NARRATIVE AND NUMBERS: LIGHT IN THE DARKNESS!

When in trouble, go back to basics!

Start with a reality check: Value ≠ Price

Drivers of intrinsic value
- Cashflows from existing assets
- Growth in cash flows
- Quality of Growth

Drivers of price
- Market moods & momentum
- Surface stories about fundamentals

Accounting Estimates

Valuation Estimates

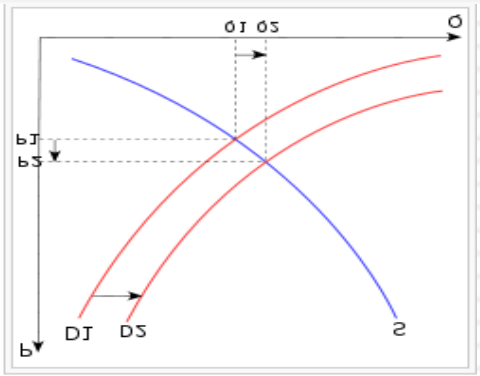
INTRINSIC VALUE

Value

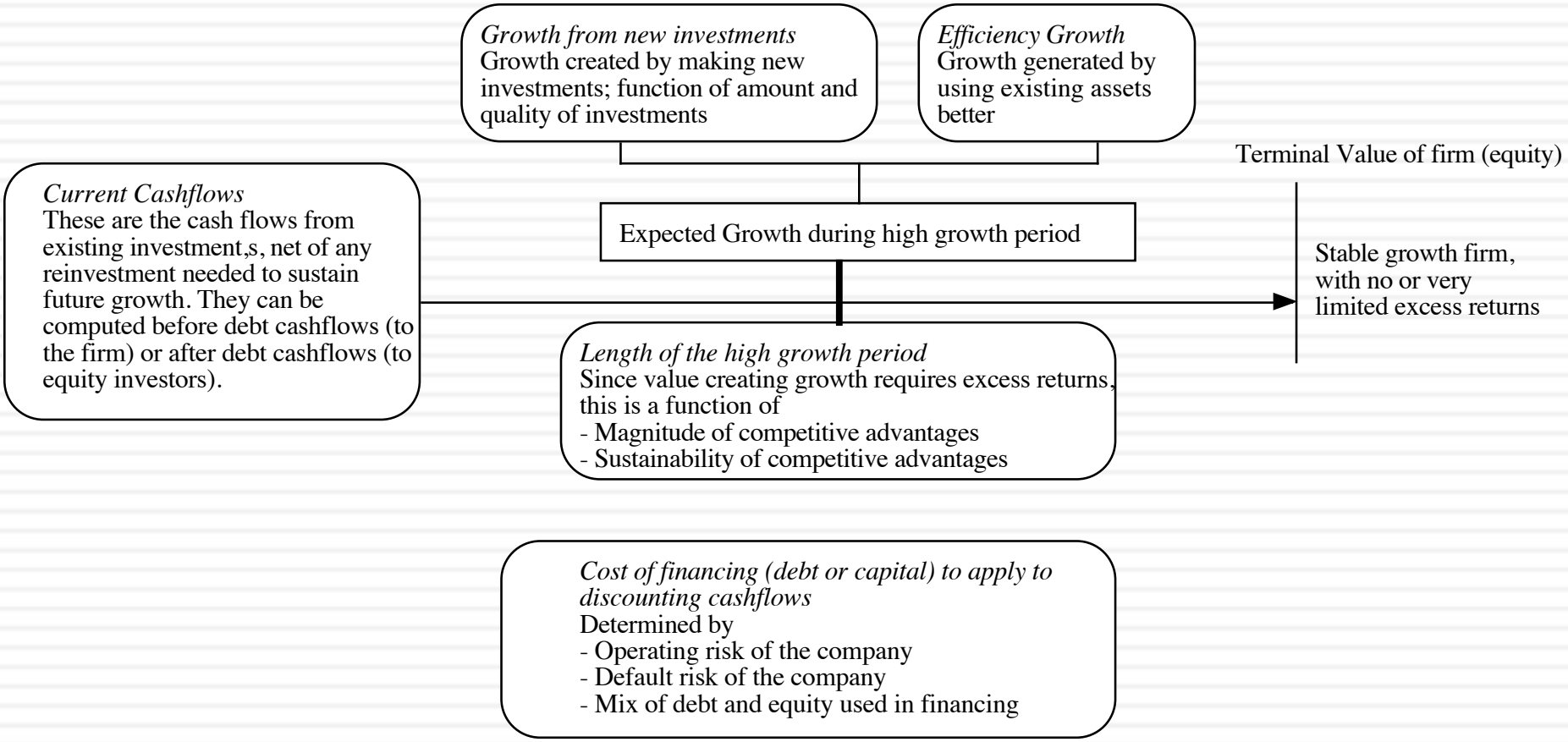
THE GAP
Is there one?
If so, will it close?
If it will close, what will cause it to close?

Price

PRICE



The Drivers of Value…



The two faces of discounted cash flow valuation

- The value of a risky asset can be estimated by discounting the expected cash flows on the asset over its life at a risk-adjusted discount rate:

$$\text{Value of asset} = \frac{E(CF_1)}{(1+r)} + \frac{E(CF_2)}{(1+r)^2} + \frac{E(CF_3)}{(1+r)^3} \ldots\ldots + \frac{E(CF_n)}{(1+r)^n}$$

where the asset has an n-year life, $E(CF_t)$ is the expected cash flow in period t and r is a discount rate that reflects the risk of the cash flows.

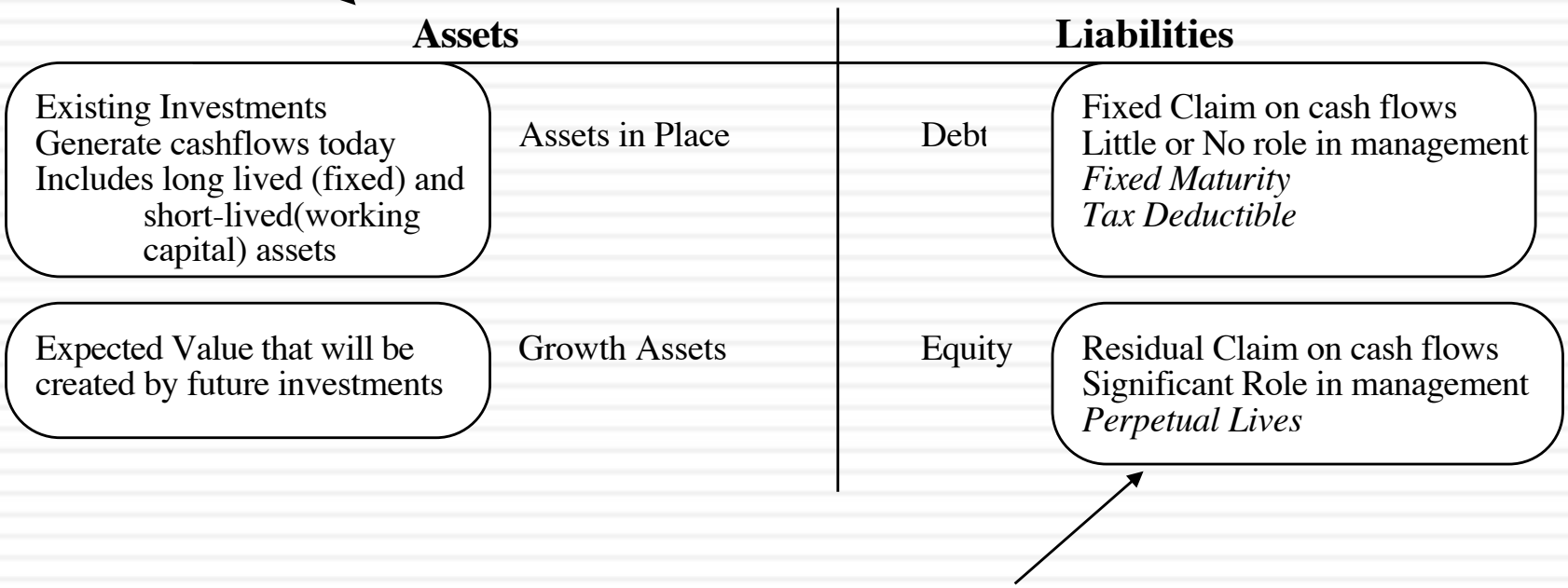
- Alternatively, we can replace the expected cash flows with the guaranteed cash flows we would have accepted as an alternative (certainty equivalents) and discount these at the riskfree rate:

$$\text{Value of asset} = \frac{CE(CF_1)}{(1+r_f)} + \frac{CE(CF_2)}{(1+r_f)^2} + \frac{CE(CF_3)}{(1+r_f)^3} \ldots\ldots + \frac{CE(CF_n)}{(1+r_f)^n}$$

where CE(CFt) is the certainty equivalent of $E(CF_t)$ and r_f is the riskfree rate.

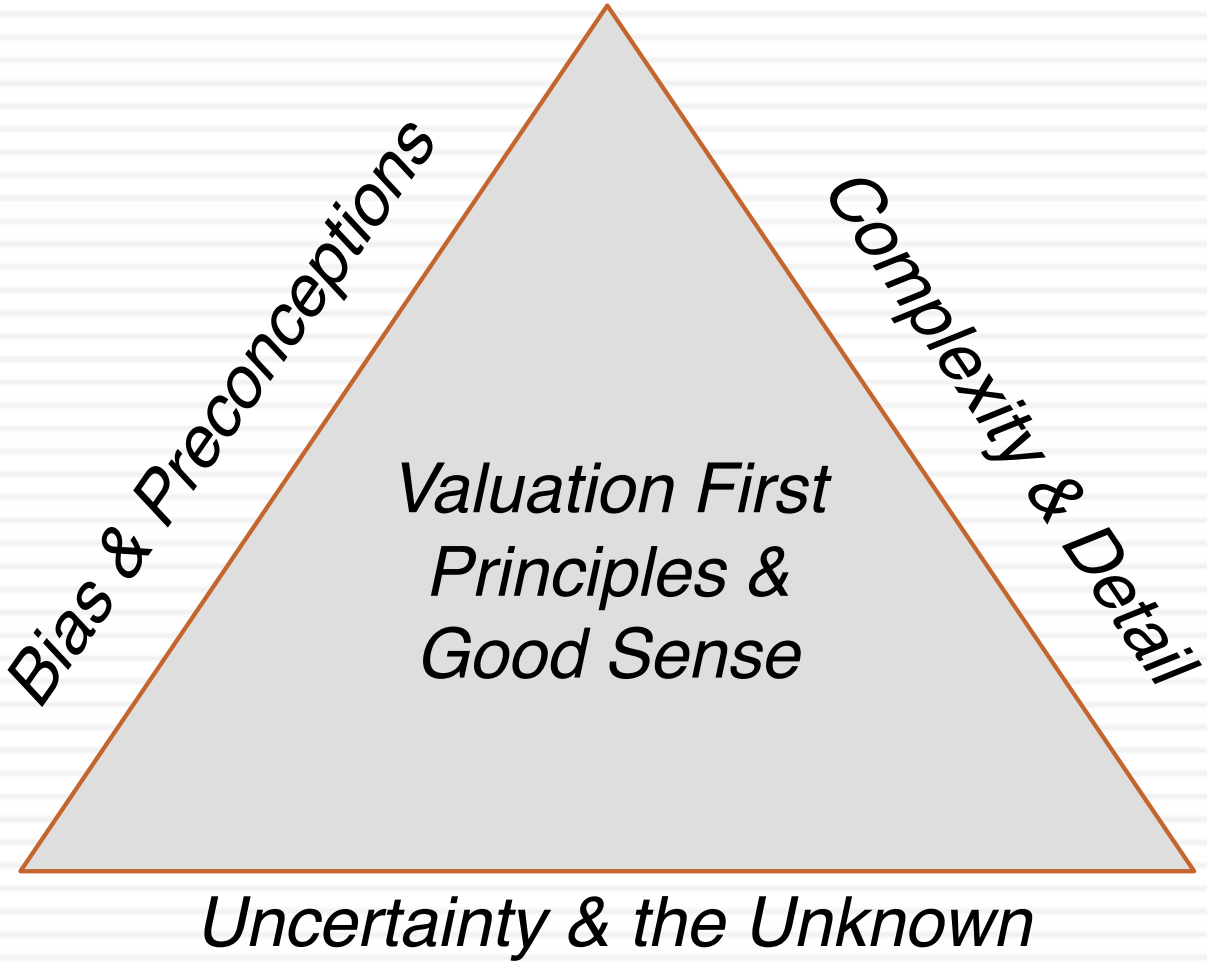
DCF Choices: Equity Valuation versus Firm Valuation

Firm Valuation: Value the entire business

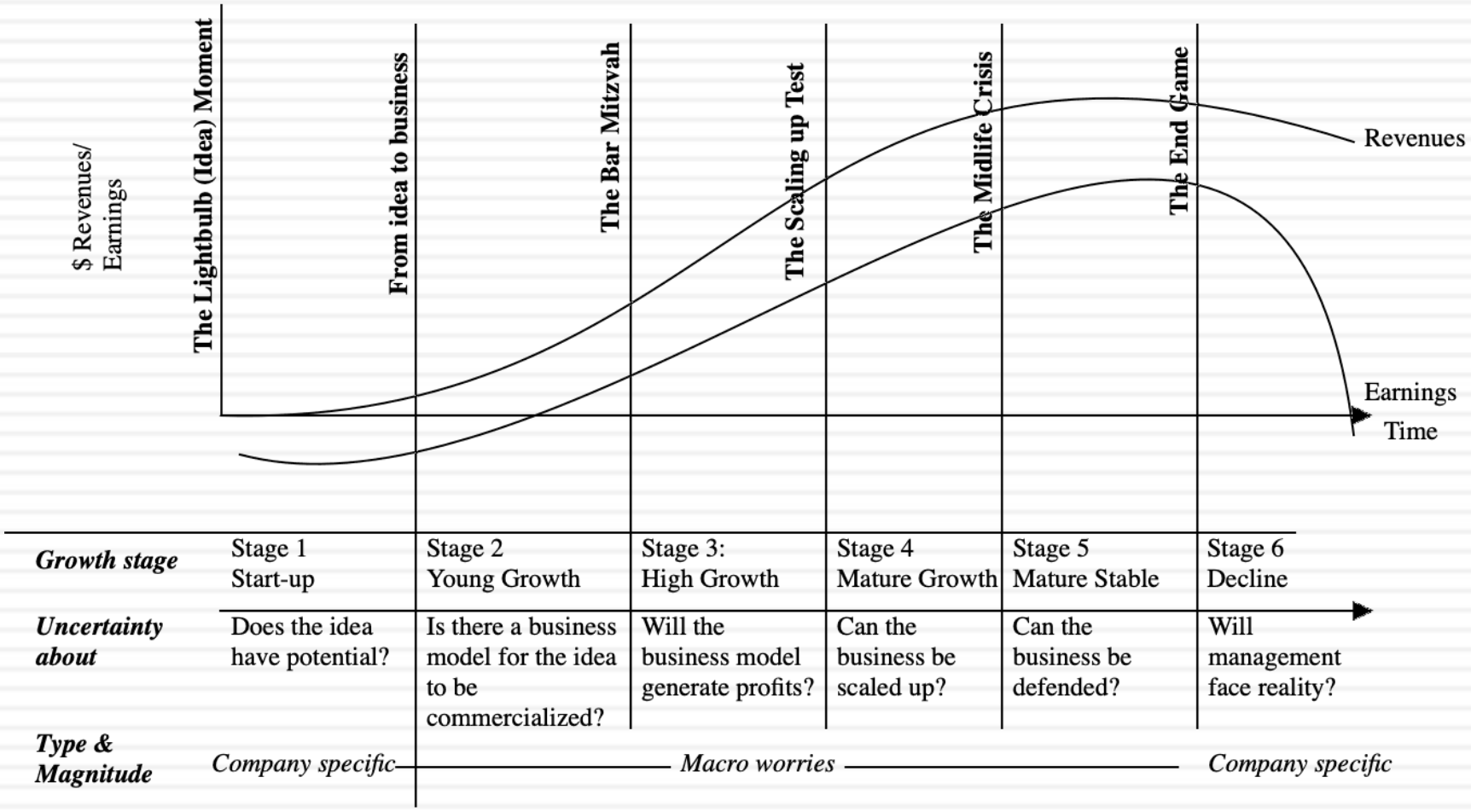


Equity valuation: Value just the equity claim in the business

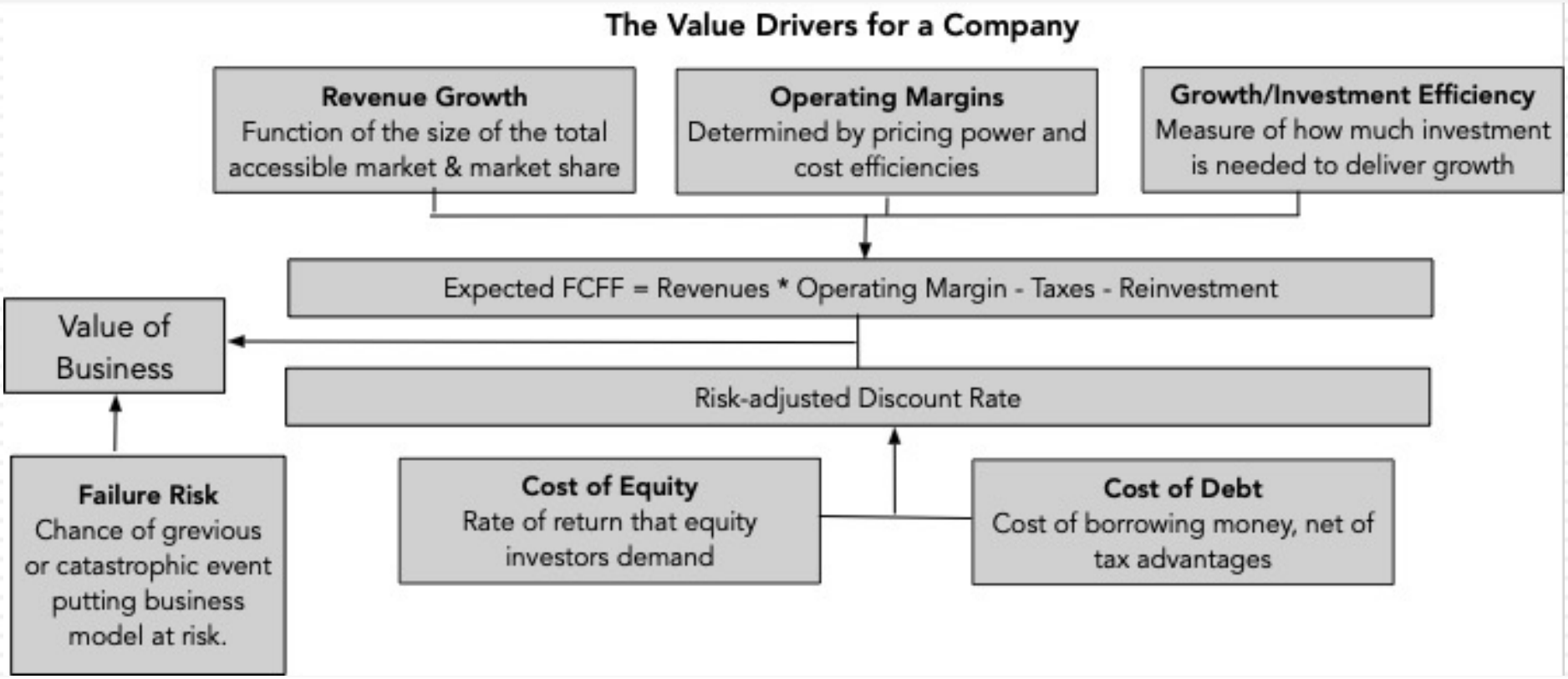
The Bermuda Triangle of Valuation



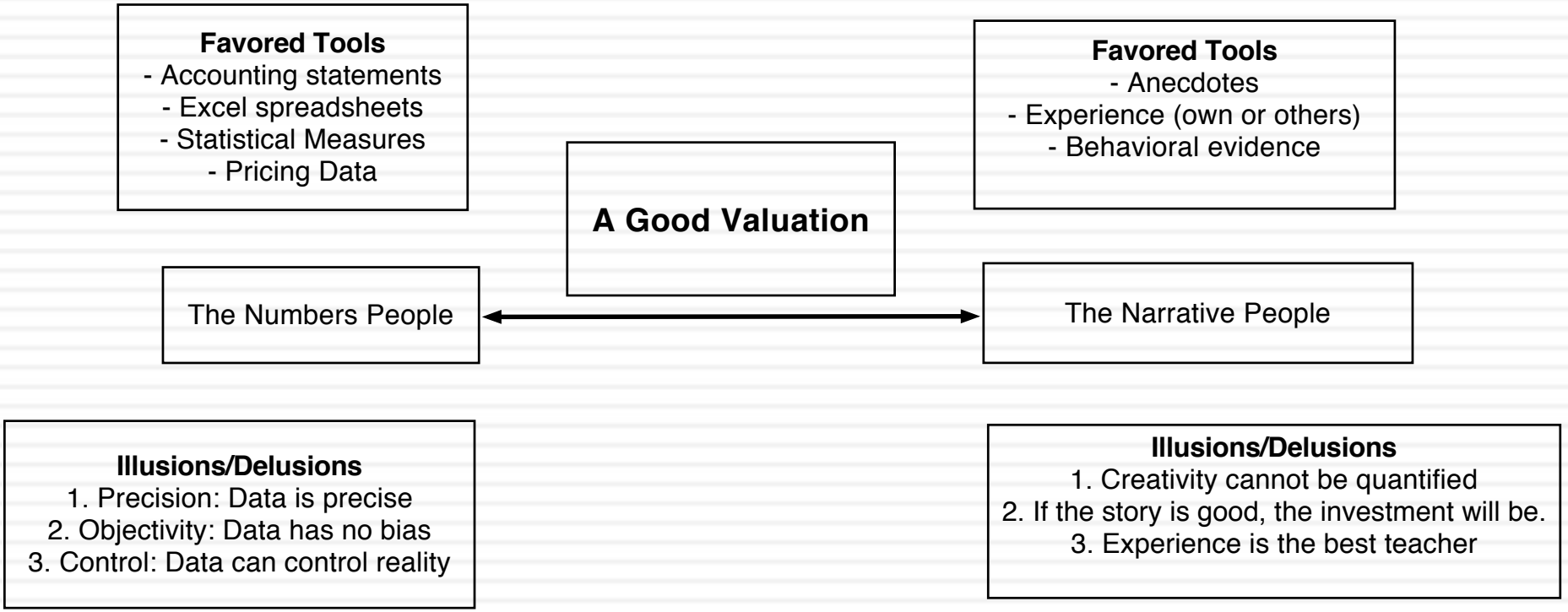
A Life Cycle View of Uncertainty



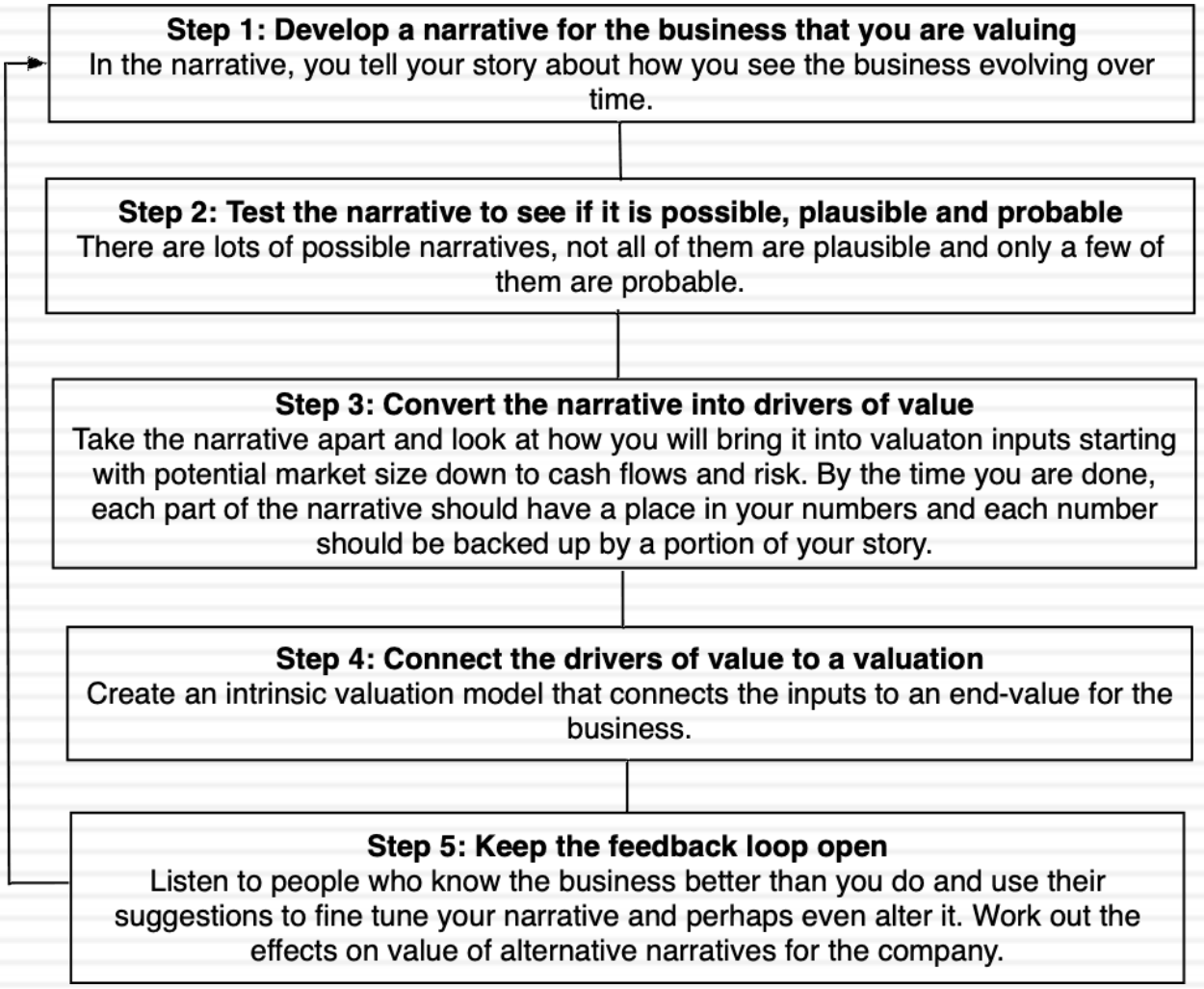
Value: The Drivers



Healthy Valuation = Story + Numbers



The steps in valuation

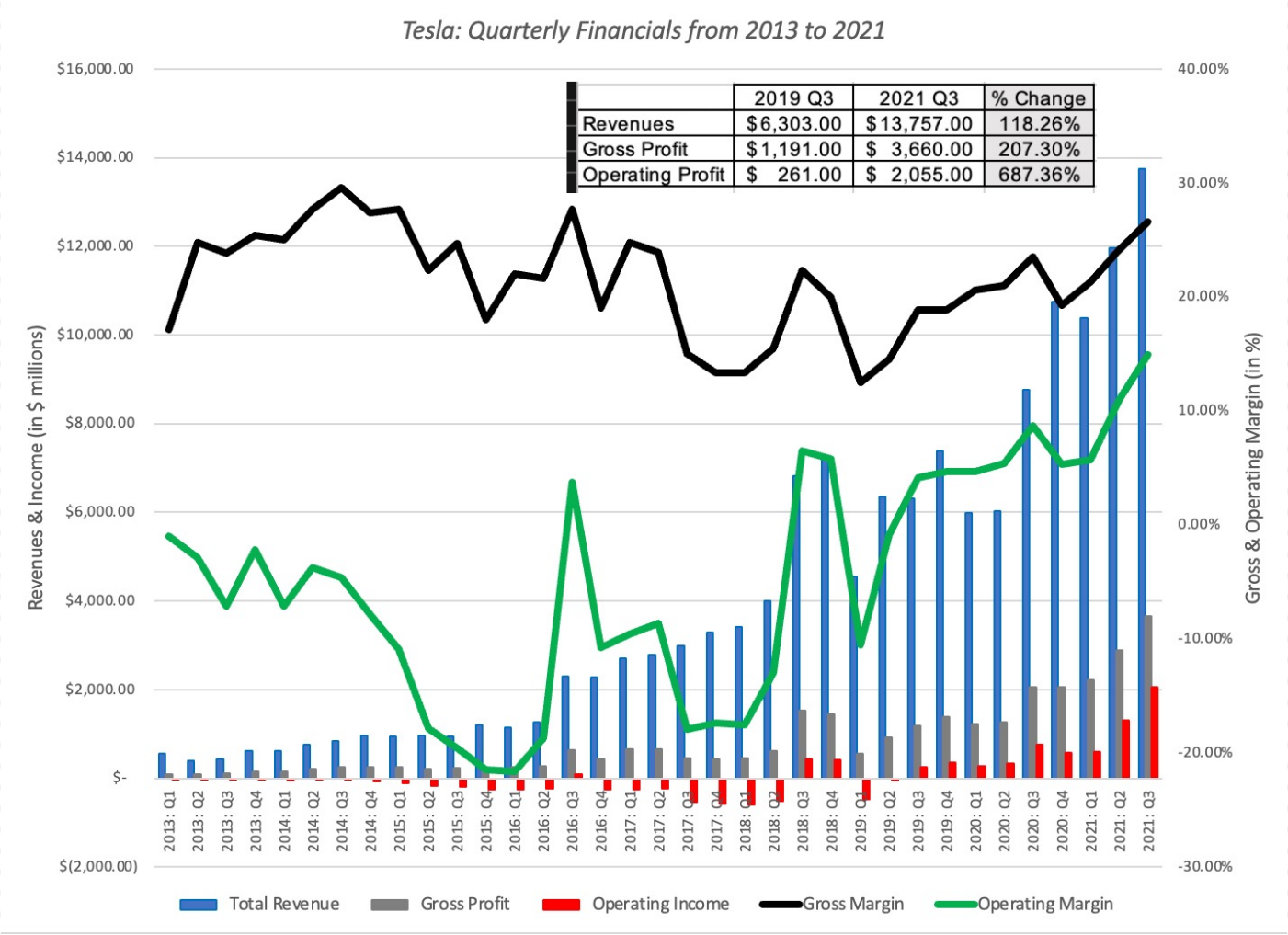


Tesla in November 2021: The Base Numbers

Country of incorporation	United States		
Industry (US)	Auto & Truck		
Industry (Global)	Auto & Truck	*Last 10K*	*Years since last 10K*
Revenues	$ 46,848.00	$ 31,536.00	0.75
Operating income or EBIT	$ 4,586.00	$ 1,951.00	0.75
Interest expense	$ 529.00	$ 784.00	
Book value of equity	$ 28,494.00	$ 23,679.00	
Book value of debt	$ 10,158.00	$ 13,337.00	
Do you have R&D expenses to capitalize?	Yes	*If you want to capitalize R&D, you have to*	
Do you have operating lease commitments?	No	*If you have operating leases, please enter*	
Cash and Marketable Securities	$ 16,095.00	$ 19,384.00	
Cross holdings and other non-operating assets	$ -	$ -	
Minority interests	$ -	$ -	
Number of shares outstanding =	1123.00		
Current stock price =	$ 1,200.00		
Effective tax rate =	11.99%		
Marginal tax rate =	25.00%		

1. Update
2. Clean up for accounting inconsistencies
3. Get a clean and comprehensive share count

Learn from history, but don't be a slave to it..



Get perspective…

Computed numbers: Here is what your company's numbers look like, relative to industry.			
If you are not working in US dollars, you should add the inflation differential to the industry averages.			
	Company	Industry (US data)	Industry (Global data)
Revenue growth in the most recent year =	69.50%	14.31%	4.97%
Pre-tax operating margin in the most recent year =	12.06%	3.41%	4.79%
Sales to capital ratio in most recent year =	1.68	0.87	1.06
Return on invested capital in most recent year=	17.88%	2.89%	4.60%
Standard deviation in stock prices =		35.02%	33.62%
Cost of capital =		4.40%	6.48%

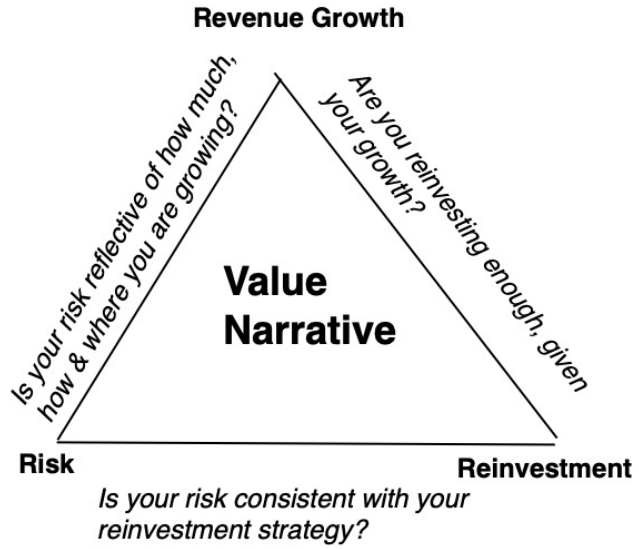
Get perspective about the growth and profitability of the business you are in…

More perspective…

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%

The Value Drivers

The value drivers below:		
Compounded annual revenue growth rate over next 5 years =	35.00%	*Growth Lever*
Target pre-tax operating margin (EBIT as % of sales in year 10)	16.00%	*Profitability Lever*
Year of convergence	5.00	*Speed of convergenc*
	Years 1-5	Years 6-10
Sales to capital ratio (for computing reinvestment) =	4.00	2.67
Market numbers		
Riskfree rate	1.56%	
Initial cost of capital =	6.00%	



1. Revenue Growth

- Past growth: For companies that are relatively mature in businesses that are not being disrupted, you can use historical growth in revenues.
- Top down growth: For young companies, past growth is both limited (in terms of history) and dangerous to use (because of scaling). For these companies, your story about the company, the market it is going after and the share of that market that it will obtain will drive your revenue path.

Tesla's Revenue Growth

Expected Revenues in 2030 (in $ millions)	*CAGR (next 5 years)*
A1: $100 billion (BMW-like)	12.00%
A2: $150 billion (Ford & Honda-like)	18.00%
A3: $200 billion (Daimler-like)	22.50%
A4: $300 billion (Toyota & VW -like)	30.00%
A5: $500 billion (20% auto market share)	40.00%
A6: Direct Input (Enter % growth rate)	35.00%

Propositions about revenue growth

1. Percentage growth rates are deceptive. Always look at absolute revenue projections as well.
2. Scaling up is hard to do. Most companies fail.
3. Using macro stories to justify high growth rates and revenues for companies can and often will lead to a big market delusion.

2. Target Operating Profit Margins

- Other things remaining equal, a company that can deliver higher operating margins in steady state will be worth more than companies that cannot.
- That said, wishing that you will have a higher operating margin will not make it so, since it will depend on:
  - The unit economics of the business you are in: If the cost of the additional unit of sale is small or zero, you have a better shot at higher margins (software vs manufacturing)
  - The greater the competition in a business, the lower margins will be in that business.
  - If there are changes occurring in cost structure that cut across companies, it is unlikely that any individual company will benefit from these changes.

Tesla's Target Margin

Operating Margin in 2025	*Target Operating Margin*
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	16.00%

Propositions about profitability

1. Growth and margins are tied together. Strategies that try for more of one will deliver less of the other.
2. Scaling up is not always the antidote for losing money. Your costs have to grow slower than revenues, and that is not guaranteed.

3. Investment Efficiency

- To generate the revenue growth and margin targets that you are forecasting, you will need to invest money.
- That investment can take many different forms ranging from:
  - Assembly plants and factories for manufacturing companies
  - New stores or sales outlets for retail companies
  - R&D for a technology/pharmaceutical company
  - Customer acquisition costs for a platform company
- The problem you face, when you use accounting numbers to get these inputs, is that accountants are inconsistent and backward looking.

Tesla's Investment Efficiency (Sales to Capital)

Sales to Invested Capital	*Sales to Capital (1st 5 years)*
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	4.00

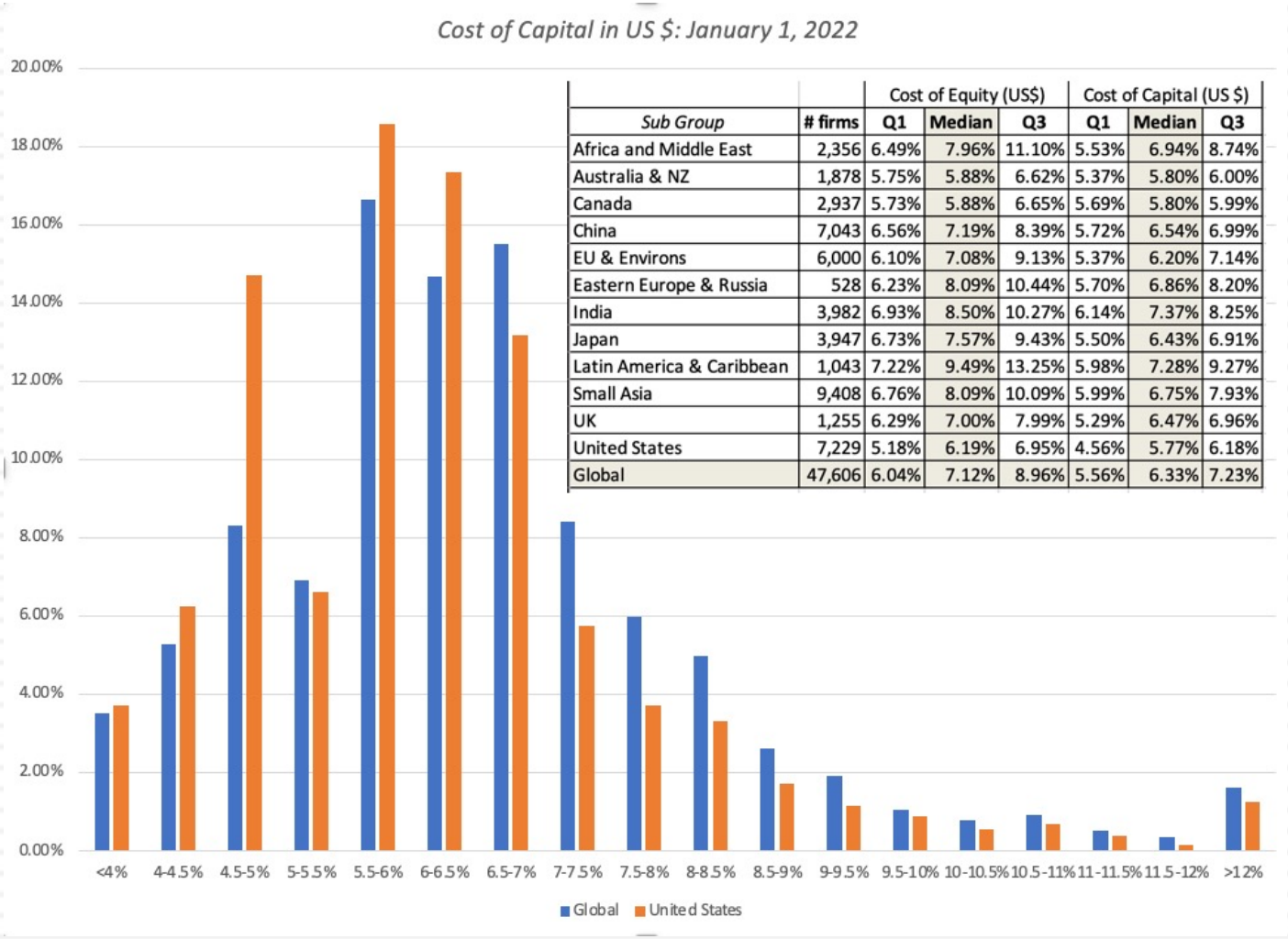
Propositions about reinvestment

1. Reinvestment in valuation is a much broader concept than accounting net cap ex or working capital.
2. Tying revenue growth to reinvestment reinforces the trade off on growth, and helps determine whether growth will add or destroy value.

4. Cost of Capital

- The cost of capital is your instrument for reflecting the operating risks that you see in your company, as a going concern.
- It is not
  - The receptacle for your hopes and fears
  - What you would like to earn on a company, unless you happen to be the marginal investor
  - The place to bring your concerns that your company will not make it
- Put simply, the cost of capital in valuation has little to do with you and comes from financial markets and what investors collectively are demanding as a price for risk.

Perspective on cost of capital



		Cost of Equity (US$)			Cost of Capital (US $)		
Sub Group	**# firms**	**Q1**	**Median**	**Q3**	**Q1**	**Median**	**Q3**
Africa and Middle East	2,356	6.49%	7.96%	11.10%	5.53%	6.94%	8.74%
Australia & NZ	1,878	5.75%	5.88%	6.62%	5.37%	5.80%	6.00%
Canada	2,937	5.73%	5.88%	6.65%	5.69%	5.80%	5.99%
China	7,043	6.56%	7.19%	8.39%	5.72%	6.54%	6.99%
EU & Environs	6,000	6.10%	7.08%	9.13%	5.37%	6.20%	7.14%
Eastern Europe & Russia	528	6.23%	8.09%	10.44%	5.70%	6.86%	8.20%
India	3,982	6.93%	8.50%	10.27%	6.14%	7.37%	8.25%
Japan	3,947	6.73%	7.57%	9.43%	5.50%	6.43%	6.91%
Latin America & Caribbean	1,043	7.22%	9.49%	13.25%	5.98%	7.28%	9.27%
Small Asia	9,408	6.76%	8.09%	10.09%	5.99%	6.75%	7.93%
UK	1,255	6.29%	7.00%	7.99%	5.29%	6.47%	6.96%
United States	7,229	5.18%	6.19%	6.95%	4.56%	5.77%	6.18%
Global	47,606	6.04%	7.12%	8.96%	5.56%	6.33%	7.23%

Tesla's Cost of Capital

Cost of Capital	*Initial cost of capital*
D1: Automobile Median	5.24%
D2: Technology Median	7.16%
D3: All companies - First Quartile	4.57%
D4: All companies - Median	5.90%
D5: All companies - Third Quartile	7.01%
D6: Direct Input	6.00%

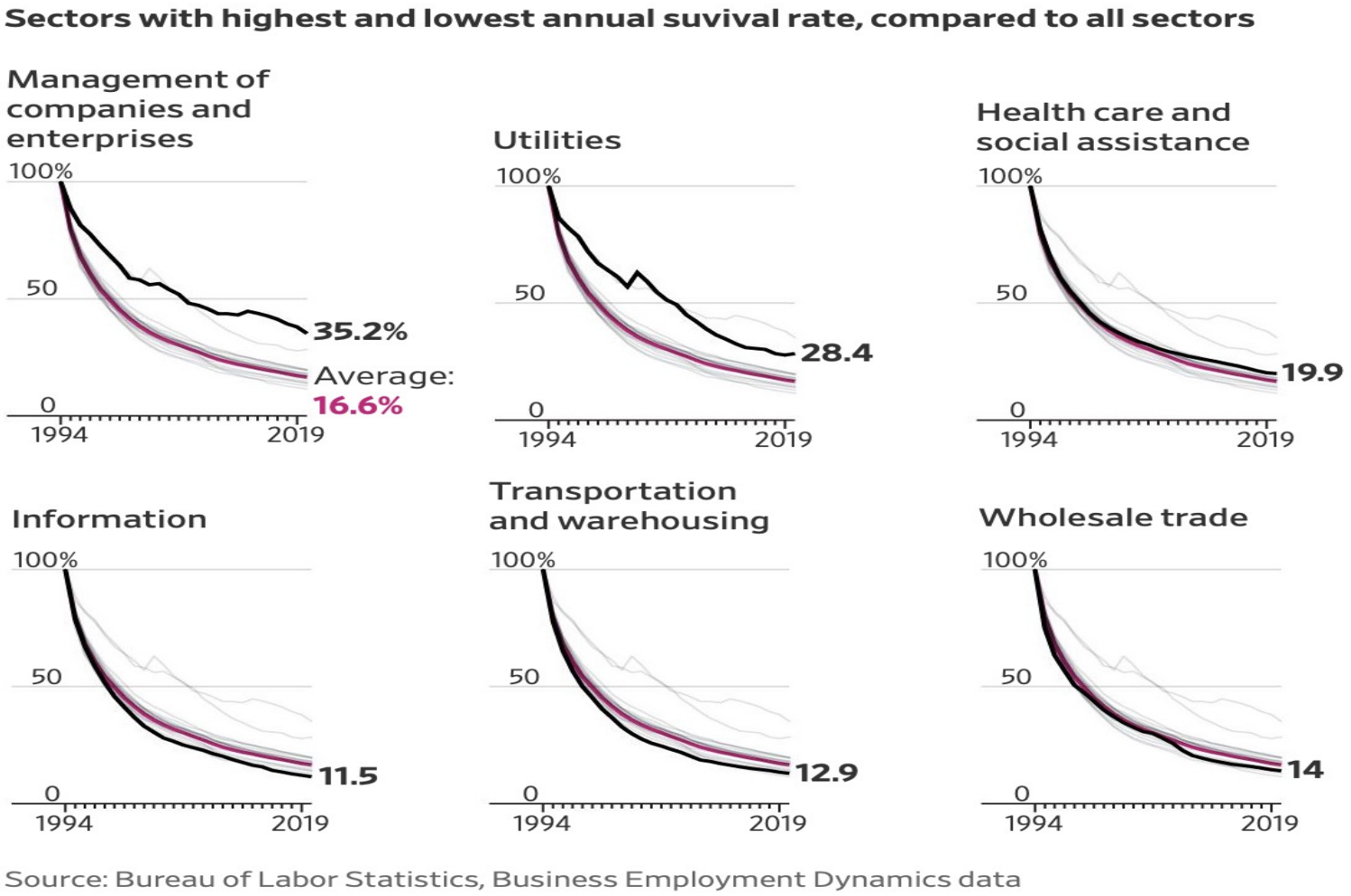
Propositions about cost of capital

1. The cost of capital is not a theoretical construct that comes out of risk and return models, but a reflection of what investors are demanding in the market place.
2. The discount rate is not on the top five or even top ten list of critical inputs driving value.

5. Failure Risk

- If you are concerned about truncation risk (failure, nationalization etc.), it is best to keep it out of your DCF, and adjust for it afterwards.
- Specifically, the best way to incorporate failure into a DCF is to
  - Estimate the likelihood that your company will have its life cut short
  - And the consequences for the value of your equity holding, if that happens..

A 2019 Update: Sector Comparison



Dealing with Options

Do you have employee options outstanding?	Yes
Number of options outstanding =	101.62
Average strike price =	$69.04
Average maturity =	5.80
Standard deviation on stock price =	30.00%

Propositions about options

1. Options are not shares (you cannot count them as shares outstanding) and they are not “not shares” (you cannot ignore them).
2. They have value that exceeds their exercise value, since they command a time premium.

Defaults.. And Changing them..

Default assumptions.	
In stable growth, I will assume that your firm will have a cost of capital similar to that of typical matur	
Do you want to override this assumption =	No
If yes, enter the cost of capital after year 10 =	5.00%
I will assume that your firm will earn a return on capital equal to its cost of capital after year 10. I am	
Do you want to override this assumption =	Yes
If yes, enter the return on capital you expect after year 10	15%
I will assume that your firm has no chance of failure over the foreseeable future.	
Do you want to override this assumption =	Yes
If yes, enter the probability of failure =	0%
What do you want to tie your proceeds in failure to?	V
Enter the distress proceeds as percentage of book or fair value	50%
I will assume that your effective tax rate will adjust to your marginal tax rate by your terminal year. If	
Do you want to override this assumption =	No
I will assume that you have no losses carried forward from prior years (NOL) coming into the valuati	
Do you want to override this assumption =	No
If yes, enter the NOL that you are carrying over into year 1	$250.00
I will assume that the growth rate in perpetuity will be equal to the risk free rate. This allows for both	
Do you want to override this assumption =	No
If yes, enter the growth rate in perpetuity	1.00%
I have assumed that none of the cash is trapped (in foreign countries) and that there is no additional tax liabili	
Do you want to override this assumption	No
If yes, enter trapped cash (if taxes) or entire balance (if mistrust)	$140,000.00
& Average tax rate of the foreign markets where the cash is trapped	15%

Cash Flows and Value

	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate		35.00%	35.00%	35.00%	35.00%	35.00%	28.31%	21.62%	14.94%	8.25%	1.56%	1.56%
Revenues	$ 46,848.00	$ 63,244.80	$ 85,380.48	$ 115,263.65	$ 155,605.92	$ 210,068.00	$ 269,542.45	$ 327,828.31	$ 376,792.75	$ 407,870.61	$ 414,233.39	$ 420,695.43
EBIT (Operating) margin	12.06%	12.85%	13.64%	14.42%	15.21%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%
EBIT (Operating income)	$ 5,650.40	$ 8,126.27	$ 11,643.06	$ 16,626.15	$ 23,671.13	$ 33,610.88	$ 43,126.79	$ 52,452.53	$ 60,286.84	$ 65,259.30	$ 66,277.34	$ 67,311.27
Tax rate	11.99%	11.99%	11.99%	11.99%	11.99%	11.99%	14.59%	17.19%	19.80%	22.40%	25.00%	25.00%
EBIT(1-t)	$ 4,972.96	$ 7,151.99	$ 10,247.15	$ 14,632.80	$ 20,833.14	$ 29,581.19	$ 36,833.99	$ 43,434.08	$ 48,352.64	$ 50,642.62	$ 49,708.01	$ 50,483.45
- Reinvestment		$ 4,099.20	$ 5,533.92	$ 7,470.79	$ 10,085.57	$ 13,615.52	$ 22,302.92	$ 21,857.20	$ 18,361.66	$ 11,654.20	$ 2,386.04	$ 5,250.28
FCFF		$ 3,052.79	$ 4,713.23	$ 7,162.01	$ 10,747.57	$ 15,965.67	$ 14,531.08	$ 21,576.89	$ 29,990.98	$ 38,988.42	$ 47,321.96	$ 45,233.17
NOL	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Cost of capital		6.00%	6.00%	6.00%	6.00%	6.00%	6.01%	6.02%	6.04%	6.05%	6.06%	6.06%
Cumulated discount factor		0.9434	0.8900	0.8396	0.7921	0.7473	0.7049	0.6648	0.6270	0.5912	0.5574	
PV(FCFF)		$ 2,879.99	$ 4,194.76	$ 6,013.36	$ 8,513.08	$ 11,930.48	$ 10,242.68	$ 14,344.99	$ 18,803.94	$ 23,051.08	$ 26,379.51	

Value and Price

Terminal cash flow	$ 45,233.17
Terminal cost of capital	6.06%
Terminal value	$ 1,005,181.62
PV(Terminal value)	$ 560,336.04
PV (CF over next 10 years)	$ 126,353.86
Sum of PV	$ 686,689.91
Probability of failure =	0.00%
Proceeds if firm fails =	$343,344.95
Value of operating assets =	$ 686,689.91
- Debt	$ 10,158.00
- Minority interests	$ -
+ Cash	$ 16,095.00
+ Non-operating assets	$ -
Value of equity	$ 692,626.91
- Value of options	$51,070.25
Value of equity in common s	$ 641,556.66
Number of shares	1,123.00
Estimated value /share	$ 571.29
Price	$ 1,200.00
Price as % of value	210.05%

More than 80% of Tesla's value of equity comes from its terminal value. It is a feature, not a bug.

A DCF is a going concern value. If there is a high risk that a company will not make it, you have to explicitly bring it in here.

The option overhang effect on value

Tesla

The Payoff to Flexibility - A Plausible Path to Auto Dominance | ***Nov-21***

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 10 million cars by 2032, it will also be able to deliver higher margins than conventional auto companies in steady state, using revenues from other businesses to complement 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 company.

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

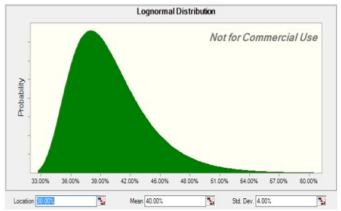
Terminal value	$ 1,005,182		
PV(Terminal value)	$ 560,336		
PV (CF over next 10 years)	$ 126,354		
Value of operating assets =	$ 686,690		
Adjustment for distress	$ -	Probability of failure =	0.00%
- Debt & Minority Interests	$ 10,158		
+ Cash & Other Non-operating assets	$ 16,095		
Value of equity	$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

How story choices drive value.. Zomato

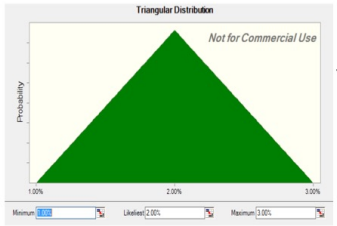
Story	TAM (in ₹ millions)	Market Share	Revenue Slice	Target Margin	Cost of Capital	Value/share	
Delivery Juggernaut	₹ 5,000,000.00	40%	25%	45%	9.50%	₹ 150.02	Plausible
Delivery Star	₹ 5,000,000.00	40%	22%	35%	9.50%	₹ 93.00	
Delivery Leader + Competition	₹ 5,000,000.00	40%	15%	35%	10.99%	₹ 61.55	
Restaurant Delivery Juggernaut + High Growth India	₹ 3,000,000.00	40%	25%	45%	9.50%	₹ 94.31	
Restaurant Delivery Star + High Growth India	₹ 3,000,000.00	40%	22%	35%	9.50%	₹ 59.02	
Restaurant Delivery + Competition + High Growth India	₹ 3,000,000.00	40%	20%	25%	10.99%	₹ 35.52	Probable
Base Case, Positive	₹ 2,000,000.00	40%	25%	45%	10.25%	₹ 56.66	
Base Case	₹ 2,000,000.00	40%	22%	35%	10.25%	₹ 39.48	
Base Case, Negative	₹ 2,000,000.00	40%	20%	25%	10.25%	₹ 26.16	
Restaurant Delivery Juggernaut + Low Growth India	₹ 1,125,000.00	40%	25%	45%	9.50%	₹ 36.48	Plausible
Restaurant Delivery Star + Low Growth India	₹ 1,125,000.00	40%	22%	35%	9.50%	₹ 24.02	
Restaurant Delivery + Competition + low Growth India	₹ 1,125,000.00	40%	20%	25%	10.99%	₹ 16.58	

Facing up to uncertainty, with a simulation: Paytm

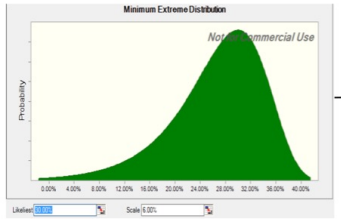
GMV Growth Rate in years 1-5



Target Take Rate (Revenue/GMV) in year 10

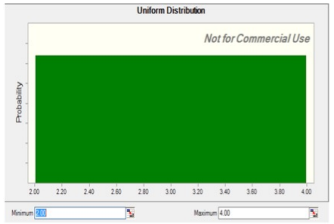


Target Operating Margin in year 10

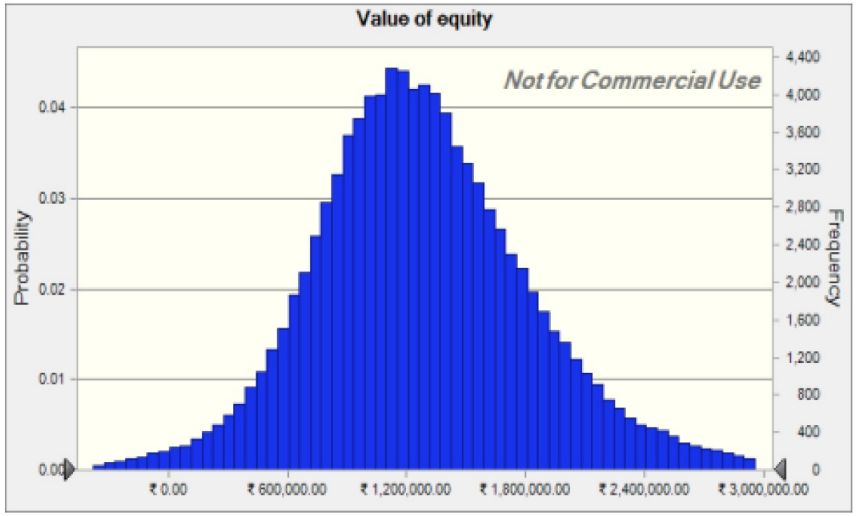


Correlation between Take rate & Operating margin = 0.50

Sales to Invested Capital in Yrs 2-10



Valuing Paytm ahead of its IPO: September 2021



Simulation Findings

1. Across the 100,000 simulations, the value of equity was negative about 3% of the time.
2. The median value across the simulations was ₹1,246,824, lower than the base case value of ₹1,456,708 (from DCF).
3. That divergence can be explained by some of the outliers in terms of extreme value, with the maximum value of equity approaching ₹8,020,677.
4. A more reasonable range for extreme values are the 10th percentile (₹627,263) and the 90th percentile (₹2,010,052).

Percentile	*Value of Equity*
0.0%	₹ -2,242,001
10.0%	₹ 627,263
20.0%	₹ 843,180
30.0%	₹ 992,398
40.0%	₹ 1,121,771
50.0%	**₹ 1,246,824**
60.0%	₹ 1,378,339
70.0%	₹ 1,528,468
80.0%	₹ 1,717,973
90.0%	₹ 2,010,052
100.0%	₹ 8,020,677