



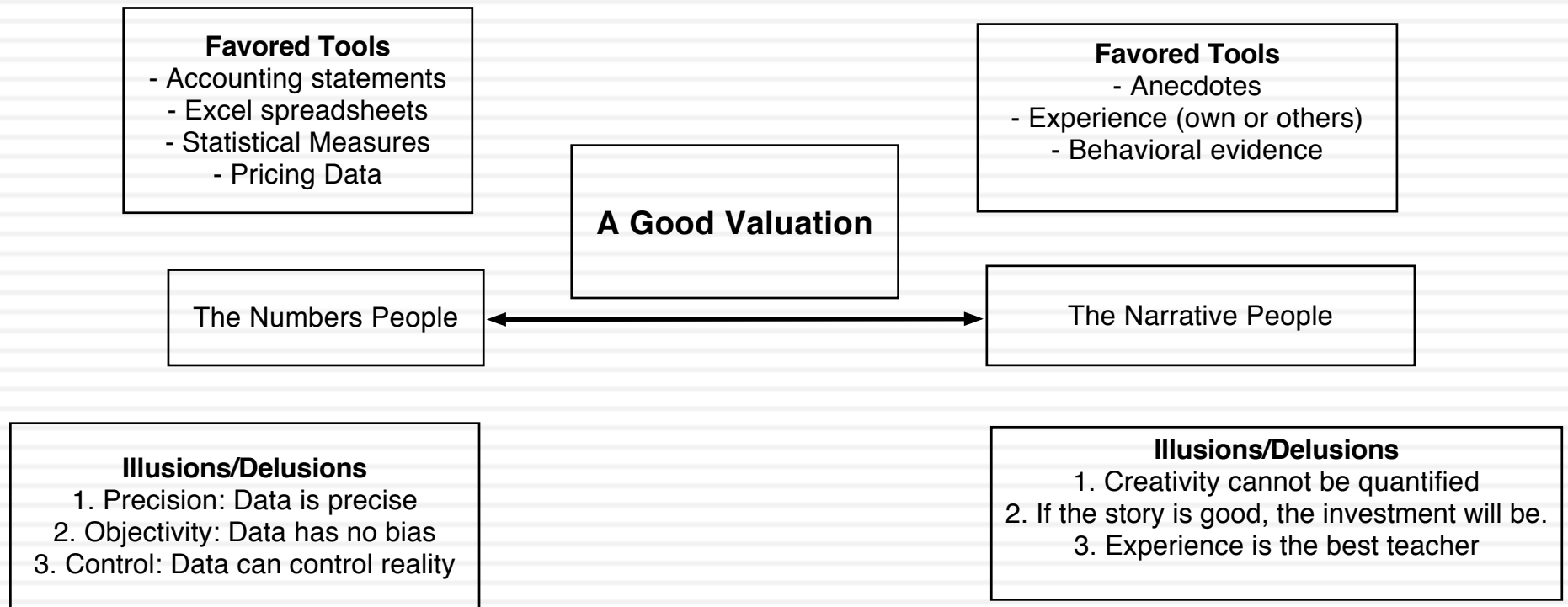
**NUMBERS AND NARRATIVE:
MODELING, STORY TELLING AND
INVESTING**

Aswath Damodaran

What are you?

- If you were asked to categorize yourself, would you more naturally think of yourself as a
 - a) Numbers Person
 - b) Story Person
 - c) Not sure
- When did you make this decision and how has it affected your educational and career choices?
- At your current job or position, do you find yourself hanging out with people who are like you (in inclination and training)?

Bridging the Gap

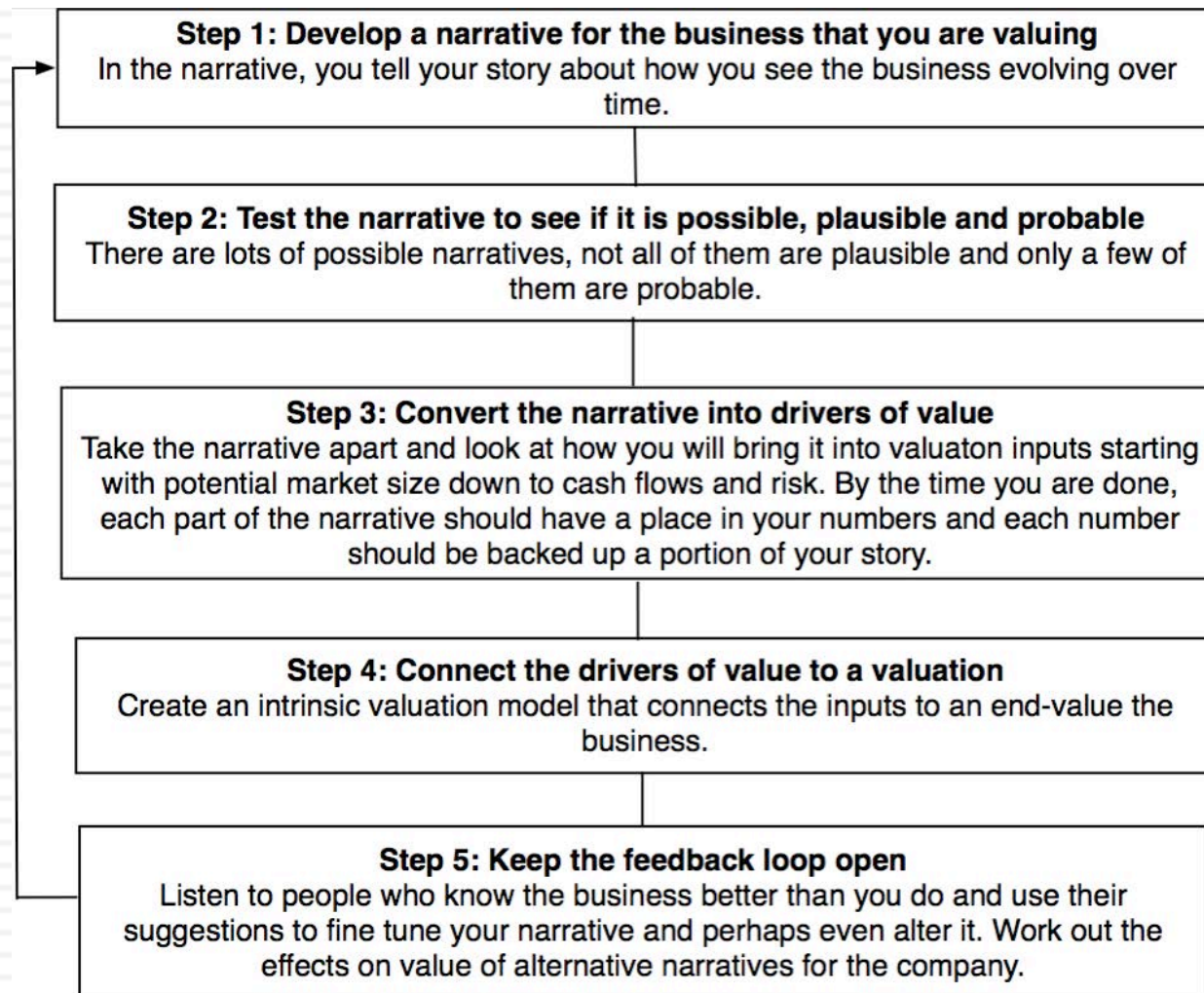




FROM NARRATIVE TO NUMBERS:
THE MECHANICS



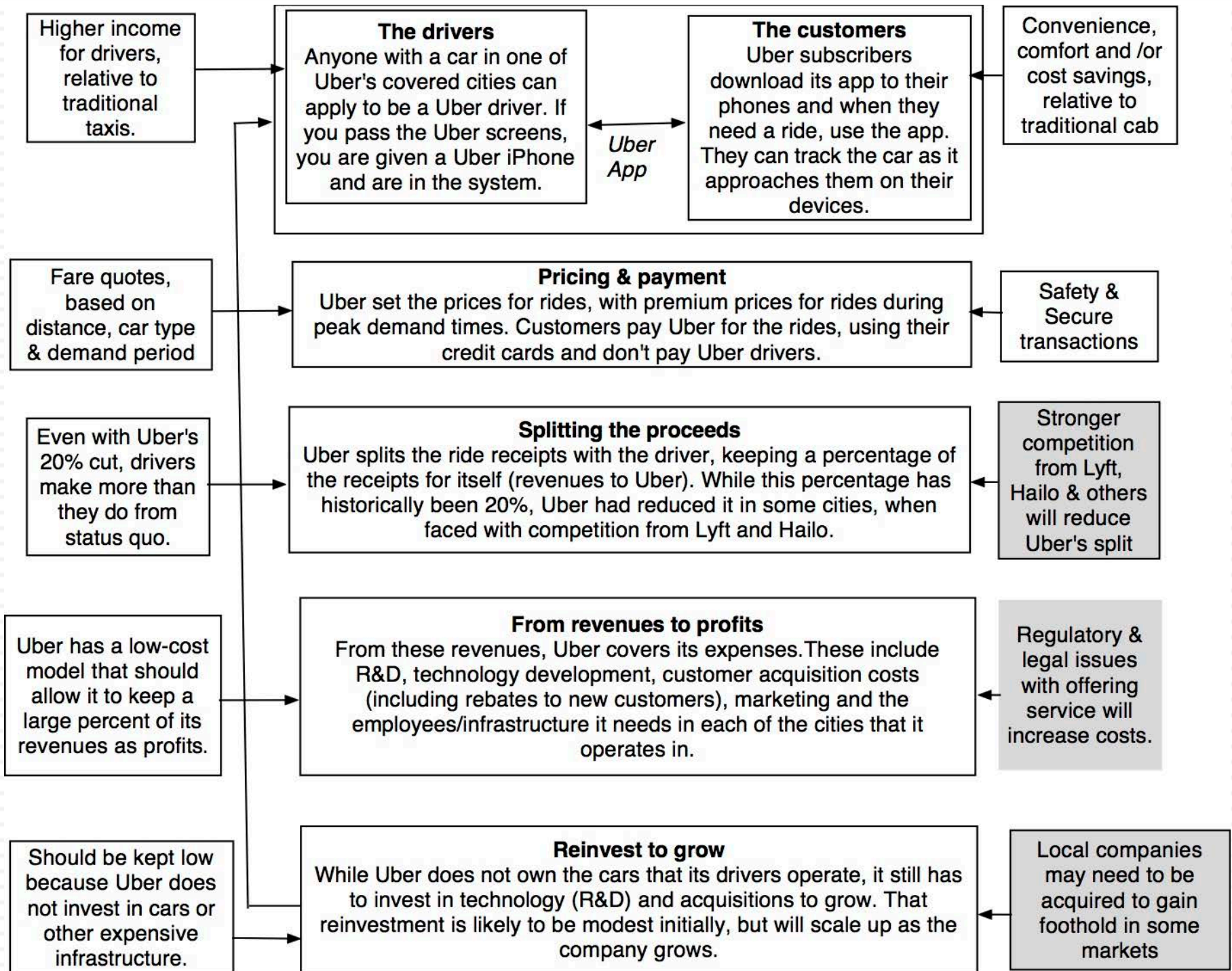
The Steps



Step 1a: Survey the landscape

- Every valuation starts with a narrative, a story that you see unfolding for your company in the future.
- In developing this narrative, you will be making assessments of
 - ▣ Your company (its products, its management and its history).
 - ▣ The market or markets that you see it growing in.
 - ▣ The competition it faces and will face.
 - ▣ The macro environment in which it operates.

Understanding Uber in 2014



Understanding Ferrari in 2015

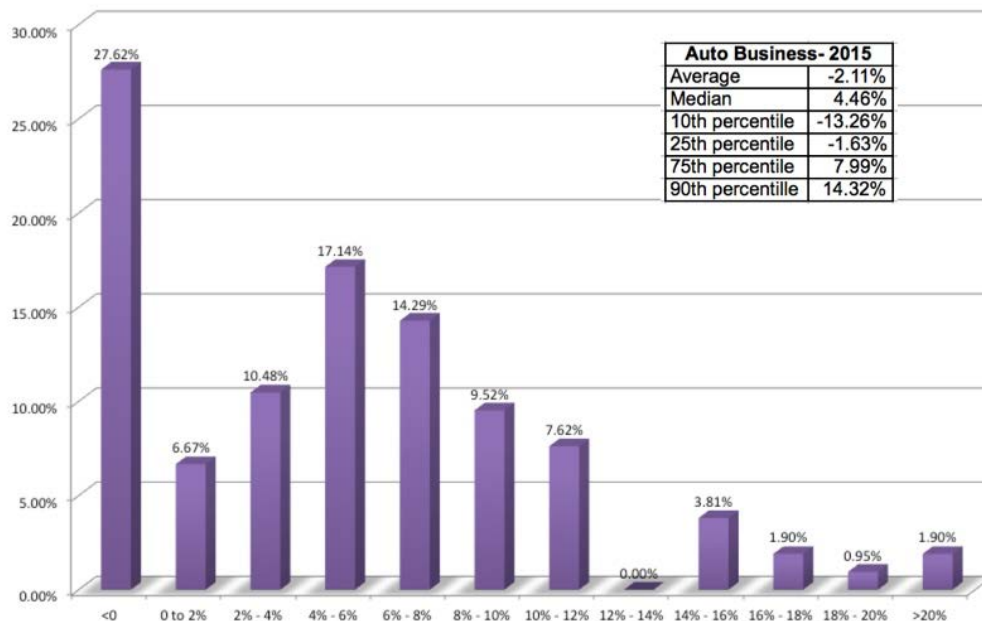
It is in the Auto Business Low Margins

Low Growth

Year	Revenues (\$)	% Growth Rate
2005	1,274,716.60	
2006	1,421,804.20	11.54%
2007	1,854,576.40	30.44%
2008	1,818,533.00	-1.94%
2009	1,572,890.10	-13.51%
2010	1,816,269.40	15.47%
2011	1,962,630.40	8.06%
2012	2,110,572.20	7.54%
2013	2,158,603.00	2.28%
2014	2,086,124.80	-3.36%
ounded Average =		5.63%

+

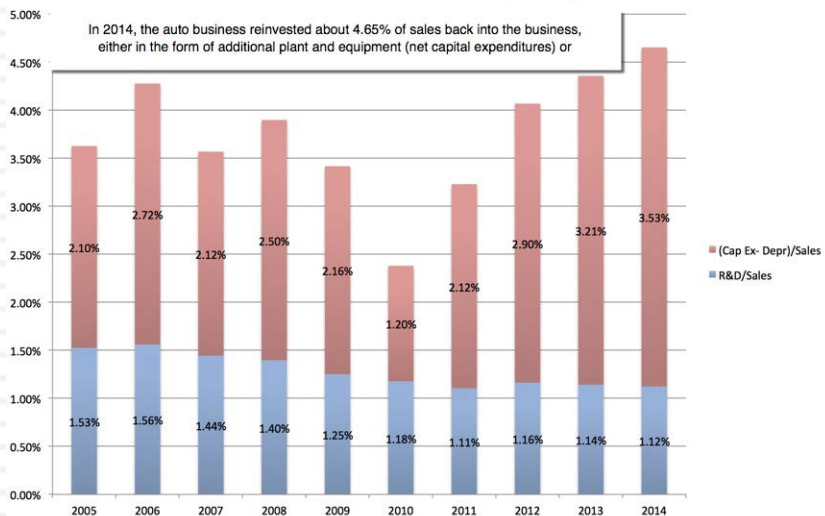
The Automobile Business: Pre-tax Operating Margins in 2015



Auto Business- 2015	
Average	-2.11%
Median	4.46%
10th percentile	-13.26%
25th percentile	-1.63%
75th percentile	7.99%
90th percentile	14.32%

High & Increasing Reinvestment

The Reinvestment Burden: Investment as % of Sales for Auto Business



Bad Business

	ROIC	Cost of capital	ROIC - Cost of capital
2004	6.82%	7.93%	-1.11%
2005	10.47%	7.02%	3.45%
2006	4.60%	7.97%	-3.37%
2007	7.62%	8.50%	-0.88%
2008	3.48%	8.03%	-4.55%
2009	-4.97%	8.58%	-13.55%
2010	5.16%	8.03%	-2.87%
2011	7.55%	8.15%	-0.60%
2012	7.80%	8.55%	-0.75%
2013	7.83%	8.47%	-0.64%
2014	6.47%	7.53%	-1.06%

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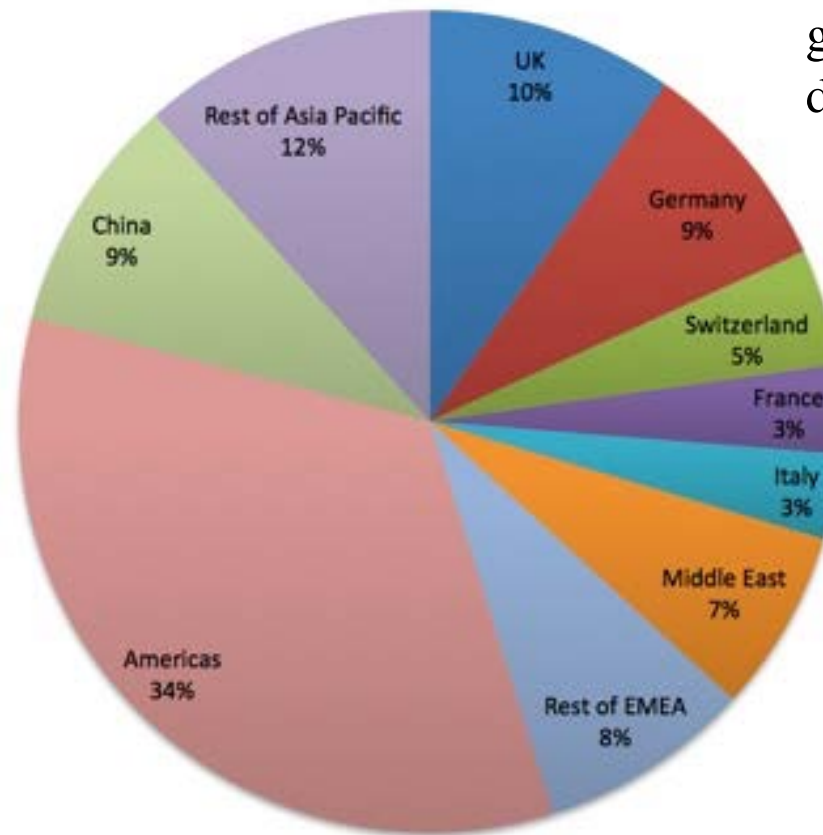
Only once in the last 10 years have auto companies collectively earned more than their cost of capital

But it is not just another auto company..

Ferrari sold only 7,255 cars in all of 2014

Ferrari had a profit margin of 18.2%, in the 95th percentile, partly because of its high prices and partly because it spends little on advertising.

Ferrari: Geographical Sales (2014)



Ferrari sales (in units) have grown very little in the last decade & have been stable

Ferrari has not invested in new plants.

Step 1b: Create a narrative for the future

- Every valuation starts with a narrative, a story that you see unfolding for your company in the future.
- In developing this narrative, you will be making assessments of your company (its products, its management), the market or markets that you see it growing in, the competition it faces and will face and the macro environment in which it operates.
 - ▣ Rule 1: Keep it simple.
 - ▣ Rule 2: Keep it focused.

The Uber Narrative: An Urban, Car Service disruptor

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

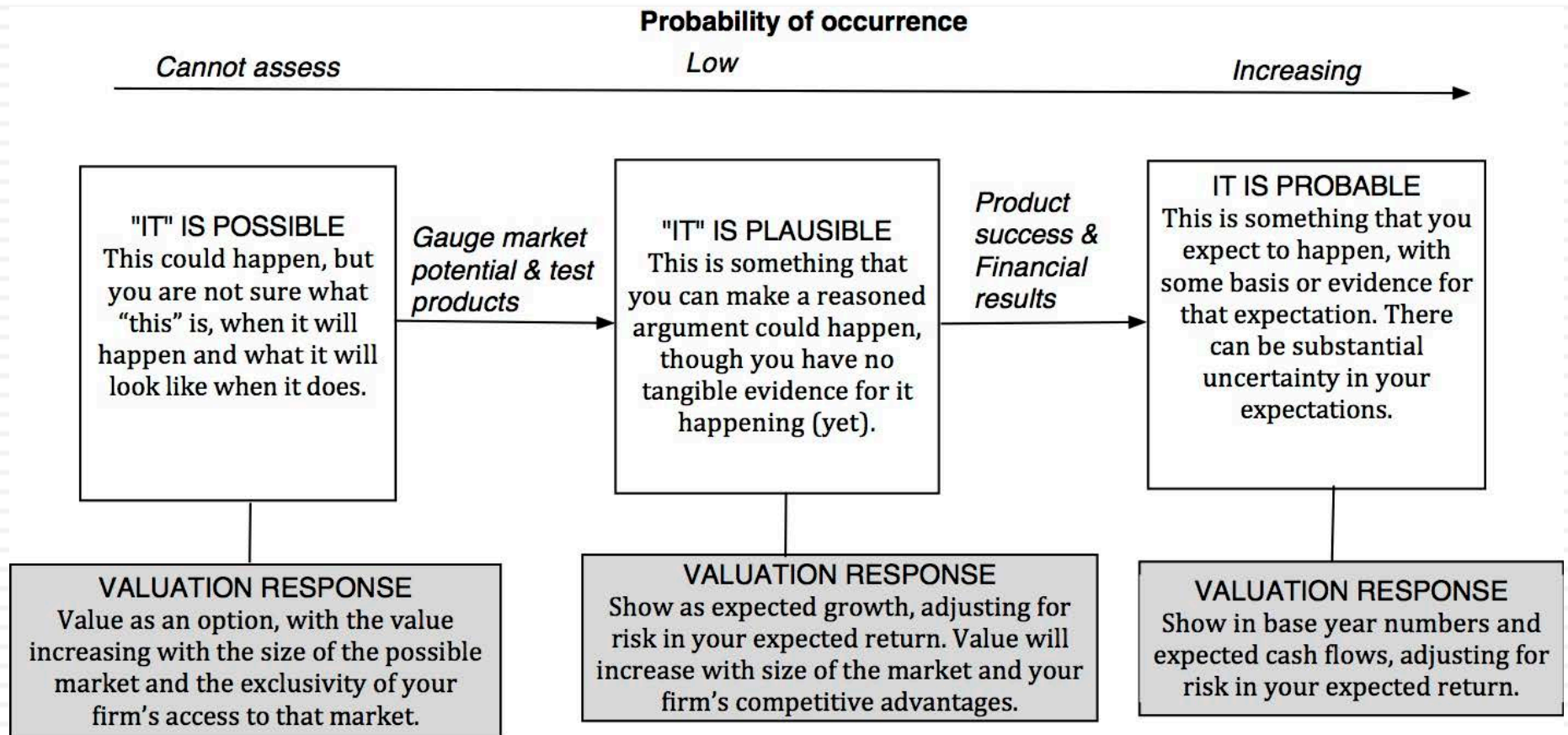
1. An urban car service business: I saw Uber primarily as a force in urban areas and only in the car service business.
2. Which would expand the business moderately (about 40% over ten years) by bringing in new users.
3. With local networking benefits: If Uber becomes large enough in any city, it will 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.

The Ferrari Narrative: An Exclusive Club

- Ferrari will stay an exclusive auto club, deriving its allure from its scarcity and the fact that only a few own Ferraris.
- By staying exclusive, the company gets three benefits:
 - ▣ It can continue to charge nose bleed prices for its cars and sell them with little or no advertising.
 - ▣ It does not need to invest in new assembly plants, since it does not plan to ramp up production.
 - ▣ It sells only to the super rich, who are unaffected by overall economic conditions or market crises.

Step 2: Check the narrative against history, economic first principles & common sense

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The Impossible, The Implausible and the Improbable

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The Impossible

Bigger than the economy

Assuming Growth rate for company in perpetuity > Growth rate for economy

Bigger than the total market

Allowing a company's revenues to grow so much that it has more than a 100% market share of whatever business it is in.

Profit margin > 100%

Assuming earnings growth will exceed revenue growth for a long enough period, and pushing margins above 100%

Depreciation without cap ex

Assuming that depreciation will exceed cap ex in perpetuity.

The Implausible

Growth without reinvestment

Assuming growth forever without reinvestment.

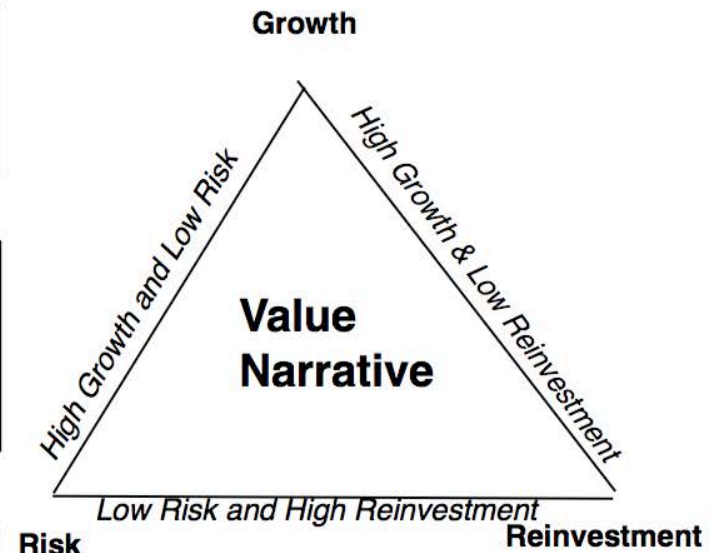
Profits without competition

Assuming that your company will grow and earn higher profits, with no competition.

Returns without risk

Assuming that you can generate high returns in a business with no risk.

The Improbable



The Improbable: Willy Wonkitis

Tesla: Summary 15-year DCF Analysis (DCF valuation as of mid-year 2013)

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Unit Volume	24,298	36,883	64,684	86,713	149,869	214,841	291,861	384,747	466,559	550,398	643,850	726,655	820,645	922,481	1,034,215	1,137,780
% Growth		52%	79%	34%	73%	43%	36%	32%	21%	18%	17%	13%	13%	12%	12%	10%
Automotive Revenue Per Unit (\$)	93,403	85,342	83,432	78,932	65,465	58,258	56,407	55,553	55,991	56,586	56,969	57,540	58,138	58,603	59,002	59,554
% Growth		-9%	-2%	-5%	-17%	-11%	-3%	-2%	1%	1%	1%	1%	1%	1%	1%	1%
Automotive Sales	2,462	3,321	5,613	7,051	10,025	12,720	16,685	21,595	26,347	31,357	36,897	42,022	47,949	54,283	61,221	67,980
Development Service Sales	16	40	42	44	46	49	51	54	56	59	62	65	68	72	75	79
Total Sales	2,478	3,361	5,655	7,095	10,072	12,768	16,736	21,648	26,403	31,416	36,959	42,087	48,017	54,355	61,296	68,059
% Growth		36%	60%	29%	42%	27%	31%	29%	22%	19%	18%	14%	14%	13%	13%	11%
EBITDA	148	417	920	1,042	1,586	2,150	3,138	4,066	4,857	5,723	6,328	7,182	8,144	9,688	10,874	12,099
% Margin	6.0%	12.4%	16.3%	14.7%	15.7%	16.8%	18.7%	18.8%	18.4%	18.2%	17.1%	17.1%	17.0%	17.8%	17.7%	17.8%
D&A	103	158	172	203	301	353	389	537	606	696	811	938	1,088	1,260	1,451	1,661
% of Capex	41%	79%	59%	65%	62%	69%	78%	86%	79%	77%	79%	76%	76%	76%	76%	77%
EBIT	45	259	748	839	1,285	1,796	2,749	3,529	4,252	5,027	5,517	6,244	7,056	8,429	9,423	10,439
% Margin	1.8%	7.7%	13.2%	11.8%	12.8%	14.1%	16.4%	16.3%	16.1%	15.0%	14.9%	14.8%	14.7%	15.5%	15.4%	15.3%
Net Interest Income (Expense)	(27)	(1)	9	33	47	90	108	155	199	278	358	445	542	651	784	934
Other Income	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pretax Income	46	258	758	872	1,332	1,886	2,857	3,684	4,451	5,305	5,875	6,688	7,598	9,080	10,207	11,373
Income Taxes	3	2	14	34	86	262	462	641	807	1,003	1,134	1,317	1,470	1,761	2,028	2,323
% Effective Rate	6%	1%	2%	4%	6%	14%	16%	17%	18%	19%	19%	20%	19%	19%	20%	20%
Net Income	44	256	744	839	1,246	1,624	2,395	3,043	3,644	4,303	4,741	5,372	6,128	7,319	8,179	9,050
Plus																
After-tax Interest Expense (Income)	27	1	(9)	(33)	(47)	(90)	(108)	(154)	(199)	(278)	(357)	(444)	(541)	(650)	(782)	(932)
Depreciation of PP&E	103	158	172	203	301	353	389	537	606	696	811	938	1,088	1,260	1,451	1,661
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Less																
Change in Working Capital	(155)	(14)	(157)	(167)	(172)	(325)	(163)	(81)	(28)	(299)	(356)	(328)	(219)	(329)	(365)	(376)
% of Change in Sales		-2%	-7%	-12%	-6%	-12%	-4%	-2%	-1%	-6%	-6%	-6%	-4%	-5%	-5%	-6%
Capital Expenditures	250	200	312	312	486	510	497	623	765	906	1,078	1,236	1,437	1,660	1,898	2,149
% of Sales	10%	6%	6%	4%	5%	4%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unlevered Free Cash Flow	78	229	750	863	1,186	1,702	2,343	2,884	3,314	4,113	4,472	4,959	5,456	6,597	7,315	8,005

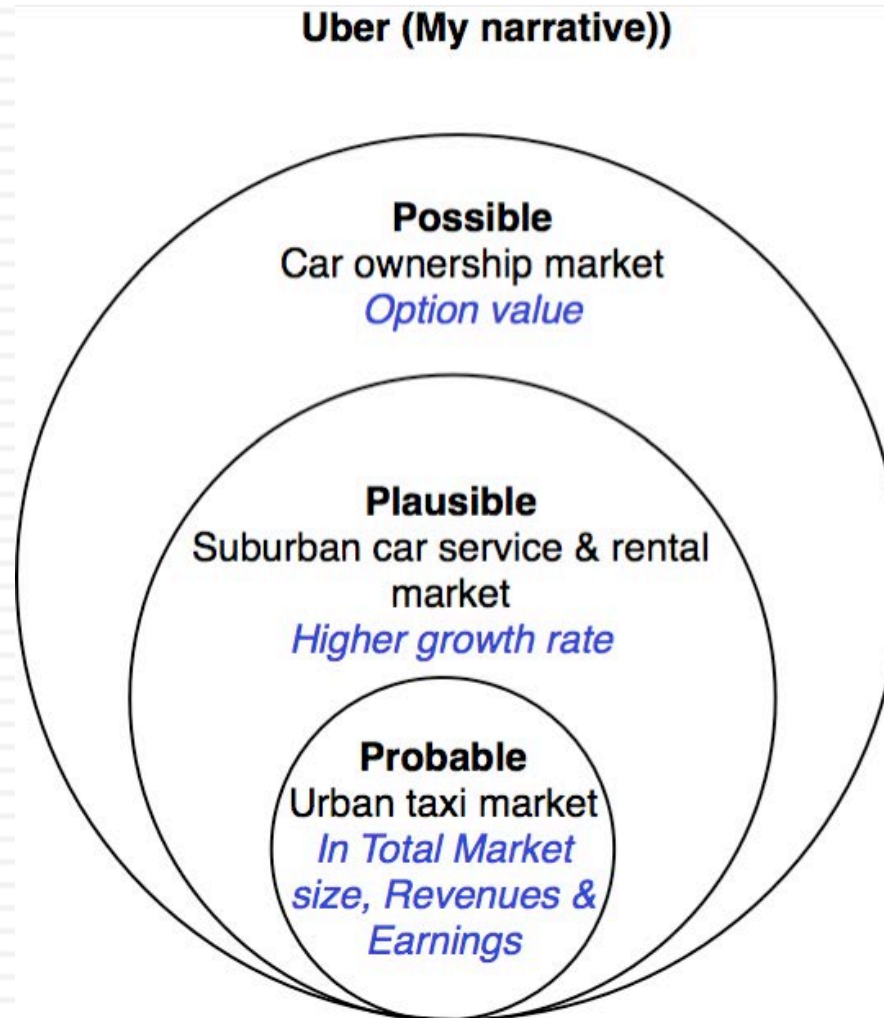
EBITDA	12,099
Sales	68,059
Net Debt (Cash)	(260)
Tesla Diluted Shares	142

Exit EBITDA High	12.0 x	Exit PPG High	5.0%	Exit P/Sales High	180%
Exit EBITDA Low	8.0 x	Exit PPG Low	3.0%	Exit P/Sales Low	130%

Discount Rate High	13.0%	FY Month of Valuation	1.0 (Beginning of this Month)
Discount Rate Low	9.0%	Month of FY End	12.0 (End of this Month)

Uber: Possible, Plausible and Probable

The larger & more ambitious your story, the more onus there is on you to show that it is possible, plausible & probable.



The Runaway Story: When you want a story to be true...

- With a runaway business story, you usually have three ingredients:
 1. Charismatic, likeable Narrator: The narrator of the business story is someone that you want to see succeed, either because you like the narrator or because he/she will be a good role model.
 2. Telling a story about disrupting a much business, where you dislike the status quo: The status quo in the business that the story is disrupting is dissatisfying (to everyone involved)>
 3. With a societal benefit as bonus: And if the story holds, society and humanity will benefit.
- Since you want this story to work out, you stop asking questions, because the answers may put the story at risk.

The Impossible: The Runaway Story

The Story



The Checks (?)

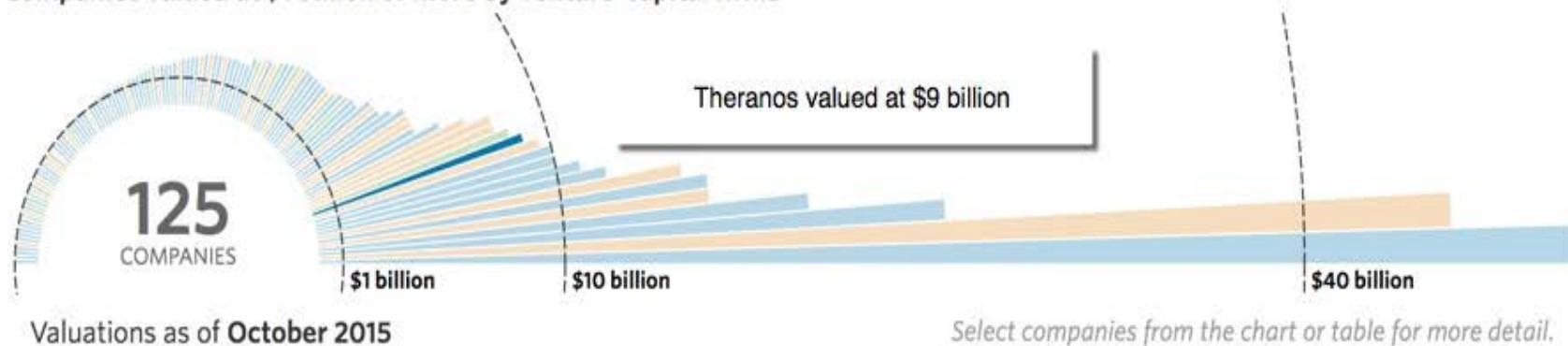
Board Member	Designation	Age
Henry Kissinger	Former Secretary of State	92
Bill Perry	Former Secretary of Defense	88
George Schultz	Former Secretary of State	94
Bill Frist	Former Senate Majority Leader	63
Sam Nunn	Former Senator	77
Gary Roughead	Former Navy Admiral	64
James Mattis	Former Marine Corps General	65
Dick Kovocovich	Former CEO of Wells Fargo	72
Riley Bechtel	Former CEO of Bechtel	63
William Foege	Epidemiologist	79
Elizabeth Holmes	Founder & CEO, Theranos	31
Sunny Balwani	President & COO, Theranos	NA

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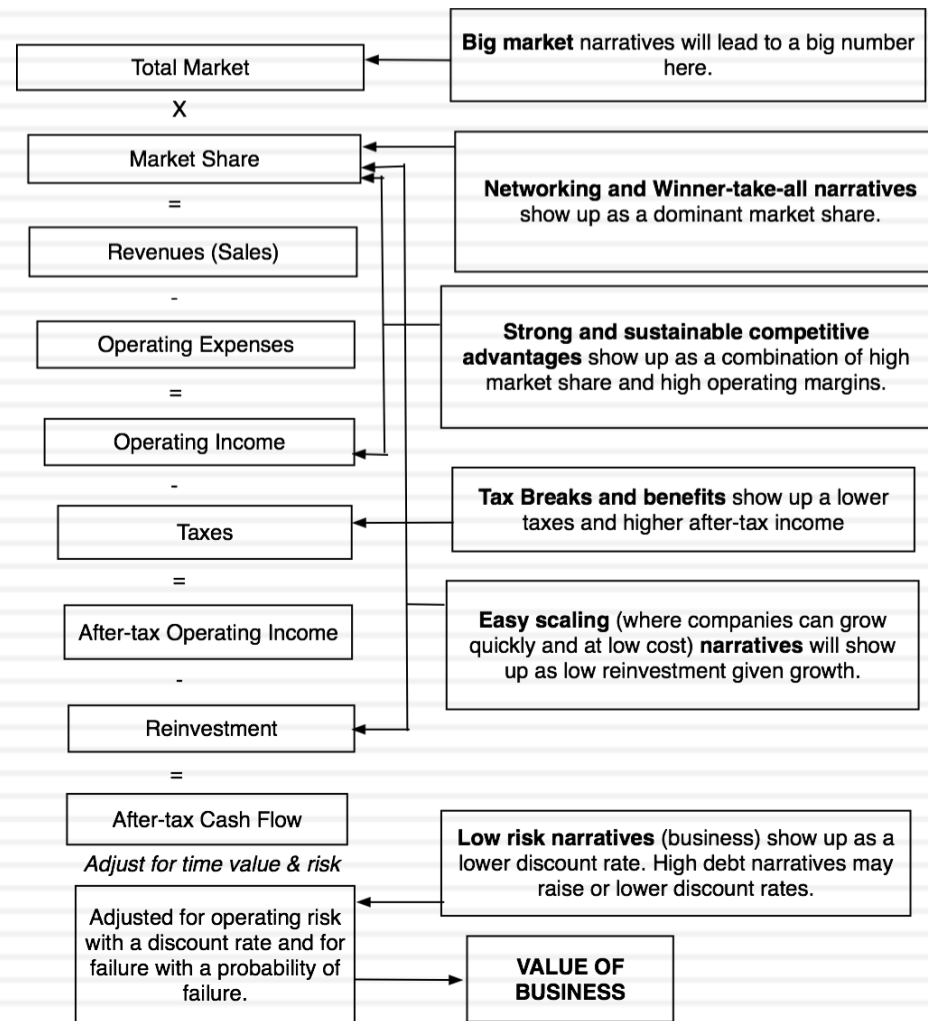
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Money

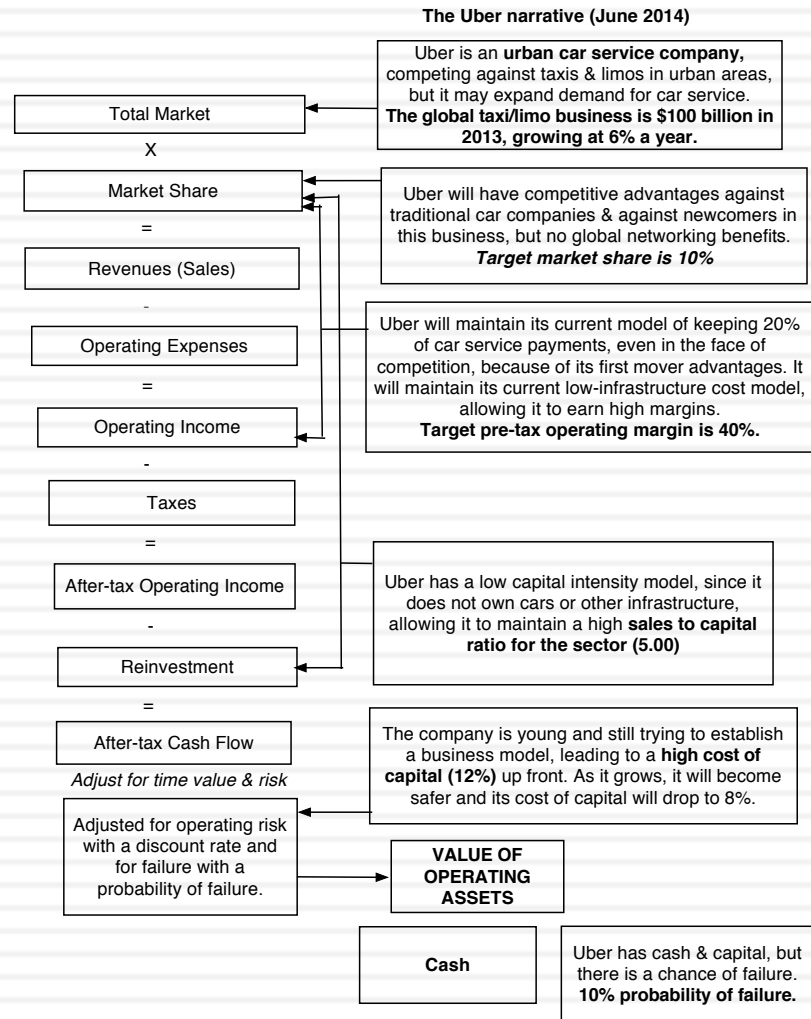
Companies valued at \$1 billion or more by venture-capital firms



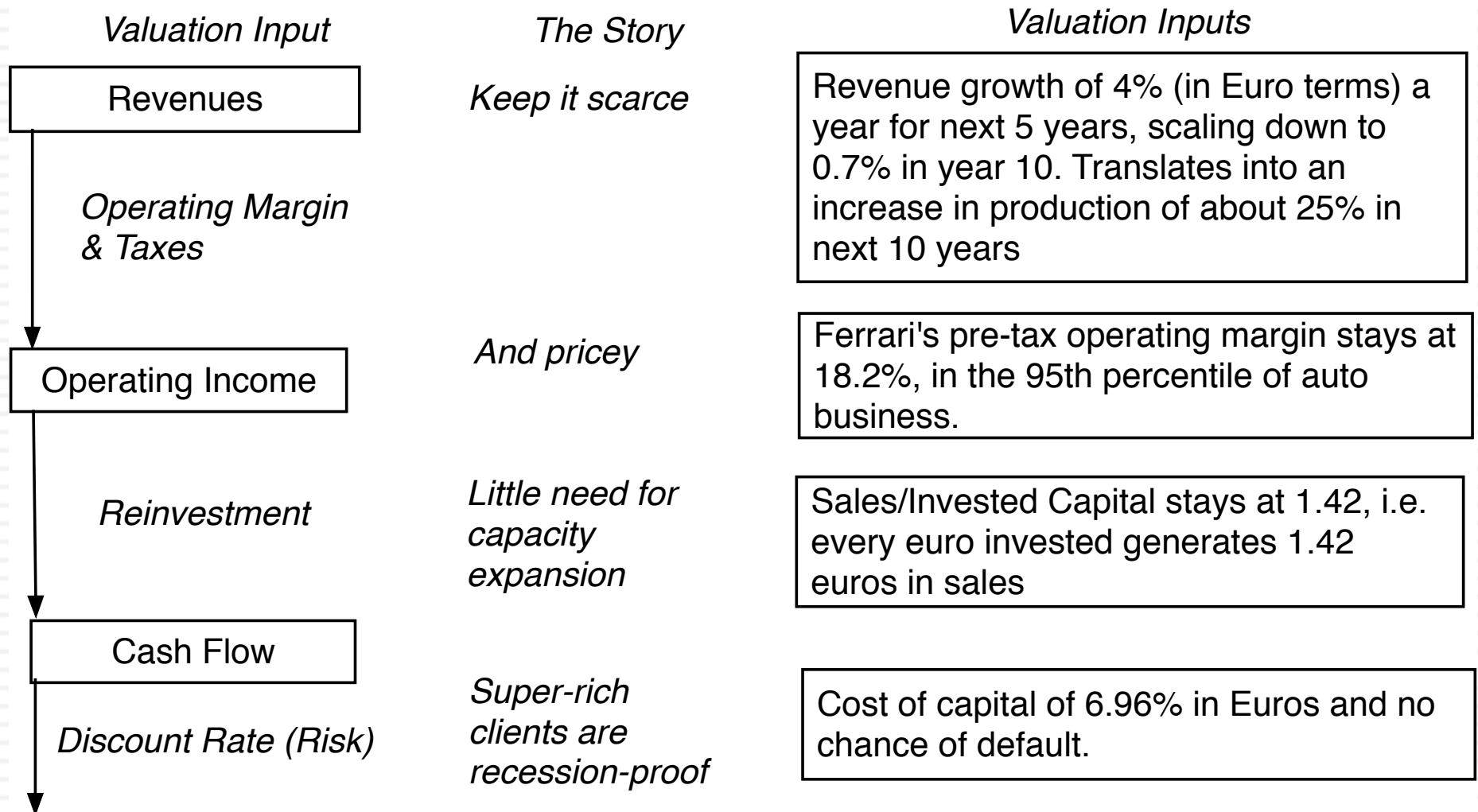
Step 4a: Connect your narrative to key drivers of value



The Uber Link



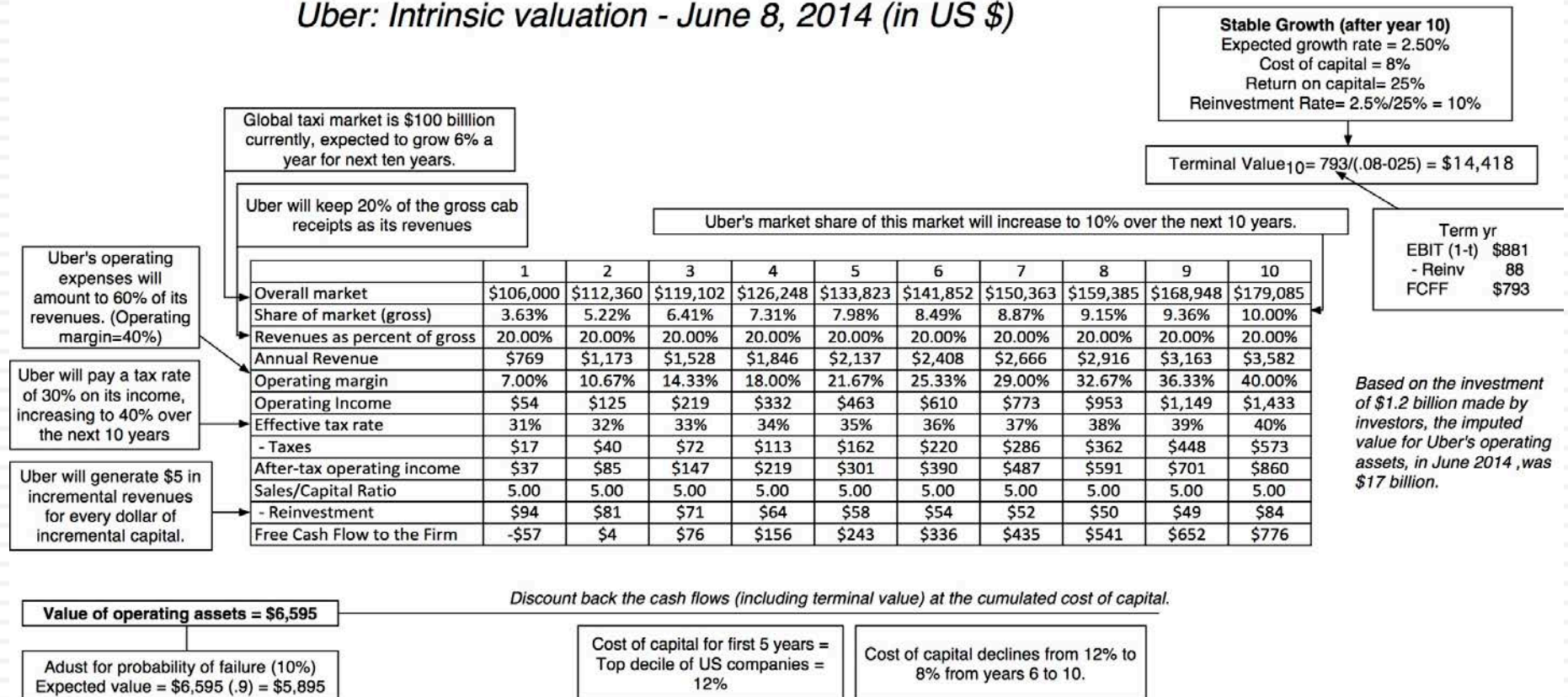
Ferrari: From story to numbers



Step 4b: Value the company (Uber)

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



Ferrari: The “Exclusive Club” Value

Stay Super Exclusive: Revenue growth is low

	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate		4.00%	4.00%	4.00%	4.00%	4.00%	3.34%	2.68%	2.02%	1.36%	0.70%	0.70%
Revenues	€ 2,763	€ 2,874	€ 2,988	€ 3,108	€ 3,232	€ 3,362	€ 3,474	€ 3,567	€ 3,639	€ 3,689	€ 3,714	€ 3,740
EBIT (Operating) margin	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%
EBIT (Operating income)	€ 503	€ 523	€ 544	€ 566	€ 588	€ 612	€ 632	€ 649	€ 662	€ 671	€ 676	€ 681
Tax rate	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%
EBIT(1-t)	€ 334	€ 348	€ 361	€ 376	€ 391	€ 407	€ 420	€ 431	€ 440	€ 446	€ 449	€ 452
- Reinvestment		€ 78	€ 81	€ 84	€ 87	€ 91	€ 79	€ 66	€ 51	€ 35	€ 18	€ 22
FCFF		€ 270	€ 281	€ 292	€ 303	€ 316	€ 341	€ 366	€ 389	€ 411	€ 431	€ 431
Cost of capital		6.96%	6.96%	6.96%	6.96%	6.96%	6.96%	6.97%	6.98%	6.99%	7.00%	7.00%
PV(FCFF)		€ 252	€ 245	€ 238	€ 232	€ 225	€ 228	€ 228	€ 227	€ 224	€ 220	
Terminal value	€ 6,835											
PV(Terminal value)	€ 3,485											
PV (CF over next 10 years)	€ 2,321											
Value of operating assets =	€ 5,806											
- Debt	€ 623											
- Minority interests	€ 13											
+ Cash	€ 1,141											
Value of equity	€ 6,311											

High Prices
+ No selling
cost =
Preserve
current
operating
margin

Minimal
Reinvestment
due to low
growth

The super
rich are not
sensitive to
economic
downturns

Step 5: Keep the feedback loop open

- When you tell a story about a company (either explicitly or implicitly), it is natural to feel attached to that story and to defend it against all attacks. Nothing can destroy an investor more than hubris.
- Being open to other views about a company is not easy, but here are some suggestions that may help:
 - ▣ Face up to the uncertainty in your own estimates of value.
 - ▣ Present the valuation to people who don't think like you do.
 - ▣ Create a process where people who disagree with you the most have a say.
 - ▣ Provide a structure where the criticisms can be specific and pointed, rather than general.

The Uber Feedback Loop: Bill Gurley

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1. Not just car service company.: Uber is a car company, not just a car service company, and there may be a day when consumers will subscribe to a Uber service, rather than own their own cars. It could also expand into logistics, i.e., moving and transportation businesses.
2. Not just urban: Uber can create new demands for car service in parts of the country where taxis are not used (suburbia, small towns).
3. Global networking benefits: By linking with technology and credit card companies, Uber can have global networking benefits.

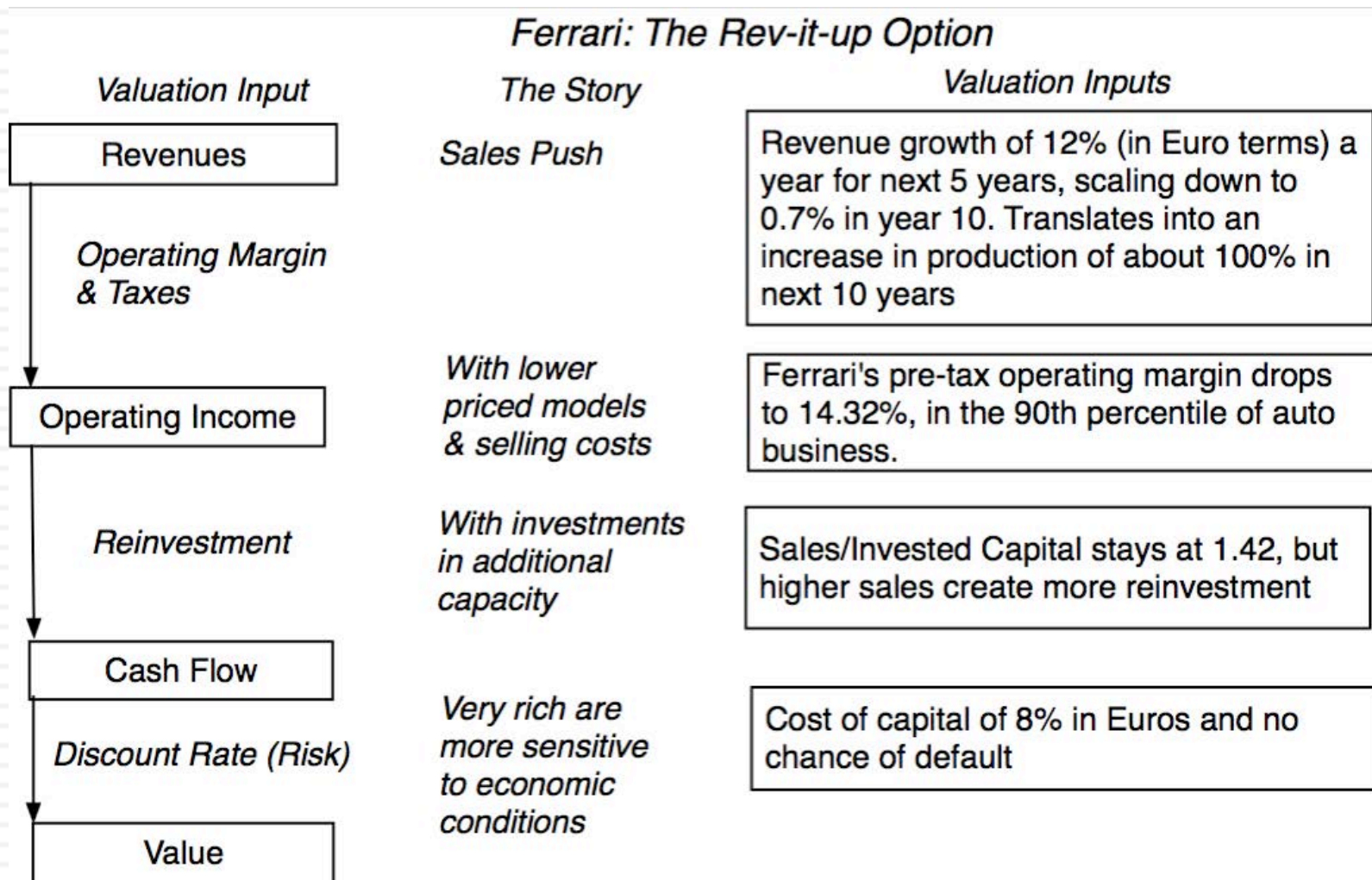
Valuing Bill Gurley's Uber narrative

	<i>Uber (Gurley)</i>	<i>Uber (Gurley Mod)</i>	<i>Uber (Damodaran)</i>
Narrative	Uber will <u>expand the car service market substantially</u> , bringing in mass transit users & non-users from the suburbs into the market, and use its <u>networking advantage to gain a dominant market share</u> , while maintaining its revenue slice at 20%.	Uber will <u>expand the car service market substantially</u> , bringing in mass transit users & non-users from the suburbs into the market, and use its <u>networking advantage to gain a dominant market share</u> , while cutting prices and margins (to 10%).	Uber will expand the car service market moderately, primarily in urban environments, and use its <u>competitive advantages to get a significant but not dominant market share</u> and maintain its revenue slice at 20%.
Total Market	\$300 billion, growing at 3% a year	\$300 billion, growing at 3% a year	\$100 billion, growing at 6% a year
Market Share	40%	40%	10%
Uber's revenue slice	20%	10%	20%
Value for Uber	\$53.4 billion + Option value of entering car ownership market (\$10 billion+)	\$28.7 billion + Option value of entering car ownership market (\$6 billion+)	\$5.9 billion + Option value of entering car ownership market (\$2-3 billion)

Different narratives, Different Numbers

<i>Total Market</i>	<i>Growth Effect</i>	<i>Network Effect</i>	<i>Competitive Advantages</i>	<i>Value of Uber</i>
A4. Mobility Services	B4. Double market size	C5. Strong global network effects	D4. Strong & Sustainable	\$90,457
A3. Logistics	B4. Double market size	C5. Strong global network effects	D4. Strong & Sustainable	\$65,158
A4. Mobility Services	B3. Increase market by 50%	C3. Strong local network effects	D3. Semi-strong	\$52,346
A2. All car service	B4. Double market size	C5. Strong global network effects	D4. Strong & Sustainable	\$47,764
A1. Urban car service	B4. Double market size	C5. Strong global network effects	D4. Strong & Sustainable	\$31,952
A3. Logistics	B3. Increase market by 50%	C3. Strong local network effects	D3. Semi-strong	\$14,321
A1. Urban car service	B3. Increase market by 50%	C3. Strong local network effects	D3. Semi-strong	\$7,127
A2. All car service	B3. Increase market by 50%	C3. Strong local network effects	D3. Semi-strong	\$4,764
A4. Mobility Services	B1. None	C1. No network effects	D1. None	\$1,888
A3. Logistics	B1. None	C1. No network effects	D1. None	\$1,417
A2. All car service	B1. None	C1. No network effects	D1. None	\$1,094
A1. Urban car service	B1. None	C1. No network effects	D1. None	\$799

The Ferrari Counter Narrative



Ferrari: The “Rev-it-up” Alternative

Get less exclusive: Double number of cars sold over next decade

	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate		12.00%	12.00%	12.00%	12.00%	12.00%	9.74%	7.48%	5.22%	2.96%	0.70%	0.70%
Revenues	€ 2,763	€ 3,095	€ 3,466	€ 3,882	€ 4,348	€ 4,869	€ 5,344	€ 5,743	€ 6,043	€ 6,222	€ 6,266	€ 6,309
EBIT (Operating) margin	18.20%	17.81%	17.42%	17.04%	16.65%	16.26%	15.87%	15.48%	15.10%	14.71%	14.32%	14.32%
EBIT (Operating income)	€ 503	€ 551	€ 604	€ 661	€ 724	€ 792	€ 848	€ 889	€ 912	€ 915	€ 897	€ 904
Tax rate	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%
EBIT(1-t)	€ 334	€ 366	€ 401	€ 439	€ 481	€ 526	€ 564	€ 591	€ 606	€ 608	€ 596	€ 600
- Reinvestment		€ 233	€ 261	€ 293	€ 328	€ 367	€ 334	€ 281	€ 211	€ 126	€ 31	€ 35
FCFF		€ 133	€ 140	€ 147	€ 153	€ 159	€ 230	€ 310	€ 395	€ 482	€ 566	€ 565
Cost of capital		8.00%	8.00%	8.00%	8.00%	8.00%	7.90%	7.80%	7.70%	7.60%	7.50%	7.50%
PV(FCFF)		€ 123	€ 120	€ 117	€ 113	€ 108	€ 145	€ 181	€ 215	€ 244	€ 266	
Terminal value	€ 8,315											
PV(Terminal value)	€ 3,906											
PV (CF over next 10 years)	€ 1,631											
Value of operating assets =	€ 5,537											
- Debt	€ 623											
- Minority interests	€ 13											
+ Cash	€ 1,141											
Value of equity	€ 6,042											

Lower Prices +
Some selling
cost = Lower
operating
margin

Reinvestment
reflects
higher sales

The very
rich are
more
sensitive to
economic
conditions

And the world is full of feedback.. My Ferrari afterthought!

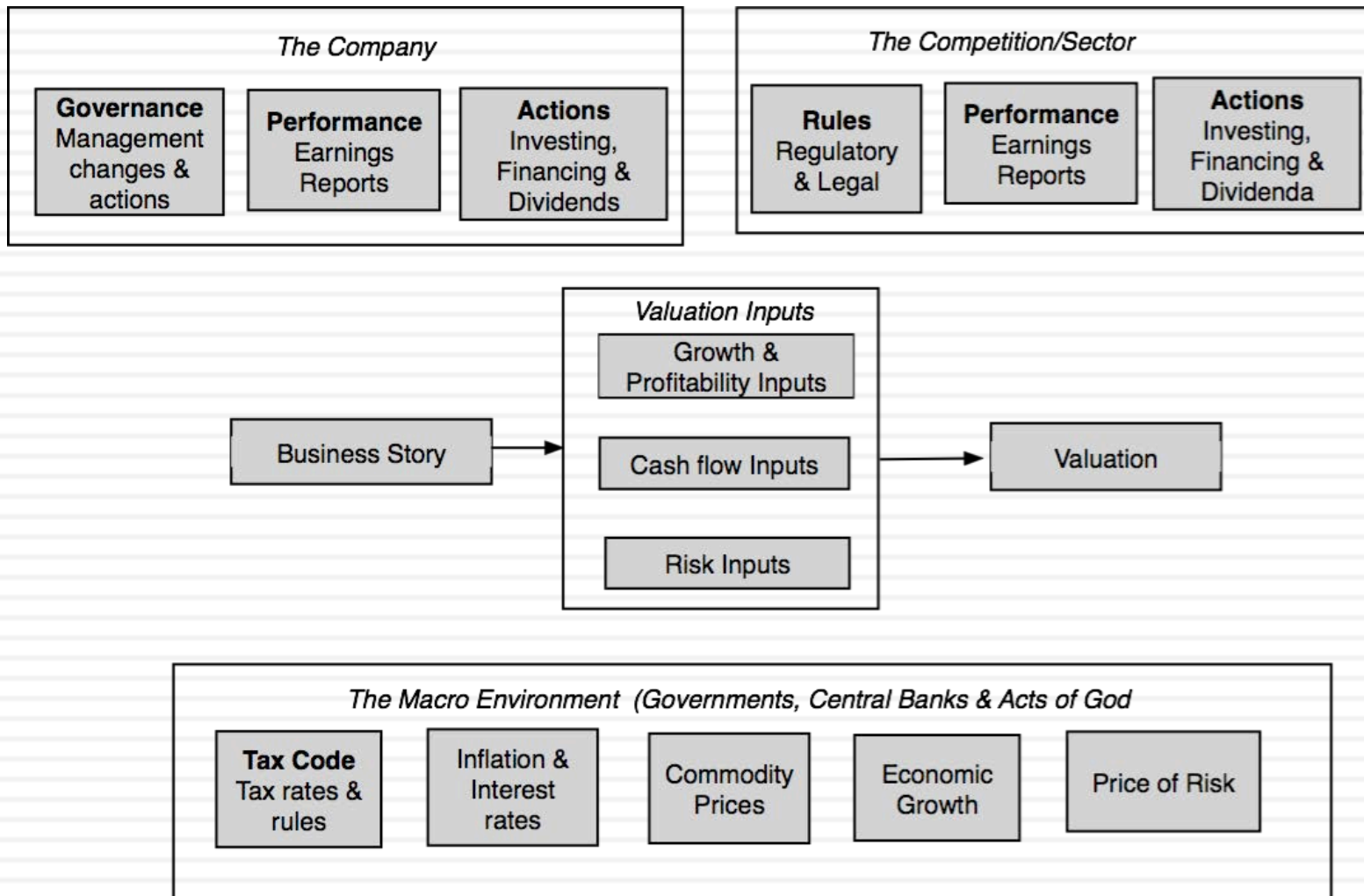


Narrative breaks, shifts & changes

“When my information changes, I alter my conclusions. What do you do, sir?”

Lord Keynes

Why narratives change



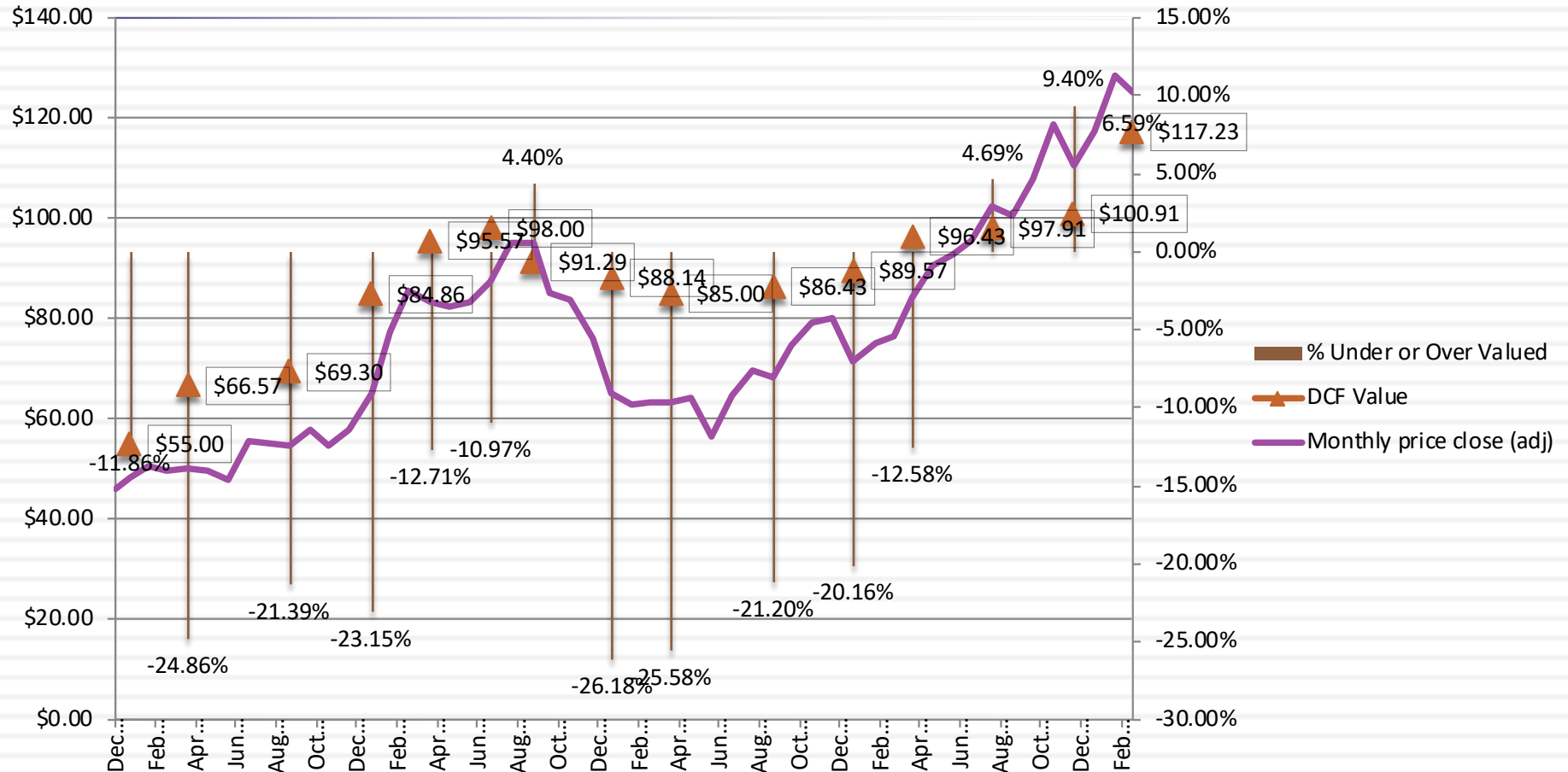
How narratives change

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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

Sometimes your story does not change..

Apple, Price and Value - 2010 to 2015



And sometimes it does.. Facebook's Evolution

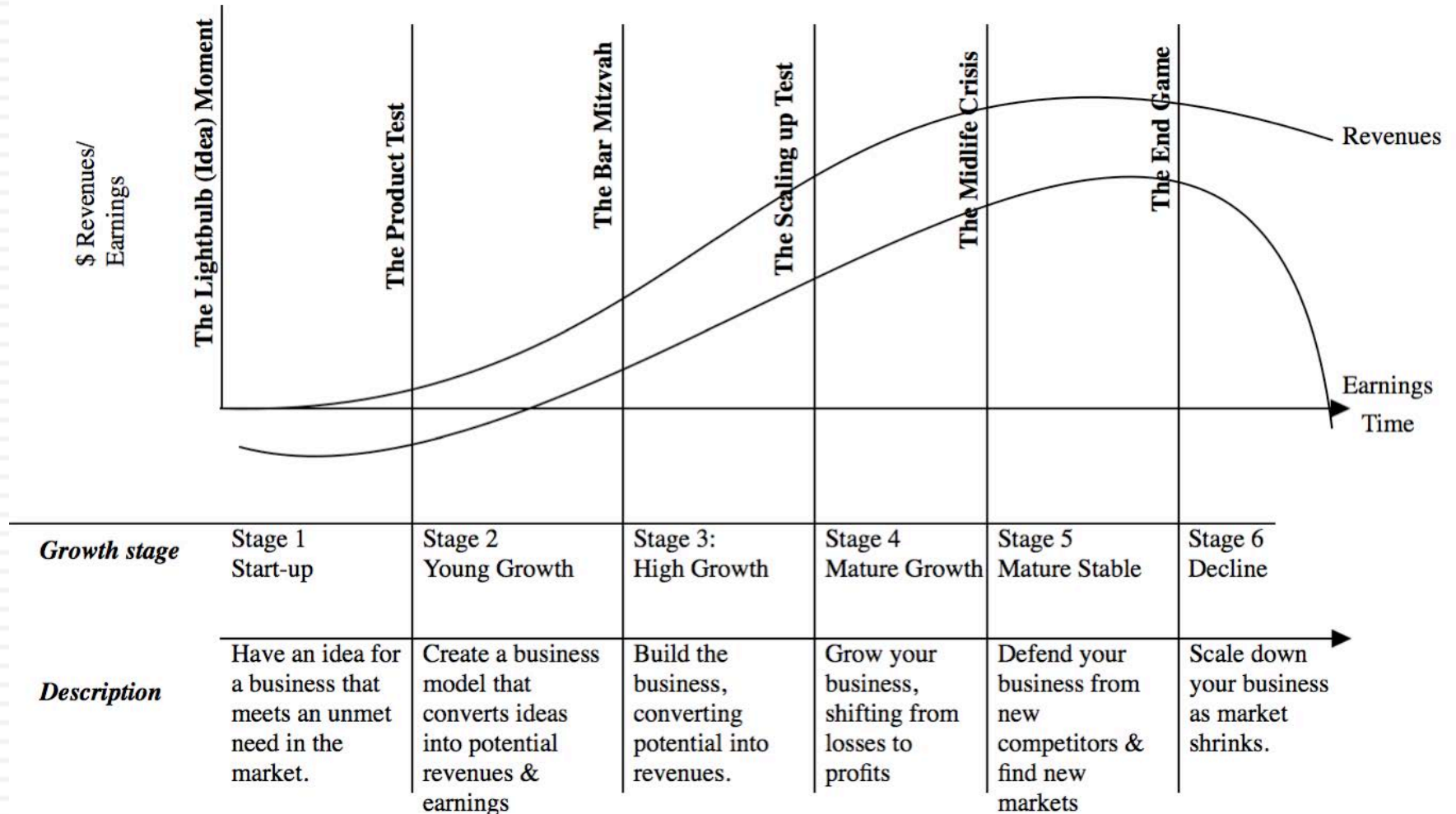
Report Date	Active Users	Mobile Active Users	% of revenue from Mobile	Net Income	Capital	T12m Sales/Capital
7/26/12	955	543	NR	(\$157)	\$3,515	1.23
10/23/12	1010	604	NR	(\$59)	\$4,252	1.09
1/30/13	1060	680	23.00%	\$64	\$4,120	1.24
5/1/13	1100	751	30.00%	\$219	\$4,272	1.28
7/24/13	1150	819	41.00%	(\$152)	\$3,948	1.55
10/30/13	1190	874	49.00%	\$425	\$4,007	1.71
1/29/14	1230	945	53.00%	\$523	\$4,258	1.85
4/23/14	1280	1010	59.00%	\$642	\$4,299	2.07
7/23/14	1320	1070	62.00%	\$791	\$4,543	2.20



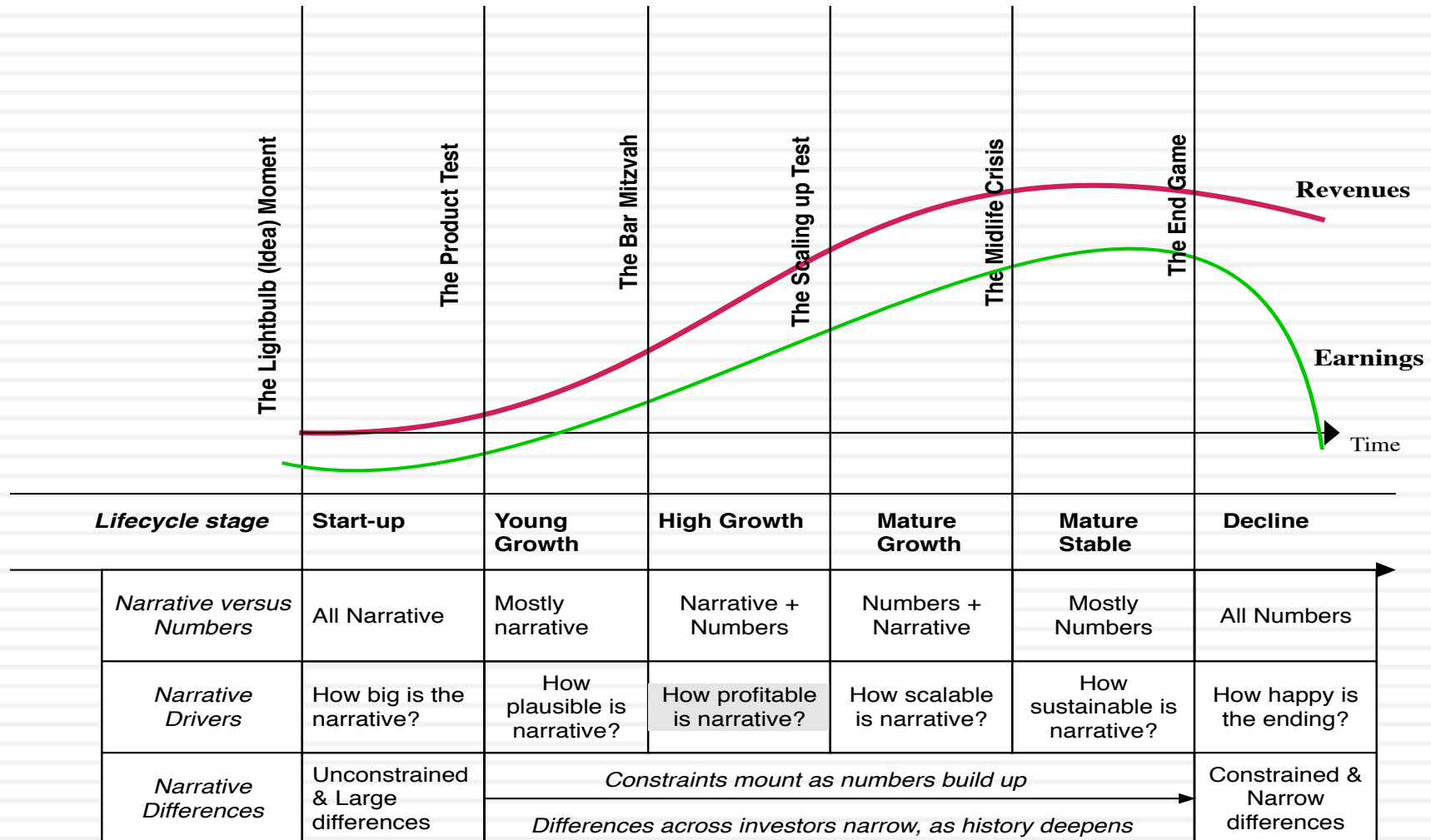
Managers: Narrative or Numbers?

“Management is, above all, a practice where art, science, and craft meet”

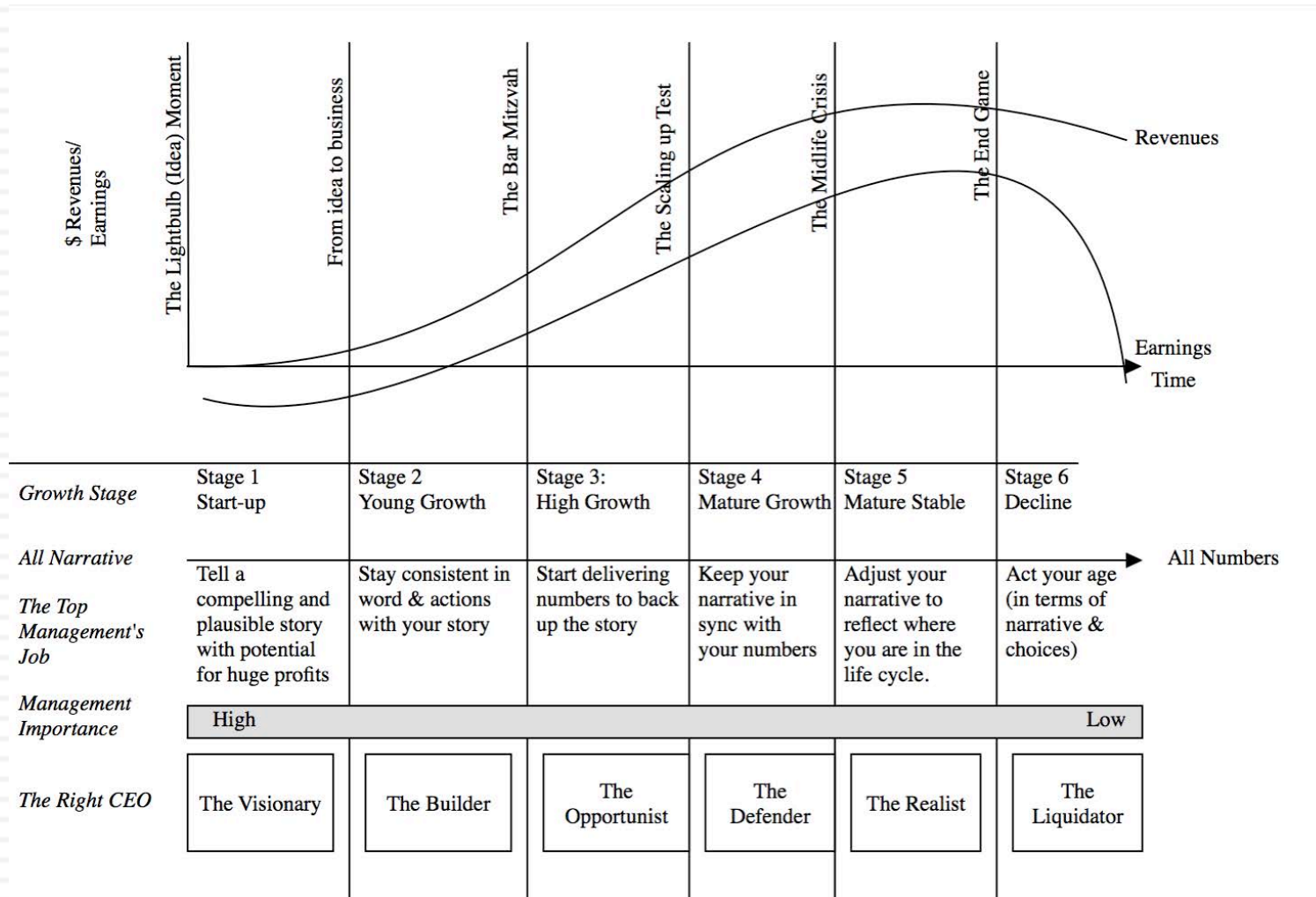
Introducing the corporate life cycle



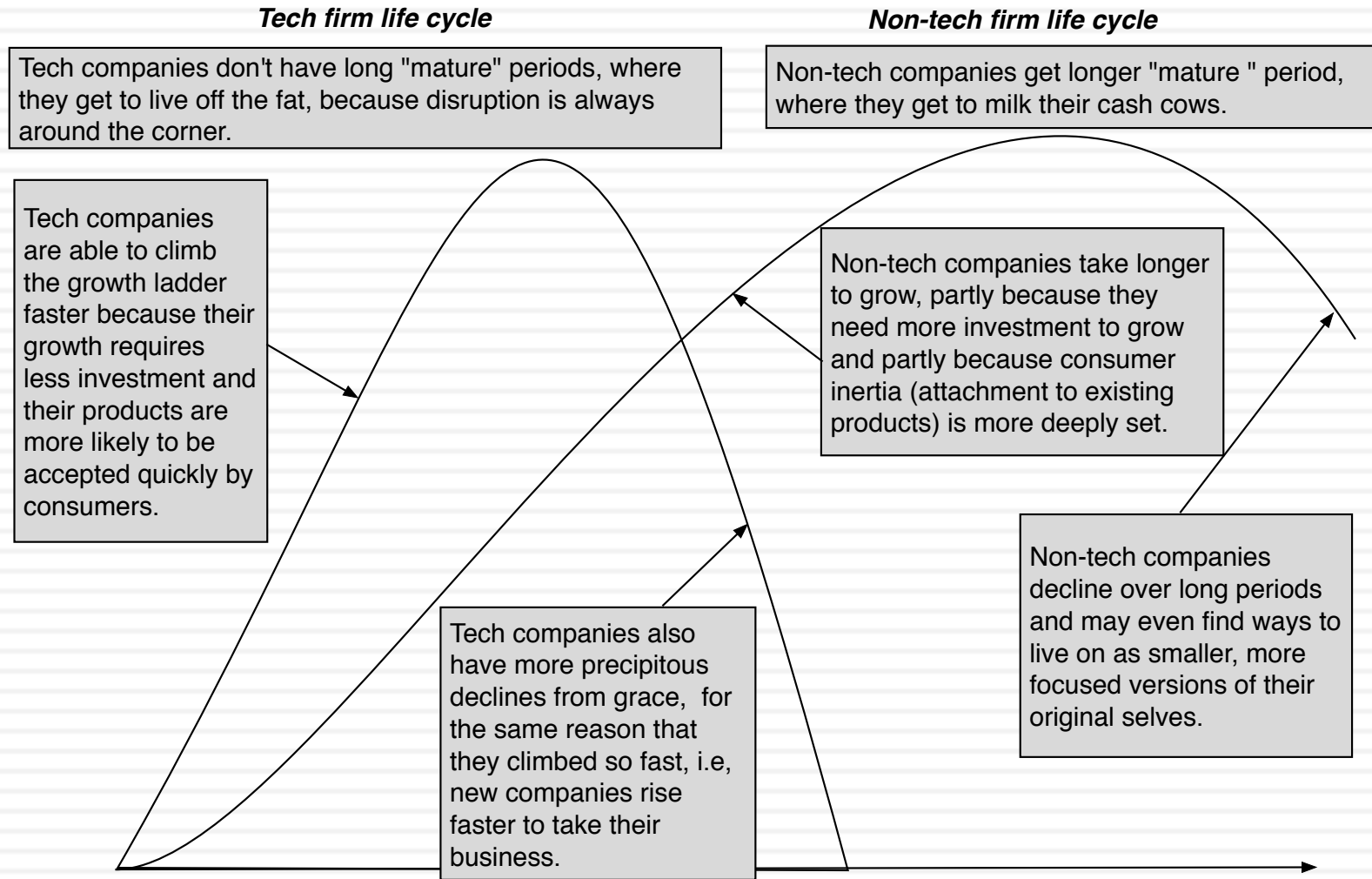
Connecting to narratives..



The Managerial Challenge



The Compressed Life Cycle?



The Consequences


- When life cycles were long, stretching over decades, time and aging allowed for smoother transitions, since CEOs aged with their companies, and moved on.
- As life cycles shorten, managers are far more likely to find their companies changing under them so quickly that they can no longer adapt.
 - To be a long tenured CEO, you will either need to be versatile and/or be able to delegate the work that you cannot do to people you empower and trust.
 - If these transitions are not well managed, there will be far more turnover in top management and activist investing will flourish.



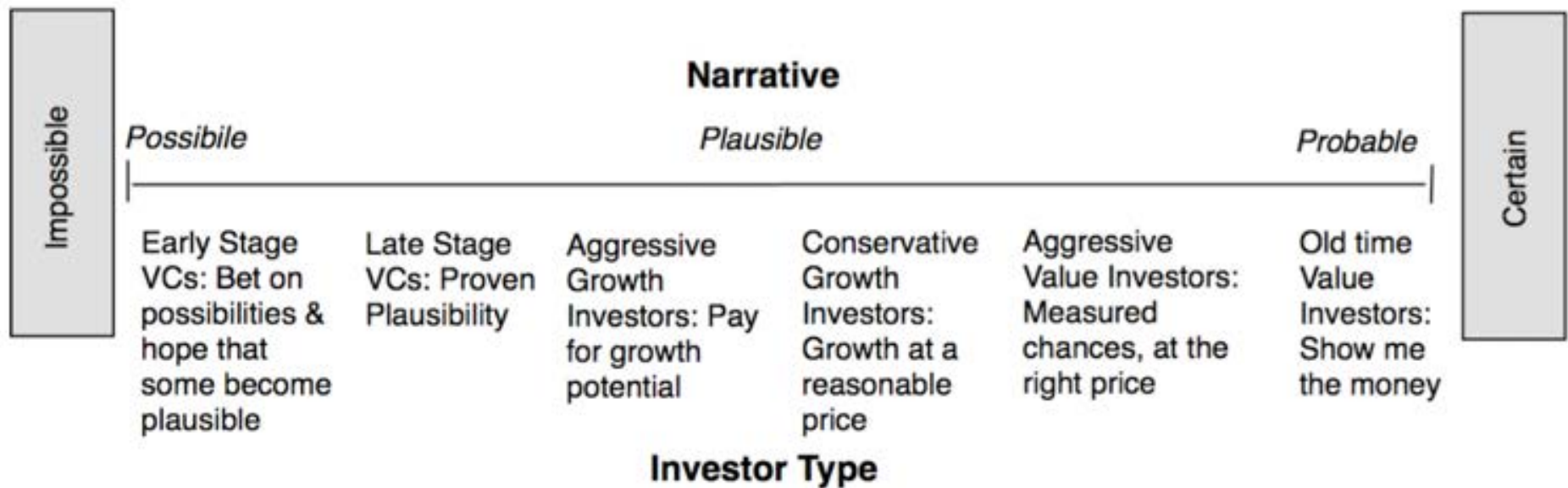
Investors: Narrative or Numbers?

“Show me the money”

The Investor Challenge

<i>Growth stage</i>	<i>Stage 1 Start-up</i>	<i>Stage 2 Young Growth</i>	<i>Stage 3: High Growth</i>	<i>Stage 4 & 5 Mature Stable</i>	<i>Stage 6 Decline</i>
<i>Key Questions</i>	Is there a market for the product or service? How big is that market? Will you survive?	Do people use your product or service? How much do they like it?	Will people pay for the product or service? Can you scale up, i.e., grow as you get bigger?	Can you make money of the product and service and sustain profitability in the face of competition?	What will you get if you sell your assets? How do you plan to return cash flows to your investors?
<i>Pricing Metrics & Measures</i>	Market size, Cash on hand, Access to capital	Number of users, User intensity (EV/User)	User engagement with model, Revenues (EV/Sales)	Earnings levels and growth (PE, EV/EBIT)	Cash flows, Payout & Debt servicing (PBV, EV/EBITDA)
<i>Narrative vs Numbers</i>	Mostly or all narrative	More narrative than numbers	Mix of narrative & numbers	More numbers than narrative	Mostly or all numbers
<i>Value Drivers</i>	Total market size, Market Share & Target Margin	Revenue Growth (and its drivers)	Revenue Growth & Reinvestment	Operating margins and Return on capital	Dividends/Cash Returns & Debt ratios
<i>Dangers</i>	<i>Macro delusions</i> , where companies are collectively overpriced, given market size.	<i>Value distractions</i> , with focus on wrong revenue drivers.	<i>Growth illusions</i> , with failure to factor in the cost of growth.	<i>Disruption Denial</i> , with failure to see threats to sustainable profits.	<i>Liquidation leakage</i> , with unrealistic assumptions about what others will pay for liquidated assets.
<i>Transitions</i>					
	<i>Potential to Product</i>	<i>Product to Revenues</i>	<i>Revenues to Profits</i>	<i>Profits to Cash flows</i>	

Investment Philosophies & Narratives



There is no one pathway to investing nirvana..

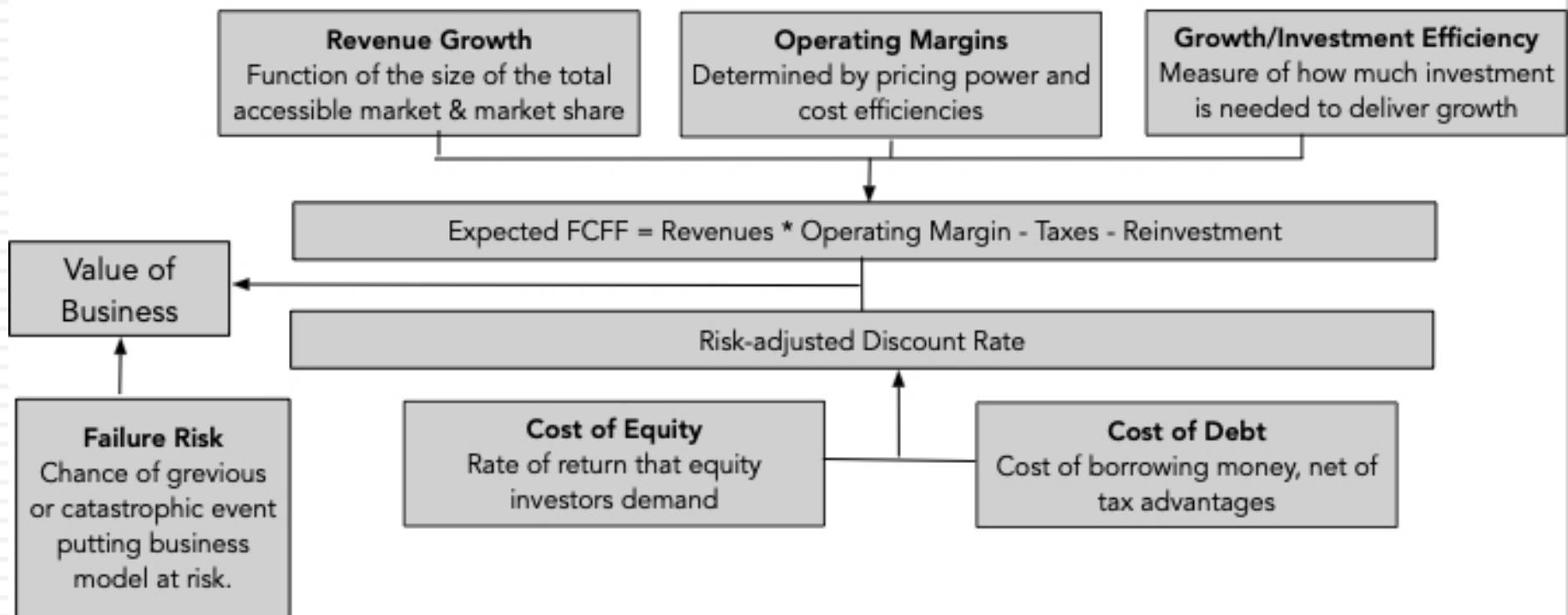
- Successful Value investors
 - ▣ Work primarily with numbers (financial ratios, pricing metrics)
 - ▣ Will tend to invest in mature companies with stable and clear stories
- Successful Growth investors
 - ▣ Make their investments primarily based upon stories
 - ▣ Will tend to invest in companies with big and expansive stories that pass the plausibility test.
- Both sides will view the other side as deluded, but they will both be better at what they do, if they can work on their weak sides.



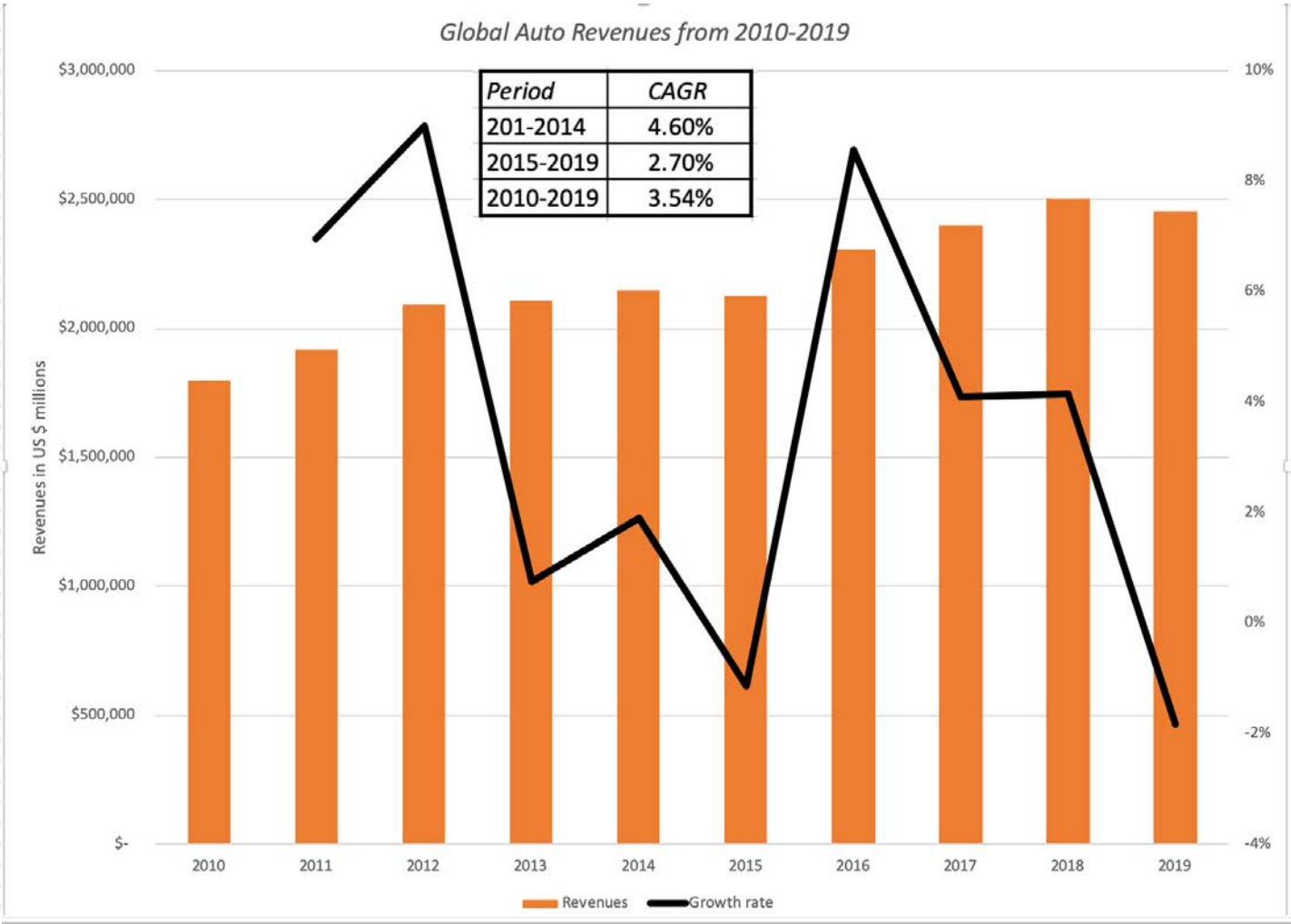
A Story Stock: Tesla

The Drivers of Value

The Value Drivers for a Company



The Growth Lever



The Biggest Auto Companies

Company Name	Revenues in 2019 (LTM)	CAGR: 2010-19	Operating Income in 2019 (LTM)	Operating Margin
Toyota Motor Corporation (TSE:7203)	\$285,284.60	1.83%	\$24,146.20	8.46%
Volkswagen AG (XTRA:VOW3)	\$270,296.60	5.72%	\$22,447.90	8.30%
Daimler AG (XTRA:DAI)	\$187,796.30	4.54%	\$5,167.40	2.75%
Ford Motor Company (NYSE:F)	\$155,900.00	2.13%	\$574.00	0.37%
Honda Motor Co., Ltd. (TSE:7267)	\$145,690.50	3.24%	\$6,968.20	4.78%
General Motors Company (NYSE:GM)	\$137,237.00	0.13%	\$5,481.00	3.99%
Fiat Chrysler Automobiles N.V. (BIT:FCA)	\$117,565.20	16.08%	\$6,174.90	5.25%
SAIC Motor Corporation (SHSE:600104)	\$111,839.00	12.03%	\$2,303.10	2.06%
BMW (XTRA:BMW)	\$108,985.90	3.63%	\$7,459.40	6.84%
Nissan Motor Co., Ltd. (TSE:7201)	\$102,176.80	0.11%	\$1,290.50	1.26%
Hyundai Motor (KOSE:A005380)	\$86,053.20	1.03%	\$2,454.50	2.85%
Peugeot S.A. (ENXTPA:UG)	\$83,946.30	2.24%	\$6,841.10	8.15%
AUDI AG (XTRA:NSU)	\$64,663.20	5.37%	\$5,034.10	7.79%
Renault SA (ENXTPA:RNO)	\$63,168.00	3.61%	\$3,801.80	6.02%
Kia Motors Corporation (KOSE:A000270)	\$46,311.20	6.97%	\$1,502.70	3.24%
Tata Motors Limited (BSE:500570)	\$40,131.40	4.91%	\$914.60	2.28%
Suzuki Motor Corporation (TSE:7269)	\$34,206.70	1.03%	\$2,259.30	6.60%
Mazda Motor Corporation (TSE:7261)	\$32,769.80	1.80%	\$721.20	2.20%
Subaru Corporation (TSE:7270)	\$30,338.50	5.27%	\$2,165.10	7.14%
Tesla, Inc. (NasdaqGS:TSLA)	\$24,578.00	81.20%	\$80.00	0.33%

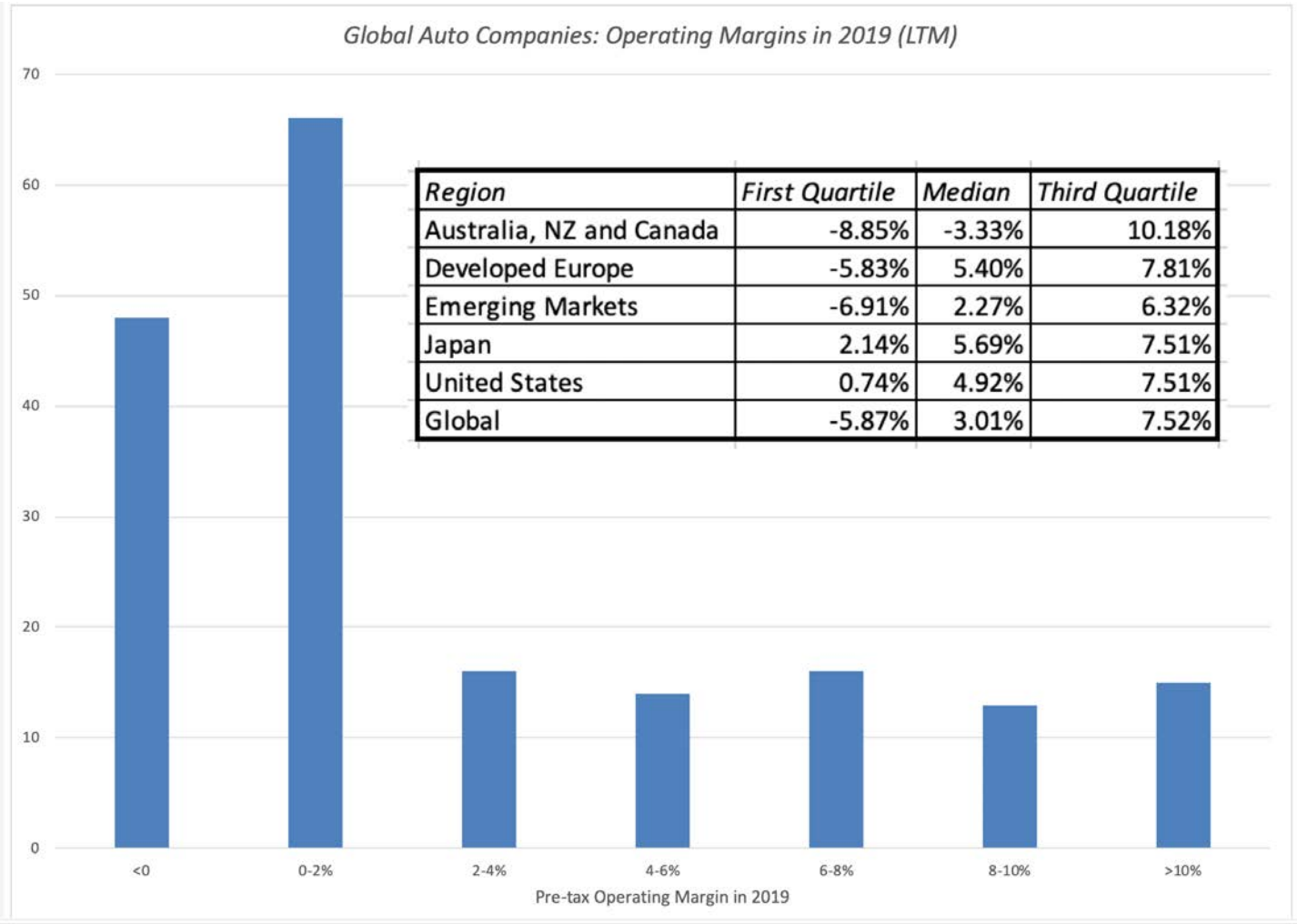
A tech company twist?

<i>Company</i>	<i>Revenues in 2019</i>	<i>Operating Income in 2019</i>	<i>Operating Margin</i>
Apple	\$ 260,174.00	\$ 63,333	24.34%
Microsoft	\$ 129,814.00	\$ 45,799	35.28%
Alphabet Inc.	\$ 155,058.00	\$ 32,650	21.06%
Amazon.com	\$ 265,469.00	\$ 12,795	4.82%
Facebook	\$ 66,529.00	\$ 21,167	31.82%
Netflix	\$ 18,875.90	\$ 2,269	12.02%
FAANG+M	\$ 895,919.90	\$ 178,012.16	19.87%

Your growth choice

<i>Expected Revenues in 2030 (in \$ millions)</i>	<i>CAGR (next 5 years)</i>
A1: \$65 billion (Renault-like)	15.00%
A2: \$100 billion (BMW-like)	21.00%
A3: \$150 billion (Ford & Honda-like)	28.00%
A4: \$200 billion (Daimler-like)	33.00%
A5: \$300 billion (Toyota & VW-like)	40.00%
A6: Direct Input (Enter % growth rate)	25.00%

The Profitability Lever



A tech twist?

- The median operating margin for tech companies (including both software & hardware is 10.25%).
- The picture is brighter for the FAANG stocks, where the aggregate operating margin across all five stocks is 19.87%, well above auto industry averages. That margin, though, is delivered on smaller revenues and with business models where production costs are a small fraction of selling prices.
- The operating margin for just software companies is even higher at 21.24%, because the marginal unit of software is close to costless to produce.

Your choice on profitability

<i>Operating Margin in 2025</i>	<i>Target Operating Margin</i>
B1: Auto Industry First Quartile	-5.87%
B2: Auto Industry Median	3.01%
B3: Auto Industry Third Quartile	7.52%
B4: Technology Median	10.25%
B5: Software	21.24%
B6: FAANG Aggregate	19.87%
B7: Direct Input	12.00%

3. The Investment Efficiency Lever



More on investment efficiency

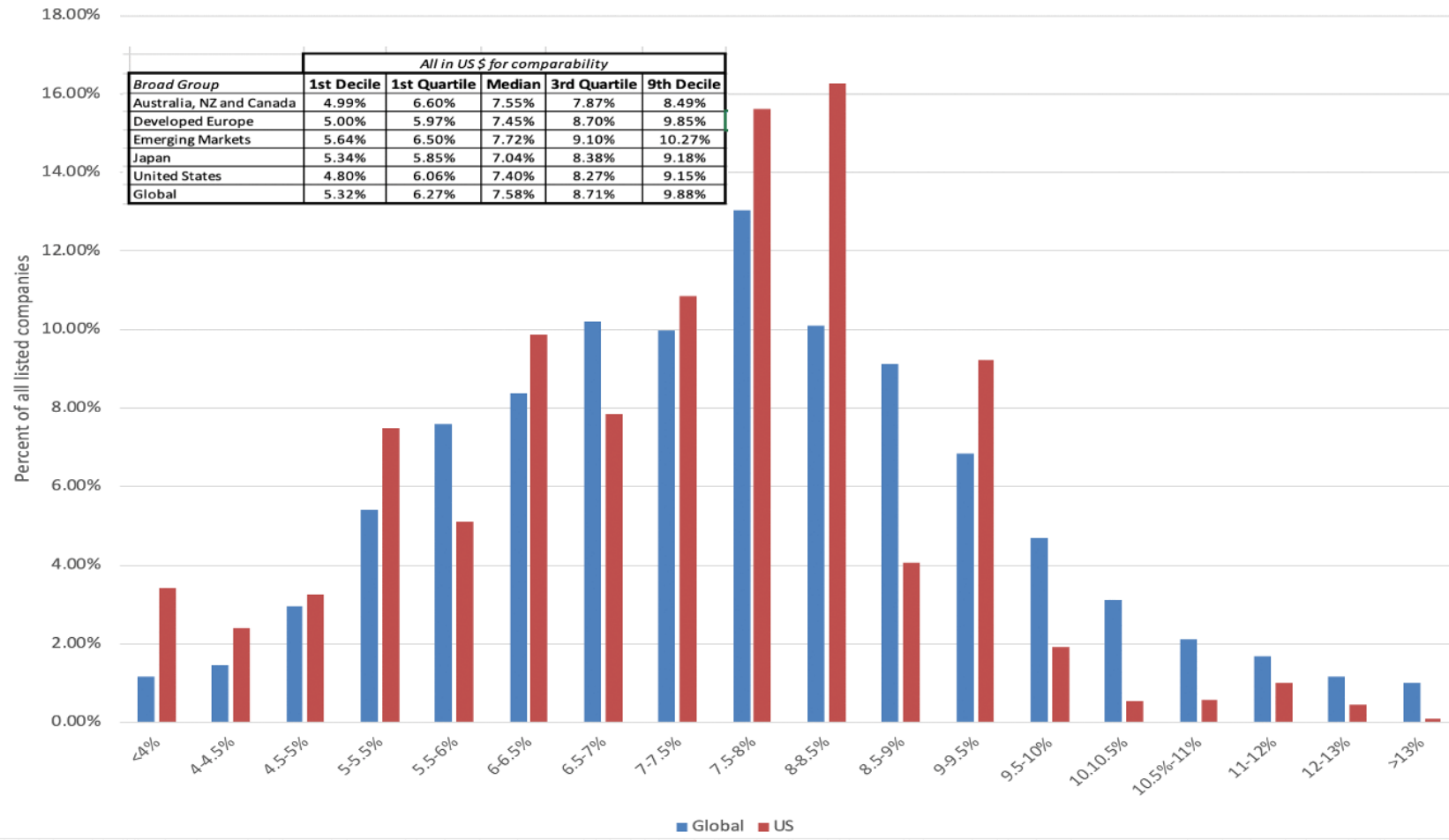
- Looking across global auto companies, the median company generates \$1.37 in sales for every dollar of capital invested, and at the 75th percentile, the more capital-efficient auto companies generate \$2.42 in revenues for every dollar of capital invested.
- My estimate of \$3 in revenues for every dollar of capital invested reflects an optimistic view of Tesla's capacity to bring technological innovation to its production processes, and reduce the capital needed to fund those processes.
- Since Tesla, in 2019, generates \$1.32 in revenue for every dollar of capital invested, my estimate is more aspirational than based on observable efficiencies, right now.

Your choice on investment efficiency

<i>Sales to Invested Capital</i>	<i>Sales to Capital (1st 5 years)</i>
C1: Auto Industry First Quartile	0.75
C2: Auto Industry Median	1.37
C3: Auto Industry Third Quartile	2.42
C4: Technology Median	1.51
C5: Software	2.30
C6: FAANG Aggregate	1.27
C7: Direct Input	3.00

4. Risk: The Cost of Capital - Global

Cost of Capital in January 2020: All Listed Non-financial Service Companies



Your choice on cost of capital & the failure rate

<i>Cost of Capital</i>	<i>Initial cost of capital</i>
D1: Automobile Median	6.94%
D2: Technology Median	8.86%
D3: All companies - First Quartile	6.27%
D4: All companies - Median	7.58%
D5: All companies - Third Quartile	8.71%
D6: Direct Input	7.00%

<i>Failure Likelihood</i>	<i>Probability of failure</i>
E1: No chance	0%
E2: 10% (Marginal profitability, High Debt)	10%
E3: 20% (Money loser, High Debt)	20%
E4: 50% (Low Growth, Money loser, High Debt)	50%

Valuation Stories

<i>Story</i>	<i>Revenues</i>	<i>Operating Margins</i>	<i>Reinvestment Efficiency</i>	<i>Risk</i>	<i>Value/Share</i>	<i>Equity Value</i>
The Big Auto	BMW-like (\$100 billion)	Auto 75th percentile	Auto 75th percentile	Auto median	\$ 105.79	\$ 27,547
	Daimler-like (\$200 billion)	Auto 75th percentile	Auto 75th percentile	Auto median	\$ 227.42	\$ 49,076
	VW/Toyota-like (\$300 billion)	Auto 75th percentile	Auto 75th percentile	Auto median	\$ 332.82	\$ 67,731
Auto+ Tech	BMW-like (\$100 billion)	Tech median	Tech median	Tech median	\$ 110.96	\$ 28,461
	Daimler-like (\$200 billion)	Tech median	Tech median	Tech median	\$ 211.84	\$ 46,317
	VW/Toyota-like (\$300 billion)	Tech median	Tech median	Tech median	\$ 297.86	\$ 61,544
An Auto FAANG	BMW-like (\$100 billion)	FAANG aggregate	FAANG aggregate	Tech median	\$ 458.37	\$ 89,953
	Daimler-like (\$200 billion)	FAANG aggregate	FAANG aggregate	Tech median	\$ 854.64	\$ 160,094
	VW/Toyota-like (\$300 billion)	FAANG aggregate	FAANG aggregate	Tech median	\$ 1,204.62	\$ 222,040
FAANG	VW/Toyota-like (\$300 billion)	Software median	Revolutionary Manufacturing	Auto median	\$ 2,105.55	\$ 381,504

The Stories

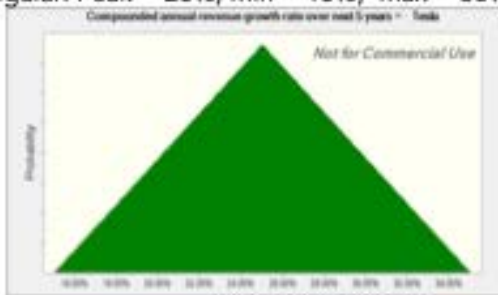
- The Big Auto Story: If your story is that Tesla will emerge from its growth period as one of the largest auto companies in the world (revenues of \$100- \$300 billion in year 10), with top-tier auto company margins (7.42%), investment efficiency (2.42) and cost of capital (6.94%), the value per share ranges from \$106/share (with BMW like revenues) to \$227/share (with Daimler-like revenues) to \$333/share (with VW/Toyota like revenues).
- The Techy Auto Company Story: Tesla is an auto/software/services company with tech company characteristics, giving it higher margins (10.25%) and a higher cost of capital (8.86%). With this story, the value per share ranges from \$111/share (with BMW like revenues) to \$212/share (with Daimler-like revenues) to \$298/share (with VW/Toyota like revenues). Put simply, the higher risk nullifies the benefits of higher profitability.
- The FAANGy Auto Company: Tesla not only develops a tech twist, but becomes as successful as the most successful tech companies (I use the FAANG stocks + Microsoft). In this story, the margins approach 18.97% and with a tech cost of capital, the value per share ranges from \$459/share (with BMW like revenues) to \$855/share (with Daimler-like revenues) to \$2,106/share (with VW/Toyota like revenues).
- The Make-your-best Company: I give Tesla the best possible outcomes on each variable, revenues like VW/Toyota, margins like pure software companies (21.24%), a sales to capital ratio that is higher than any of the sector averages (4.00) and a cost of capital of an auto company (6.94%), and arrive at a value per share of \$2106.

Possible? Plausible? Probable?

- With the big auto stories, the key question will be whether Tesla can climb to the very top of the heap in terms of revenues, generally reserved for mass market companies, while earning operating margins that are usually reserved for smaller luxury auto companies?
- With the techy auto stories, the key question becomes whether a company that derives the bulk of its revenues from selling cars be profitable and reinvest like a tech company?
- With the FAANGy stories, the investment question becomes whether you should up front for a company on the expectation that it will be an exceptional company. It very well might make it to the top of the heap, but if it does not, you are set up for disappointment.
- With the MYB story, you are approaching the most dangerous place in valuation, where you pick and choose each assumption, without considering the ones you have already made. Put simply, is it even possible to build a company that generates revenues like Toyota, earns margins like Microsoft and invests more efficiently than any manufacturing company in history has ever done, while still preserving the low cost of capital of an auto company?

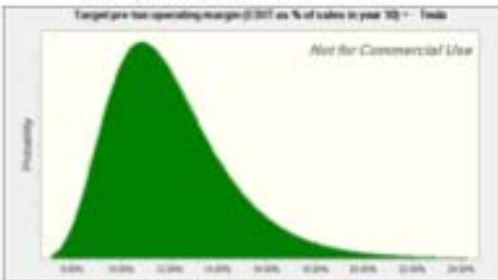
Revenue Growth

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



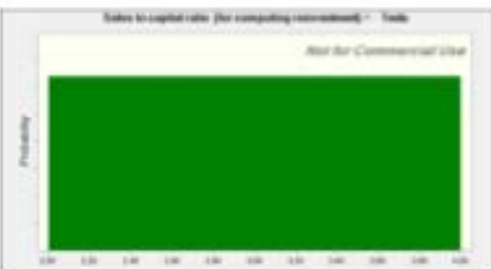
Operating Margin

Log Normal: Mean = 12%



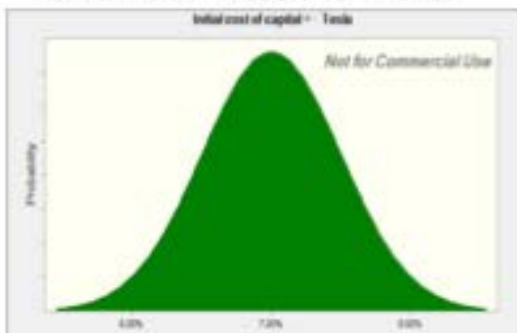
Sales to Capital

Uniform: Min = 1.00 Max = 3.00



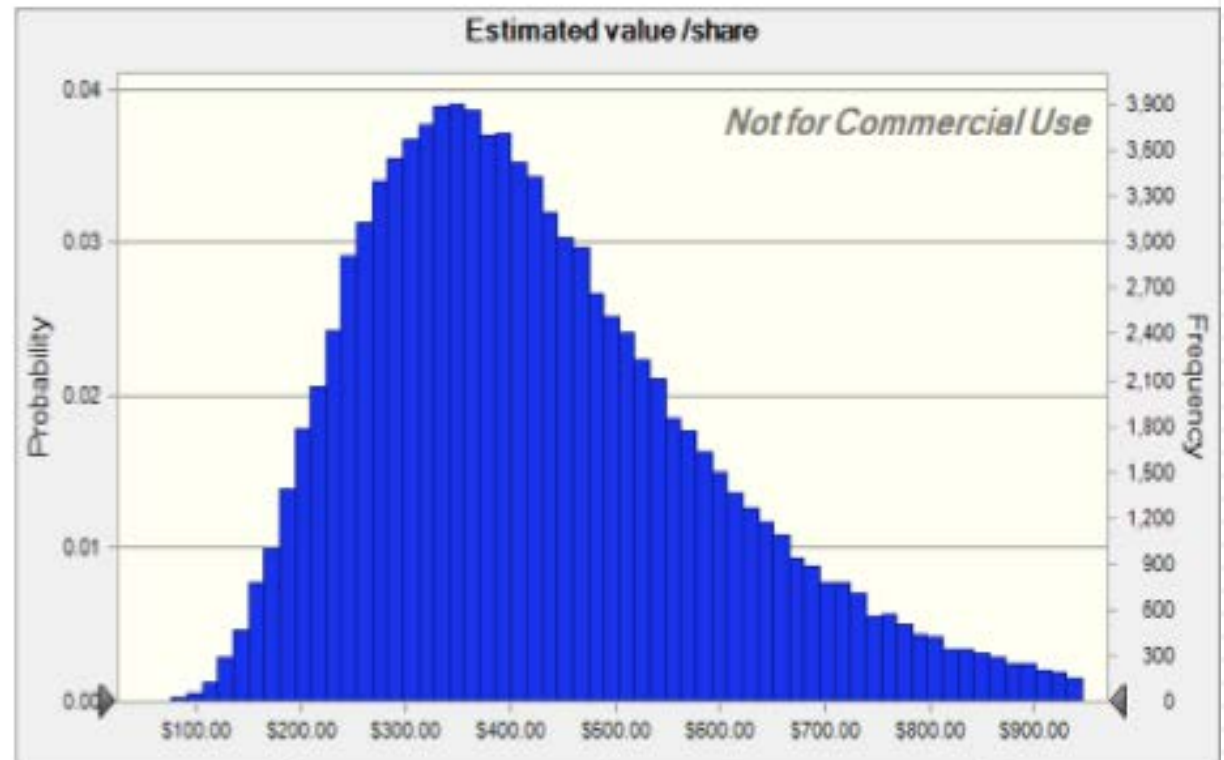
Cost of Capital

Normal: Mean = 7% Std dev = 0.5%



Tesla Value/Share in January 2020

Across 100,000 Simulations



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

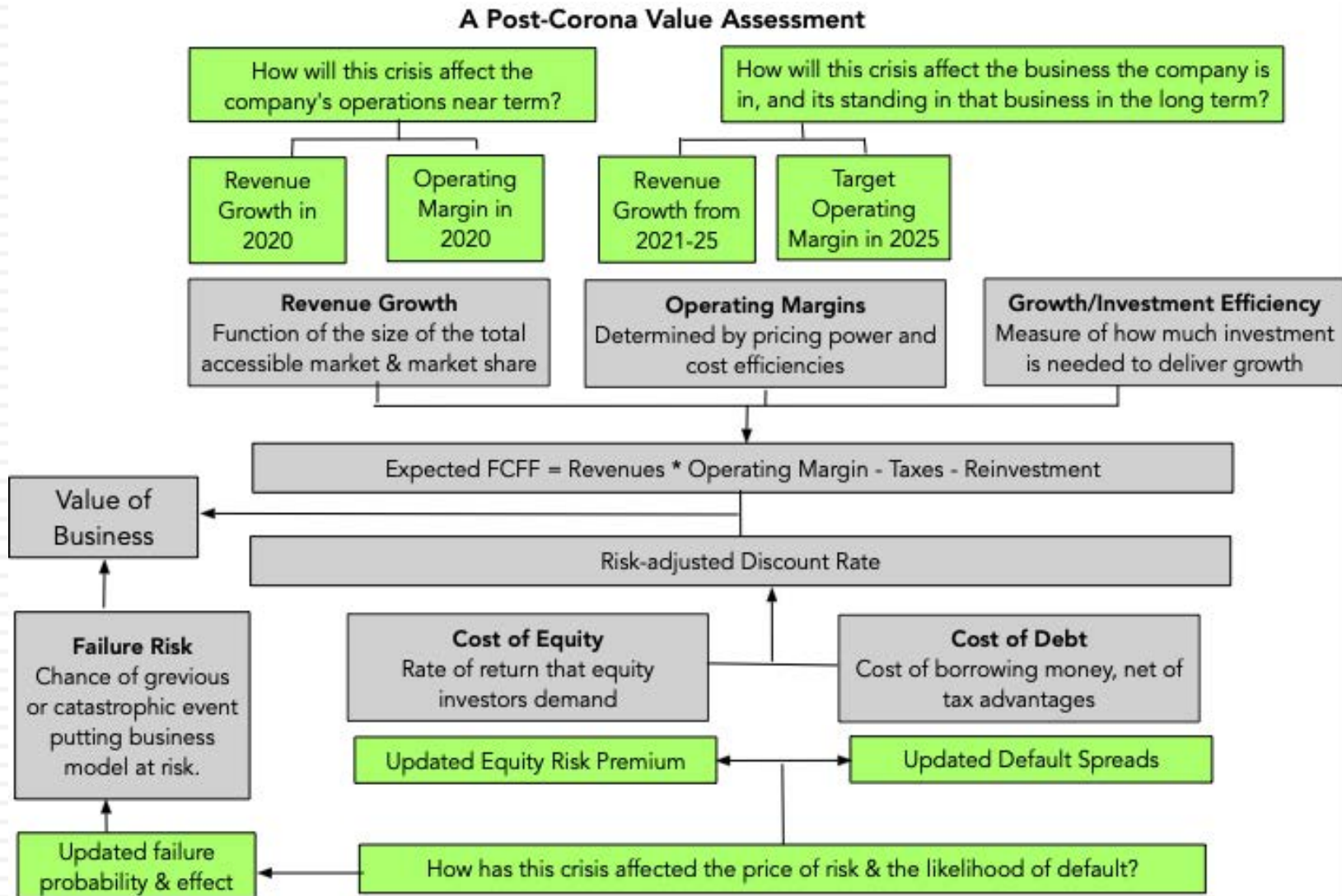
When a crisis hits, the dark side beckons...

- During a crisis, you will be told that you can no longer value companies with fundamentals, and that you have to play the trading game.
- If your concept of valuation is downloading last year's financials for a company into a spread sheet and then using historical growth rates, with some mean reversion thrown in, to forecast future numbers, they are right.
- If your notion of valuation is more dynamic and forward-looking, it is precisely at times like these that you need to go back to basics.

And the dark side beckons...

- If your concept of valuation is downloading last year's financials for a company into a spread sheet and then using historical growth rates, with some mean reversion thrown in, to forecast future numbers, you are probably feeling lost right now, and with good reason.
- It is also not a time to wring our hands, complain that there is too much uncertainty and argue that the fundamentals don't matter.
 - If you do so, you will be drawn to the dark side of investing, where fundamentals don't matter (paradigm shifts, anyone?), new pricing metrics get invented and you are at the mercy of mood and momentum.
- Ironically, it is precisely at times like these that you need to go back to basics.

A Post-Corona Version



Tesla

The Payoff to Flexibility

Jul-20

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

The Assumptions

	Base year	Years 1-5	Years 6-10		After year 10	Link to story
Revenues (a)	\$ 26,022	33.00%	→ 0.67%		0.67%	Growth in EV market & Tesla's early mover advantage work in its favor.
Operating margin (b)	4.07%	4.07%	→ 10.25%		10.25%	Continued economies of scale & brand
Tax rate	25.00%	25.00%	→ 25.00%		25.00%	Global tax rate
Reinvestment (c)		Sales to capital ratio 3.00		RIR =	6.70%	Capacity build up allows for less reinvestment in the near years.
Return on capital	3.90%	Marginal ROIC =	26.47%		10.00%	Cost of entry will limit competition.
Cost of capital (d)		6.04%	→ 6.00%		6.00%	Moves to median company cost of capital

The Cash Flows

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

The Value

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



The End

“There is no real ending. It’s just the place where you stop the story.”