NUMBERS AND NARRATIVE: MODELING, STORY TELLING AND INVESTING

Aswath Damodaran

Are you a numbers person or a story person?

The side of the brain we tend to use more may determine our learning styles, not to mention instructors' teaching methods:

LEFT SIDE



Linear

Processes information by taking pieces, lining them up. and arranging them in a logical order to draw conclusions.

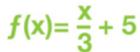


Reality-based

Deals with reality the way it is. When affected by the environment, adjustment can be easily made.



Processes information in order. This makes for easy daily planning and accomplishing tasks.



Symbolic

Processing symbols is no problem such as letters. words, and mathematical notation.

RIGHT SIDE



Holistic

Processes information by starting with the answer. It sees the big picture first, not the details.



Fantasy-oriented

Processes information based on what they think the answer is. Often they find the answer intuitively.



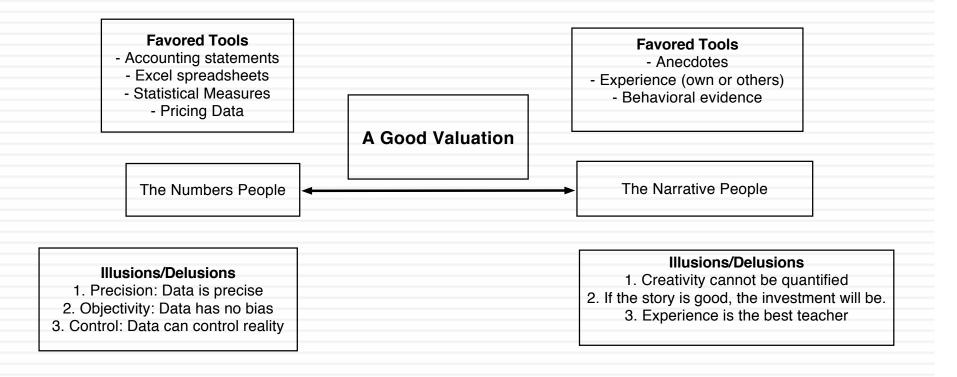
Processes information through random processing. Tasks are done randomly and in parts.



Concrete

Processing requires things to be concrete such as feeling, seeing, or touching the real object.

Bridging the Gap



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

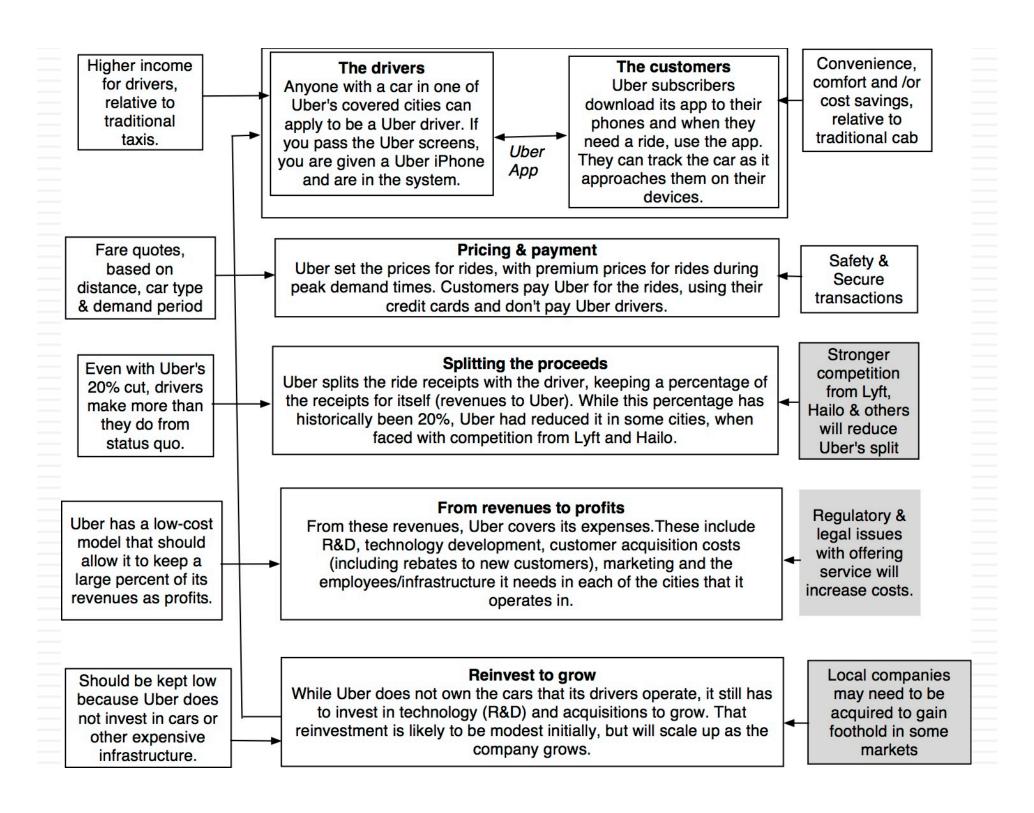
Create an intrinsic valuation model that connects the inputs to an end-value the business.

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.

Step 1: 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.

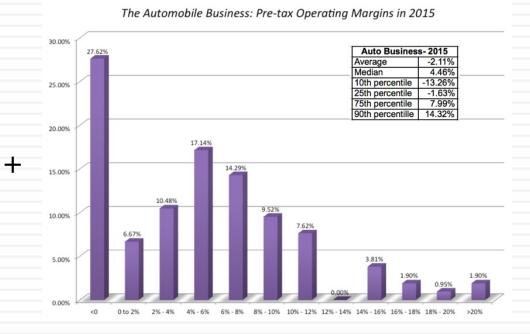


Low Growth

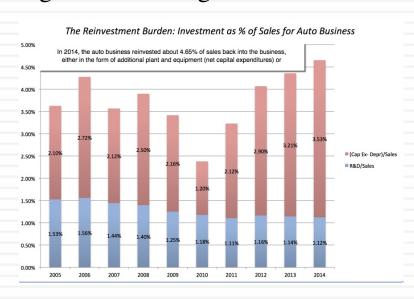
The Auto Business

Low Margins

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 Ave	rage =	5.63%



High & Increasing Reinvestment



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%

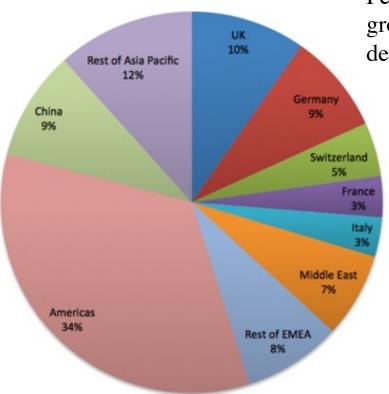
Only once in the last 10 years have auto companies collectively earned more than their cost of capital

What makes Ferrari different?

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 2: 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

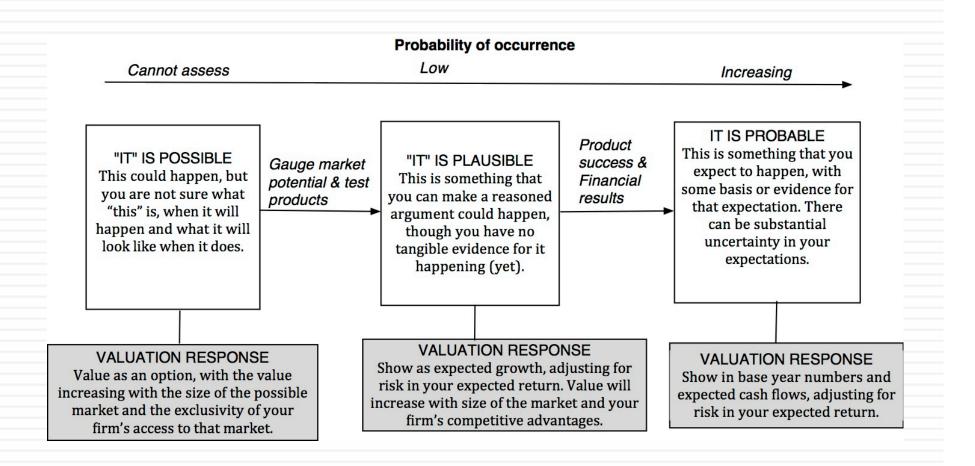
In June 2014, my initial narrative for Uber was that it would be

- 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.
- 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

- 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 3: Check the narrative against history, economic first principles & common sense



The Impossible, The Implausible and the **Improbable**

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 exceeds 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.

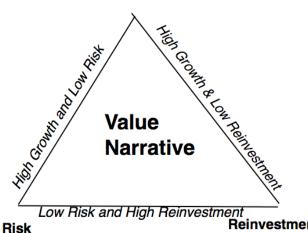
Profits without competition Assuming that your company will grow and earn higher profits, with no competition.

Returns without risk

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

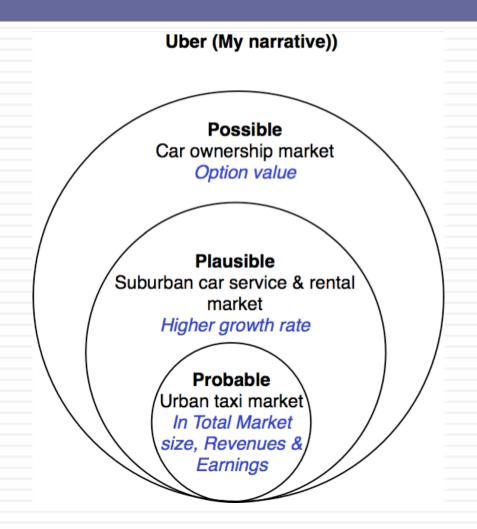
The Improbable



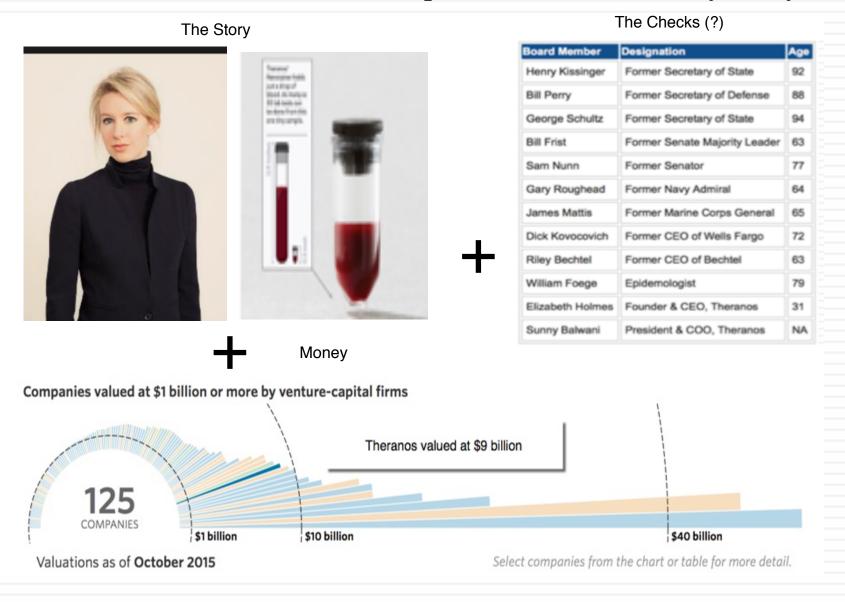


Reinvestment

Uber: Possible, Plausible and Probable



The Impossible: The Runaway Story



VC 1.1 Big Market Supply Capital Product VC 1.2 Value business based on big market potential VC 1.3 Supply Capital Entrepreneur 1 Product VCs 1 Value business based on big market potential Product Entrepreneur 2 VCs 2 Value business based on big market potential Supply Capital Entrepreneur 3 Product VCs 3 Value business based on big market potential Product VCs 4 Big Market Value business based on big market potential Product Entrepreneur 5 VCs 5 Value business based on big market potential Supply Capital Entrepreneur 6 Product VCs 6 Value business based on big market potential Product Entrepreneur 7 VCs 7 Value business based on big market potential

The Implausible: The Big Market Delusion

				Breakeven	% from Online	Imputed Online Ad
Company	Market Cap	Enterprise Value	Current Revenues	Revenues (2025)	Advertising	Revenue (2025)
Google	\$441,572.00	\$386,954.00	\$69,611.00	\$224,923.20	89.50%	\$201,306.26
Facebook	\$245,662.00	\$234,696.00	\$14,640.00	\$129,375.54	92.20%	\$119,284.25
Yahoo!	\$30,614.00	\$23,836.10	\$4,871.00	\$25,413.13	100.00%	\$25,413.13
LinkedIn	\$23,265.00	\$20,904.00	\$2,561.00	\$22,371.44	80.30%	\$17,964.26
Twitter	\$16,927.90	\$14,912.90	\$1,779.00	\$23,128.68	89.50%	\$20,700.17
Pandora	\$3,643.00	\$3,271.00	\$1,024.00	\$2,915.67	79.50%	\$2,317.96
Yelp	\$1,765.00	\$0.00	\$465.00	\$1,144.26	93.60%	\$1,071.02
Zillow	\$4,496.00	\$4,101.00	\$480.00	\$4,156.21	18.00%	\$748.12
Zynga	\$2,241.00	\$1,142.00	\$752.00	\$757.86	22.10%	\$167.49
Total US	\$770,185.90	\$689,817.00	\$96,183.00	\$434,185.98	r Josephowne	\$388,972.66
Alibaba	\$184,362.00	\$173,871.00	\$12,598.00	\$111,414.06	60.00%	\$66,848.43
Tencent	\$154,366.00	\$151,554.00	\$13,969.00	\$63,730.36	10.50%	\$6,691.69
Baidu	\$49,991.00	\$44,864.00	\$9,172.00	\$30,999.49	98.90%	\$30,658.50
Sohu.com	\$18,240.00	\$17,411.00	\$1,857.00	\$16,973.01	53.70%	\$9,114.51
Naver	\$13,699.00	\$12,686.00	\$2,755.00	\$12,139.34	76.60%	\$9,298.74
Yandex	\$3,454.00	\$3,449.00	\$972.00	\$2,082.52	98.80%	\$2,057.52
Yahoo! Japan	\$23,188.00	\$18,988.00	\$3,591.00	\$5,707.61	69.40%	\$3,961.08
Sina	\$2,113.00	\$746.00	\$808.00	\$505.09	48.90%	\$246.99
Netease	\$14,566.00	\$11,257.00	\$2,388.00	\$840.00	11.90%	\$3,013.71
Mail.ru	\$3,492.00	\$3,768.00	\$636.00	\$1,676.47	35.00%	\$586.76
Mixi	\$3,095.00	\$2,661.00	\$1,229.00	\$777.02	96.00%	\$745.94
Kakaku	\$3,565.00	\$3,358.00	\$404.00	\$1,650.49	11.60%	\$191.46
Total non-US	\$474,131.00	\$444,613.00	\$50,379.00	\$248,495.46		\$133,415.32
Global Total	\$1,244,316.90	\$1,134,430.00	\$146,562.00	\$682,681.44		\$522,387.98

The Improbable: Willy Wonkitis

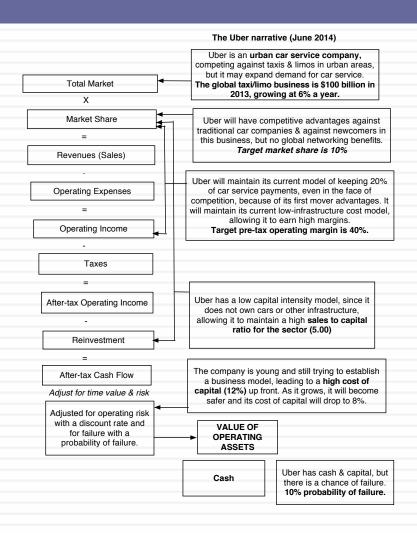
Tesla: Summary 15-year DCF Analysis (DCF valuation as of mid-year 2013)

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	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 202
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	1,137,78
% Growth		52%	75%	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	59,5
% Growth		-9%	-2%	-5%	-17%	-11%	-3%	-2%	1%	1%	1%	196	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	67,98
Development Service Sales	16	40	42	44	46	49	51	54	56	59	62	65	68	72	75	7
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	68,05
% Growth		36%	68%	25%	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	12,09
% 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	1,66
% of Capex	41%	79%	55%	65%	62%	69%	78%	86%	79%	77%	75%	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	10,43
% Margin	1.8%	7.7%	13.2%	11.8%	12.8%	14.1%	16.4%	16.3%	16.1%	16.0%	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	90
Other Income	28	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	11,37
ncome Taxes	3	2	14	34	86	262	462	641	807	1,003	1,134	1,317	1,470	1,761	2,028	2,3
6 Effective Rate	6%	1%	2%	4%	6%	14%	16%	17%	18%	19%	19%	20%	19%	19%	20%	2
let 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	9,0
Plus																
fter-tax Interest Expense (Income)	27	1	(9)	(33)	(47)	(90)	(108)	(154)	(199)	(278)	(357)	(444)	(541)	(650)	(782)	(9
Pepreciation of PP&E	103	158	172	203	301	353	389	537	606	696	811	938	1,088	1,260	1,451	1,6
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ess																
hange in Working Capital	(155)	(14)	(157)	(167)	(172)	(325)	(163)	(81)	(28)	(299)	(356)	(328)	(219)	(329)	(365)	(3
i of Change in Sales		-2%	-7%	-12%	-6%	-12%	-4%	-2%	-1%	-6%	-6%	-6%	-4%	-5%	-5%	
apital Expenditures	250	200	312	312	486	510	497	623	765	906	1,078	1,236	1,437	1,660	1,898	2,1
6 of Sales	10%	6%	6%	4%	5%	4%	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	
nlevered 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	8,0
													EBITDA			12,0
													COITUA			12,0

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

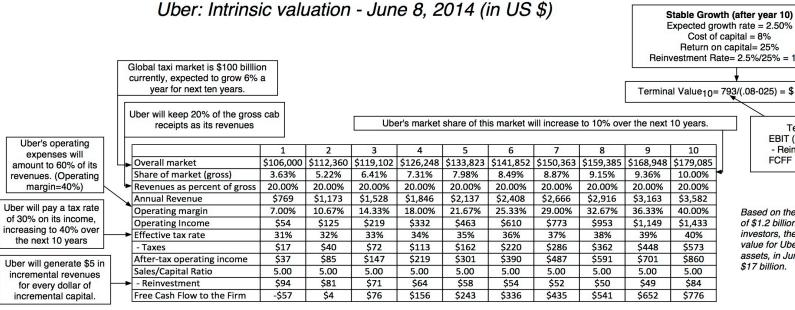
Exit EBITDA High Exit EBITDA Low	12.0 x	Exit PPG High	5.0%	Exit P/Sales High	180%
	8.0 x	Exit PPG Low	3.0%	Exit P/Sales Low	130%
	Discount Rate High	13.0%	FY Month of Valuation	1.0 (Beginning	of this Month)

Step 4: Connect your narrative to key drivers of value



Ferrari: From story to numbers

Valuation Inputs Valuation Input The Story Revenue growth of 4% (in Euro terms) a Revenues Keep it scarce year for next 5 years, scaling down to 0.7% in year 10. Translates into an Operating Margin increase in production of about 25% in & Taxes next 10 years Ferrari's pre-tax operating margin stays at And pricey 18.2%, in the 95th percentile of auto Operating Income business. I ittle need for Sales/Invested Capital stays at 1.42, i.e. Reinvestment capacity every euro invested generates 1.42 expansion euros in sales Cash Flow Super-rich Cost of capital of 6.96% in Euros and no clients are Discount Rate (Risk) chance of default. recession-proof



Return on capital= 25% Reinvestment Rate= 2.5%/25% = 10%

Terminal Value₁₀= 793/(.08-025) = \$14,418

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

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

Value of operating assets = \$6,595

Adust for probability of failure (10%) Expected value = \$6,595 (.9) = \$5,895 Cost of capital for first 5 years = Top decile of US companies =

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

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

Aswath Damodaran

Ferrari: The "Exclusive Club" Value

Stay Super Exclusive: Revenue growth is low

	Ва	se year		1		2		3		4		5		6		7		8		9	i	10	Ter	minal year
Revenue growth rate			4.	00%	4.	00%	4.0	00%	4.	00%	4.0	00%	3.	34%	2.	68%	2.	02%	1.	36%	0.7	70%		0.70%
Revenues	€	2,763	€ :	2,874	€	2,988	€ 3	3,108	€	3,232	€ :	3,362	€	3,474	€	3,567	€	3,639	€	3,689	€ 3	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%	6.9	96%	6.	96%	6.9	96%	6.	96%	6.	97%	6.	98%	6.	99%	7.0	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

- 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.
- Not just urban: Uber can create new demands for car service in parts of the country where taxis are not used (suburbia, small towns).
- Global networking benefits: By linking with technology and credit card companies, Uber can have global networking benefits.

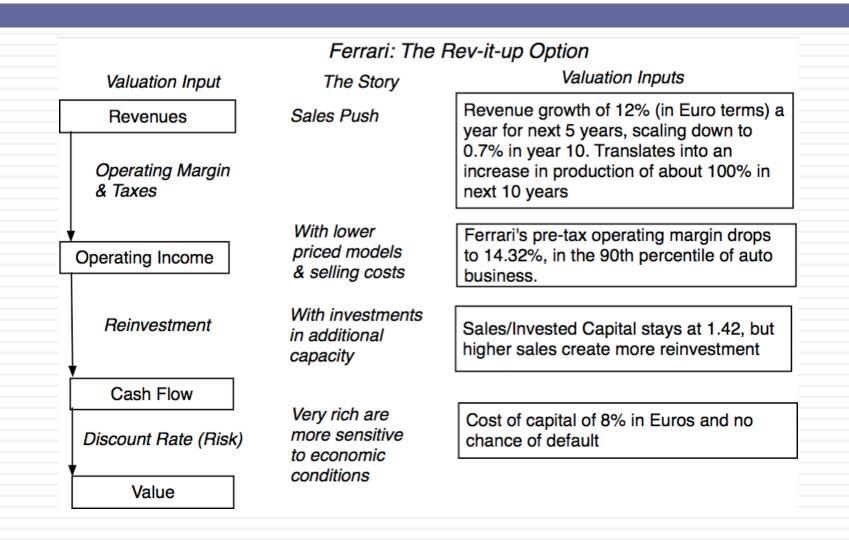
Valuing Bill Gurley's Uber narrative

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

Different narratives, Different Numbers

Total Market	Growth Effect	Network Effect	Competitive Advantages	Value of Uber
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

	Ва	se year		1		2		3		4		5		6		7		8		9	j	10	Ter	minal 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	4,869	€	5,344	€	5,743	€	6,043	€	6,222	€ (5,266	₩	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			8.0	00%	8.	00%	8.	00%	8.	.00%	8.6	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!



Step 6: If the world changes, your narrative has to change with it..

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: The September 2015 Update

Input	June 2014	September 2015	Rationale
Total Market	\$100 billion; Urban car service	\$230 billion; Logistics	Market is broader, bigger & more global than I thought it would be. Uber's entry into delivery & moving businesses is now plausible, perhaps even probable.
Growth in market	Increase market size by 34%; CAGR of 6%.	Double market size; CAGR of 10.39%.	New customers being drawn to car sharing, with more diverse offerings.
Market Share	10% (Local Networking)	25% (Weak Global Networking)	Higher cost of entry will reduce competitors, but remaining competitors have access to capital & in Asia, the hometown advantage.
Slice of gross receipts	20% (Left at status quo)	15%	Increased competition will reduce car service company slice.
Operating margin	40% (Low cost model)	25% (Partial employee model)	Drivers will become partial employees, higher insurance and regulatory costs.
Cost of capital	12% (Ninth decile of US companies)	10% (75 th percentile of US companies)	Business model in place and substantial revenues.
Probability of failure	10%	0%	Enough cash on hand to find off threats to survival.
Value of equity	\$5.9 billion	\$23.4 billion	Value increased more than four fold.

Potential Market	Market size (in millions)
A1. Urban car service	\$100,000
A2. All car service	\$175,000
A3. Logistics	\$230,000
A4. Mobility Services	\$310,000

Growth Effect	CAGR (next 10 years)
B1. None	3.00%
B2. Increase market by 25%	5.32%
B3. Increase market size by 50%	7.26%
B4: Double market size	10.39%

Network Effects	Market Share
C1. No network effects	5%
C2. Weak local network effects	10%
C3. Strong local network effects	15%
C4. Weak global network effects	25%
C5. Strong global network effects	40%

Increases overa	I market to \$618	billion in	year 10
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G2

	Base	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Assumptions
Overall market	\$230,000	\$253,897	\$280,277	\$309,398	\$341,544	\$377,031	\$416,204	\$459,448	\$507,184	\$559,881	\$618,052	A3 & B4
Share of market (gross)	4.71%	6.74%	8.77%	10.80%	12.83%	14.86%	16.89%	18.91%	20.94%	22.97%	25.00%	C4
Gross Billings	\$10,840	\$17,117	\$24,582	\$33,412	\$43,813	\$56,014	\$70,277	\$86,900	\$106,218	\$128,612	\$154,513	
Revenues as percent of gross	20.00%	19.50%	19.00%	18.50%	18.00%	17.50%	17.00%	16.50%	16.00%	15.50%	15.00%	D3
Annual Revenue	\$2,168	\$3,338	\$4,670	\$6,181	\$7,886	\$9,802	\$11,947	\$14,338	\$16,995	\$19,935	\$23,177	
Operating margin	-23.06%	-18.26%	-13.45%	-8.64%	-3.84%	0.97%	5.77%	10.58%	15.39%	20.19%	25.00%	E2
Operating Income	-\$500	-\$609	-\$628	-\$534	-\$303	\$95	\$690	\$1,517	\$2,615	\$4,026	\$5,794	
Effective tax rate	30.00%	31.00%	32.00%	33.00%	34.00%	35.00%	36.00%	37.00%	38.00%	39.00%	40.00%	
- Taxes	-\$150	-\$189	-\$201	-\$176	-\$103	\$33	\$248	\$561	\$994	\$1,570	\$2,318	
After-tax operating income	-\$350	-\$420	-\$427	-\$358	-\$200	\$62	\$442	\$956	\$1,621	\$2,456	\$3,477	
Sales/Capital Ratio		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	F
- Reinvestment		\$234	\$267	\$302	\$341	\$383	\$429	\$478	\$531	\$588	\$648	
Free Cash Flow to the Firm		-\$654	-\$694	-\$660	-\$541	-\$322	\$13	\$478	\$1,090	\$1,868	\$2,828	
Terminal value											\$56,258	
Present value of FCFF		-\$595	-\$573	-\$496	-\$369	-\$200	\$7	\$248	\$520	\$822	\$1,152	
Present value of terminal value											\$22,914	
Cost of capital	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	9.60%	9.20%	8.80%	8.40%	8.00%	G1

PV of cash flows during next 10 years =	\$515
PV of terminal value =	\$22,914
Value of operating assets	\$23,429
Probability of failure	0.00%
Adjusted value of operating assets	\$23,429
Less Debt	\$0
Value of Equity	\$23,429

Expense Profile	Operating Margin
E1: Independent contractor	40%
E2: Partial employee	25%
E3: Full employee	15%

F: Status Quo: S	Sales/Capital = 5
	•
	F: Status Quo:

Competitive Advantages	Slice of Gross Receipts
D1. None	5%
D2. Weak	10%
D3. Semi-strong	15%
D4. Strong & Sustainable	20%

Capital Intensity

Risk Estimates

G1. Cost of capital at 75th percentile of US companies = 10% G2. Probability of failure in next 10 years= 0%

Uber Valuation: September 2015

The End

"There is no real ending. It's just the place where you stop the story."