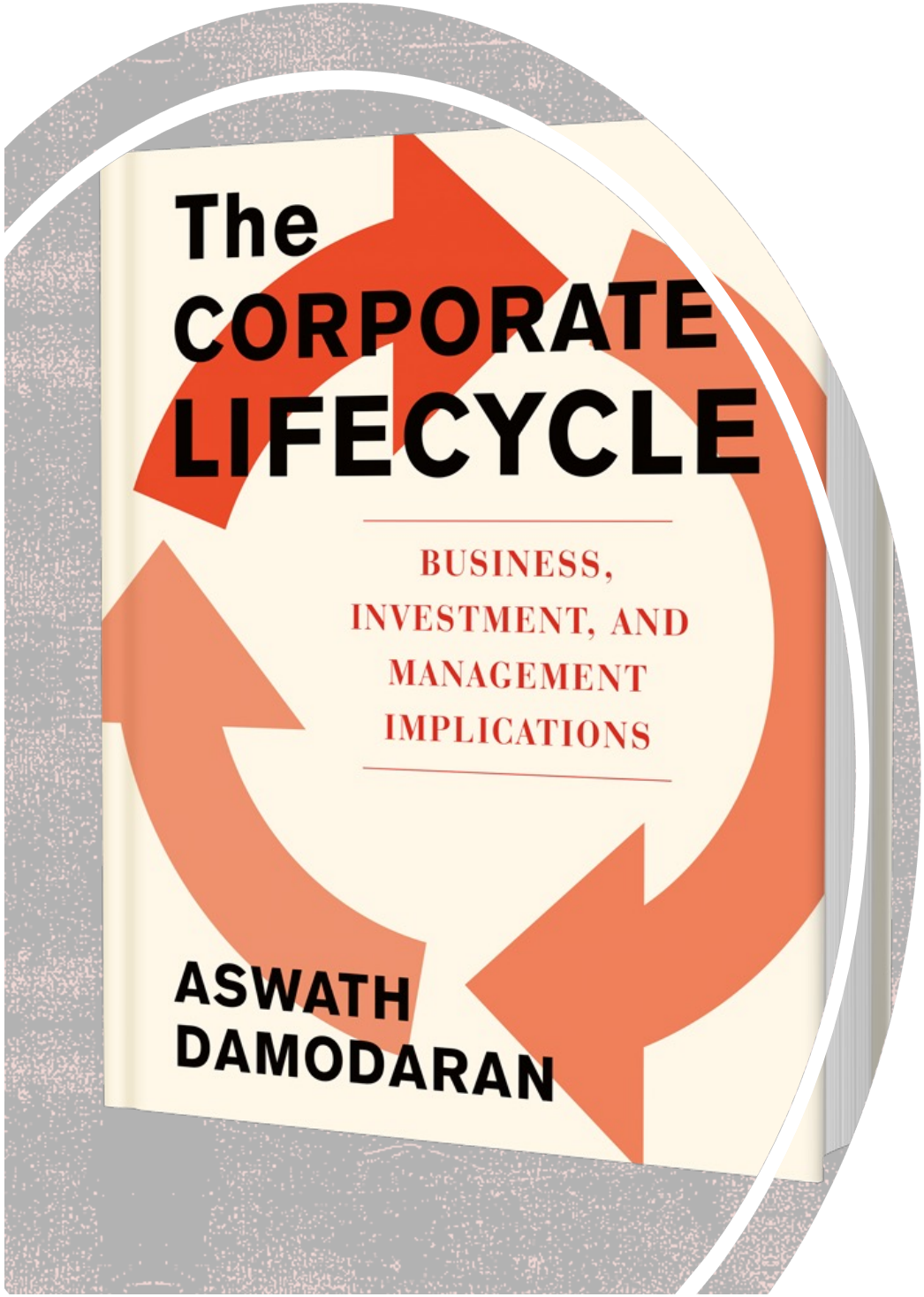
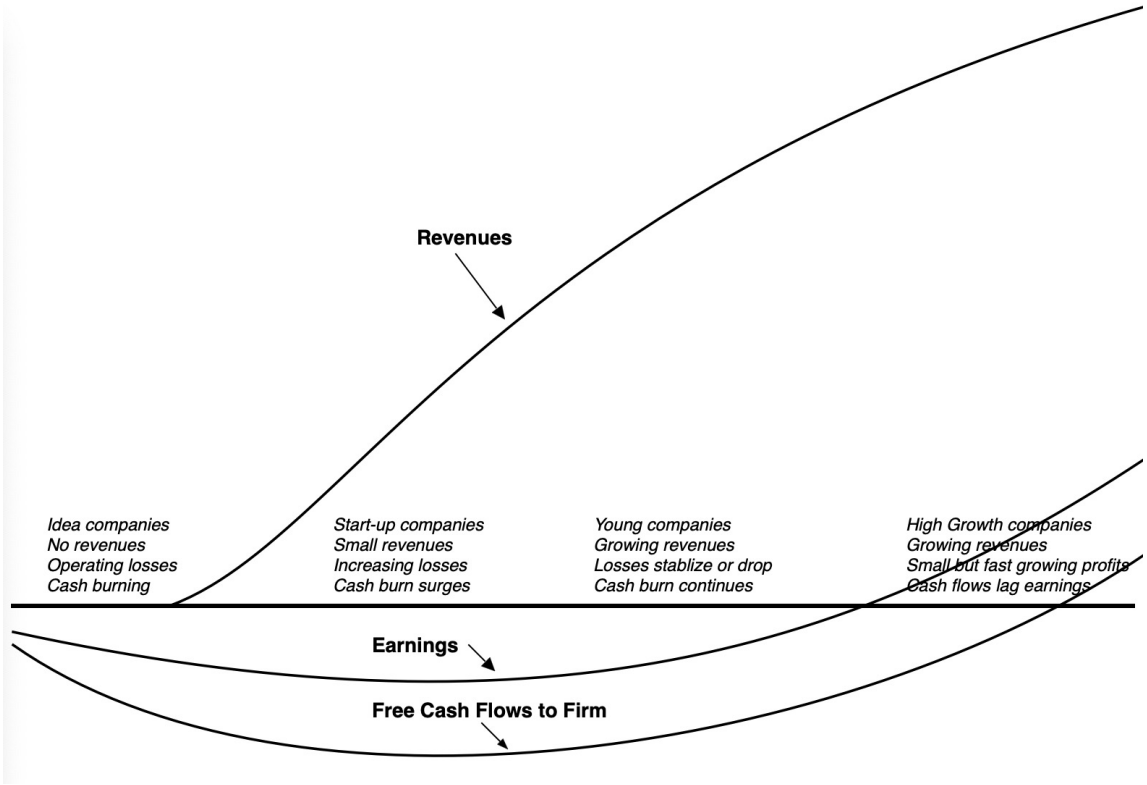
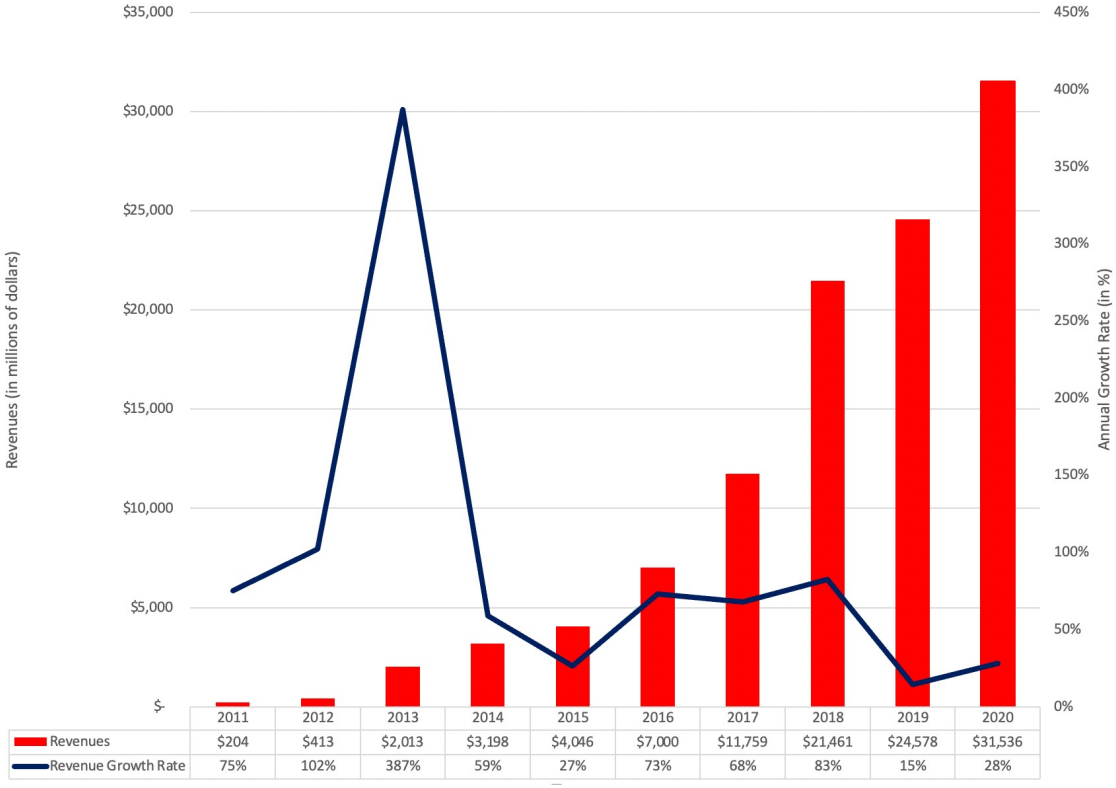


VALUING HIGH GROWTH FIRMS

THE HIGH GROWTH PHASE



VALUING HIGH GROWTH FIRMS: THE SCALING EFFECT



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenues	$204	$413	$2,013	$3,198	$4,046	$7,000	$11,759	$21,461	$24,578	$31,536
Revenue Growth Rate	75%	102%	387%	59%	27%	73%	68%	83%	15%	28%

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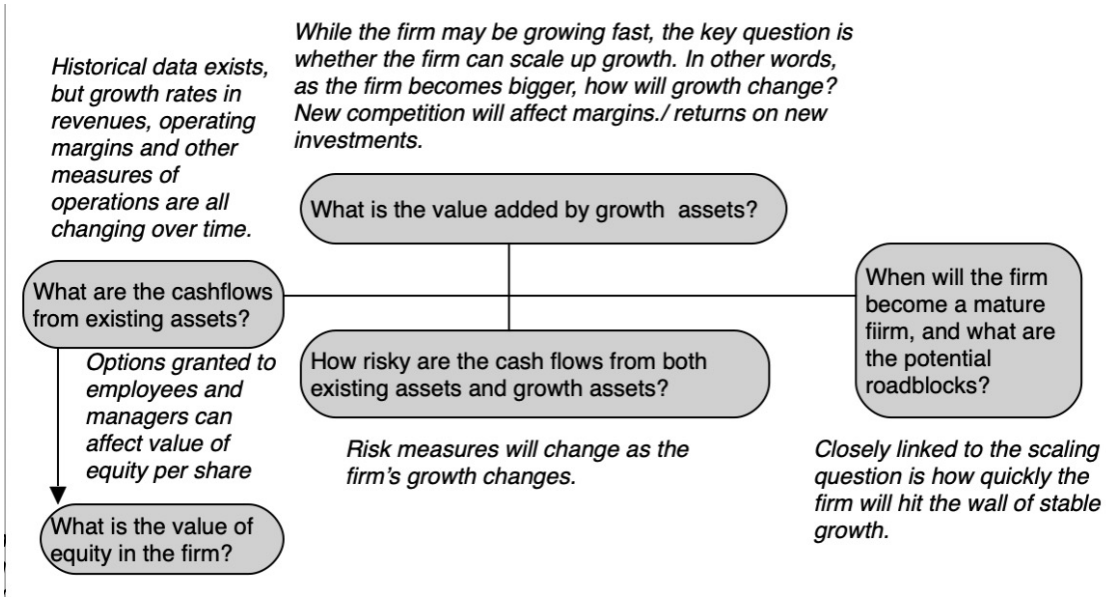


WITH ADDED CHALLENGES

THE INTRINSIC VALUE RESPONSE: 1. TELL A STORY!

- With high growth companies, the key parts of the story will relate to the business model being built and how that model will play out in terms of scalability (growth), profitability (margins) and reinvestment (growth efficiency).
- With high growth companies, when spinning your business narrative, the **focus will still stay on potential, but more weight must be given to the financial history of the company and its corporate governance structure**.
- In some cases, this record can make you more enthusiastic about the company's prospects (revenue growth and profitability) and in others, it can lead you to scale back your story.

STEP 2: THE 3P TEST

- On revenues, the biggest questions arise, as you make assumptions that **revenues can be scaled up**. To make this assessment, you can **look at market size, and what you are giving your company as market share**, given your growth assumptions, and potential competition.
- On operating profit margins, the positive trend lines in profits can lead to over optimism about operating profit margins, but it **has to be tempered by unit economics**.
- On reinvestment, assessing whether a company is reinvesting enough to deliver its growth **can be difficult, since historical reinvestment is likely to be volatile** and obscured by investments and acquisitions that are paid for with the company's stock. There may be clues in the industry averages and in the business model.

STEP 3A: STORY PIECES TO VALUE INPUTS – REVENUE GROWTH

- Revenue growth rates will decrease as companies get larger, and every growth company will get larger over time if our forecasts of growth come to fruition.
- The following should be considered in estimating revenue growth:
  - **Absolute revenue changes**: One simple test is to compute the absolute change in revenues each period, rather than to trust the percentage growth rate.
  - **Trend lines**: Looking at past revenue growth rates, by year, for the firm in question should give us a sense of how growth rates have changed as the company size changed in the past.
  - **Sector data**: The final tool is to look at revenue growth rates of more mature firms in the business to get a sense of what a reasonable growth rate will be as the firm becomes larger.

STEP 3B: PROFITABILITY

- Let's start with the most likely case, which is that the **current margin is either negative or too low** relative to the sustainable long-term margin. This can happen for three reasons.
  - One is that the firm has **up-front fixed costs** that must be incurred in the initial phases of growth, with the payoff in terms of revenue and growth in later periods
  - The second reason is the **mingling of expenses incurred to generate growth with operating expenses**. As the firm matures, this problem will get smaller, leading to higher margins and profits.
  - The third reason is that **there might be a lag** between expenses being incurred and revenues being generated.
- The other possibility, where **the current margin is too high and will decrease over time**, is less likely, but it can occur, especially with growth companies that **have a niche product in a small market**. As the firm grows, this will change, and margins will decrease.

STEP 3C: REINVESTMENT

- Since high growth firms tend to have changing margins, we will adopt the same road map we used for young growth companies, where **we estimated reinvestment based on the change in revenues and the sales-to-capital ratio**:

  $\text{Reinvestment}_t = \text{Change in Revenues}_t / (\text{Sales/Capital})$

- The sales-to-capital ratio can be estimated using the **company's data** (which is more stable than the net capital expenditure or working capital numbers) and the **sector averages**.
- We **can build lags** between the reinvestment and revenue change into the computation by using revenues in a future period to estimate reinvestment in the current one.

STEP 3D: RISK PROFILE

- The key to maintaining balance in growth company valuations is to **adjust the discount rates over time** to keep them consistent with the growth and margin assumptions that we make in each period.
  - Growth firms should have high costs for equity and debt when revenue growth is highest, but the **costs of debt and equity should decline as revenue growth moderates and margins improve**.
  - As earnings improve and growth drops, another phenomenon comes into play. The firm generates more cash flows than it needs, which it can **use to both pay dividends and service debt financing**.
- In summary, **the cost of capital for a growth company should be a year-specific number** that keeps pace with the rest of the changes we forecast at the firm

STEP 3E: CLOSURE

- Do not wait too long to put a firm into stable growth.
  - Both **scale and competition conspire to lower growth rates** quickly at even the most promising growth companies.
  - **Growth periods that exceed ten years, especially when accompanied by high growth rates over these periods, are uncommon**, because only a few companies have been able to accomplish this over time.
- When you put your firm into stable growth, give it the characteristics of a stable growth firm.
  - With **discount rates**, as noted in the preceding section, this takes the form of using lower costs of debt and equity and a higher debt ratio.
  - With reinvestment, the key assumption is the return on capital that we assume for the stable growth phase.
  - While some analysts believe that the return on capital should be set equal to the cost of capital in stable growth, **we would preserve some company-specific flexibility**.

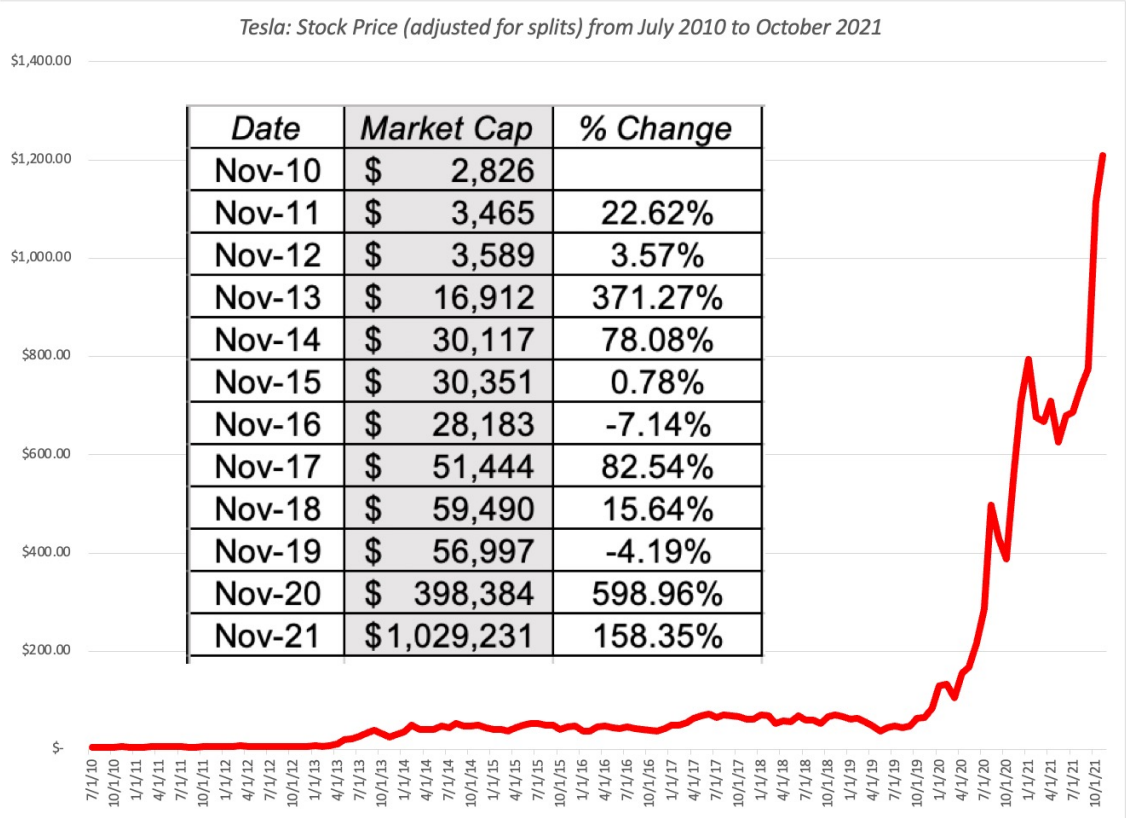
STEP 4: VALUE THE BUSINESS

- The nature of cash flows at growth companies[md]low or negative in the early years and higher later[md]will ensure that **the terminal value is a high proportion of value**, accounting for 80%, 90% or even more than 100% of value.
  - Some analysts use this fact as ammunition against using discounted cash flow valuations, suggesting that assumptions about the high-growth phase will be **drowned out by terminal value assumptions.**
  - The base year value for the terminal value calculation (earnings and cash flows in year 5 or 10) is a function of the assumptions during the high-growth phase. **Changing these assumptions will have dramatic effects (as it should) on value.**

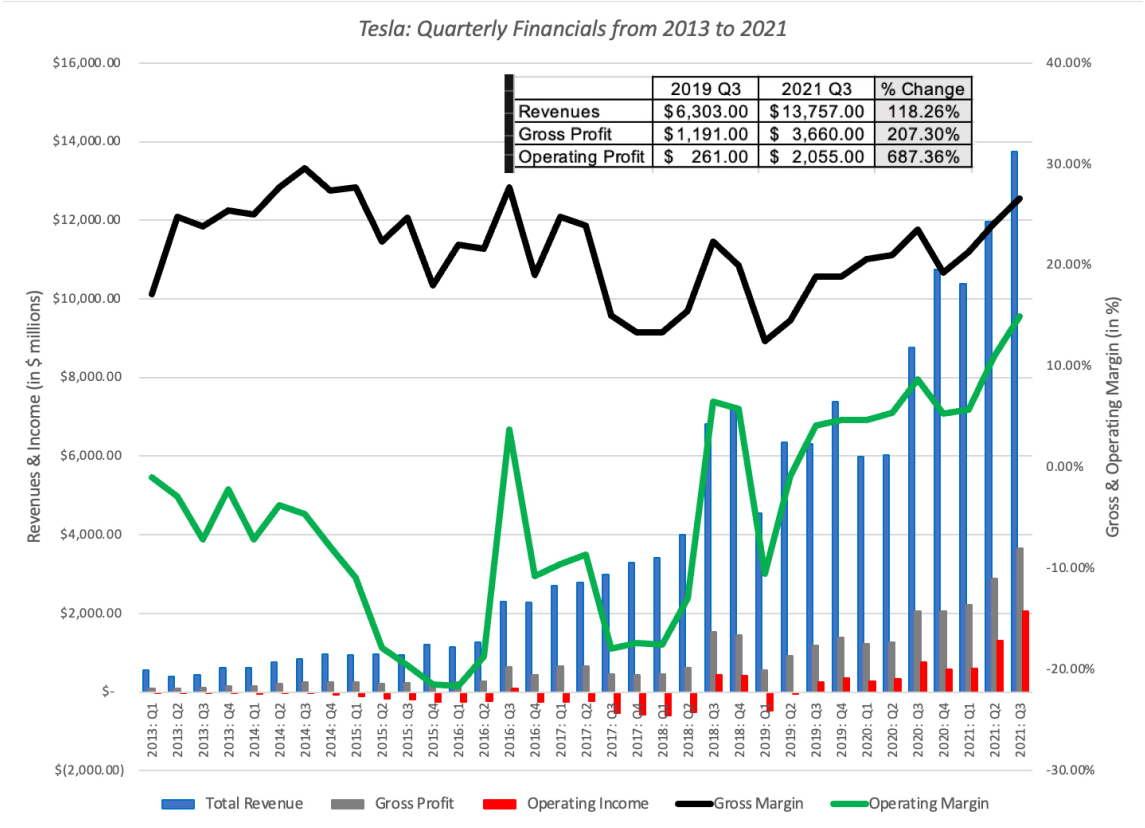
STEP 5: KEEP THE FEEDBACK LOOP OPEN

- When you estimate a value for a high growth company that is **very different from the market price**, in either direction, it should be natural that you pause and consider why:
  - **You are wrong**: The difference between price and value may be because your estimates of inputs, include revenue growth, margins and reinvestment are wrong, and that the market consensus is right.
  - **The market is wrong**: The value-price difference can arise because the market, caught up in mood and momentum, has pushed the stock price to a level that does not reflect its intrinsic value.
  - **You are both wrong**, but one of you is less wrong: The truth is that neither you nor the market has a crystal ball, and that you are making your best estimates for the future.
- The healthiest response, in our view, when value and price are different, is to **assume that you may be missing something** that the market is seeing but having examined the data and made the appropriate tweaks, you can end up with value still being different from the price.

VALUING TESLA IN NOVEMBER 2021 – THE MARKET LEAD IN..



Date	Market Cap	% Change
Nov-10	$ 2,826	
Nov-11	$ 3,465	22.62%
Nov-12	$ 3,589	3.57%
Nov-13	$ 16,912	371.27%
Nov-14	$ 30,117	78.08%
Nov-15	$ 30,351	0.78%
Nov-16	$ 28,183	-7.14%
Nov-17	$ 51,444	82.54%
Nov-18	$ 59,490	15.64%
Nov-19	$ 56,997	-4.19%
Nov-20	$ 398,384	598.96%
Nov-21	$1,029,231	158.35%



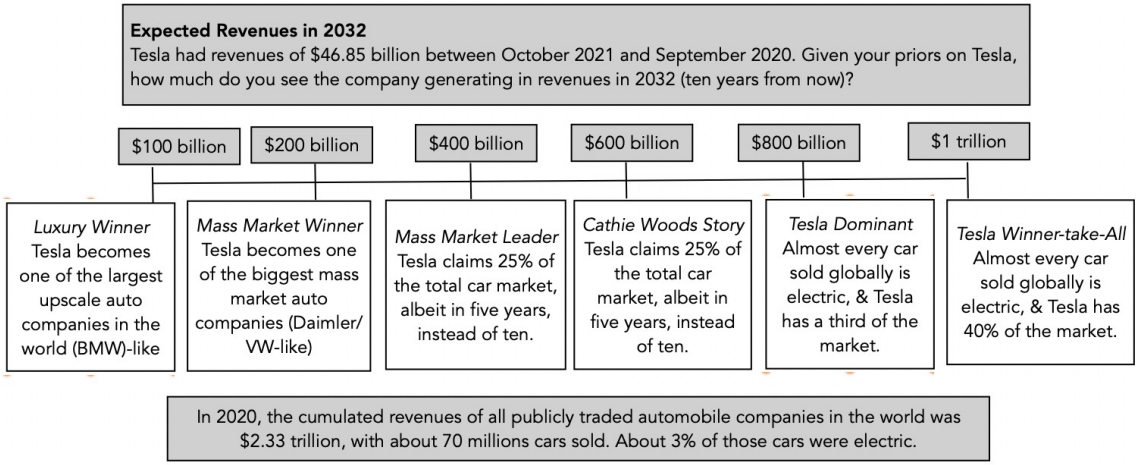
WITH THE FINANCIAL BACK UP..

MY TESLA STORIES OVER TIME!

Date	*Story*	*Target Revenues ($ millions)*	*Target Margin*	*Sales/ Capital*	*Cost of Capital*	*Value of Equity ($ millions)*	*Market Cap*	*% Over of Under Value*
Sep-13	Luxury auto company, with luxury car company revenues and margins.	$67,000	12.50%	1.41	10.03%	$12,146.0	$20,495.9	68.75%
Aug-17	Auto/tech company, with focus primarily on high-end auto market	$93,000	12.00%	2.24	8.83%	$33,904.0	$57,633.5	69.99%
Jun-19	High-end auto/tech company with some mass market appeal, with unpredictable management.	$105,000	10.00%	2.00	7.87%	$34,389.0	$31,755.6	-7.66%
Jan-20	Auto/tech company, with increasing mass market appeal.	$128,000	12.00%	3.00	7.00%	$84,236.0	$102,837.0	22.08%

Aswath Damodaran

MY UPDATED TESLA STORY - REVENUES



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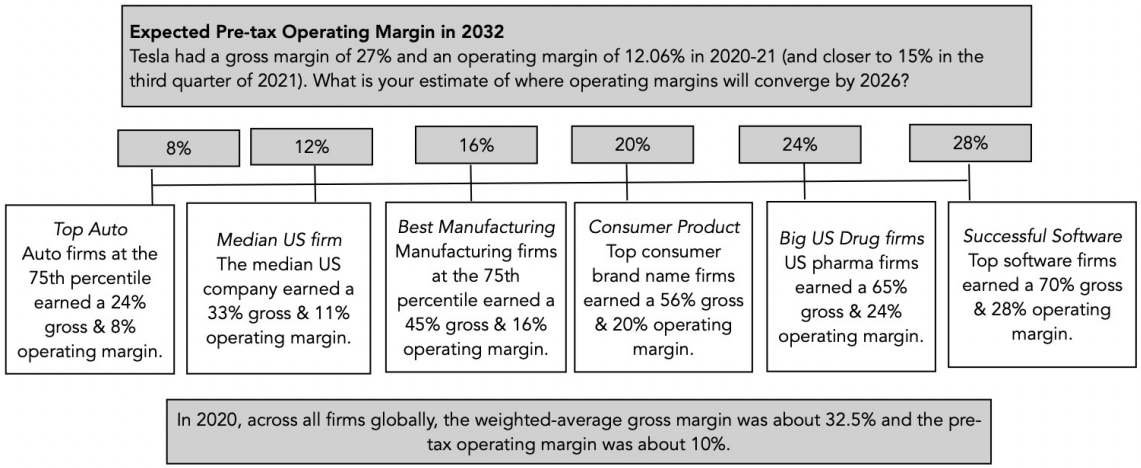
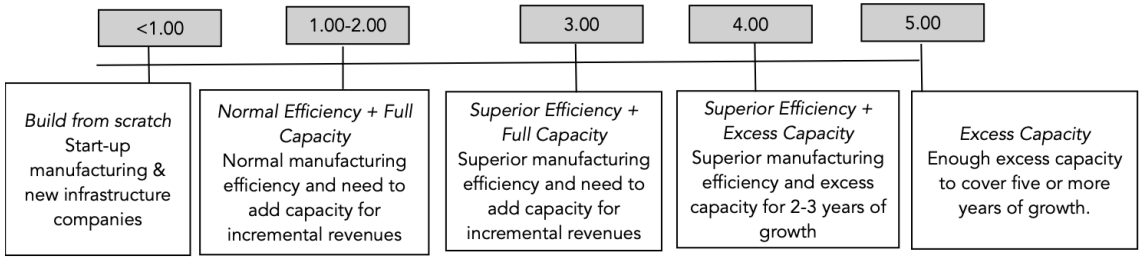
AND PROFITABILITY...



WITH REINVESTMENT...

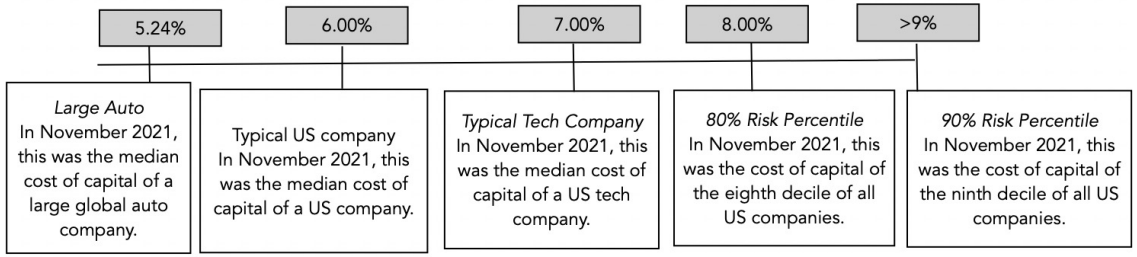
Expected Reinvestment Efficiency (next 5 years)
In 2020-21, Tesla generated revenue of $46.8 billion on invested capital of $27.8 billion (working out to $1.68 in revenues for every dollar in capital invested). Over the last five years, that ratio has risen, with approximately $3 in revenues generated for every dollar of capital invested. How many dollars of revenues will be generated for each dollar in capital invested by Tesla over the next five years (2022-2026)?



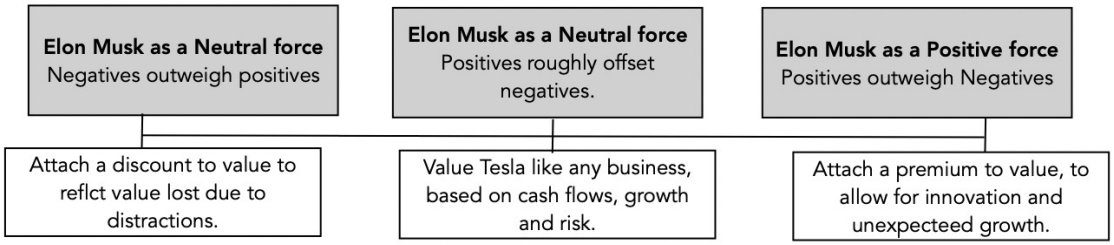
In 2020, the aggregate sales to capital ratio for the 25 largest auto companies was 3.25. Across all auto companies, the sales to capital ratio was 2.53.

RISK (AND PERSONALITY)

Cost of Capital (next 5 years)
In November 2021, Tesla was funded almost entirely with equity (99% equity, 1 debt) deriving 48% of its revenues from the US, 21% from China and 31% from the rest of the world. The cost of capital for the firm, based on treating it as a mix of automobiles/green energy businesses was 5.88%.



In November 2021, the median cost of capital (in US %) is 5.24% for an automobile company, 5.90% across all companies and 7.16% for a technology company.



TESLA VALUATION IN NOVEMBER 2021

Tesla

The Payoff to Flexibility						***Nov-21***
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 flexibile 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)	$ 46,848	35.00% →	1.56%		1.56%	Growth in EV market & Tesla's early mover advantage work in its favor.
Operating margin (b)	12.06%	12.06% →	16.00%		16.00%	Continued economies of scale & brand
Tax rate	11.99%	11.99% →	25.00%		25.00%	Global tax rate
Reinvestment (c)		Sales to capital ratio	4.00	RIR =	10.40%	Capacity build up allows for less reinvestment in the near years.
Return on capital	17.88%	Marginal ROIC =	51.66%		15.00%	Cost of entry will limit competition.
Cost of capital (d)		6.00% →	6.06%		6.06%	Moves to median company cost of capital

The Cash Flows						
	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$ 63,245	12.85%	$ 8,126	$ 7,152	$ 4,099	$ 3,053
2	$ 85,380	13.64%	$ 11,643	$ 10,247	$ 5,534	$ 4,713
3	$ 115,264	14.42%	$ 16,626	$ 14,633	$ 7,471	$ 7,162
4	$ 155,606	15.21%	$ 23,671	$ 20,833	$ 10,086	$ 10,748
5	$ 210,068	16.00%	$ 33,611	$ 29,581	$ 13,616	$ 15,966
6	$ 269,542	16.00%	$ 43,127	$ 36,834	$ 22,303	$ 14,531
7	$ 327,828	16.00%	$ 52,453	$ 43,434	$ 21,857	$ 21,577
8	$ 376,793	16.00%	$ 60,287	$ 48,353	$ 18,362	$ 29,991
9	$ 407,871	16.00%	$ 65,259	$ 50,643	$ 11,654	$ 38,988
10	$ 414,233	16.00%	$ 66,277	$ 49,708	$ 2,386	$ 47,322
Terminal year	$ 420,695	16.00%	$ 67,311	$ 50,483	$ 5,250	$ 45,233

The Value			
Terminal value	$ 1,005,182		
PV(Terminal value)	$ 560,336		
PV (CF over next 10 years)	$ 126,354		
Value of operating assets =	$ 686,690		
Adjustment for distress	$ -	Probability of failure =	0.00%
- Debt & Minority Interests	$ 10,158		
+ Cash & Other Non-operating assets	$ 16,095		
Value of equity	$ 692,627		
- Value of equity options	$ 51,070		
Number of shares	1,123.00		
Value per share	$ 571.29	Stock was trading at =	$1,200.00

Aswath Damodaran

PRICING CHALLENGES

- Forward Numbers: The first is to **scale market values to expected operating outcomes in the future.** Thus, rather than divide price per share today by current earnings per share, you can divide by expected earnings per share in five or even ten years and compare these forward multiples across the peer group.
- Growth-adjusted Multiples: High growth firms will look expensive, if you look at just PE ratios. One approach that can, at least on surface, deal with this problem is to bring in the growth into the pricing multiple:

  PEG ratio = PE ratio/ Expected growth rate

Company	*Market Cap*	*EV*	*Revenues*	*EBITDA*	*Net Income*	*EV/Sales*	*EV/EBITDA*	*PE*
Toyota Motor Corporation (TSE:7203)	$ 248,785	$ 398,274	$255,641	$41,072	$ 26,891	1.56	9.70	9.25
Volkswagen AG (XTRA:VOW3)	$ 142,343	$ 333,815	$243,016	$32,989	$ 21,289	1.37	10.12	6.69
Daimler AG (XTRA:DAI)	$ 107,839	$ 234,741	$162,149	$23,199	$ 16,044	1.45	10.12	6.72
Stellantis N.V. (BIT:STLA)	$ 63,353	$ 51,125	$134,751	$16,637	$ 9,910	0.38	3.07	6.39
Ford Motor Company (NYSE:F)	$ 68,256	$ 181,411	$124,192	$ 8,274	$ 2,867	1.46	21.93	23.81
SAIC Motor Corporation Limited (SHSE:600104)	$ 36,064	$ 25,641	$119,843	$ 6,590	$ 3,745	0.21	3.89	9.63
General Motors Company (NYSE:GM)	$ 79,025	$ 169,913	$117,330	$17,820	$ 11,124	1.45	9.53	7.10
Honda Motor Co., Ltd. (TSE:7267)	$ 52,485	$ 97,008	$109,247	$20,081	$ 8,658	0.89	4.83	6.06
Fiat Chrysler Automobiles N.V.	$ -	$ (3,766)	$105,868	$ 8,094	$ 36	-0.04	-0.47	0.00
Bayerische Motoren Werke Aktiengesellschaft (XTF	$ 65,783	$ 169,096	$ 93,942	$19,161	$ 13,079	1.80	8.83	5.03
Hyundai Motor Company (KOSE:A005380)	$ 37,235	$ 99,332	$ 91,666	$ 6,533	$ 3,382	1.08	15.21	11.01
Nissan Motor Co., Ltd. (TSE:7201)	$ 20,250	$ 69,304	$ 69,174	$ 2,840	$ (438)	1.00	24.40	NA
Kia Corporation (KOSE:A000270)	$ 28,695	$ 21,857	$ 60,285	$ 5,558	$ 3,072	0.36	3.93	9.34
Renault SA (ENXTPA:RNO)	$ 9,995	$ 58,919	$ 53,766	$ 4,509	$ (429)	1.10	13.07	NA
Tesla, Inc. (NasdaqGS:TSLA)	$1,118,751	$1,112,814	$ 46,848	$ 7,267	$ 3,468	23.75	153.13	322.59
Tata Motors Limited (BSE:500570)	$ 23,264	$ 34,004	$ 37,263	$ 3,220	$ (1,273)	0.91	10.56	NA
Volvo Car AB (publ.) (OM:VOLCAR B)	$ 21,332	$ 19,247	$ 34,158	$ 3,275	$ 1,849	0.56	5.88	11.54
Suzuki Motor Corporation (TSE:7269)	$ 22,322	$ 17,894	$ 32,424	$ 3,498	$ 2,067	0.55	5.12	10.80
Mazda Motor Corporation (TSE:7261)	$ 5,762	$ 6,030	$ 29,815	$ 1,526	$ 418	0.20	3.95	13.77
BYD Company Limited (SEHK:1211)	$ 96,146	$ 97,302	$ 29,810	$ 2,815	$ 507	3.26	34.57	189.83
Median						1.04	9.62	9.34
Average						2.17	17.57	38.21

Aswath Damodaran

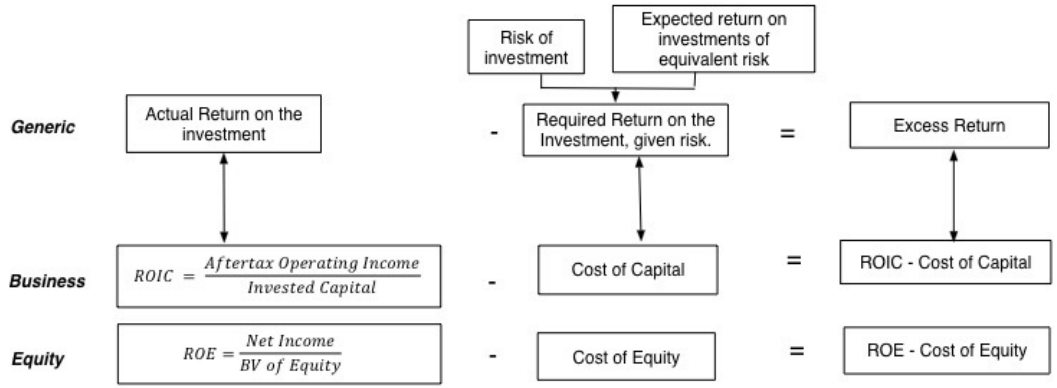
PRICING TESLA IN NOVEMBER 2021 – AUTO PRICING

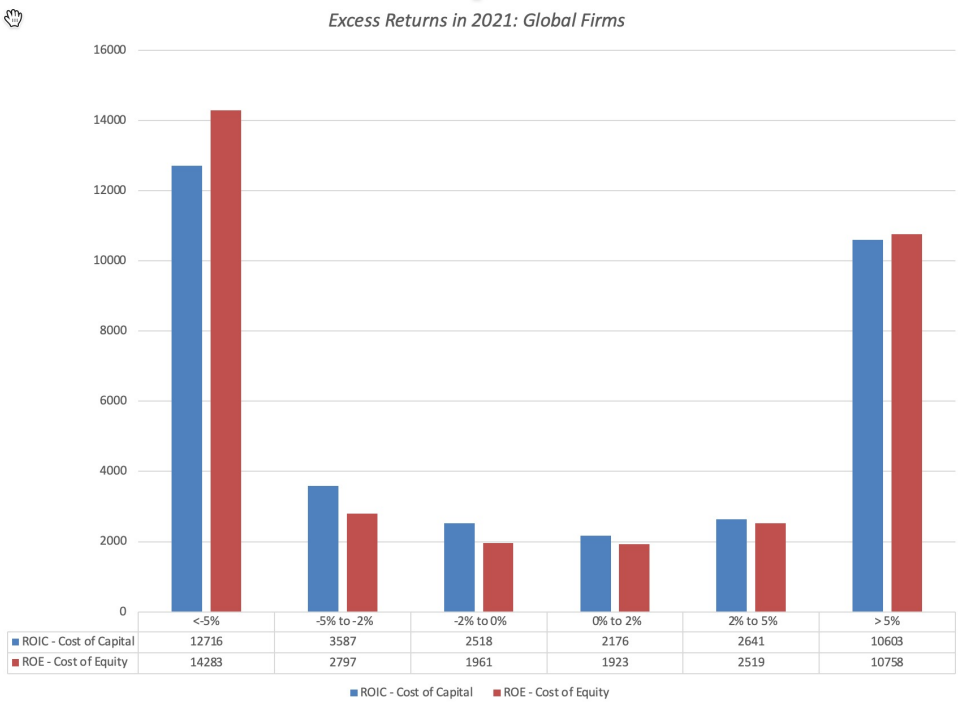
AUTO PEG RATIOS

Company	*Market Cap*	*Net Income*	*PE*	*Expected Net Income Growth: Next 5 years*	*PEG Ratio*	*Expected Net Income in 5 years*	*Forward PE*
Stellantis N.V. (BIT:STLA)	$ 63,353	$ 9,910	6.39	35.30%	0.18	$ 44,932.26	1.41
Bayerische Motoren Werke Aktiengesells	$ 65,783	$ 13,079	5.03	25.40%	0.20	$ 40,557.28	1.62
Daimler AG (XTRA:DAI)	$ 107,839	$ 16,044	6.72	33.70%	0.20	$ 68,545.32	1.57
Ford Motor Company (NYSE:F)	$ 68,256	$ 2,867	23.81	66.90%	0.36	$ 37,128.67	1.84
Honda Motor Co., Ltd. (TSE:7267)	$ 52,485	$ 8,658	6.06	15.20%	0.40	$ 17,565.88	2.99
Volkswagen AG (XTRA:VOW3)	$ 142,343	$ 21,289	6.69	15.20%	0.44	$ 43,193.02	3.30
General Motors Company (NYSE:GM)	$ 79,025	$ 11,124	7.10	13.20%	0.54	$ 20,677.27	3.82
Suzuki Motor Corporation (TSE:7269)	$ 22,322	$ 2,067	10.80	19.70%	0.55	$ 5,079.88	4.39
SAIC Motor Corporation Limited (SHSE	$ 36,064	$ 3,745	9.63	10.50%	0.92	$ 6,169.36	5.85
Toyota Motor Corporation (TSE:7203)	$ 248,785	$ 26,891	9.25	3.50%	2.64	$ 31,937.95	7.79
Tesla, Inc. (NasdaqGS:TSLA)	$ 1,118,751	$ 3,468	322.59	42.80%	7.54	$ 20,593.02	54.33
BYD Company Limited (SEHK:1211)	$ 96,146	$ 507	189.83	8.98%	21.14	$ 778.60	123.49
Median			8.18	0.17	0.49		3.56
Average			50.33	0.24	2.92		17.70

ADD-ONS AND ADDENDUMS: 1. VALUE OF GROWTH

- While **many investors view growth as an unalloyed good, it requires a tradeoff**, where a company invests more back into itself in the near term, denying payouts (dividends or buybacks) to its investors, during that period, for higher earnings in the future.
- The **net effect of growth will depend on how much is reinvested back**, relative to what the company can harvest as future growth.





Sub Group	Number of	Return on Capital - Cost of Capital					Positive/Negative %	
		<-5%	-5% to -2%	-2% to +2%	2% to 5%	>5%	Positive	Negative
Africa and Middle East	1,913	37.95%	14.69%	14.22%	7.16%	25.98%	39.52%	60.48%
Australia & NZ	1,510	60.66%	5.23%	7.48%	4.37%	22.25%	30.66%	69.34%
Canada	2,071	72.33%	4.01%	6.13%	2.95%	14.58%	21.05%	78.95%
China	6,377	27.16%	14.08%	13.88%	8.95%	35.93%	51.73%	48.27%
Eastern Europe & Russia	415	30.60%	12.77%	16.14%	9.88%	30.60%	47.95%	52.05%
EU & Environs	4,698	34.36%	11.56%	12.71%	6.85%	34.53%	47.40%	52.60%
India	3,526	33.35%	17.81%	12.62%	7.71%	28.50%	41.97%	58.03%
Japan	3,665	17.49%	16.13%	22.05%	10.89%	33.45%	53.70%	46.30%
Latin America & Caribbean	847	31.17%	11.57%	13.70%	8.50%	35.06%	49.23%	50.77%
Small Asia	8,346	35.85%	15.96%	15.37%	8.24%	24.57%	39.91%	60.09%
UK	1,037	37.51%	9.35%	10.22%	5.01%	37.90%	48.60%	51.40%
United States	4,593	39.95%	16.20%	6.88%	5.60%	31.37%	40.15%	59.85%
Global	38,998	35.67%	13.92%	13.17%	7.53%	29.71%	43.40%	56.60%

EXCESS RETURNS ACROSS GLOBAL FIRMS...

Bad Businesses				
	# Firms	*Median: ROIC - WACC*	% of firms with excess returns	
			Positive	Negative
Drugs (Biotechnology)	1,223	-86.31%	42.27%	57.73%
Precious Metals	947	-24.25%	39.92%	60.08%
Metals & Mining	1,706	-21.95%	40.39%	59.61%
Air Transport	151	-12.28%	23.84%	76.16%
Hotel/Gaming	654	-10.83%	26.30%	73.70%
Oil/Gas (Production and Exploration)	642	-10.74%	46.42%	53.58%
Coal & Related Energy	206	-8.83%	46.60%	53.40%
Restaurant/Dining	385	-8.06%	37.14%	62.86%
Entertainment	734	-7.28%	46.46%	53.54%
Oilfield Svcs/Equip.	457	-5.42%	39.39%	60.61%

Good Businesses				
	# Firms	*Median: ROC-WACC*	*Positive*	*Negative*
Tobacco	55	13.31%	80.00%	20.00%
Retail (Building Supply)	98	7.12%	78.57%	21.43%
Information Services	266	6.98%	72.56%	27.44%
Computer Services	1,040	5.35%	69.71%	30.29%
Healthcare Support Services	445	4.34%	68.76%	31.24%
Furn/Home Furnishings	359	3.85%	64.35%	35.65%
Hospitals/Healthcare Facilities	223	3.40%	66.82%	33.18%
Chemical (Specialty)	898	3.28%	66.70%	33.30%
Building Materials	449	3.17%	63.25%	36.75%
Chemical (Diversified)	71	3.14%	71.83%	28.17%

WITH BEST AND WORST INDUSTRIES…

2. BREAKEVEN ANALYSIS

- You can hold all else constant, and change one variable (growth, revenues, risk) and **find the breakeven value for that variable** that will yield the current market price. The problem with this approach is that it requires to isolate one out of many key inputs to come to your conclusion.
- A more expansive approach to backing out market expectations is to **pick two or even three of the most critical inputs into valuation** and look for combinations of assumptions on these variables that yield the market price.
- A third variant is to go back to the story that you built your valuation around, and see how, **as you change the story, the valuation changes**.

TESLA BREAK-EVEN IN NOVEMBER 2021

		Estimated Value of Tesla's Common Equity of today					
		Revenues in 2032 (in billions of US $)					
		200 (Daimler-like)	*$300 (Toyota-like)*	*$400 (16% Auto Mkt Share)*	*$ 600 (25% Auto Mkt Share)*	*800 (30% Auto Mkt Share)*	*1000 (40% Auto Mkt Share)*
Target Operating Margin	12%	$ 257	$ 370	$ 469	$ 666	$ 857	$ 1,049
	16%	$ 346	$ 503	$ 642	$ 918	$ 1,185	$ 1,455
	20%	$ 435	$ 636	$ 814	$ 1,169	$ 1,514	$ 1,861
	24%	$ 524	$ 769	$ 986	$ 1,421	$ 1,842	$ 2,267
	28%	$ 613	$ 902	$ 1,160	$ 1,673	$ 2,170	$ 2,673
Shaded cells: Values greater than the current market cap on November 4, 2021							

Aswath Damodaran