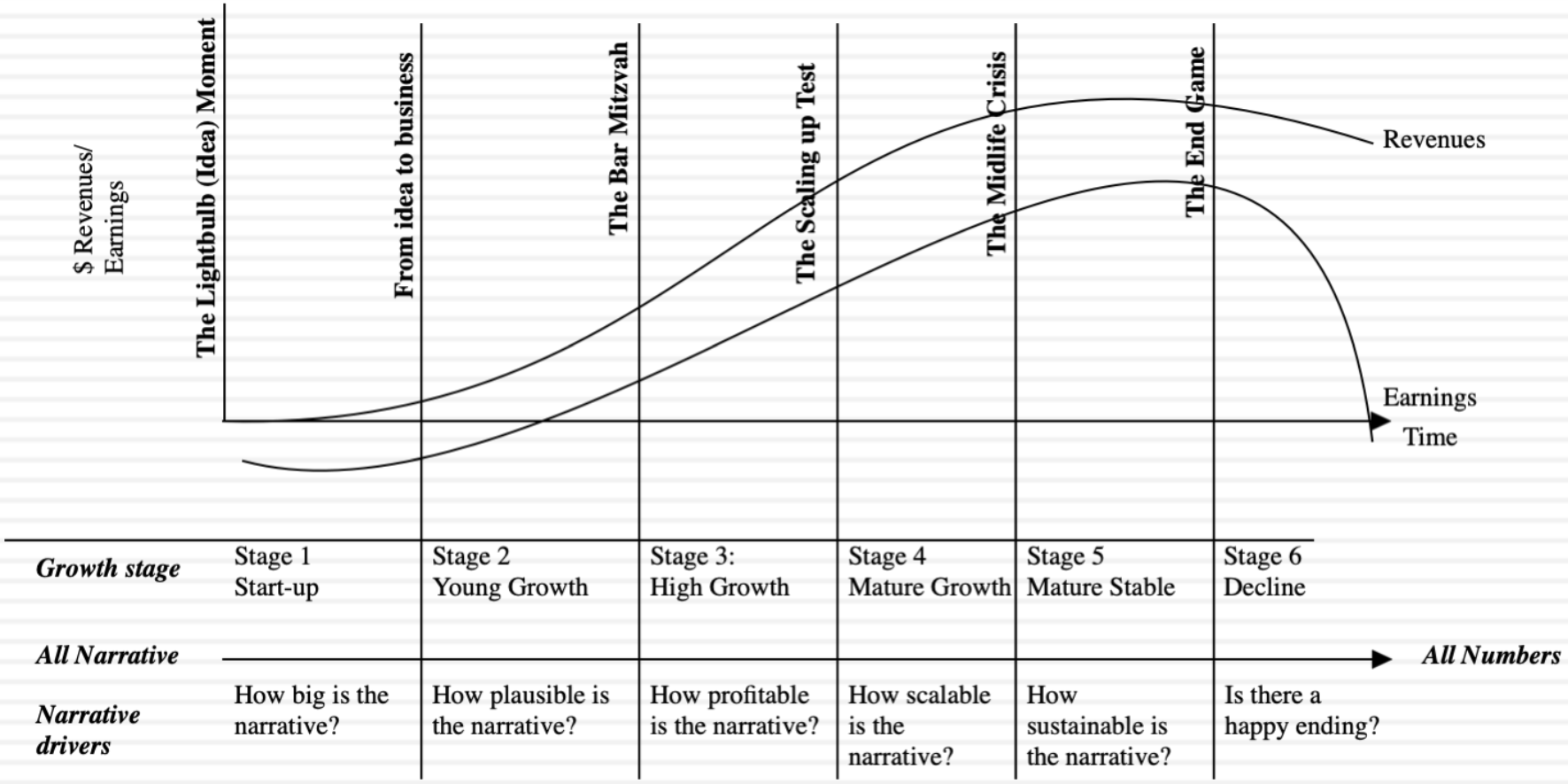
Valuing a Disruptor

- 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.

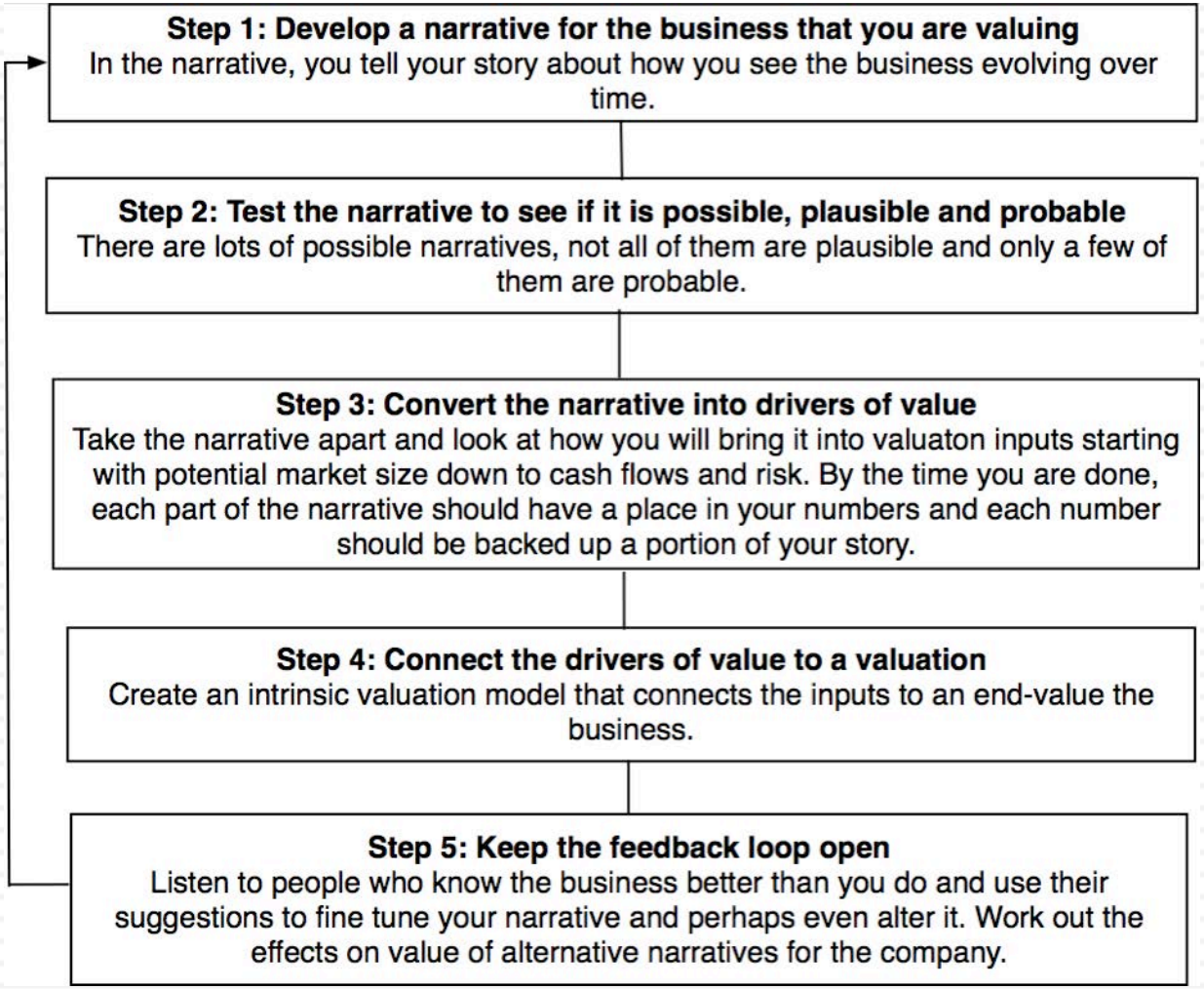
A Key Tool: Story Telling



Story versus Numbers: The Life Cycle



The Steps

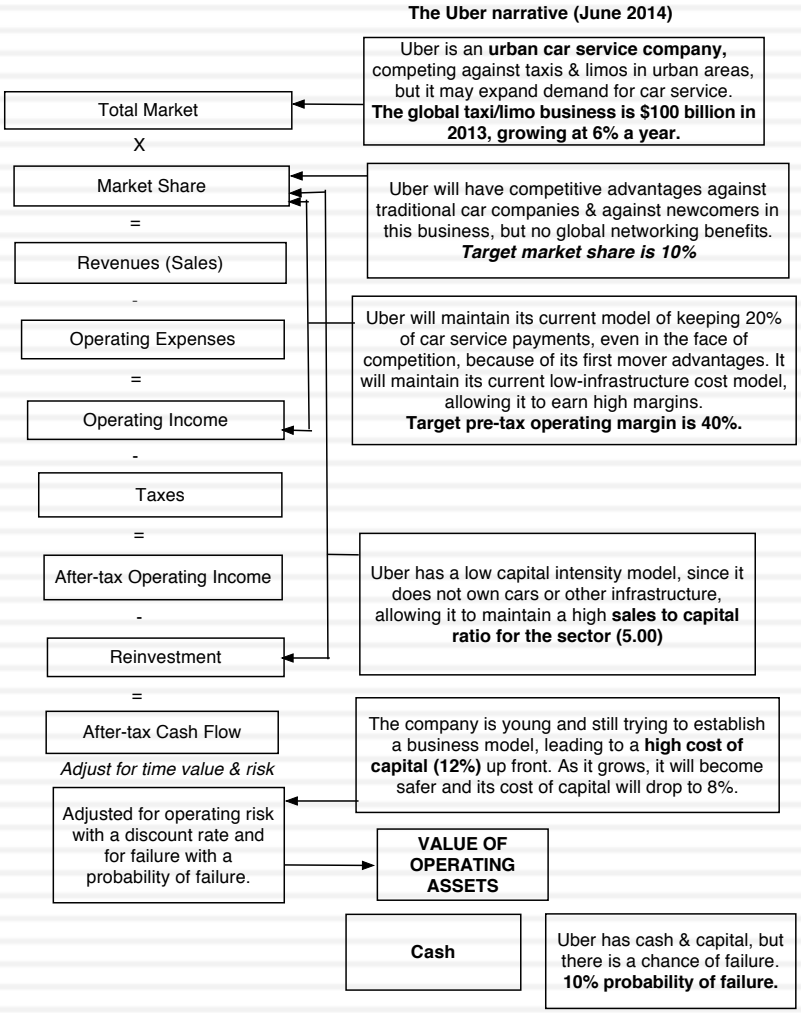

Step 1: Develop a narrative for the business that you are valuing
In the narrative, you tell your story about how you see the business evolving over time.
Step 2: Test the narrative to see if it is possible, plausible and probable
There are lots of possible narratives, not all of them are plausible and 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

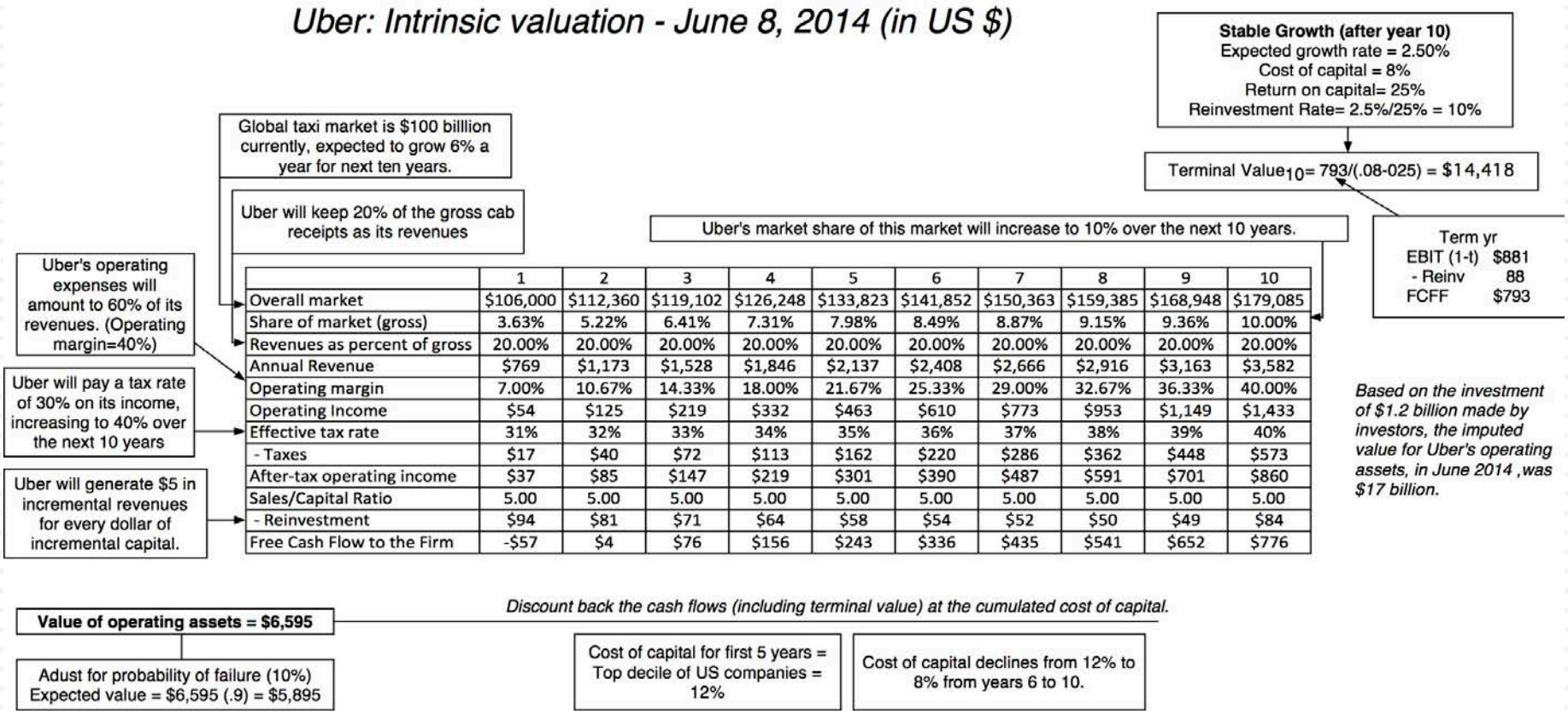
In June 2014, my initial narrative for Uber was that it would be

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



	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

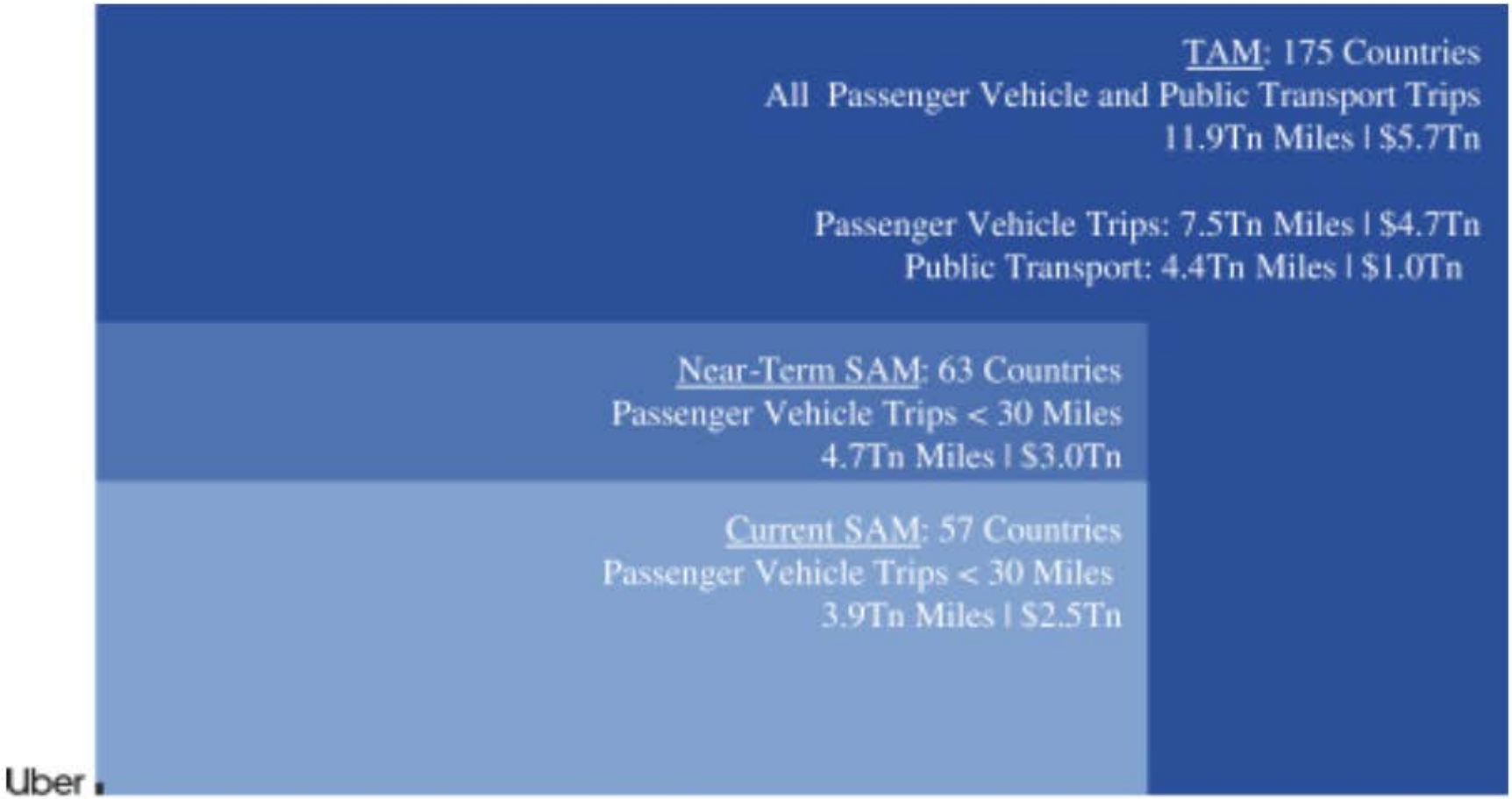
And your story will change over time…

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

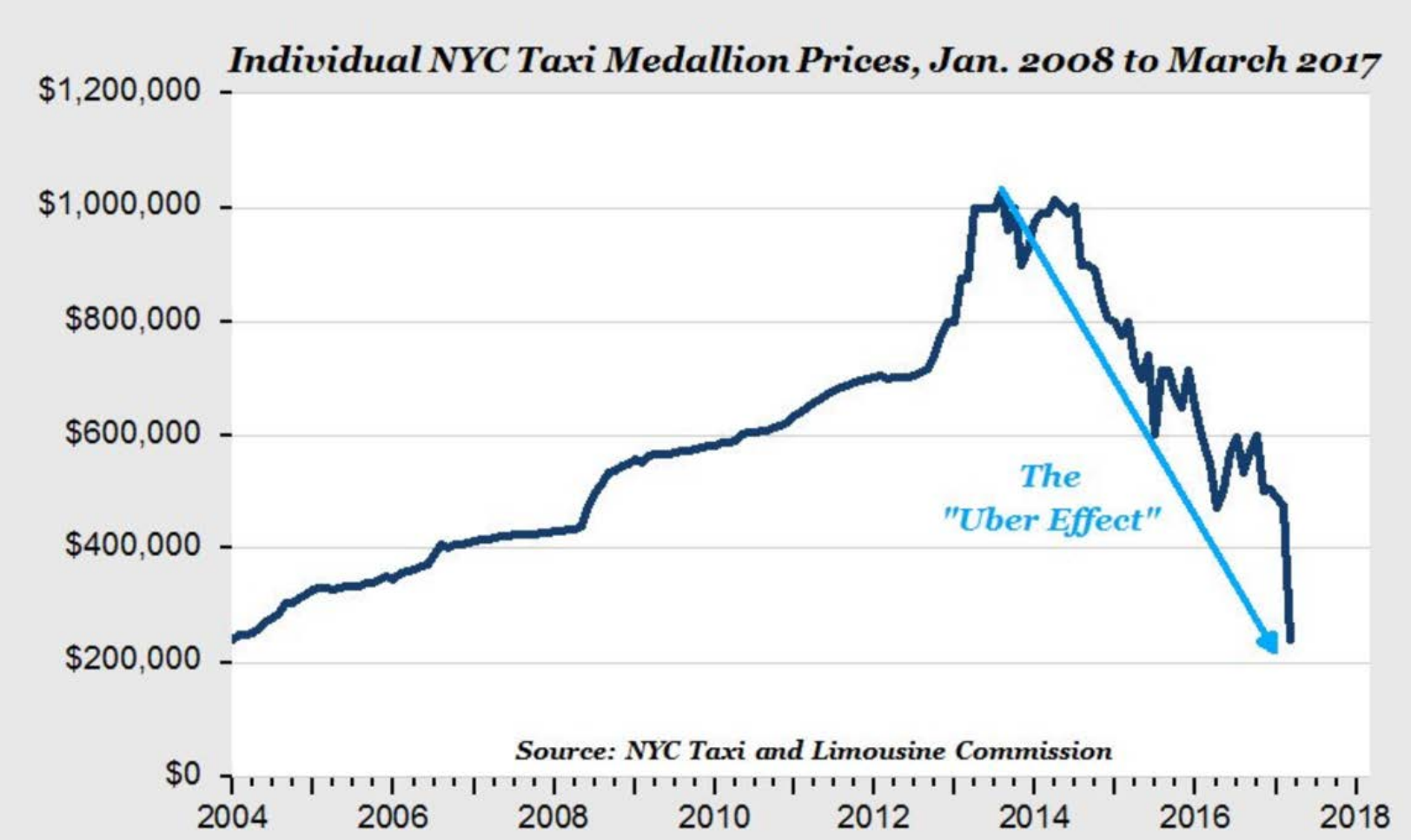
The Value

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.

Pricing Basics

	Start with a basic intrinsic value model	*Divide both sides of the equation by the denominator of the multiple that you are trying to deconstruct,.*	You should end up with an intrinsic version of your multiple, which should relate it to fundamentals.
If Equity Multiple	Start with a dividend or FCFE model, preferably simple. Price= EPS * Payout / (r -g)	Divide your dividend or FCFE model by denominator of equity multiple. Prtce/Book = ROE * Payout / (r -g)	Intrinsic version of equity multiple, with drivers of value Price/Book = f(ROE, r, g, Payout)
If EV Multiple	Start with a operating asset value model, preferably simple. EV= EBIT (1-t) (1- RIR)/ (WACC -g)	Divide your operating asset model by denominator of EV multiple. EV/Sales = After-tax Operating Margin (1- RIR)/ (WACC -g)	Intrinsic version of EV multiple, with drivers of value EV/Sales = f(After-tax Operating Margin, RIR, WACC, g)

- If you write g = (1- Payout ratio) * ROE, and substituting back into the P/BV equation,

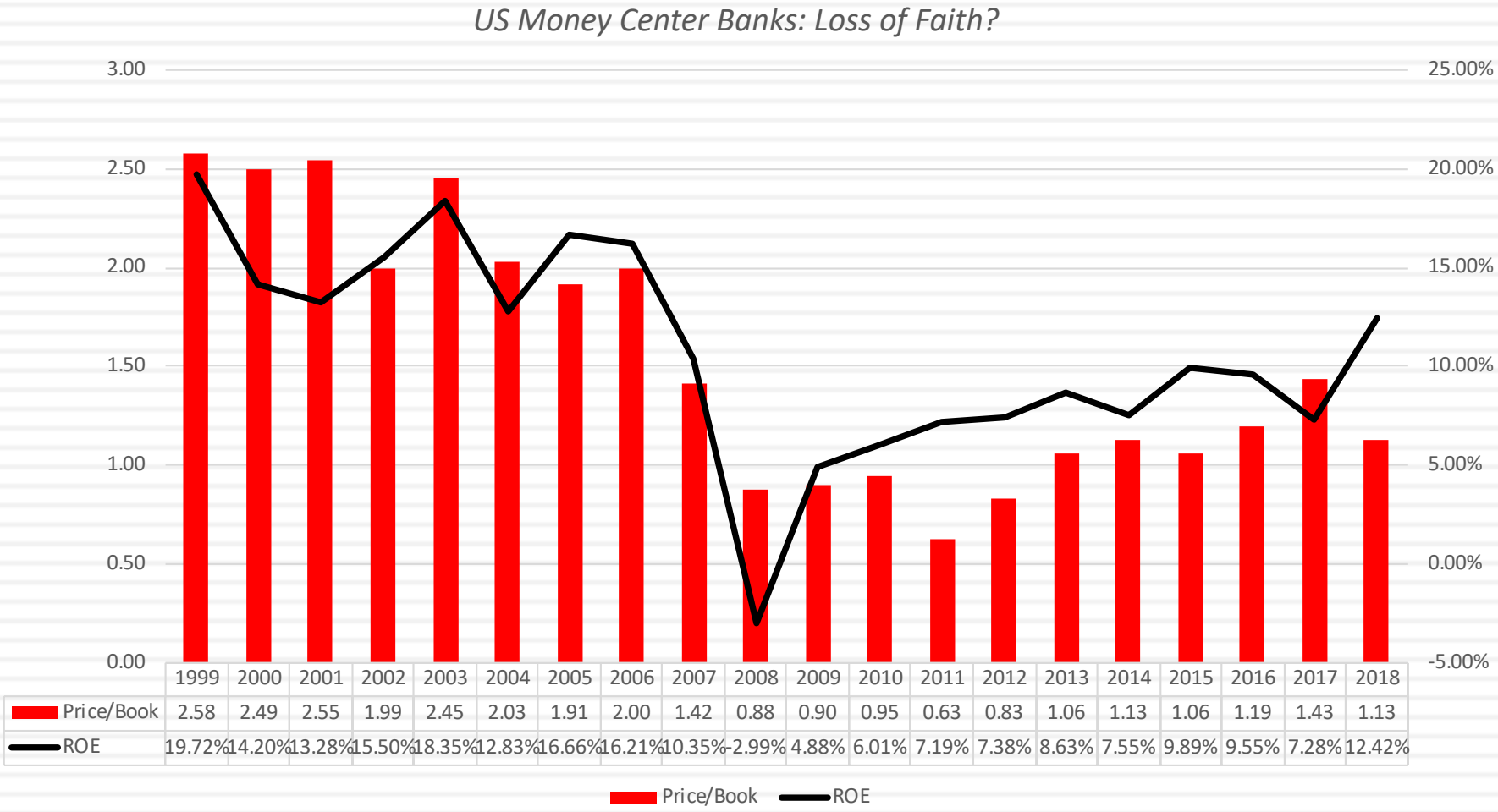
$$\frac{P_0}{BV_0} = PBV = \frac{ROE - g_n}{r - g_n}$$

- A company that is expected to earn less than the ROE should trade at less than book value.

Pricing Disrupted Companies

- Look cheap: Companies in disrupted businesses often look cheap, on pricing multiples (PE, Price to book, EV to EBITDA).
- Relative to the market or their own past: The comparison is either to the rest of the market or their own past history on this pricing multiple.
- But are not cheap, if you bring in fundamental changes: The pricing may just reflect the effect that disruptors are having on fundamentals.

Money Center Banks: Disruption from within..



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Price/Book	2.58	2.49	2.55	1.99	2.45	2.03	1.91	2.00	1.42	0.88	0.90	0.95	0.63	0.83	1.06	1.13	1.06	1.19	1.43	1.13
ROE	19.72%	14.20%	13.28%	15.50%	18.35%	12.83%	16.66%	16.21%	10.35%	-2.99%	4.88%	6.01%	7.19%	7.38%	8.63%	7.55%	9.89%	9.55%	7.28%	12.42%

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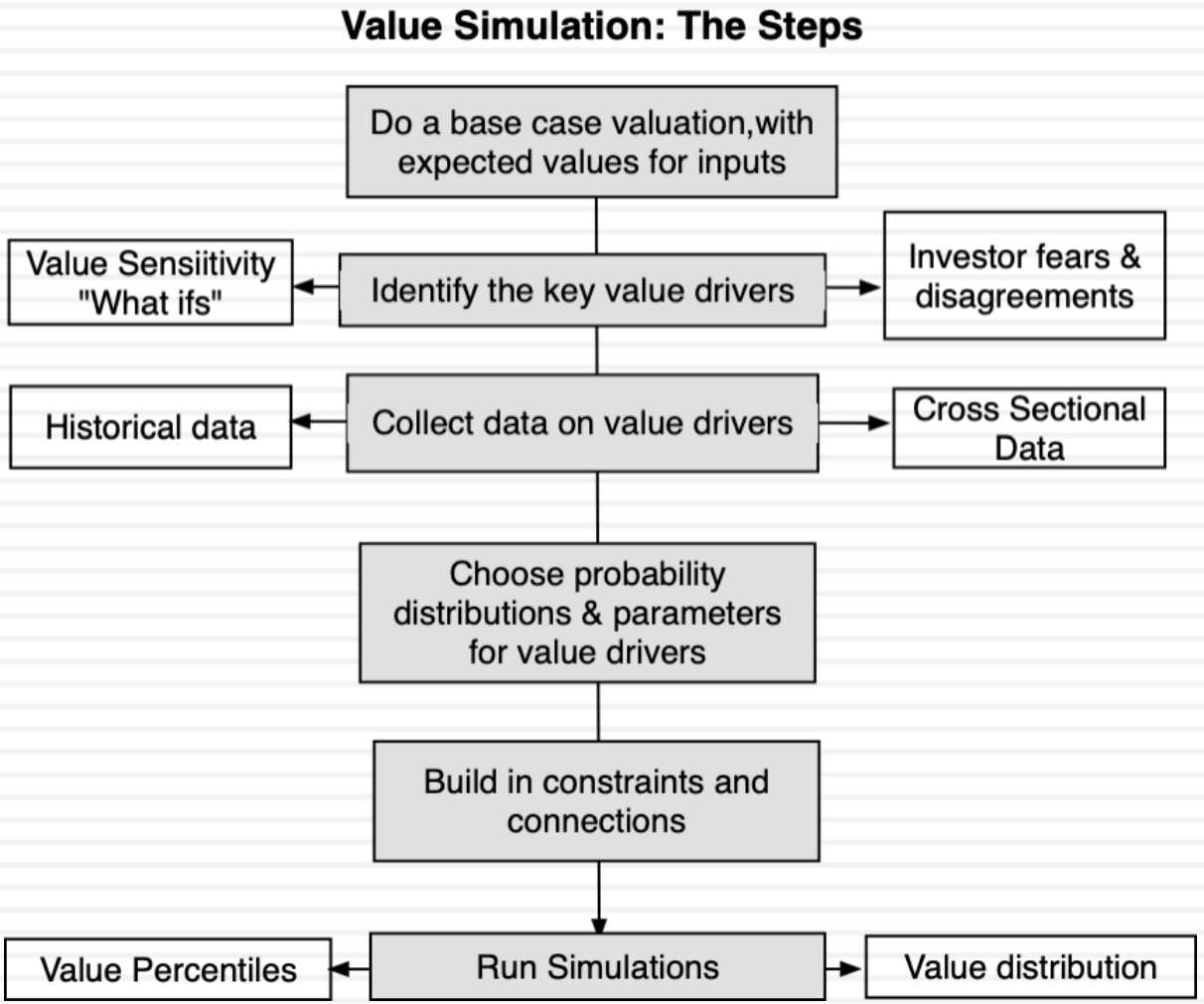
Facing up to Uncertainty

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

Terminal year (11)
EBIT (1-t) $ 1,852
- Reinvestment $ 386
FCFF $ 1,466

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

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

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

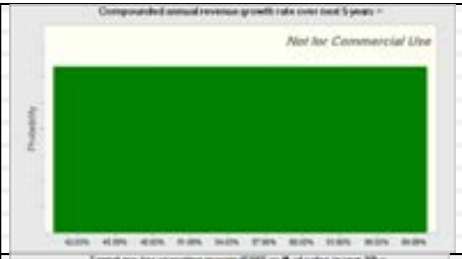
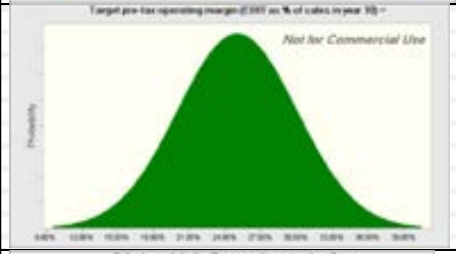
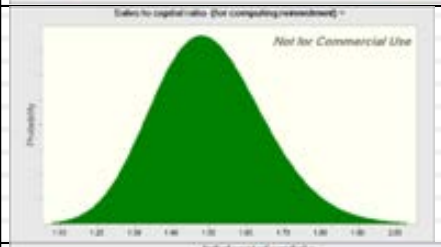
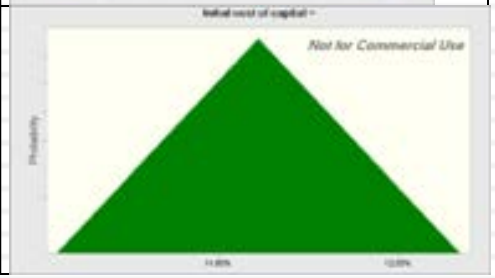
D/E=1.71%

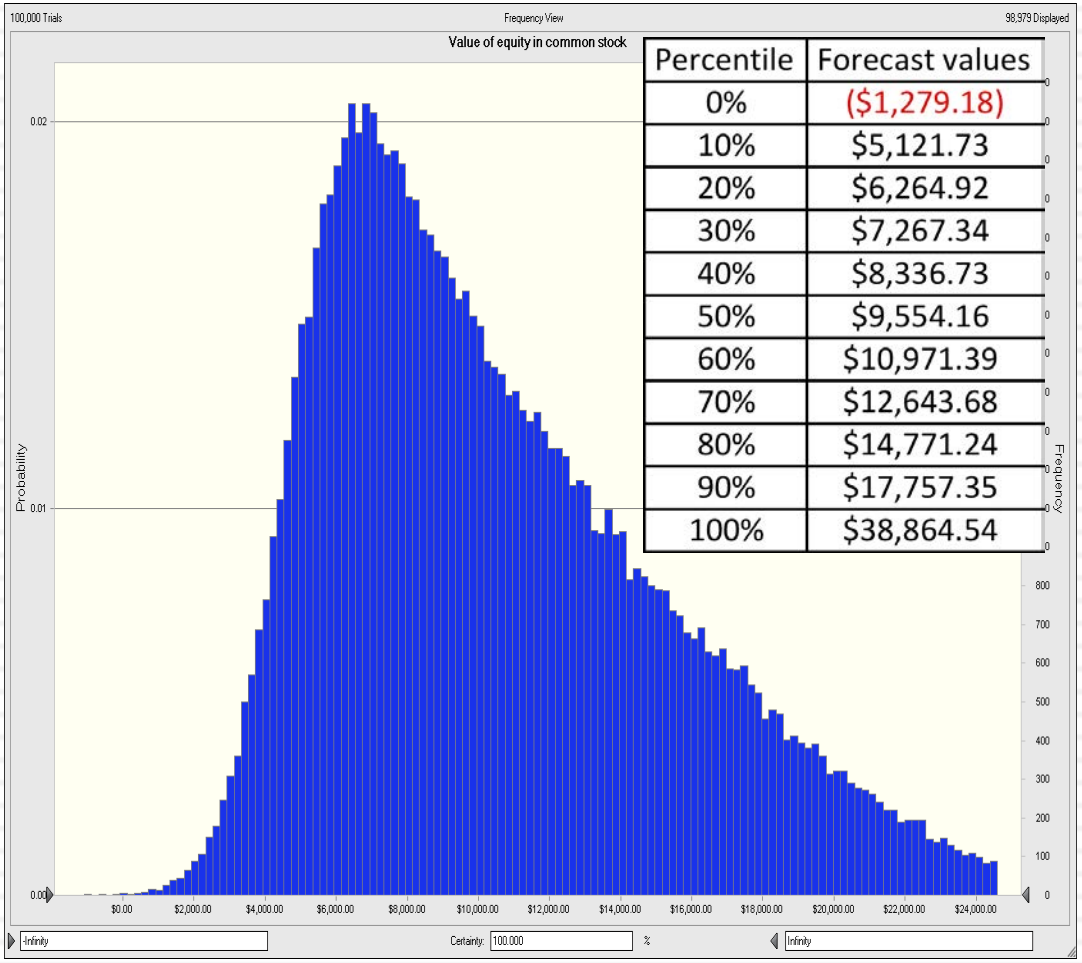
x

Risk Premium
6.15%

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

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%	

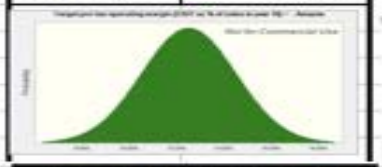


Percentile	Forecast values
0%	($1,279.18)
10%	$5,121.73
20%	$6,264.92
30%	$7,267.34
40%	$8,336.73
50%	$9,554.16
60%	$10,971.39
70%	$12,643.68
80%	$14,771.24
90%	$17,757.35
100%	$38,864.54

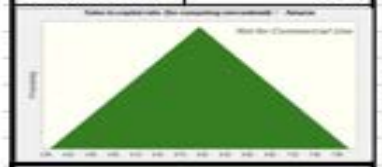
Investing Payoff? Amazon in October 2018

Revenue Growth Rate	
Minimum	5.00%
Maximum	25.00%

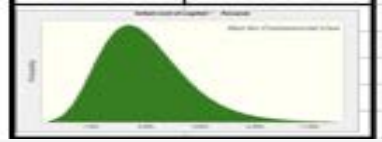
Operating Margin	
Mean	12.50%%
Std Dev	2.00%



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%



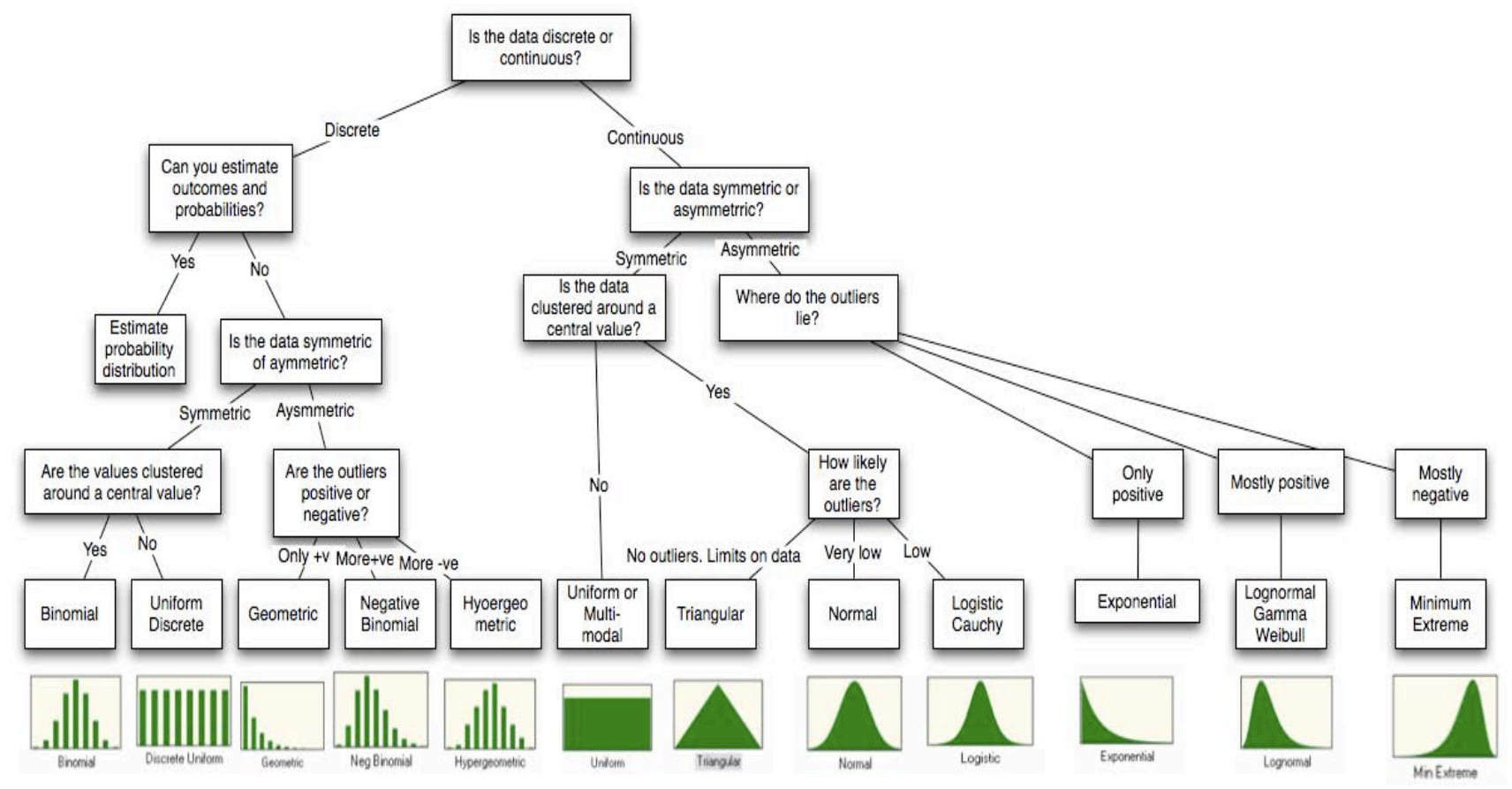
Correlation = 0.40

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

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

Amazon: Simulated Values in September 2018

Distributional Awareness…



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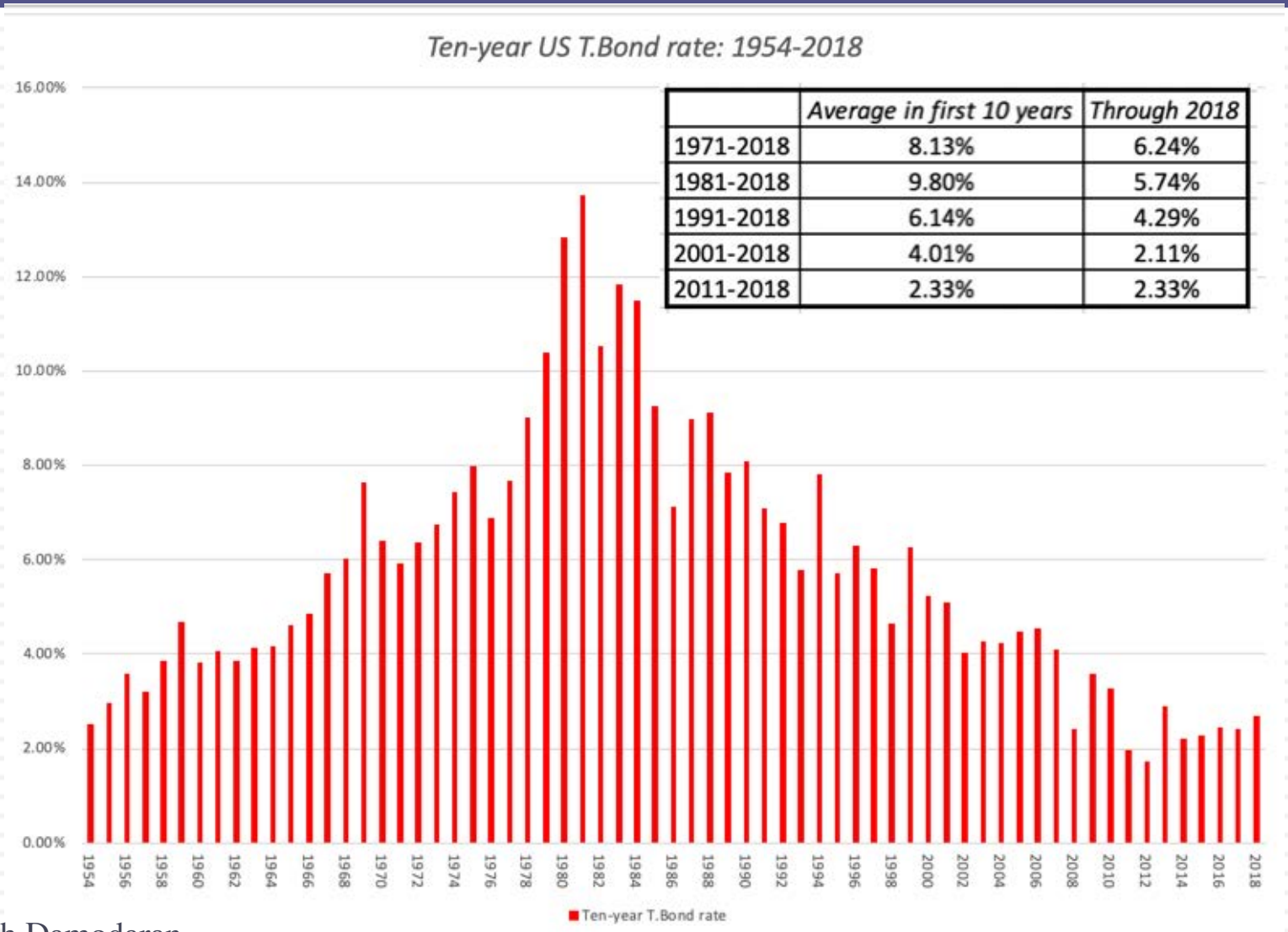
Macro Change and Disruption

I. Macro Input Shifts

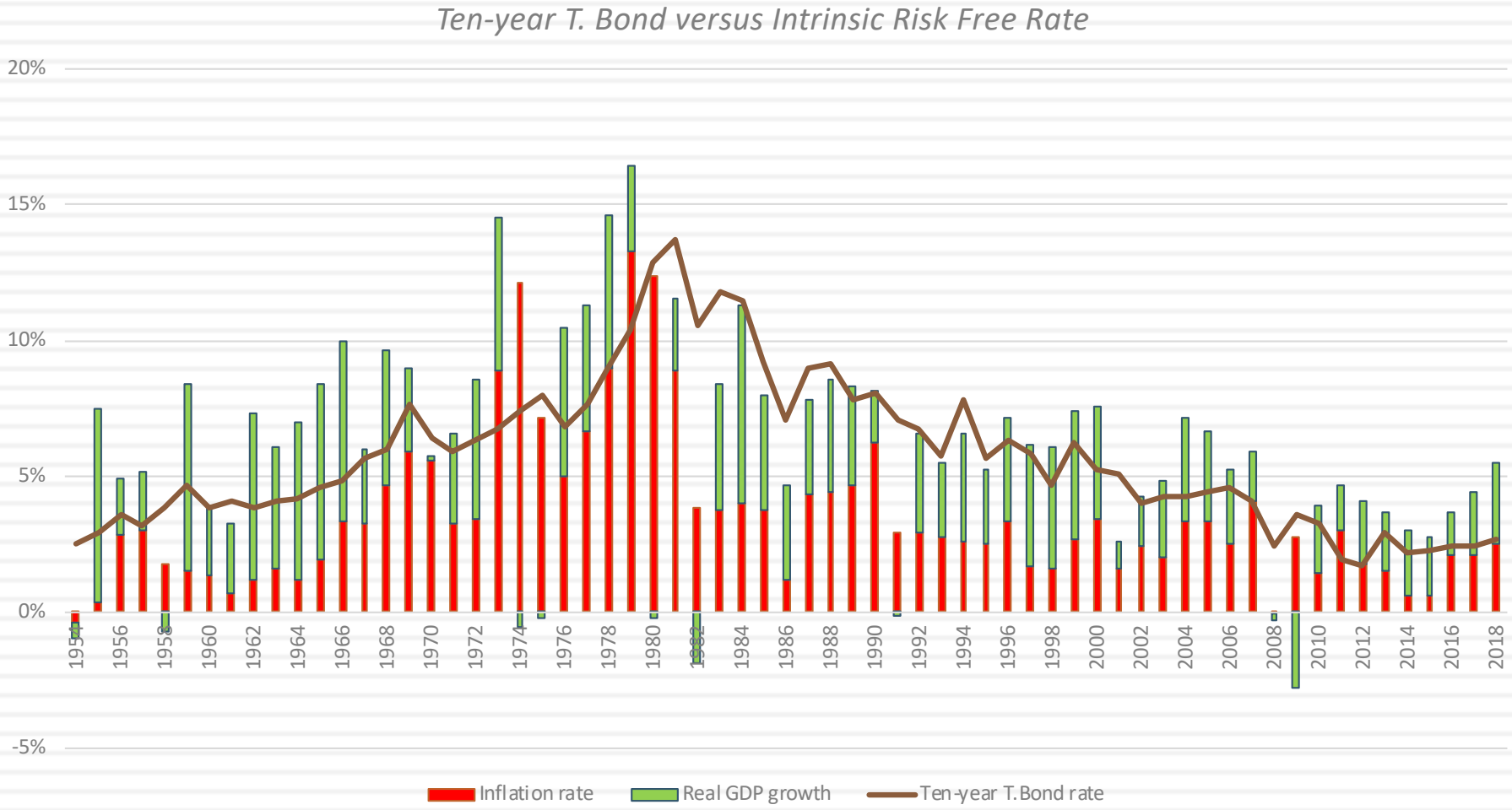
- When valuing companies or assets, there are macro inputs that have an effect on value (risk free rates, risk premiums and exchange rates, to name just three) that we use.
- When the current values of these inputs deviate from what we ”expect them to be”, we become uncomfortable and then take actions 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

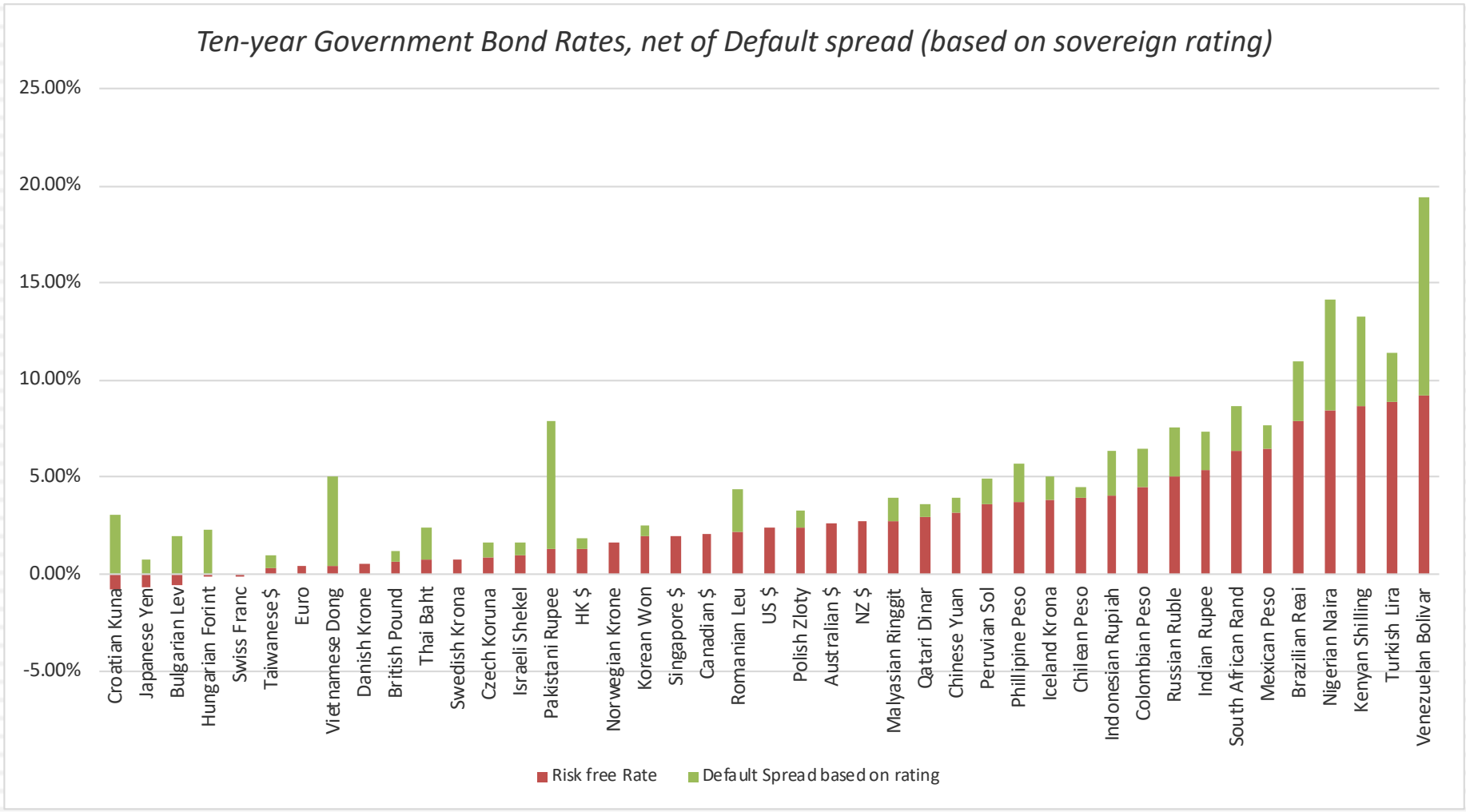


	Average in first 10 years	Through 2018
1971-2018	8.13%	6.24%
1981-2018	9.80%	5.74%
1991-2018	6.14%	4.29%
2001-2018	4.01%	2.11%
2011-2018	2.33%	2.33%

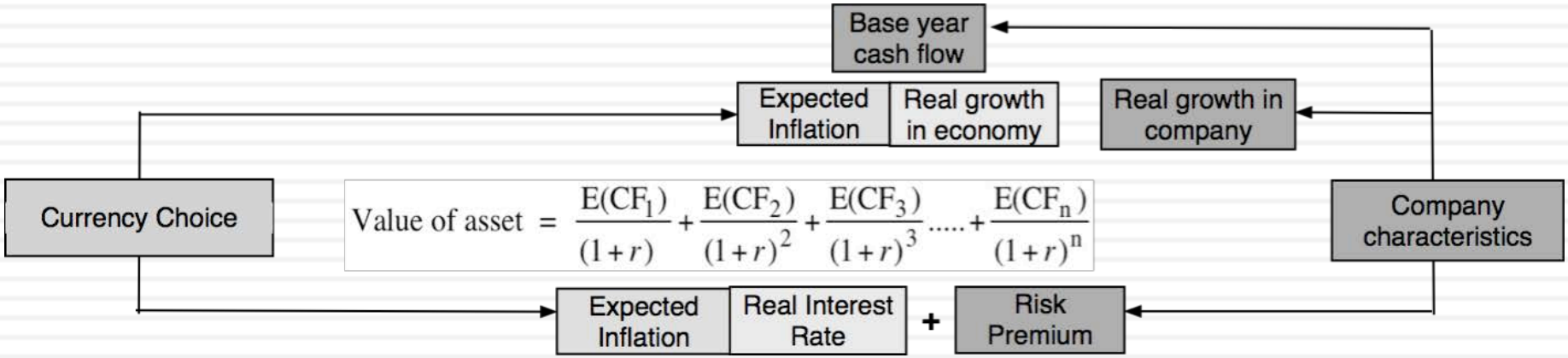
An intrinsic risk free rate…



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

Firm's D/E Ratio: 66.98%

Unlevered beta of alcoholic beverage business = 0.80

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

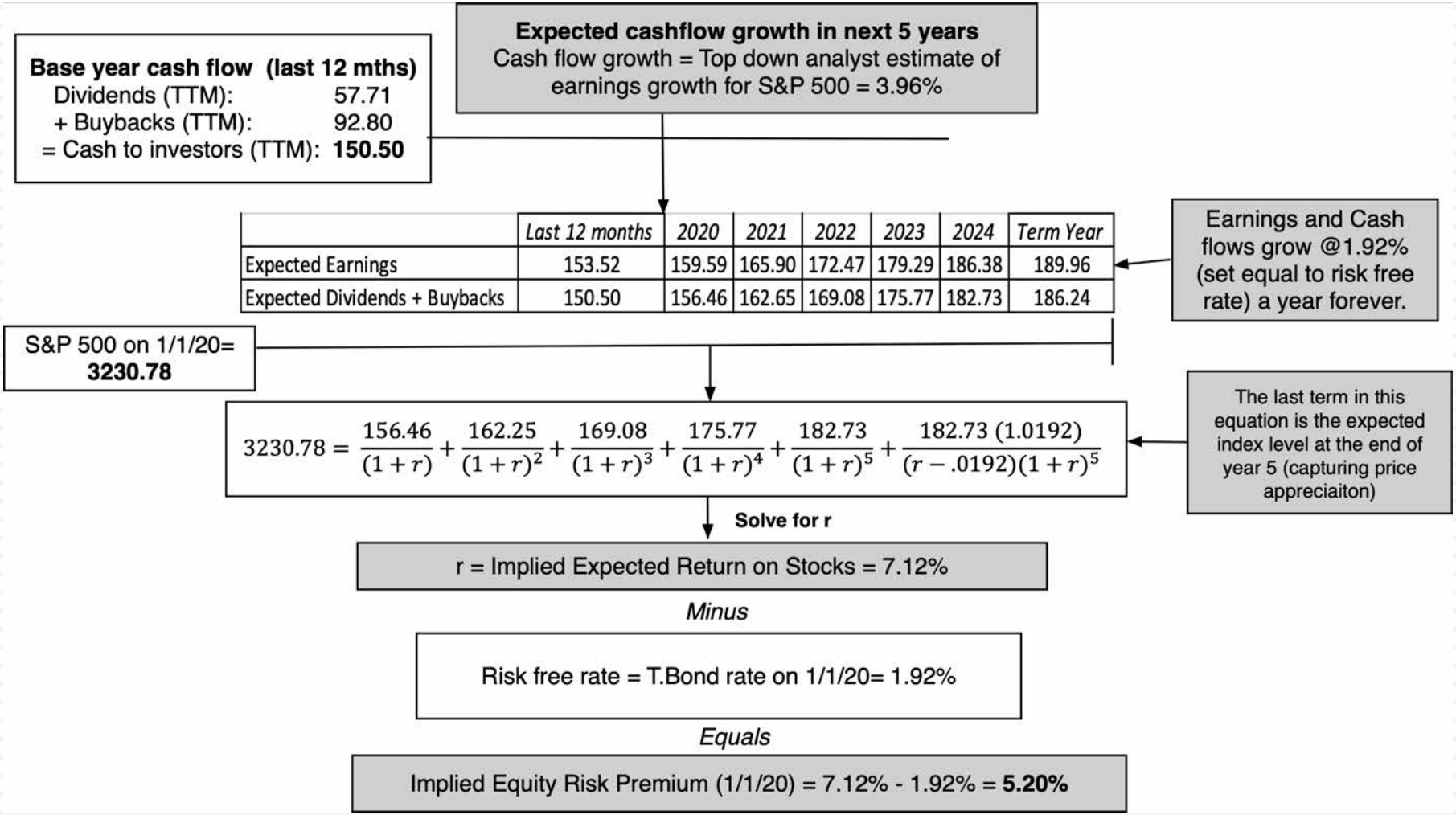
- If investors are risk averse, they need inducement to invest in risky assets. That inducement takes the form of a risk premium, a premium you would demand over and above the riskfree asset to invest in a risky asset.
- Every risky asset market has a "risk" premium that determines how individual assets 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?

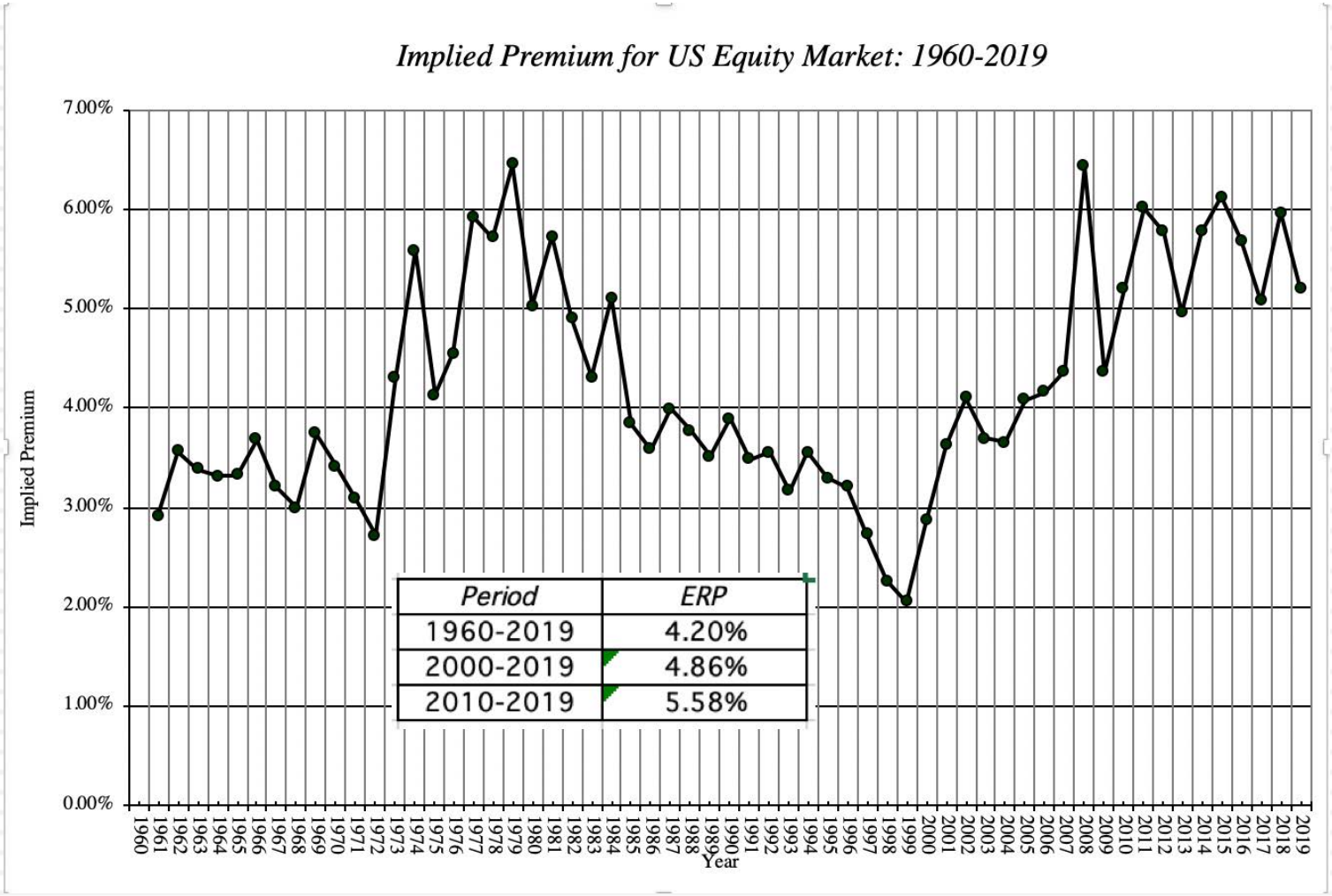
	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2018	7.93%	6.26%	6.11%	4.66%
Std Error	2.09%	2.22%		
1969-2018	6.34%	4.00%	5.01%	3.04%
Std Error	2.38%	2.71%		
2009-2018	13.00%	11.21%	12.48%	11.00%
Std Error	3.71%	5.50%		

- 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?



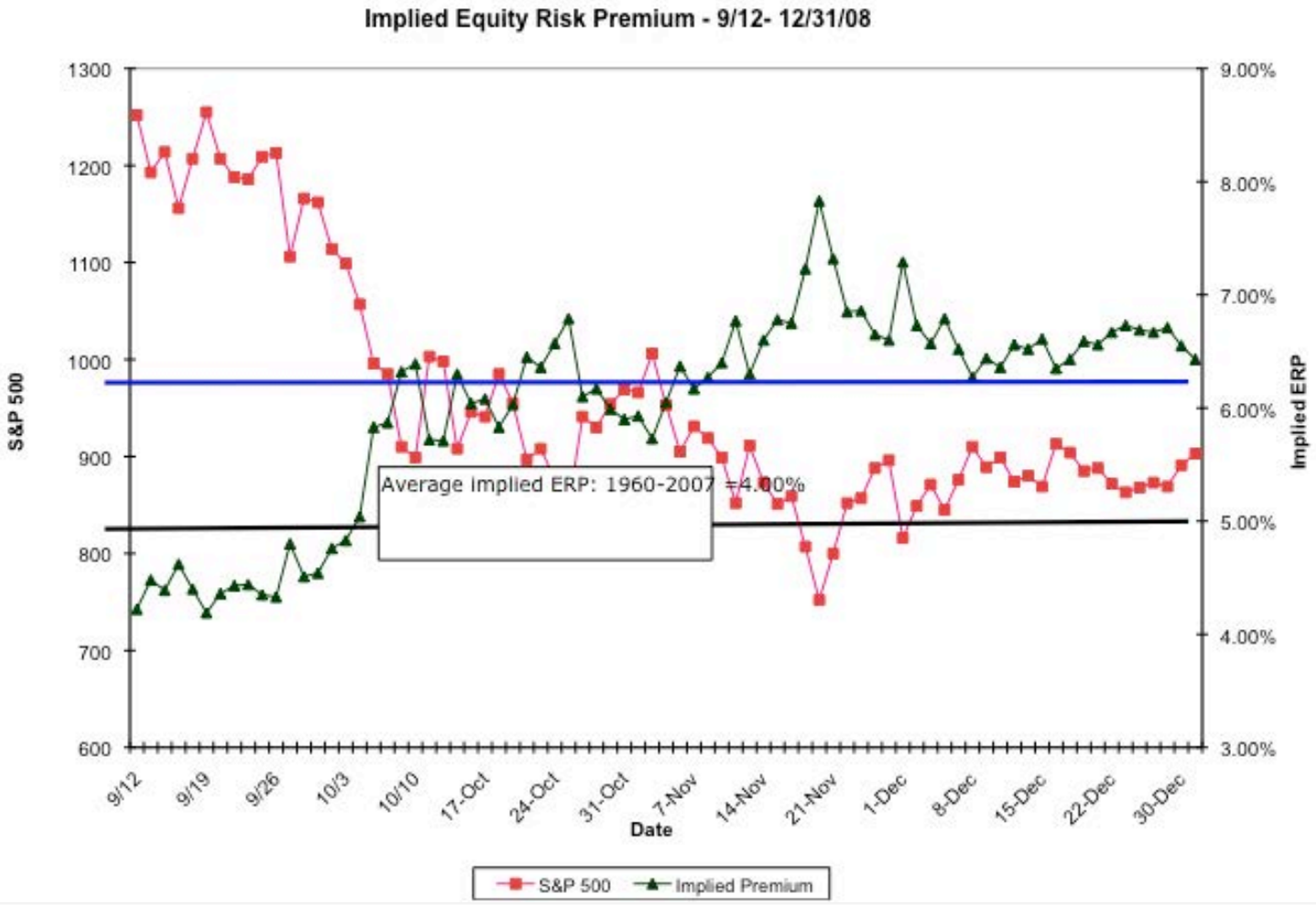
Implied Premiums in the US: 1960-2019



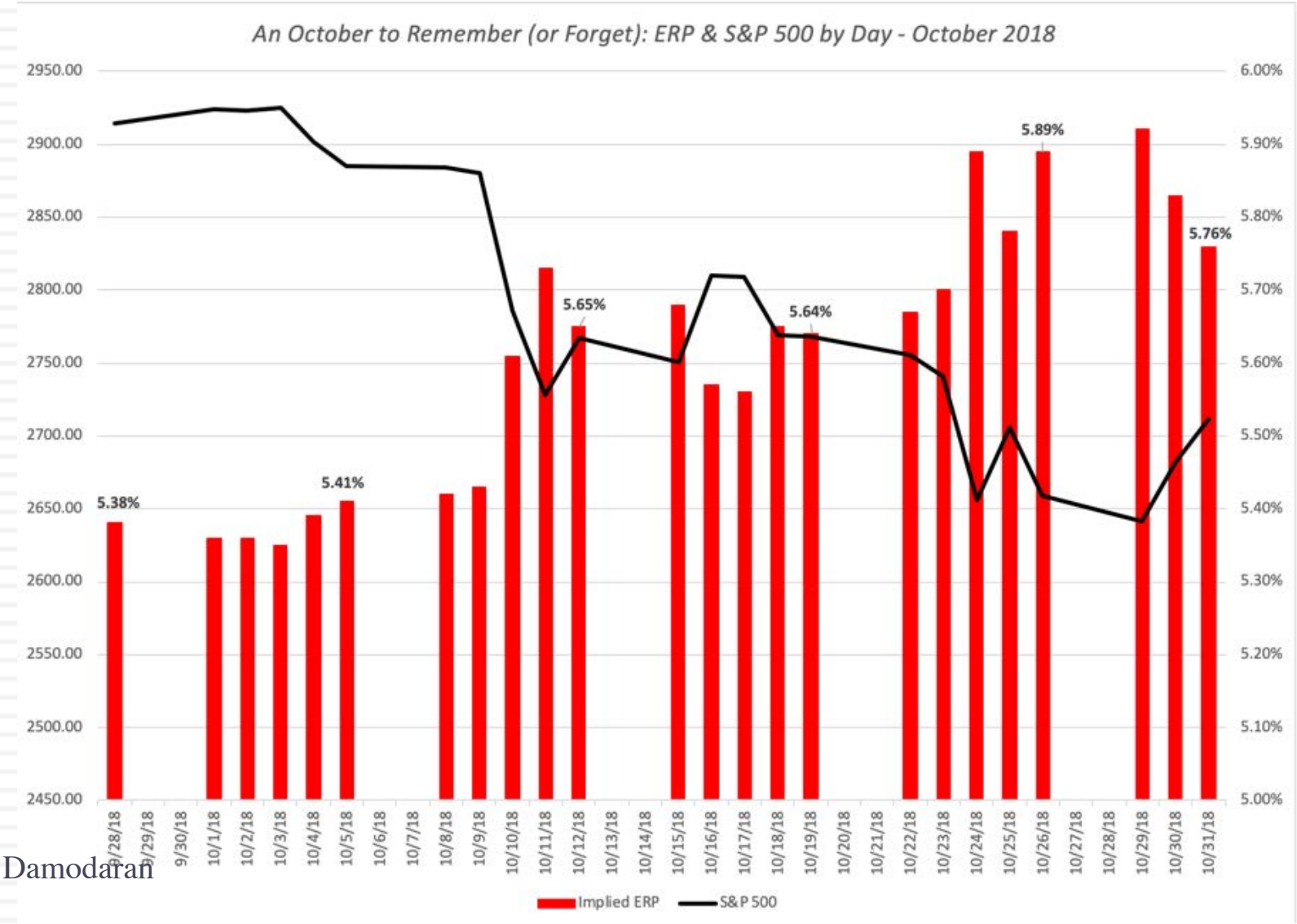
II. Market/Macro Crises

- 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

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New Business Models

New Business Models

- With disruption and change comes the possibility that companies build their stories and value around different business models than in the past.
- To the extent that the way we think about running businesses and valuing businesses is built around existing business models, this can lead to a disconnect between the models and data we use from the ones we should be using.
- Luckily, both intrinsic value and pricing can be adapted easily to meet the challenge.

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

Push back on Uber Valuation

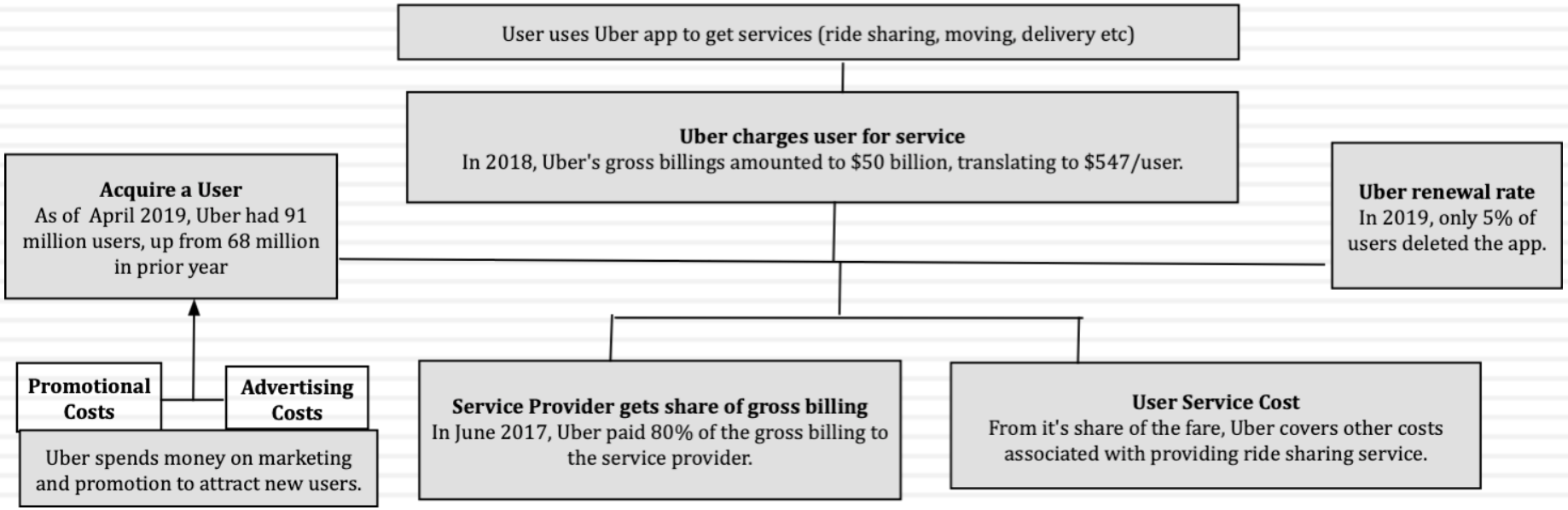
- Input disagreement: Lots of inputs and assumptions and I could be wrong on any or all of them..
- Model debate: DCF was designed for old economy companies and not suited to new economy firms that are more focused on accumulating users & subscribers, making them stick with the firm and sell them products & services over long periods.
- DCF is flexible: DCF models are much more flexible than most people give them credit for, and that they can be modified to reflect other frameworks. If you have a problem with a DCF value, it should not be with the model but with the person using that model.

User/ Subscriber/Member Based Valuation

- A user, subscriber or member has value only because he/she generates revenues for the company. The key to valuing a unit then becomes identifying the link to cash flows and value.
- To **value users**, you have to value an individual user first and then estimate the cost of acquiring new users.
  - The value of an existing user is the present value of the expected cash flows that you will generate from that user, over the lifetime that he or she remains a user.
  - The value of a new user will be the value of a user, net of the cost of acquiring a user.
  - The aggregate value of users will be the sum of the values of existing and new users.
- To get to the **value of a company**, you have to net out the other centralized/non-user specific costs that it will face.

Uber User Economics

Figure 4: The Mechanics of Uber's Business



Uber's Income Statement (from Prospectus)

	Year Ended December 31,		
	2016	2017	2018
Revenue	$ 3,845	$ 7,932	$ 11,270
Costs and expenses			
Cost of revenue, exclusive of depreciation and amortization shown separately below	2,228	4,160	5,623
Operations and support	881	1,354	1,516
Sales and marketing	1,594	2,524	3,151
Research and development	864	1,201	1,505
General and administrative	981	2,263	2,082
Depreciation and amortization	320	510	426
Total costs and expenses	6,868	12,012	14,303

Uber: Deconstructing the Financials

Costs of Servicing Existing Users

Year	*Gross Billings*	*Net Revenue*	*Operating Expenses*	*Net Revenue/Gross Billings*	*Operating Expense/Net Revenue*
2016	$ 19,236.00	$ 3,219.00	$ 3,109.00	16.73%	96.58%
2017	$ 34,409.00	$ 7,191.00	$ 5,514.00	20.90%	76.68%
2018	$ 49,799.00	$ 10,025.00	$ 7,139.00	20.13%	71.21%

Costs of Adding New Users

Year	# Users added	Selling Expenses	Cost/New user
2016	21	1594	$ 75.90
2017	23	2524	$ 109.74
2018	23	3151	$ 137.00

Corporate Expenses

Year	R&D	G&A	Depreciation	Total	As % of Net Revenue
2016	$ 864.00	$ 981.00	$ 320.00	$ 2,165.00	67.26%
2017	$ 1,201.00	$ 2,263.00	$ 510.00	$ 3,974.00	55.26%
2018	$ 1,505.00	$ 2,082.00	$ 426.00	$ 4,013.00	40.03%

Uber's Existing User Value

Growth rate in Operating Expenses
Assumed that 90% of operating expenses are variable, growing at revenue growth rate. Overall expenses grow 10.95%/year

Growth rate in Revenues
Assumed 12% growth in annual revenues/user over next 15 years

User Lifetime
Assumed to be 15 years, with an annual renewal probability of 95%.

	Base Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Membership Survival	1.0000	0.9500	0.9025	0.8574	0.8145	0.7738	0.7351	0.6983	0.6634	0.6302	0.5987	0.5688	0.5404	0.5133	0.4877	0.4633
Gross Billings	$ 547.24	$612.91	$686.46	$768.84	$861.10	$964.43	$1,080.16	$1,209.78	$1,354.95	$1,517.54	$1,699.65	$1,903.61	$2,132.04	$2,387.89	$2,674.43	$2,995.36
Net Revenues	$ 110.16	$123.38	$138.19	$154.77	$173.35	$194.15	$ 217.45	$ 243.54	$ 272.76	$ 305.50	$ 342.16	$ 383.21	$ 429.20	$ 480.70	$ 538.39	$ 602.99
Operating Expenses	$ 65.12	$ 72.25	$ 80.16	$ 88.94	$ 98.67	$109.48	$ 121.47	$ 134.77	$ 149.52	$ 165.90	$ 184.06	$ 204.22	$ 226.58	$ 251.39	$ 278.92	$ 309.46
Operating Profit/user	$ 45.05	$ 51.14	$ 58.03	$ 65.84	$ 74.67	$ 84.67	$ 95.98	$ 108.77	$ 123.24	$ 139.60	$ 158.09	$ 179.00	$ 202.62	$ 229.31	$ 259.47	$ 293.54
Survival adjusted Operating Profit		$ 48.58	$ 52.37	$ 56.45	$ 60.82	$ 65.52	$ 70.55	$ 75.96	$ 81.76	$ 87.98	$ 94.66	$ 101.81	$ 109.49	$ 117.72	$ 126.54	$ 135.99
After-tax Operating Profit/user	$ 33.79	$ 36.44	$ 39.28	$ 42.34	$ 45.62	$ 49.14	$ 52.92	$ 56.97	$ 61.32	$ 65.99	$ 70.99	$ 76.36	$ 82.12	$ 88.29	$ 94.90	$ 101.99
Present Value		$ 33.66	$ 33.53	$ 33.38	$ 33.23	$ 33.07	$ 32.90	$ 32.73	$ 32.55	$ 32.36	$ 32.16	$ 31.96	$ 31.75	$ 31.54	$ 31.32	$ 31.10
Annual Growth Rate (Revenues)	12.00%															
Annual Growth Rate (Op Exp)	10.95%															
Risk-adjusted discount rate	8.24%															
Life of user =	15.00															
Value per existing user =	$ 487.25															
Number of existing users =	91.00															
Value of Existing Users	**$44,339.77**															

Risk Adjusted Discount Rate
Used a 8.24% cost of capital, set at the median cost of capital for US companies, adjusted for inflation difference.

Survival-adjusted PV
PV of after-tax operating income, adjusted for drop out rate over time.

Uber's New User Value

Value Added by New Users at Uber

Base year Value/ New User
Value of User = $487.25
Cost of adding New User = $113.71
Value added by new user = $373.54

User Growth rates
Years 1-5: 12%
Years 6-10: 6%

Cost of capital
Used 9.97%, the 75th percentile of US companies

	Base Year	1	2	3	4	5	6	7	8	9	10
Total Users	91.00	101.92	114.15	127.85	143.19	160.37	170.00	180.20	191.01	202.47	214.62
New Users	0.00	15.47	17.33	19.41	21.73	24.34	17.64	18.70	19.82	21.01	22.27
Value per new user	$373.54	$379.14	$384.83	$390.60	$396.46	$402.40	$408.44	$414.57	$420.78	$427.10	$433.50
Value added by new users		$5,865.27	$6,667.64	$7,579.77	$8,616.68	$9,795.45	$7,205.30	$7,752.18	$8,340.57	$8,973.62	$9,654.72
Terminal Value (new users)											$31,603.73
Present Value		**$ 5,333.52**	**$ 5,513.45**	**$ 5,699.46**	**$ 5,891.74**	**$ 6,090.50**	**$ 4,073.87**	**$ 3,985.70**	**$ 3,899.44**	**$ 3,815.05**	**$ 15,950.37**
Value Added by New Users	**$ 60,253.08**										

Beyond year 10
User growth continues at 2.5% a year

Uber Corporate Expense Value (Drag)

Base Year Expenses
From Prospectus for 2018

Growth rate of 7%
Economies of scale

Tax Rate
Assumed =25%

Cost of capital
Used 8.24%, median US company cost of capital

	Base Year	1	2	3	4	5	6	7	8	9	10
Corporate Expenses	-$3,330.93	-$3,564.10	-$3,813.59	-$4,080.54	-$4,366.17	-$4,671.81	-$4,998.83	-$5,348.75	-$5,723.16	-$6,123.78	-$6,552.45
After-tax Corporate Expenses		$ (2,673.07)	$ (2,860.19)	$ (3,060.40)	$ (3,274.63)	$ (3,503.85)	$ (3,749.12)	$ (4,011.56)	$ (4,292.37)	$ (4,592.84)	$ (4,914.34)
Terminal Value (Corporate Exp)											$ (87,756.02)
PV of Corporate Expenses		-$2,469.58	-$2,441.29	-$2,413.32	-$2,385.67	-$2,358.34	-$2,331.33	-$2,304.62	-$2,278.22	-$2,252.12	-$41,981.99
Value Drag of Corporate Expenses	**-$63,216.48**										

Uber Valuation

Existing Users			New Users			Corporate Expenses				
Inputs			**Inputs**			**Inputs**				
Net Revenue/User =	$ 110.16		Cost of acquiring user =	$ 113.71		Corporate Expenses	$ 2,812.72			
Operating Expense/User=	$ 65.12		Value of new user =	$ 373.54		CAGR - Next 10 years	7.00%			
Operating Profit/User =	$ 45.05		Growth rate in net users (1-5)	12.00%		Discount Rate =	8.24%			
CAGR in Revenue/User	12.00%		Growth rate in net users (6-10)	6.00%						
Annual Renewal Rate =	95.00%		Discount Rate	9.97%						
User Life =	15									
Discount Rate =	8.24%									
Output			**Output**			**Output**				
Value/User =	$ 487.25		# Users in year 10 =	214.62						
# Existing Users =	91.00		# Net New Users (10 years)	123.62						
Value of Existing Users =	**$44,339.77**	+	**Value of New Users =**	**$60,253.08**	-	**PV of Corporate Expenses**	**$(63,216.48)**	=	Value of Operating A	$ 41,376.37
									+ Cash	$ 15,407.00
									+ Cross Holdings	$ 8,700.00
									- Debt	$ 6,869.00
									Value of equity	**$ 58,614.37**
									# Shares	2235.26
									Value/Share	**$ 26.22**

Existing users will stick with Uber and increase how much they spend on its services, the longer they stay. Operating expenses are mostly variable, but there will be mild econmies of scale.

Uber will continue to add new users, but at a decreasing pace, with a cost of acquiring a new user staying stable (with the current cost incrteasing at the inflation rate). The new user spending profile will mirror existing users.

Uber's corporate expenses will continue to grow, notwithstanding economies of scale, as the company increases spending moderately on autonomous cars.

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.