



MY VALUATION JOURNEY: HAVE FAITH, YOU MUST!

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I. Don't mistake accounting for finance

Valued based upon motive for investment – some marked to market, some recorded at cost and some at quasi-cost

Assets are recorded at original cost, adjusted for depreciation.

The Balance Sheet

Assets		Liabilities	
Long Lived Real Assets	Fixed Assets	Current Liabilities	Short-term liabilities of the firm
Short-lived Assets	Current Assets	Debt	Debt obligations of firm
Investments in securities & assets of other firms	Financial Investments	Other Liabilities	Other long-term obligations
Assets which are not physical, like patents & trademarks	Intangible Assets	Equity	Equity investment in firm

True intangible assets like brand name, patents and customer did not show up. The only intangible asset of any magnitude (goodwill) is a plug variable that is of consequence only if you do an acquisition.

Equity reflects original capital invested and historical retained earnings.

The financial balance sheet

Recorded at intrinsic value (based upon cash flows and risk), not at original cost

Assets		Liabilities	
Existing Investments Generate cashflows today Includes long lived (fixed) and short-lived (working capital) assets	Assets in Place	Debt	Fixed Claim on cash flows Little or No role in management <i>Fixed Maturity</i> <i>Tax Deductible</i>
Expected Value that will be created by future investments	Growth Assets	Equity	Residual Claim on cash flows Significant Role in management <i>Perpetual Lives</i>

Value will depend upon magnitude of growth investments and excess returns on these investments

Intrinsic value of equity, reflecting intrinsic value of assets, net of true value of debt outstanding.

II. Don't assume that $D+CF = DCF$

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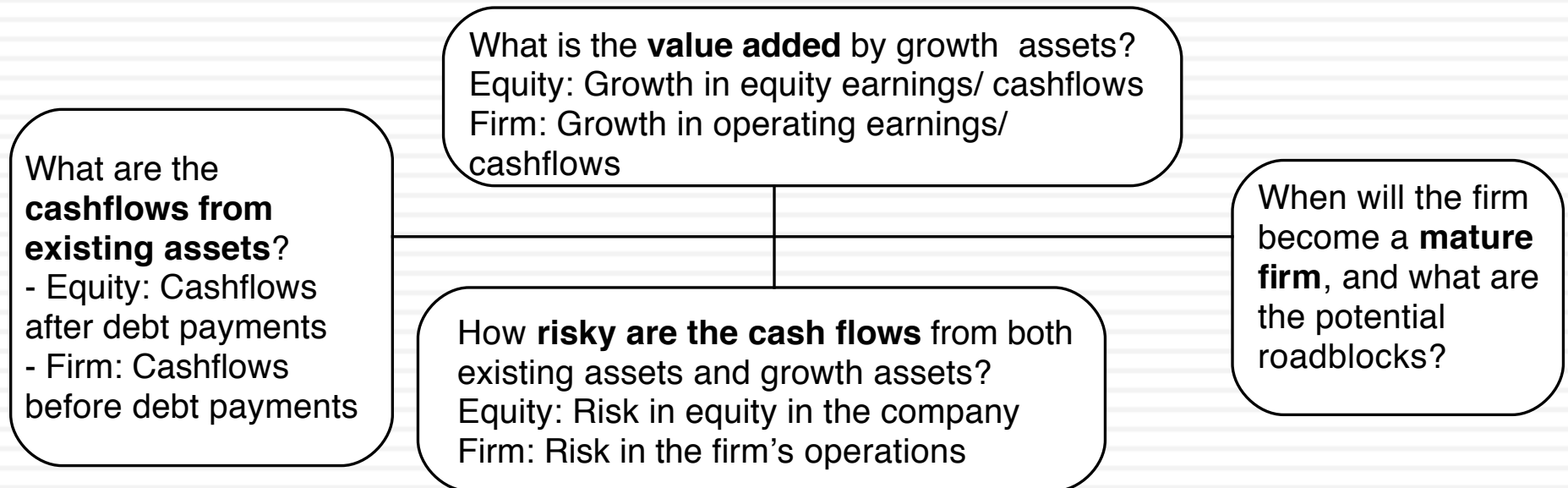
- The value of a risky asset can be estimated by discounting the expected cash flows on the asset over its life at a risk-adjusted discount rate:

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

1. *The IT Proposition:* If “it” does not affect the cash flows or alter risk (thus changing discount rates), “it” cannot affect value.
2. *The DUH Proposition:* For an asset to have value, the expected cash flows have to be positive some time over the life of the asset.
3. *The DON'T FREAK OUT Proposition:* Assets that generate cash flows early in their life will be worth more than assets that generate cash flows later; the latter may however have greater growth and higher cash flows to compensate.

The drivers of value..

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DCF as a tool for intrinsic valuation

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Value of growth

The future cash flows will reflect expectations of how quickly earnings will grow in the future (as a positive) and how much the company will have to reinvest to generate that growth (as a negative). The net effect will determine the value of growth.

Expected Cash Flow in year $t = E(CF) = \text{Expected Earnings in year } t - \text{Reinvestment needed for growth}$

Cash flows from existing assets

The base earnings will reflect the earnings power of the existing assets of the firm, net of taxes and any reinvestment needed to sustain the base earnings.

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

Steady state

The value of growth comes from the capacity to generate excess returns. The length of your growth period comes from the strength & sustainability of your competitive advantages.

Risk in the Cash flows

The risk in the investment is captured in the discount rate as a beta in the cost of equity and the default spread in the cost of debt.

A. Cash Flows

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To get to cash flow	Here is why
Operating Earnings	This is the earnings before interest & taxes you generate from your existing assets. Operating Earnings = Revenues * Operating Margin Measures the operating efficiency of your assets & can be grown either by growing revenues and/or improving margins.
(minus) Taxes	These are the taxes you would pay on your operating income and are a function of the tax code under which you operate & your fidelity to that code.
(minus) Reinvestment	Reinvestment is designed to generate future growth and can be in long term and short term assets. Higher growth usually requires more reinvestment, and the efficiency of growth is a function of how much growth you can get for your reinvestment.
Free Cash Flow to the Firm	This is a pre-debt cash flow that will be shared by lenders (as interest & principal payments) and by equity investors (as dividends & buybacks).

As

Shell: From Revenues to Cash flows

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	2011	2012	2013	2014	2015
Revenues	\$470,171	\$467,153	\$451,235	\$421,105	\$264,960
Operating Margin	9.31%	8.11%	6.15%	5.47%	-0.88%
Operating Income	\$43,764	\$37,879	\$27,769	\$23,026	\$(2,322)
Effective tax rate	42.07%	44.02%	46.63%	50.80%	47.98%
Operating Income after taxes	\$25,352	\$21,205	\$14,821	\$11,328	\$(1,208)
Depreciation	\$11,713	\$13,518	\$16,099	\$17,196	\$16,779
Cap Ex	\$26,301	\$32,576	\$39,975	\$31,676	\$26,131
Change in WC	\$6,471	\$(3,391)	\$(2,988)	\$(6,405)	\$(5,521)
FCFF	\$4,293	\$5,538	\$(6,067)	\$3,253	\$(5,039)
Reinvestment	\$21,059	\$15,667	\$20,888	\$8,075	\$3,831

Infosys: From Revenues to Cash flows

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Year	2013	2014	2015	2016	2017	LTM
Revenues	₹ 401,674	₹ 494,280	₹ 544,568	₹ 629,679	₹ 661,427	₹ 683,119
Operating Income	₹ 104,301	₹ 120,439	₹ 143,972	₹ 159,193	₹ 163,283	₹ 165,945
Effective Tax Rate	26.3%	27.6%	28.6%	28.0%	28.0%	21.0%
After-tax Operating Income	₹ 76,823	₹ 87,180	₹ 102,845	₹ 114,579	₹ 117,494	₹ 131,155
- (Cap Ex - Depreciation)	₹ 21,229	₹ 13,542	₹ 25,006	₹ 20,810	₹ 11,080	₹ 2,936
- Change in non-cash WC	₹ 10,859	₹ 1,498	₹ 11,503	₹ 22,799	₹ 18,791	₹ 766
FCFF	₹ 44,734	₹ 72,140	₹ 66,336	₹ 70,970	₹ 87,623	₹ 127,453
Reinvestment Rate	41.77%	17.25%	35.50%	38.06%	25.42%	2.82%

Includes
acquisitions

B. Discount rates

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Expected Return on a Risky Investment = Cost of Equity

=

Risk free Rate

Rate of return on a long term, default free bond.

+

Beta

Relative measure of risk added to a diversified portfolio.

X

Equity Risk Premium

Premium investors demand over and above the risk free rate for investing in equities as a class.

Will vary across currencies and across time.

Determined by the business or businesses that you operate in, with more exposure to macro economic risk translating into a higher beta.

Function of the countries that you do business in and how much value you derive from each country.

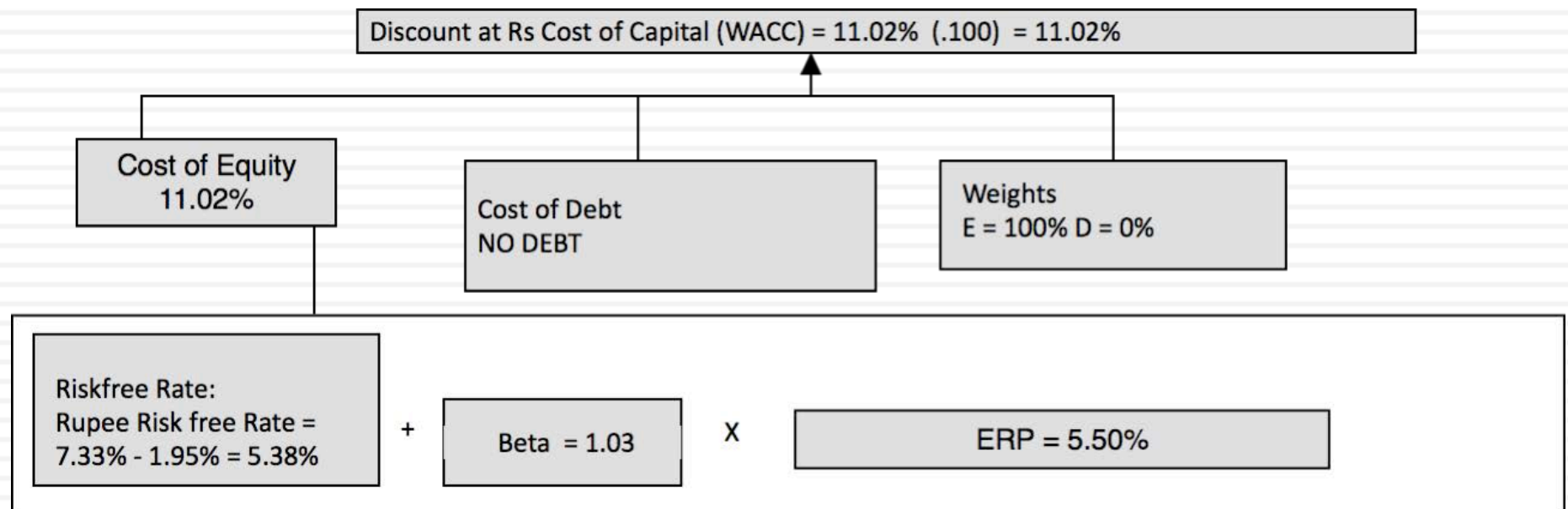
Shell's Cost of Capital in US\$ in 2016

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Business	% of Company	Unlevered Beta	D/E Ratio	Beta	Cost of Equity (in US\$)	
Upstream	56.56%	1.13	30.63%	1.39	13.47%	
Downstream	43.44%	0.85	30.63%	1.05	10.63%	
Shell	100.00%	1.01	30.63%	1.24	12.24%	
Business	Cost of Equity	E/(D+E)	Pre-tax Cost of Debt	After-tax Cost of debt	D/(D+E)	Cost of Capital
Upstream	13.47%	76.55%	3.10%	2.33%	23.45%	10.86%
Downstream	10.63%	76.55%	3.10%	2.33%	23.45%	8.68%
Shell	12.24%	76.55%	3.10%	2.33%	23.45%	9.91%

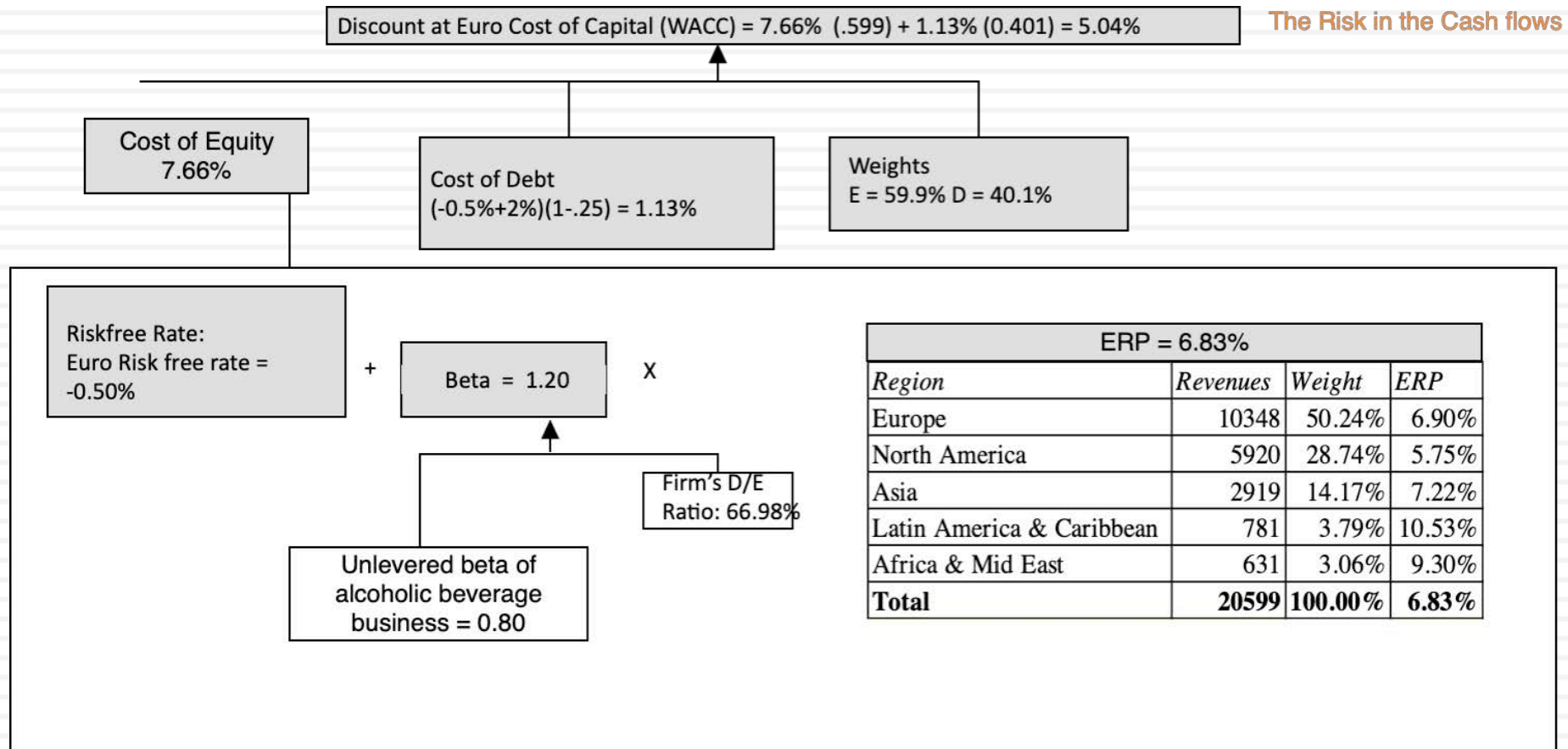
Infosys: Cost of Capital in Indian Rupees in 2018

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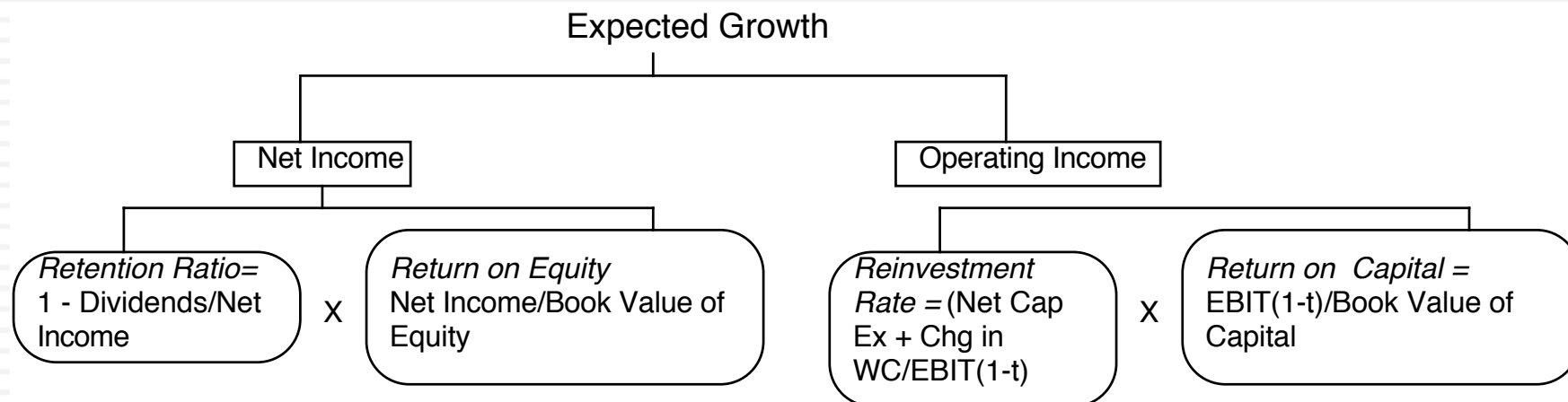


Heineken: Cost of Capital in Euros in September 2019

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C. Expected Growth



- Quality growth is rare and requires that a firm be able to reinvest a lot and reinvest well (earnings more than your cost of capital) at the same time.
- The larger you get, the more difficult it becomes to maintain quality growth.
- You can grow while destroying value at the same time.

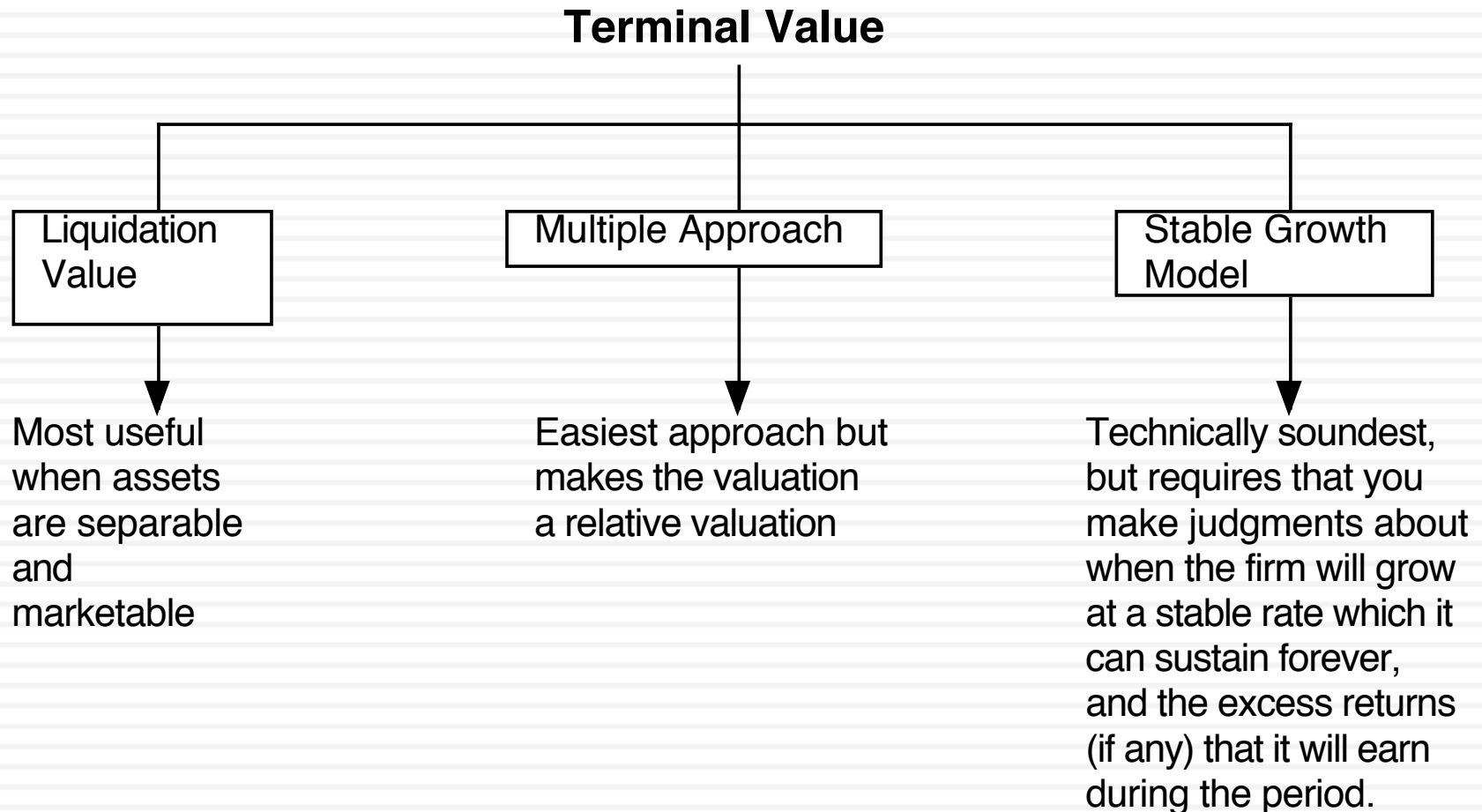
A More General Structure

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- When operating income is negative or margins are expected to change over time, we use a three step process to estimate growth:
 - ▣ Estimate growth rates in revenues over time
 - Determine the total market (given your business model) and estimate the market share that you think your company will earn.
 - Decrease the growth rate as the firm becomes larger
 - Keep track of absolute revenues to make sure that the growth is feasible
 - ▣ Estimate expected operating margins each year
 - Set a target margin that the firm will move towards
 - Adjust the current margin towards the target margin
 - ▣ Estimate the capital that needs to be invested to generate revenue growth and expected margins
 - Estimate a sales to capital ratio that you will use to generate reinvestment needs each year.

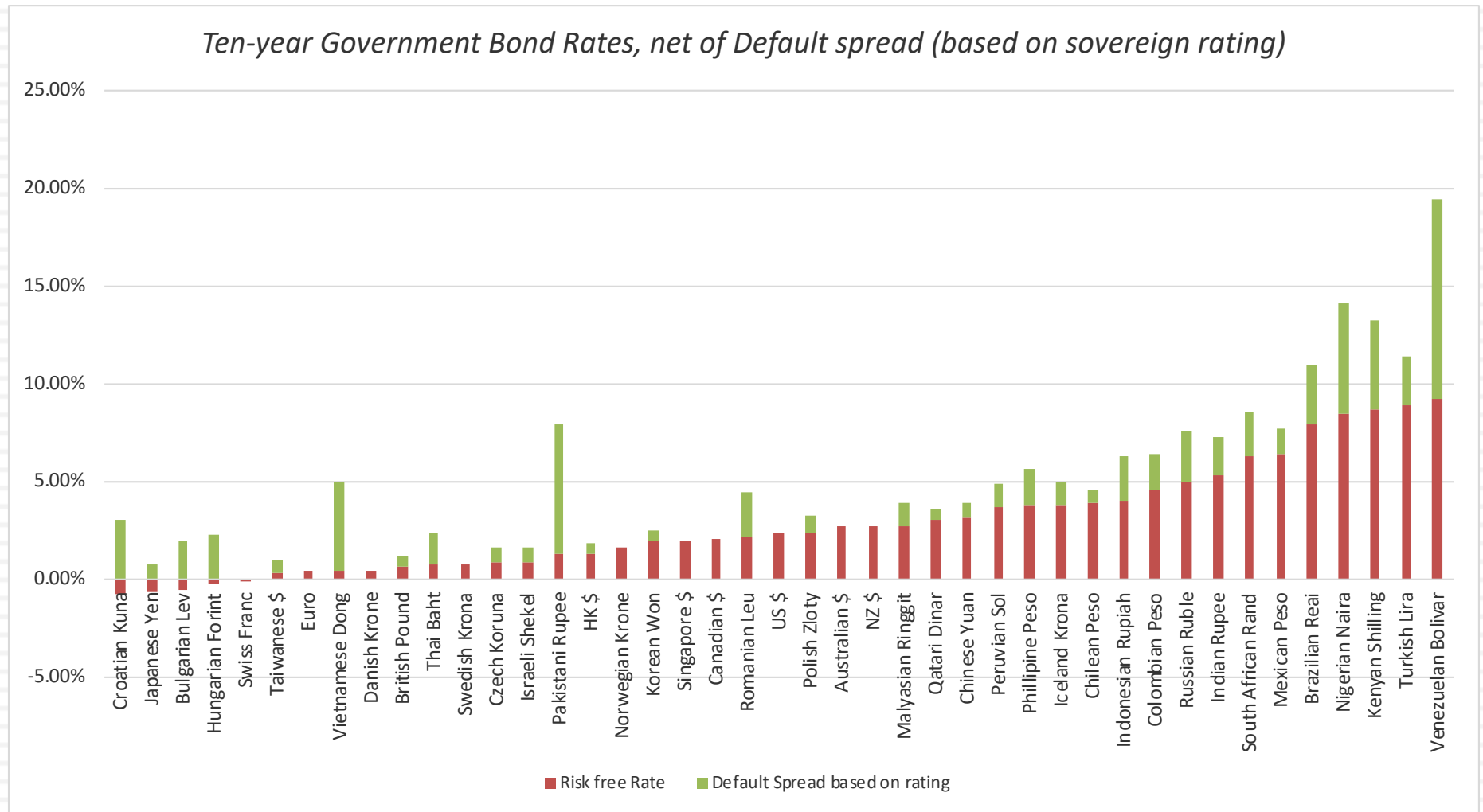
D. The Terminal Value

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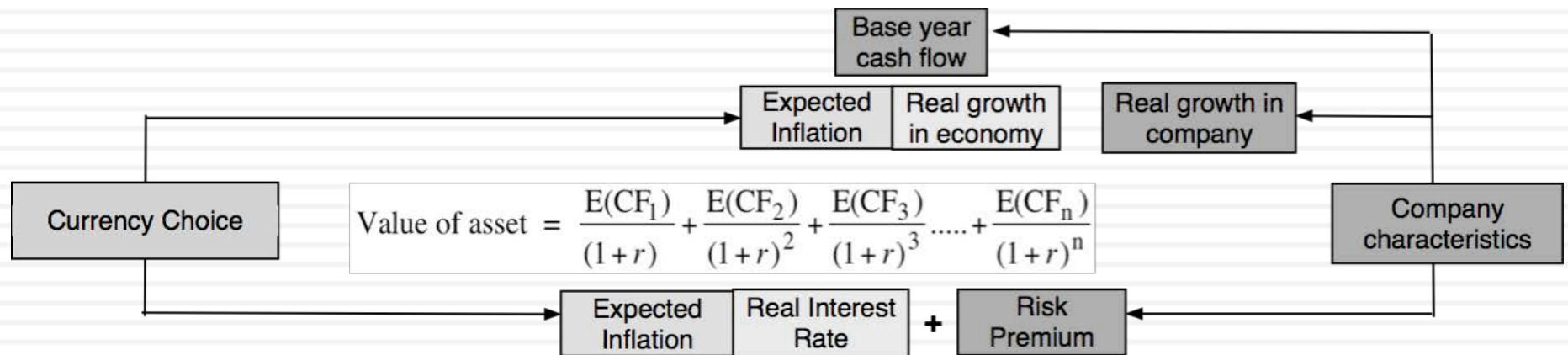
1. Currencies matter

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The Currency Effect

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Valuing Infosys in Rupees and Dollars

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	In Rupees	In Dollars
Risk free Rate	5.38%	2.85%
Expected growth rate	10.00% for next 5 years, scaling down to 5.38% in year 10 (and forever)	7.37% for next 5 years, scaling down to 2.85% in year 10 (and forever)
Return on Capital	Marginal ROIC of 39.70%, scaling down to 15% forever	Marginal ROIC of 37.68%, scaling down to 12.36% forever.
Cost of capital	11.02% for next 5 years, scaling down to 9.88% in year 10 (and beyond)	8.36% for next 5 years, scaling down to 7.23% in year 10 (and beyond)
Value per share	Rs 1072.22 per share about 7% below stock price of Rs 1,150/share	\$16.86 per share about 7% below stock price of \$18.02/share

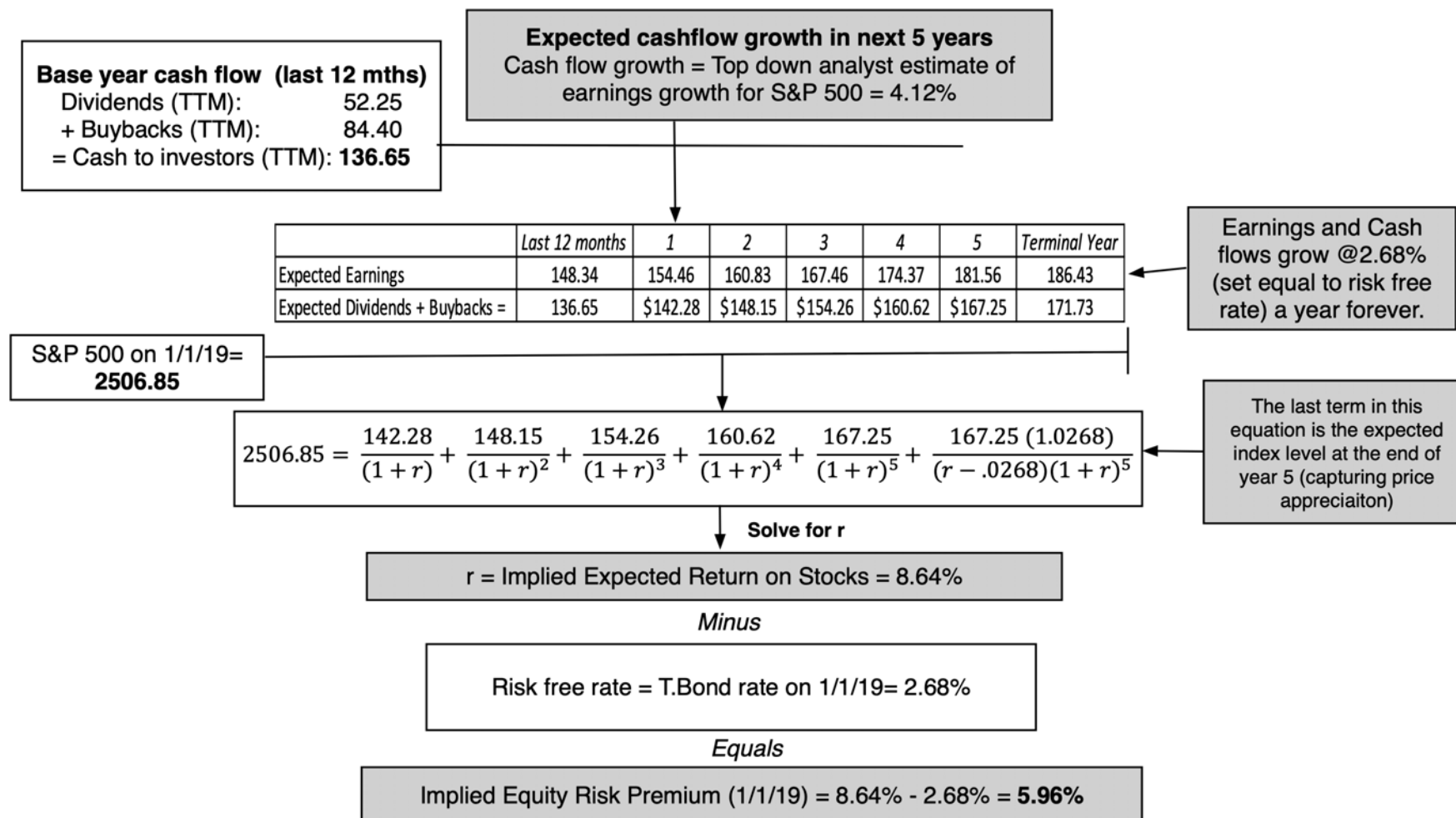
2. Risk is not in the past..

	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2017	8.09%	6.38%	6.26%	4.77%
Std Error	2.10%	2.24%		
1968-2017	6.58%	4.24%	5.28%	3.29%
Std Error	2.39%	2.70%		
2008-2017	9.85%	5.98%	8.01%	4.56%
Std Error	6.12%	8.70%		

- If you are going to use a historical risk premium, make it
 - ▣ Long term (because of the standard error)
 - ▣ Consistent with your risk free rate
 - ▣ A “compounded” average
- No matter which estimate you use, recognize that it is backward looking, is noisy and may reflect selection bias.

But in the future..

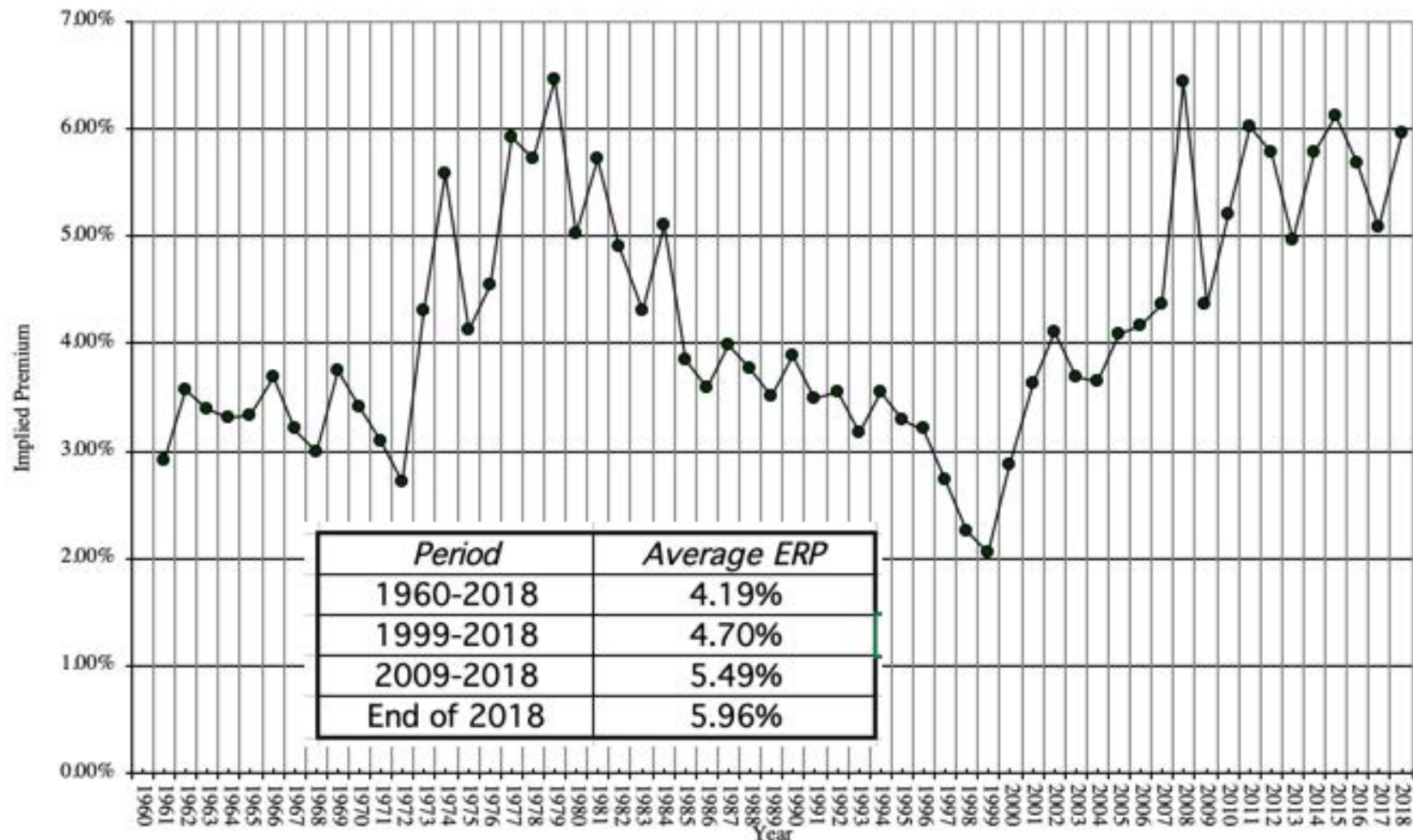
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Implied ERP for the S&P 500: History

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Implied Premium for US Equity Market: 1960-2018



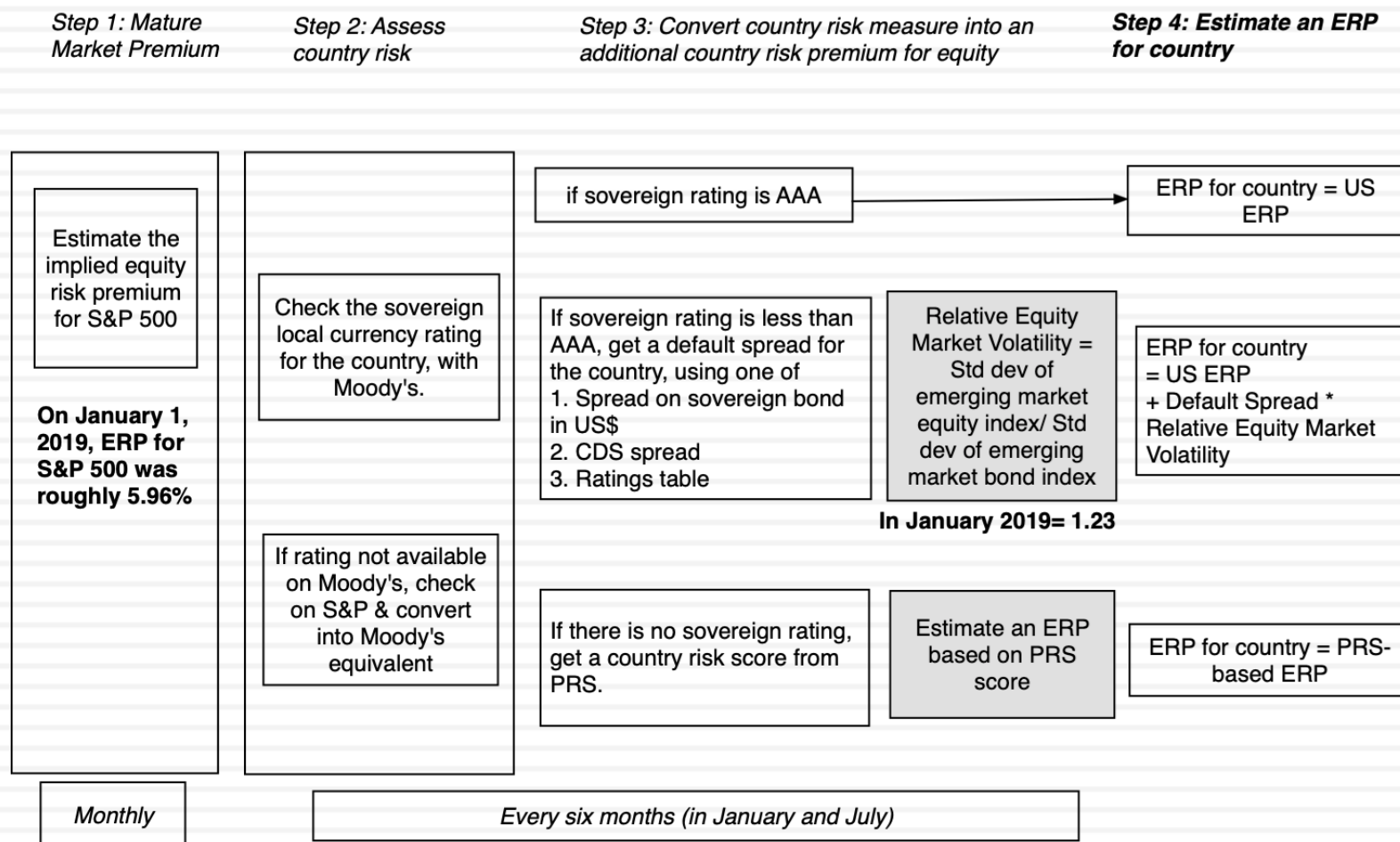
3 Globalization is not a buzz word

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- As companies get globalized, the valuations that we do have to reflect that globalization. In particular, we need to be wary of
 - ▣ Currency mismatches: Multinationals derive their revenues in many currencies but you have to be currency-consistent.
 - ▣ Beta gaming: When a company is listed in many markets, you can get very different betas, depending on how you set up and run a beta regression
 - ▣ Equity Risk Premiums: The standard practice of estimating equity risk premiums based on your country of incorporation will lead to skewed valuations.

A Template for Estimating the ERP

ERP Estimation Procedure - January 1, 2019



Andorra	8.60%	2.64%	Italy	9.02%	3.06%
Austria	6.51%	0.55%	Jersey (States of)	6.80%	0.84%
Belgium	6.80%	0.84%	Liechtenstein	5.96%	0.00%
Cyprus	10.13%	4.17%	Luxembourg	5.96%	0.00%
Denmark	5.96%	0.00%	Malta	7.63%	1.67%
Finland	6.51%	0.55%	Netherlands	5.96%	0.00%
France	6.65%	0.69%	Norway	5.96%	0.00%
Germany	5.96%	0.00%	Portugal	9.02%	3.06%
Greece	14.99%	9.03%	Spain	8.18%	2.22%
Guernsey (States of)	6.80%	0.84%	Sweden	5.96%	0.00%
Iceland	7.63%	1.67%	Switzerland	5.96%	0.00%
Ireland	7.14%	1.18%	Turkey	10.96%	5.00%
Isle of Man	6.65%	0.69%	United Kingdom	6.65%	0.69%
			Western Europe	7.11%	1.15%

Canada	5.96%	0.00%
United States	5.96%	0.00%
North America	5.96%	0.00%

Caribbean	13.61%	7.65%
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Argentina	13.60%	7.64%
Belize	14.99%	9.03%
Bolivia	10.96%	5.00%
Brazil	10.13%	4.17%
Chile	6.94%	0.98%
Colombia	8.60%	2.64%
Costa Rica	12.21%	6.25%
Ecuador	14.99%	9.03%
El Salvador	16.37%	10.41%
Guatemala	9.43%	3.47%
Honduras	12.21%	6.25%
Mexico	7.63%	1.67%
Nicaragua	13.60%	7.64%
Panama	8.60%	2.64%
Paraguay	9.43%	3.47%
Peru	7.63%	1.67%
Suriname	13.60%	7.64%
Uruguay	8.60%	2.64%
Venezuela	28.10%	22.14%
Central and South America	10.61%	4.65%

Angola	14.99%	9.03%
Benin	12.21%	6.25%
Botswana	7.14%	1.18%
Burkina Faso	13.60%	7.64%
Cameroon	13.60%	7.64%
Cape Verde	13.60%	7.64%
Congo (DR)	14.99%	9.03%
Congo (Rep)	18.46%	12.50%
Côte d'Ivoire	10.96%	5.00%
Egypt	14.99%	9.03%
Ethiopia	12.21%	6.25%
Gabon	16.37%	10.41%
Ghana	14.99%	9.03%
Kenya	13.60%	7.64%
Morocco	9.43%	3.47%
Mozambique	19.83%	13.87%
Namibia	9.43%	3.47%
Nigeria	13.60%	7.64%
Rwanda	13.60%	7.64%
Senegal	10.96%	5.00%
South Africa	9.02%	3.06%
Swaziland	13.60%	7.64%
Tanzania	12.21%	6.25%
Tunisia	13.60%	7.64%
Uganda	13.60%	7.64%
Zambia	16.37%	10.41%
Africa	12.63%	6.67%

Albania	12.21%	6.25%
Armenia	12.21%	6.25%
Azerbaijan	10.13%	4.17%
Belarus	14.99%	9.03%
Bosnia and Herzegovina	14.99%	9.03%
Bulgaria	8.60%	2.64%
Croatia	10.13%	4.17%
Czech Republic	6.94%	0.98%
Estonia	6.94%	0.98%
Georgia	10.13%	4.17%
Hungary	9.02%	3.06%
Kazakhstan	9.02%	3.06%
Kyrgyzstan	13.60%	7.64%
Latvia	7.63%	1.67%
Lithuania	7.63%	1.67%
Macedonia	10.96%	5.00%
Moldova	14.99%	9.03%
Montenegro	12.21%	6.25%
Poland	7.14%	1.18%
Romania	9.02%	3.06%
Russia	9.43%	3.47%
Serbia	10.96%	5.00%
Slovakia	7.14%	1.18%
Slovenia	8.18%	2.22%
Tajikistan	9.43%	3.47%
Ukraine	18.46%	12.50%
Eastern Europe & Russia	9.24%	3.28%

Abu Dhabi	6.65%	0.69%
Bahrain	13.60%	7.64%
Iraq	16.37%	10.41%
Israel	6.94%	0.98%
Jordan	12.21%	6.25%
Kuwait	6.65%	0.69%
Lebanon	14.99%	9.03%
Oman	9.02%	3.06%
Qatar	6.80%	0.84%
Ras Al Khaimah (Emirate of)	7.14%	1.18%
Saudi Arabia	6.94%	0.98%
Sharjah	7.63%	1.67%
United Arab Emirates	6.65%	0.69%
Middle East	7.96%	2.00%

Country	PRS	ERP	CRP	Country	PRS	ERP	CRP
Algeria	65	13.60%	7.64%	Malawi	61	16.37%	10.41%
Brunei	80.5	6.94%	0.98%	Mali	61.3	16.37%	10.41%
Gambia	63.3	14.99%	9.03%	Myanmar	62	16.37%	10.41%
Guinea	54.3	22.61%	16.65%	Niger	54.5	22.61%	16.65%
Guinea-Bissau	62	16.37%	10.41%	Sierra Leone	54.8	22.61%	16.65%
Guyana	66.5	12.21%	6.25%	Somalia	53.5	22.61%	16.65%
Haiti	60	18.46%	12.50%	Sudan	38.8	28.10%	22.14%
Iran, D.P.R.	69.3	10.13%	4.17%	Syria	51.8	22.61%	16.65%
Liberia	53.5	22.61%	16.65%	Togo	61	16.37%	10.41%
Libya	66.5	12.21%	6.25%	Yemen, Republic	48	28.10%	22.14%
Madagascar	64	14.99%	9.03%	Zimbabwe	59.3	18.46%	12.50%

Bangladesh	10.96%	5.00%
Cambodia	13.60%	7.64%
China	6.94%	0.98%
Fiji	10.96%	5.00%
Hong Kong	6.65%	0.69%
India	8.60%	2.64%
Indonesia	8.60%	2.64%
Japan	6.94%	0.98%
Korea	6.65%	0.69%
Macao	6.80%	0.84%
Malaysia	7.63%	1.67%
Maldives	13.60%	7.64%
Mauritius	8.18%	2.22%
Mongolia	14.99%	9.03%
Pakistan	14.99%	9.03%
Papua New Guinea	13.60%	7.64%
Philippines	8.60%	2.64%
Singapore	5.96%	0.00%
Solomon Islands	14.99%	9.03%
Sri Lanka	12.21%	6.25%
Taiwan	8.18%	2.22%
Thailand	8.18%	2.22%
Vietnam	10.96%	5.00%
Asia	7.43%	1.47%

Australia	5.96%	0.00%
Cook Islands	12.21%	6.25%
New Zealand	5.96%	0.00%
Australia & New Zealand	5.96%	0.00%

Black #: Total ERP

Red #: Country risk premium

Regional #: GDP weighted average

And risk comes from where you operate, not where you incorporate! Infosys and Heineken

Infosys in 2017

<i>Region</i>	<i>Revenues</i>	<i>ERP</i>	<i>Weight</i>	<i>Weighted ERP</i>
North America	₹ 42,408	5.08%	62.01%	3.1499%
Europe	₹ 15,302	6.01%	22.37%	1.3437%
Rest of the World	₹ 8,504	6.21%	12.43%	0.7721%
India	₹ 2,180	7.27%	3.19%	0.2317%
Total	₹ 68,394		100.00%	5.4974%

Heineken in 2019

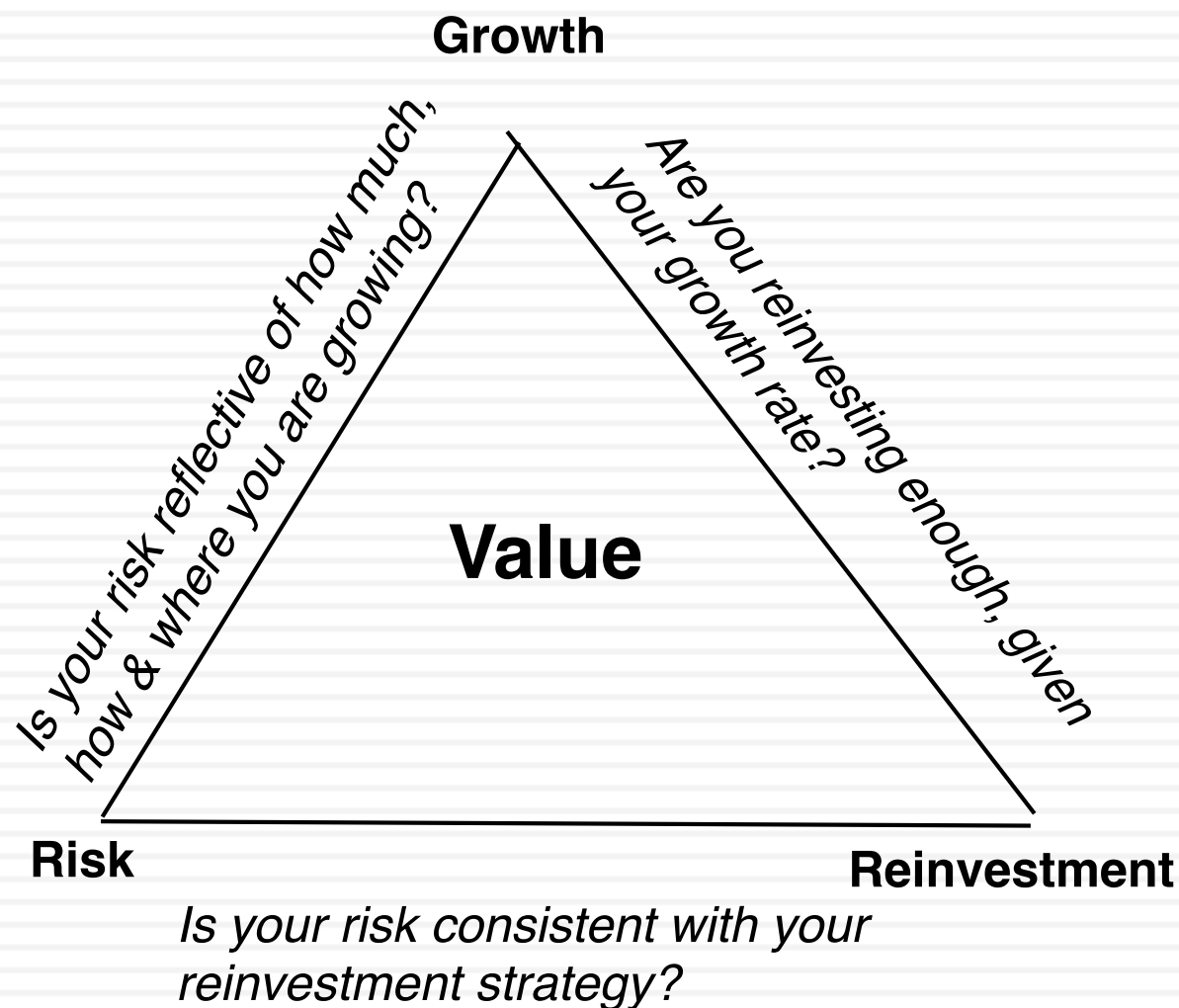
<i>Region</i>	<i>Revenues</i>	<i>Weight</i>	<i>ERP</i>
Europe	€ 10,348	50.24%	6.90%
North America	€ 5,920	28.74%	5.75%
Asia	€ 2,919	14.17%	7.22%
Latin America & Caribbean	€ 781	3.79%	10.53%
Africa & Mid East	€ 631	3.06%	9.30%
Total	€ 20,599	100.00%	6.83%

Shell: Equity Risk Premium- March 2016

<i>Country</i>	<i>Oil & Gas Production</i>	<i>% of Total</i>	<i>ERP</i>
Denmark	17396	3.83%	6.20%
Italy	11179	2.46%	9.14%
Norway	14337	3.16%	6.20%
UK	20762	4.57%	6.81%
<i>Rest of Europe</i>	<i>874</i>	<i>0.19%</i>	<i>7.40%</i>
Brunei	823	0.18%	9.04%
Iraq	20009	4.40%	11.37%
Malaysia	22980	5.06%	8.05%
Oman	78404	17.26%	7.29%
Russia	22016	4.85%	10.06%
<i>Rest of Asia & ME</i>	<i>24480</i>	<i>5.39%</i>	<i>7.74%</i>
<i>Oceania</i>	<i>7858</i>	<i>1.73%</i>	<i>6.20%</i>
Gabon	12472	2.75%	11.76%
Nigeria	67832	14.93%	11.76%
Rest of Africa	6159	1.36%	12.17%
USA	104263	22.95%	6.20%
Canada	8599	1.89%	6.20%
Brazil	13307	2.93%	9.60%
<i>Rest of Latin America</i>	<i>576</i>	<i>0.13%</i>	<i>10.78%</i>
Royal Dutch Shell	454326	100.00%	8.26%

4. Don't let your inputs be at war with each other..

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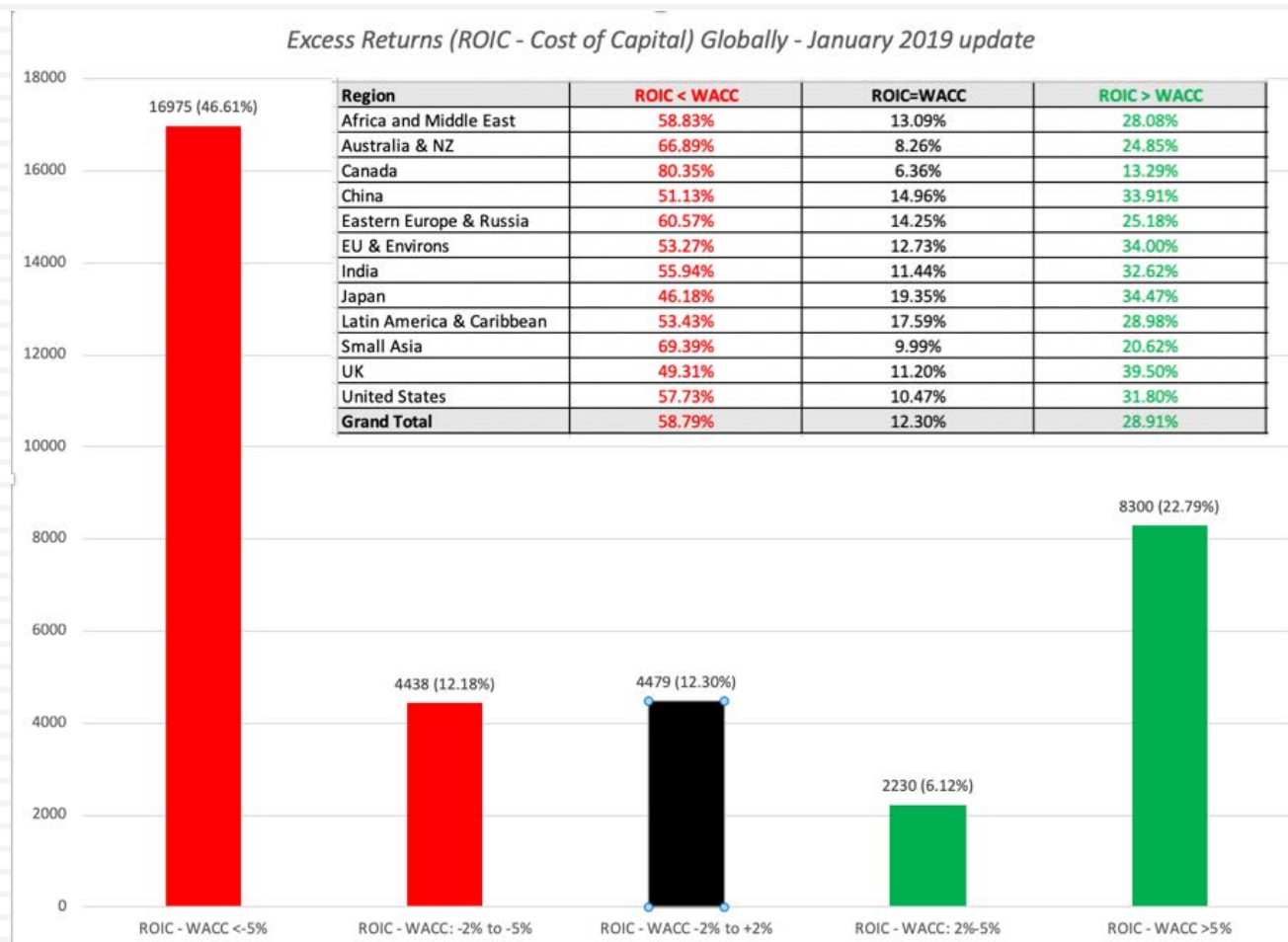


ES

	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%	75%	34%	73%	43%	38%	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%	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	12,099
% 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%	53%	65%	62%	78%	78%	86%	77%	77%	76%	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%	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	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%												

And consider the trade offs..

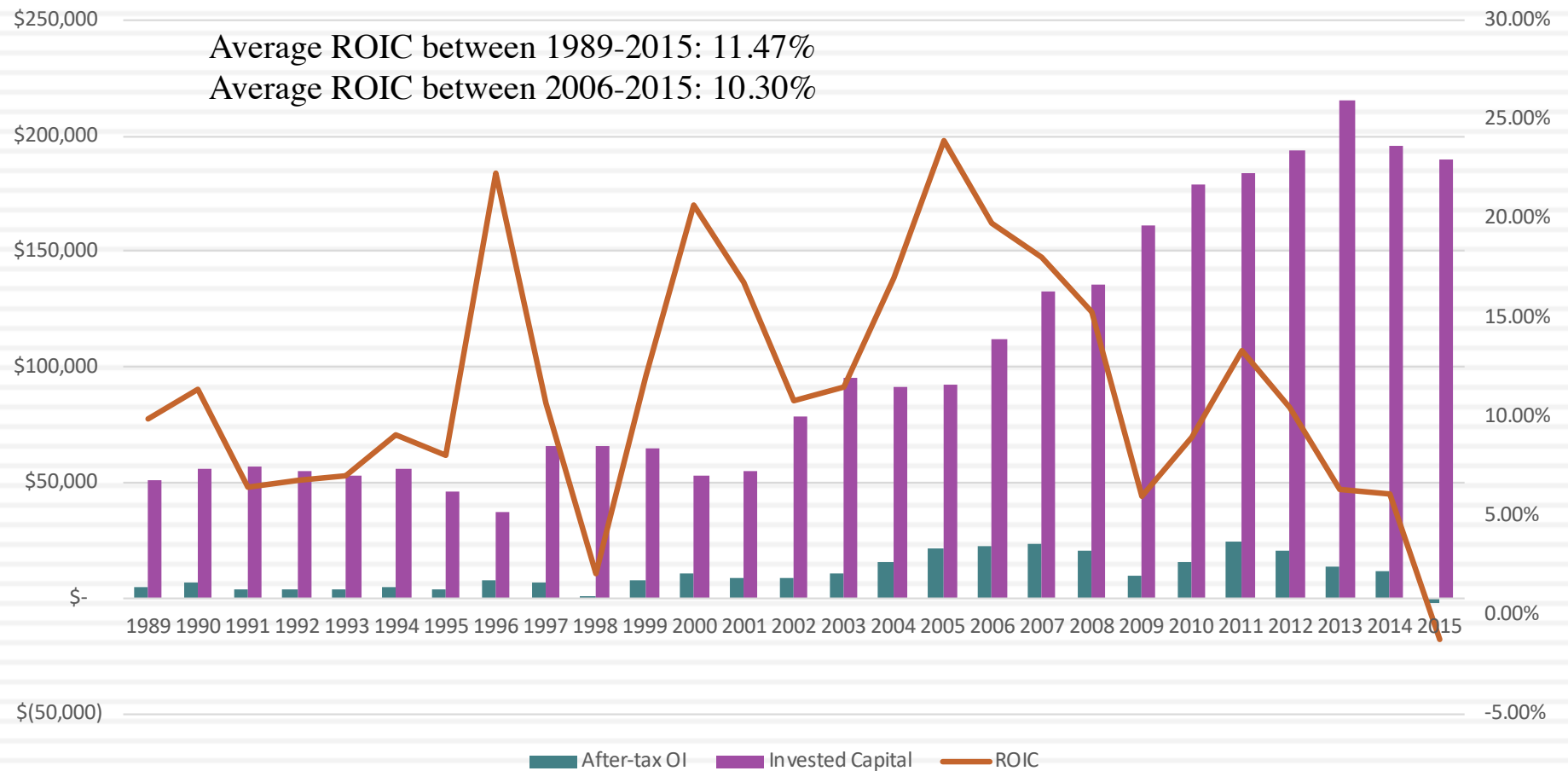
30



Shell: Return on Invested Capital – The Macro Effect

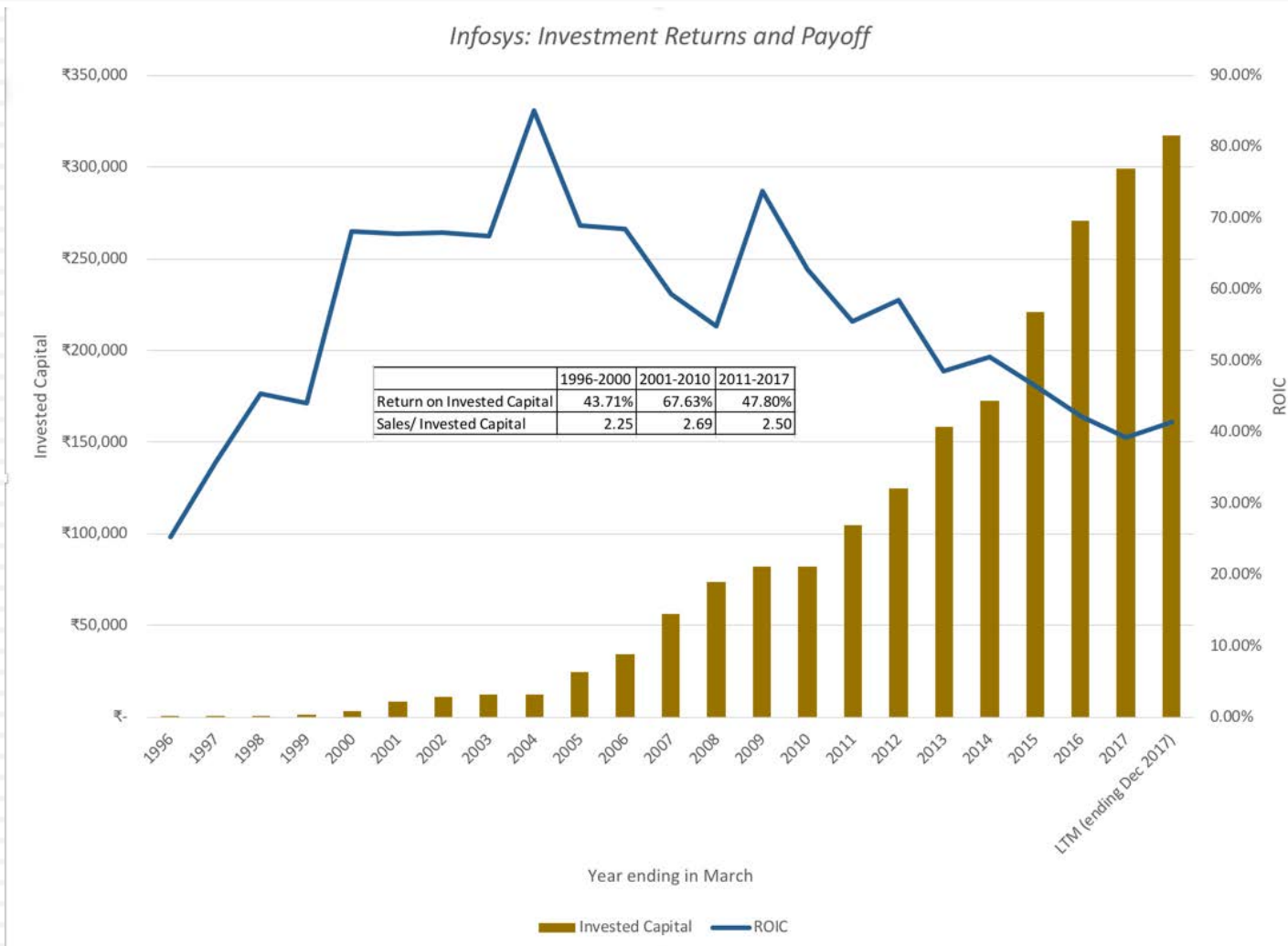
31

Shell's ROIC over time



Infosys: Return on Invested Capital – Scaling up is hard to do...

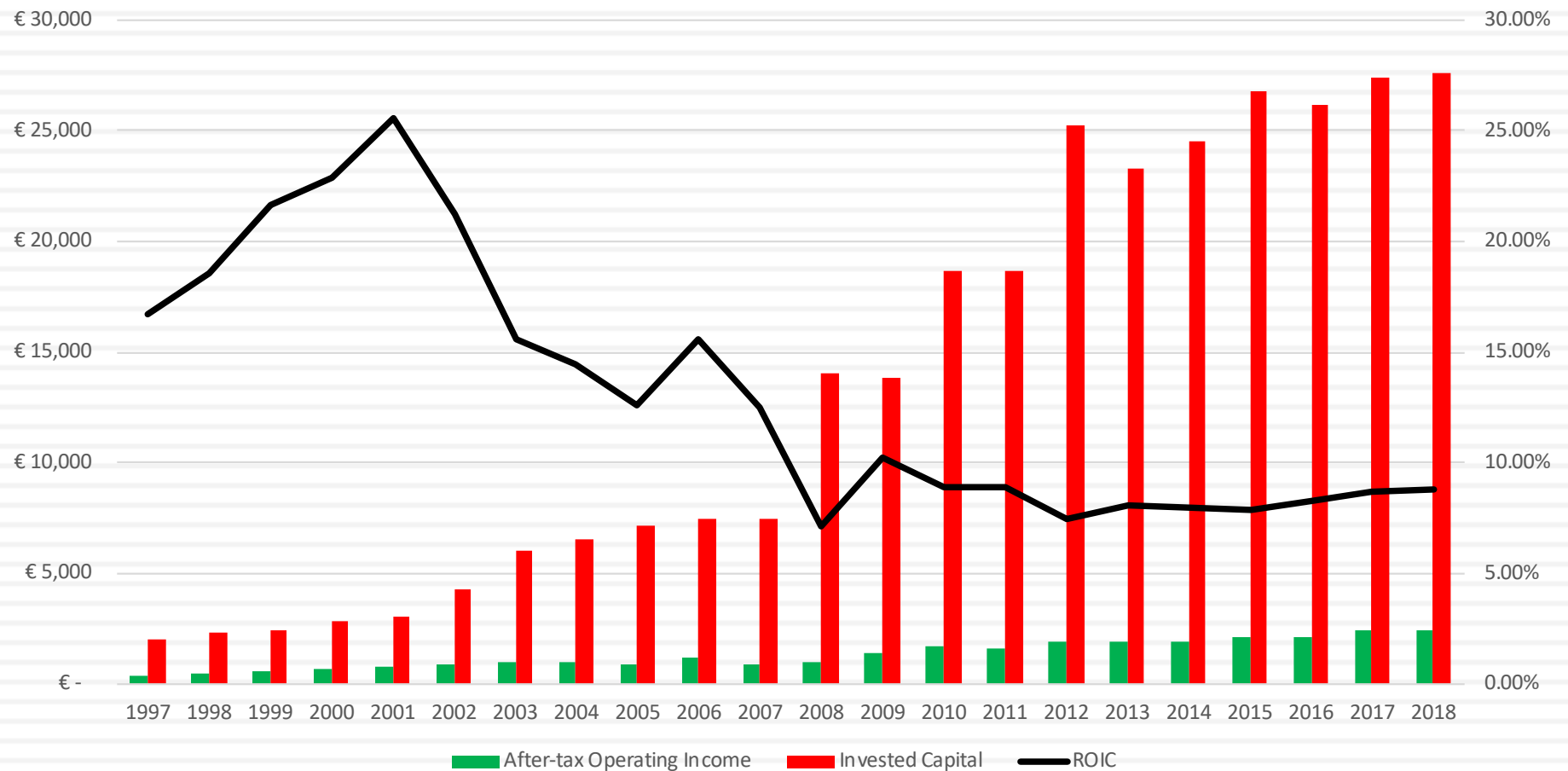
32



Heineken: Return on Invested Capital = Fading competitive advantages?

33

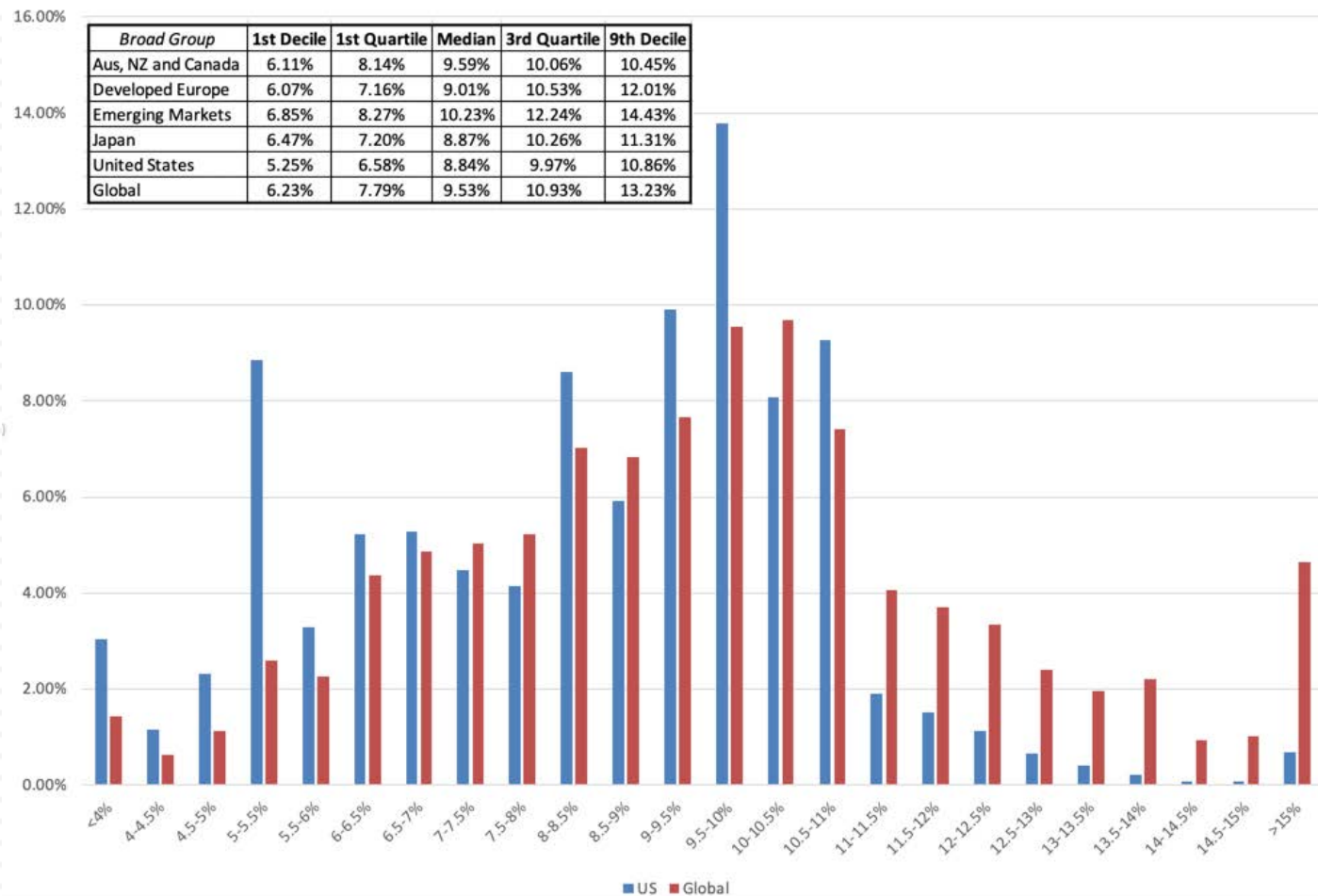
Heineken: Invested Capital, Operating Income and ROIC



5. Don't sweat the small stuff

34

Cost of Capital Distribution- January 2019

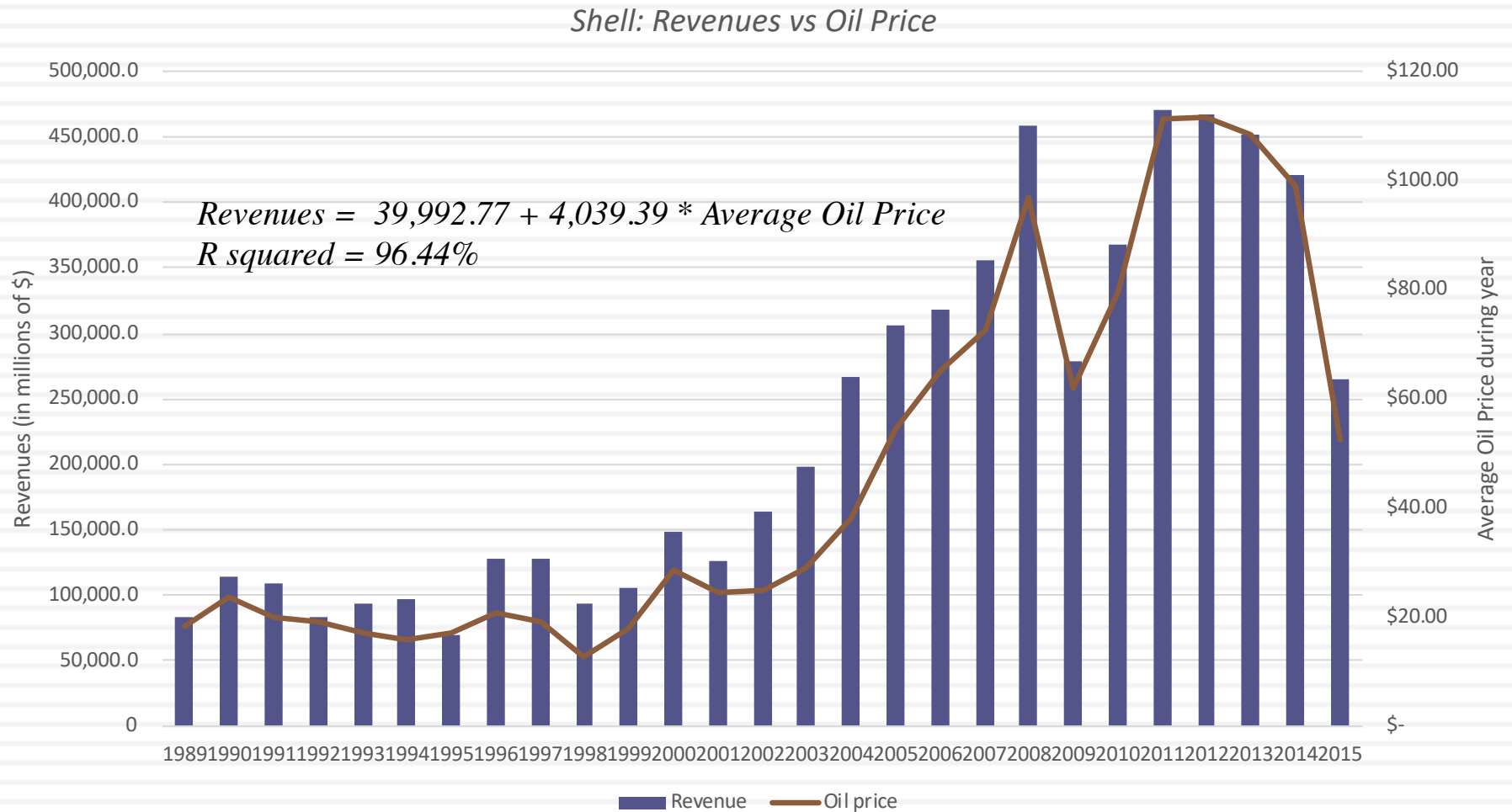


6. Don't let your macro views drown out your micro views..

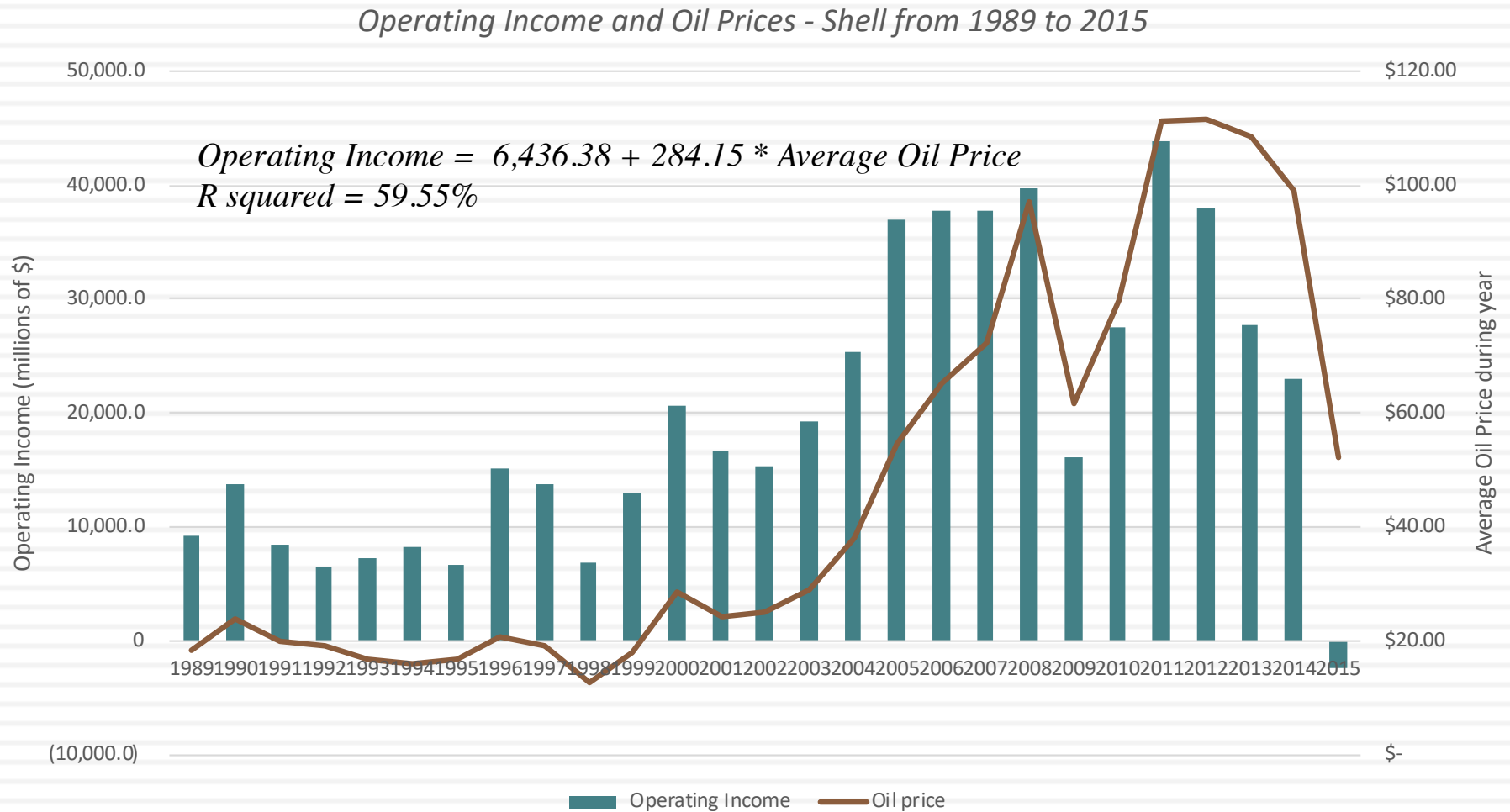
35

- When you are asked to value a company, you should keep your focus on what drives that value. If you bring in your specific macro views into the valuation, the value that you obtain for a company will be a joint result of what you think about the company and your macro views.
- **Bottom line:** If you have macro views, provide them separately. You should be as macro-neutral as you can be, in your company valuations.
- **Follow up:** If you find macro risk dominating your thoughts, deal with it frontally.

The biggest driver for Shell (and no surprise) is..



Though they do have some power to alter your income..



Valuing Shell at April 2016 oil price (\$40)

Revenue calculated from prevailing oil price of \$40/barrel in March 2016
 Revenue = $39992.77 + 4039.40 \times \40
 = \$201,569

Compounded revenue growth of 3.91% a year, based on Shell's historical revenue growth rate from 2000 to 2015

	Base Year	1	2	3	4	5	Terminal Year
Revenues	\$ 201,569	\$ 209,450	\$ 217,639	\$ 226,149	\$ 234,991	\$ 244,180	\$ 249,063
Operating Margin	3.01%	6.18%	7.76%	8.56%	8.95%	9.35%	9.35%
Operating Income	\$ 6,065.00	\$ 12,942.85	\$ 16,899.10	\$ 19,352.39	\$ 21,040.39	\$ 22,830.80	\$ 23,287.41
Effective tax rate	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
AT Operating Income	\$ 4,245.50	\$ 9,060.00	\$ 11,829.37	\$ 13,546.68	\$ 14,728.27	\$ 15,981.56	\$ 16,301.19
+ Depreciation	\$ 26,714.00	\$ 27,759	\$ 28,844	\$ 29,972	\$ 31,144	\$ 32,361	
- Cap Ex	\$ 31,854.00	\$ 33,099	\$ 34,394	\$ 35,738	\$ 37,136	\$ 38,588	
- Chg in WC		\$ 472.88	\$ 491.37	\$ 510.58	\$ 530.55	\$ 551.29	
FCFF		\$ 3,246.14	\$ 5,788.19	\$ 7,269.29	\$ 8,205.44	\$ 9,203.68	\$ 13,011.34
Terminal Value						\$ 216,855.71	
Return on capital							12.37%
Cost of Capital		9.91%	9.91%	9.91%	9.91%	9.91%	8.00%
Cumulated Discount Factor		1.0991	1.2080	1.3277	1.4593	1.6039	
Present Value		\$ 2,953.45	\$ 4,791.47	\$ 5,474.95	\$ 5,622.81	\$ 140,940.73	
Value of Operating Assets	\$ 159,783.41						
+ Cash	\$ 31,752.00						
+ Cross Holdings	\$ 33,566.00						
- Debt	\$ 58,379.00						
- Minority Interests	\$ 1,245.00						
Value of Equity	\$ 165,477.41						
Number of shares	4209.7						
Value per share	\$ 39.31						

Added long term investments in joint ventures and subtracted out minority interest in consolidated holdings.

Operating margin converges on Shell's historical average margin of 9.35% from 200-2015

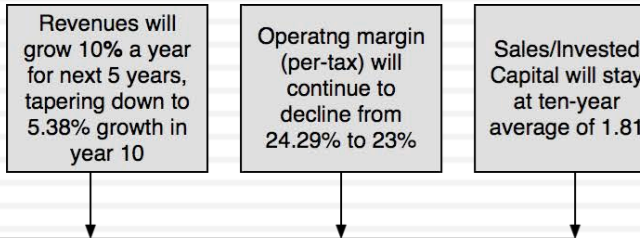
Return on capital reverts and stays at Shell's historic average of 12.37% from 200-2015

Infosys: March 2018 (in Rupees)

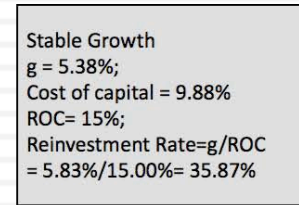
Cash flows from existing assets

	LTM	2011-2017	Industry (US data)
Revenue growth =	3.28%	14.22%	15.31%
Pre-tax operating margin =	24.29%	26.16%	8.35%
Sales to capital ratio =	1.81	2.50	3.69
Return on invested capital =	31.57%	47.80%	27.96%

The Payoff from growth



Maturity and Closure



Rupee Cashflows

Terminal Value = $169,632 / (.0988 - .0538) = 3,769,597$

	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate		10.00%	10.00%	10.00%	10.00%	10.00%	9.08%	8.15%	7.23%	6.30%	5.38%	5.38%
Revenues	₹ 683,119	₹ 751,431	₹ 826,574	₹ 909,231	₹ 1,000,155	₹ 1,100,170	₹ 1,200,021	₹ 1,297,847	₹ 1,391,656	₹ 1,479,386	₹ 1,558,976	₹ 1,642,849
EBIT (Operating) margin	24.29%	24.16%	24.03%	23.90%	23.78%	23.65%	23.52%	23.39%	23.26%	23.13%	23.00%	23.00%
EBIT (Operating income)	₹ 165,945	₹ 181,568	₹ 198,657	₹ 217,348	₹ 237,790	₹ 260,148	₹ 282,208	₹ 303,536	₹ 323,678	₹ 342,170	₹ 358,565	₹ 377,855
Tax rate	28.00%	28.00%	28.00%	28.00%	28.00%	28.00%	28.40%	28.80%	29.20%	29.60%	30.00%	30.00%
EBIT(1-t)	₹ 119,480	₹ 130,729	₹ 143,033	₹ 156,491	₹ 171,209	₹ 187,306	₹ 202,061	₹ 216,118	₹ 229,164	₹ 240,888	₹ 250,995	₹ 264,499
- Reinvestment	₹ 37,842	₹ 41,626	₹ 45,789	₹ 50,368	₹ 55,404	₹ 55,313	₹ 54,191	₹ 51,966	₹ 48,599	₹ 44,090	₹ 39,867	₹ 35,867
FCFF	₹ 92,887	₹ 101,407	₹ 110,702	₹ 120,841	₹ 131,902	₹ 146,747	₹ 161,927	₹ 177,198	₹ 192,289	₹ 206,905	₹ 216,999	₹ 228,632
Cost of capital		11.02%	11.02%	11.02%	11.02%	11.02%	10.80%	10.57%	10.34%	10.11%	9.88%	
Cumulated discount factor		0.9007	0.8113	0.7307	0.6581	0.5928	0.5350	0.4839	0.4386	0.3983	0.3625	
PV(FCFF)	₹ 83,664	₹ 82,268	₹ 80,890	₹ 79,531	₹ 78,190	₹ 78,514	₹ 78,356	₹ 77,712	₹ 76,588	₹ 74,999		

Discount at Rs Cost of Capital (WACC) = 11.02% (.100) = 11.02%

The Risk in the Cash flows

On March 27, 2018, Infosys was trading at Rs 1150/ share

Cost of Equity
11.02%

Cost of Debt
NO DEBT

Weights
E = 100% D = 0%

Riskfree Rate:
Rupee Risk free Rate =
7.33% - 1.95% = 5.38%

Beta = 1.03

Firm's D/E
Ratio: 0%

Business	Revenues	EV/Sales	Estimated Value	Value Weight	Unlevered Beta
Computer Software	₹ 2,101	6.3640	₹ 13,371	13.51%	1.1114
Computer Services	₹ 66,383	1.2899	₹ 85,630	86.49%	1.0136
Company	₹ 68,484		₹ 99,001		1.0268

ERP = 5.50%

Region	Revenues	ERP	Weight	Weighted ERP
North America	₹ 42,408	5.08%	62.01%	3.1499%
Europe	₹ 15,302	6.01%	22.37%	1.3437%
Rest of the World	₹ 8,504	6.21%	12.43%	0.7721%
India	₹ 2,180	7.27%	3.19%	0.2317%
Total	₹ 68,394		100.00%	5.4974%

Heineken: September 2019 (in Euros)

Cash flows from existing assets

	LTM	2013-2018
Revenues	€ 23,119	Growth rate = 3.22%
Operating Margin	14.86%	14.44%
Sales/Invested Capital	0.71	0.79
ROIC	7.46%	8.32%
Effective Tax Rate	29.70%	27.00%

The Payoff from growth

Revenues will grow 3.22% a year for next 5 years, tapering down to -0.5% growth in year 10

Operating margin (per-tax) will drop to 14.00%

Sales/Invested Capital will stay at five-year average of 0.79.

Maturity and Closure

Stable Growth
 $g = -0.5\%$;
 Cost of capital = 5%
 $ROC = 5\%$;
 Reinvestment Rate = $-0.5\%/5\% = -10\%$

Euro Cashflows

Terminal Value = $2972 / (0.05 - (-0.005)) = 54,034$

	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate	3.22%	3.22%	3.22%	3.22%	3.22%	2.48%	1.73%	0.99%	0.24%	-0.50%	-0.50%
Revenues	€ 23,863	€ 24,632	€ 25,425	€ 26,244	€ 27,089	€ 27,759	€ 28,240	€ 28,519	€ 28,589	€ 28,446	€ 28,304
EBIT (Operating) margin	14.38%	14.34%	14.30%	14.26%	14.21%	14.17%	14.13%	14.09%	14.04%	14.00%	14.00%
EBIT (Operating income)	€ 3,432	€ 3,532	€ 3,635	€ 3,741	€ 3,850	€ 3,934	€ 3,990	€ 4,017	€ 4,015	€ 3,982	\$ 3,963
Tax rate	29.70%	29.70%	29.70%	29.70%	29.70%	28.76%	27.82%	26.88%	25.94%	25.00%	\$ 0
EBIT(1-t)	€ 2,413	€ 2,483	€ 2,556	€ 2,630	€ 2,707	€ 2,802	€ 2,880	€ 2,937	€ 2,973	€ 2,987	\$ 2,972
- Reinvestment	€ 942	€ 973	€ 1,004	€ 1,036	€ 1,070	€ 849	€ 609	€ 353	€ 88	€ (181)	\$ (297)
FCFF	€ 1,471	€ 1,511	€ 1,552	€ 1,594	€ 1,637	€ 1,953	€ 2,271	€ 2,584	€ 2,885	€ 3,168	\$ 3,269

Discount at Euro Cost of Capital (WACC) = $7.66\% (.599) + 1.13\% (0.401) = 5.04\%$

The Risk in the Cash flows

On September 1, 2019, Heineken was trading at 93.25 Euros/share

Cost of Equity
7.66%

Cost of Debt
 $(-0.5\% + 2\%)(1 - 0.25) = 1.13\%$

Weights
E = 59.9% D = 40.1%

Riskfree Rate:
Euro Risk free rate = -0.50%

+

Beta = 1.20

x

Unlevered beta of alcoholic beverage business = 0.80

Firm's D/E Ratio: 66.98%

ERP = 6.83%

Region	Revenues	Weight	ERP
Europe	10348	50.24%	6.90%
North America	5920	28.74%	5.75%
Asia	2919	14.17%	7.22%
Latin America & Caribbean	781	3.79%	10.53%
Africa & Mid East	631	3.06%	9.30%
Total	20599	100.00%	6.83%



The **Chimera DCF** mixes dollar cash flows with peso discount rates, nominal cash flows with real costs of capital and cash flows before debt payments with costs of equity, violating basic consistency rules



In a **Trojan Horse DCF**, Just as the Greeks used a wooden horse to smuggle soldiers into Troy, analysts use the Trojan Horse of cash flows to smuggle in a pricing (in the form of a terminal value, estimated by using a multiple).



In a **Dreamstate DCF**, you build amazing companies on spreadsheets, making outlandish assumptions about growth and operating margins over time.



A **Kabuki DCF** is a work of art, where analyst and rule maker (or court) go through the motions of valuation, with the intent of developing models that are legally or accounting-rule defensible rather than yielding reasonable values.

$$D+CF \neq DCF$$



In a **Dissonant DCF**, assumptions about growth, risk and cash flows are not consistent with each other, with little or no explanation given for the mismatch.

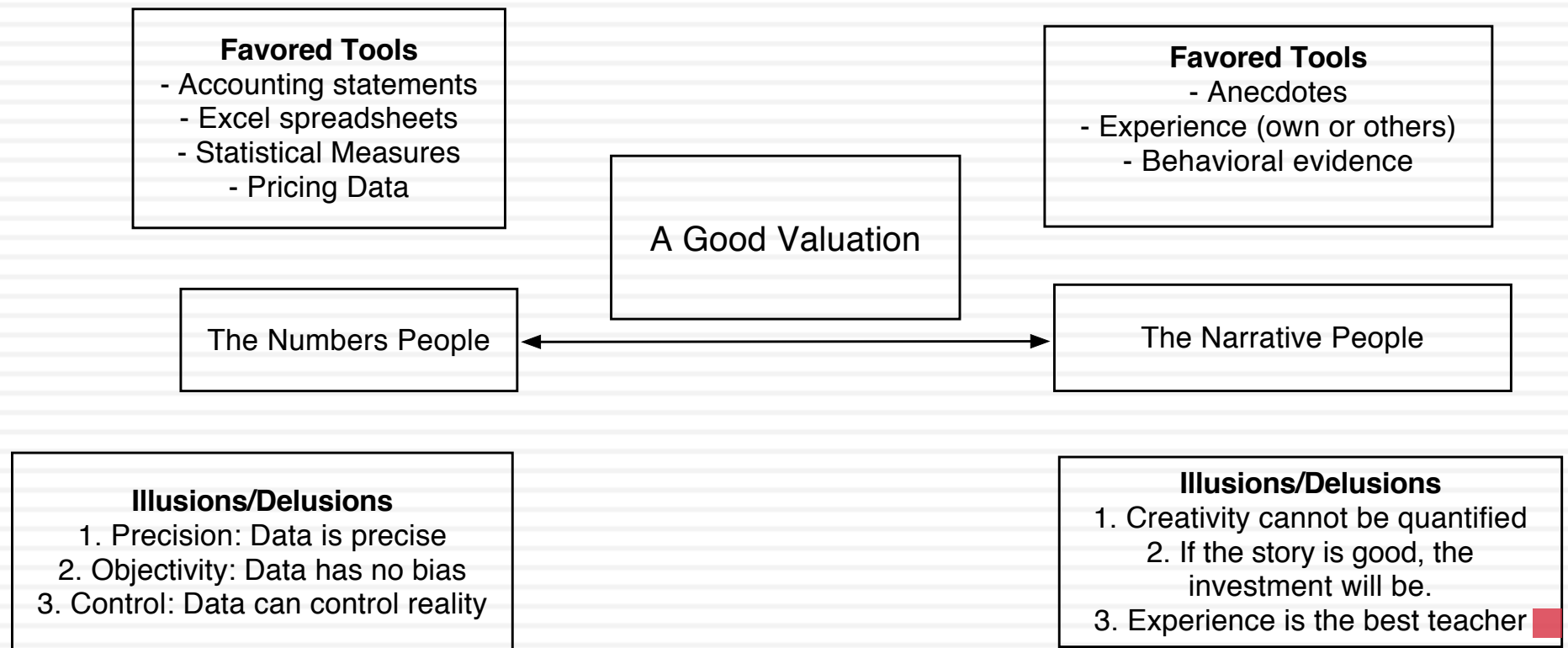


In a **Robo DCF**, the analyst builds a valuation almost entirely from the most recent financial statements and automated forecasts.



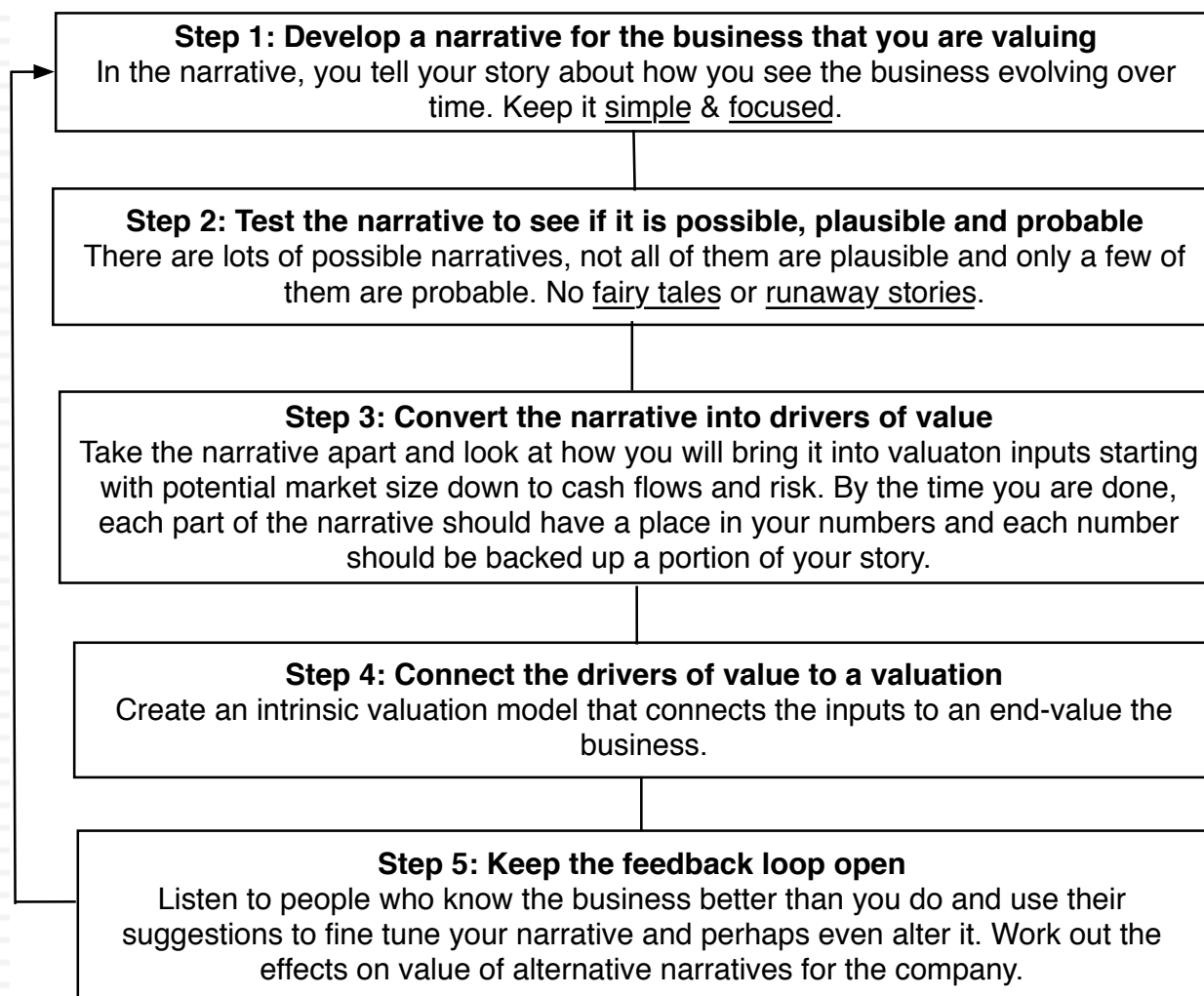
A **Mutant DCF** is a collection of numbers where items have familiar names (free cash flow, cost of capital) but the analyst putting it together has neither a narrative nor a sense of the basic principles of

III. Don't mistake modeling for valuation



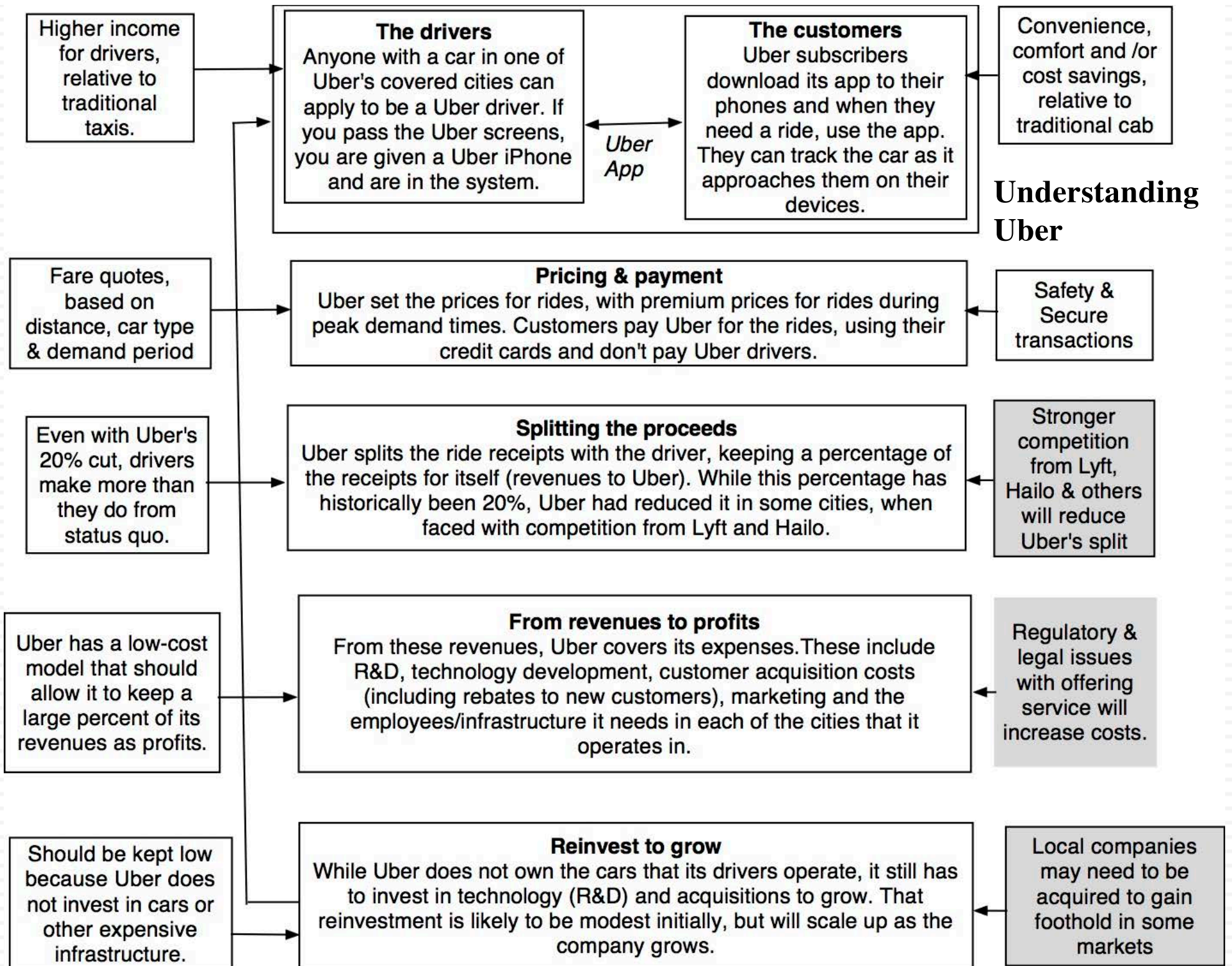
From story to numbers and beyond..

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Step Zero: 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

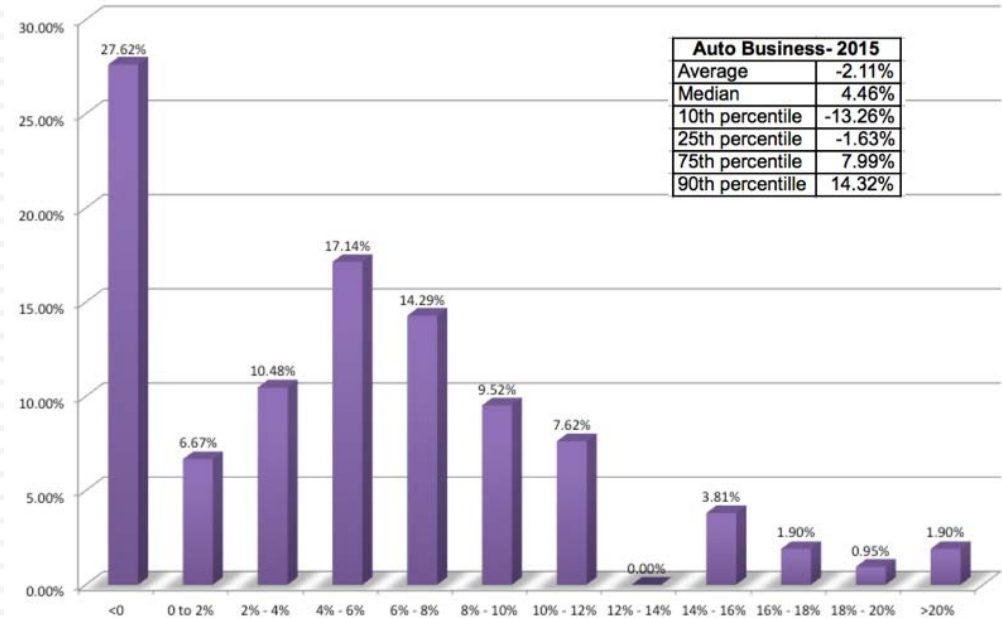
The Auto Business

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 Average =		5.63%

+

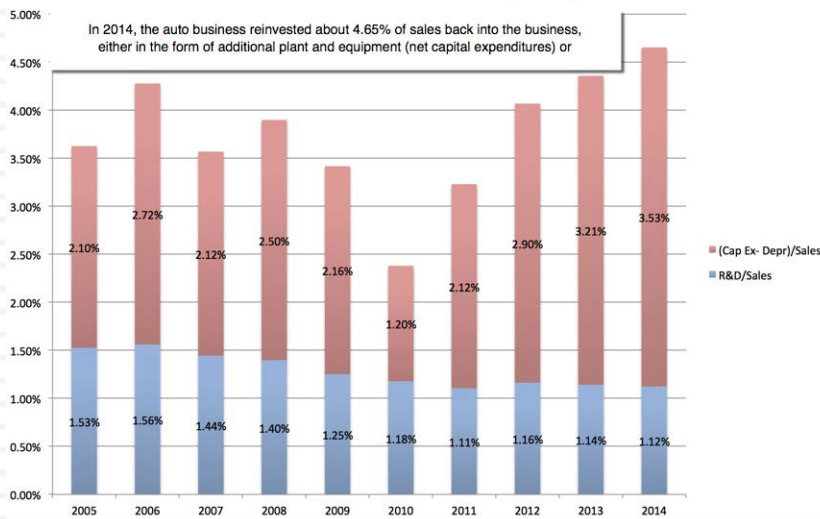
The Automobile Business: Pre-tax Operating Margins in 2015



High & Increasing Reinvestment

Bad Business

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

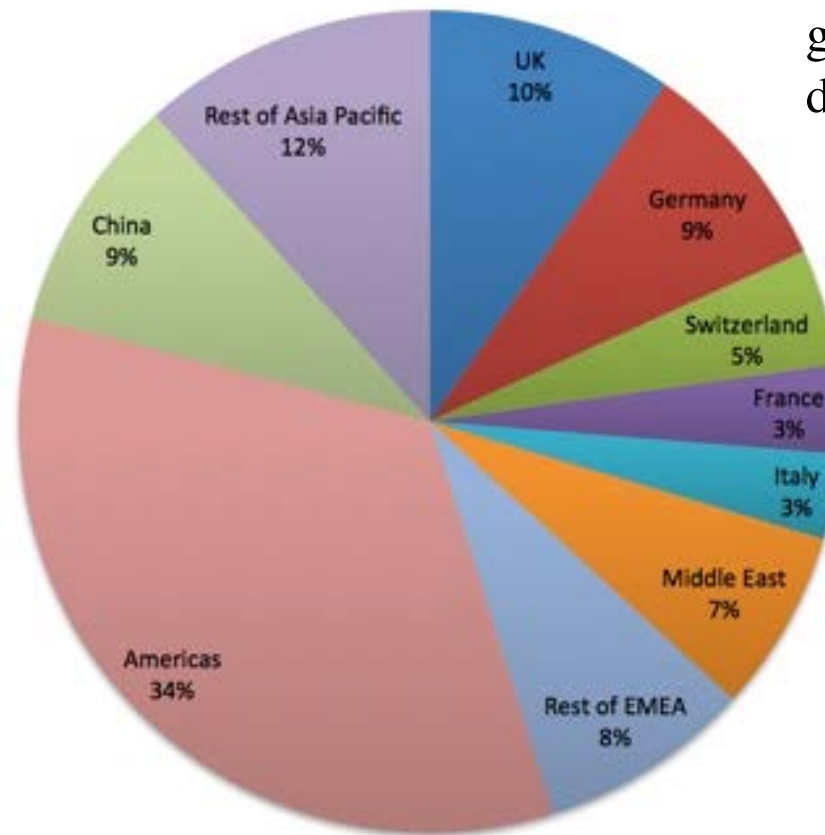
Only once in the last 10 years have auto companies collectively earned more than their cost of capital

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 1: The Uber Narrative

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

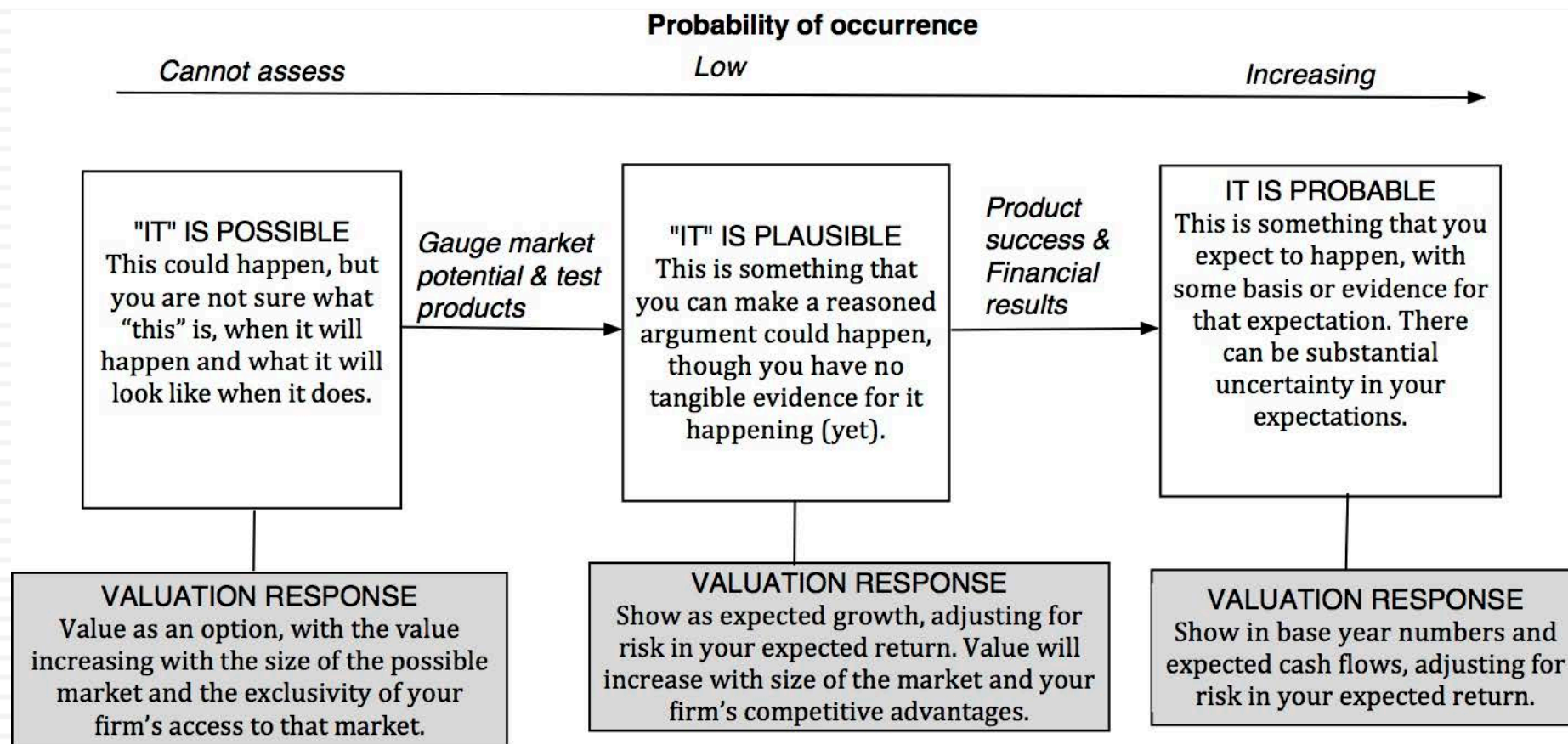
1. An urban car service business: I saw Uber primarily as a force in urban areas and only in the car service business.
2. Which would expand the business moderately (about 40% over ten years) by bringing in new users.
3. With local networking benefits: If Uber becomes large enough in any city, it will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

- 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

51

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.

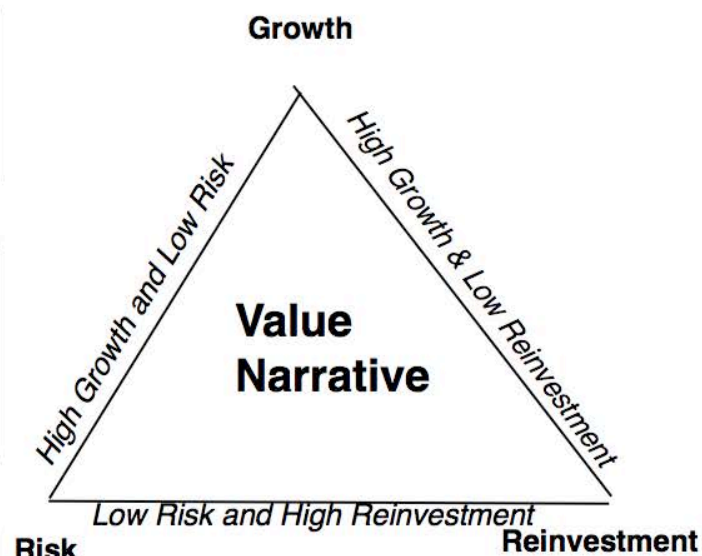
Profits without competition

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

Returns without risk

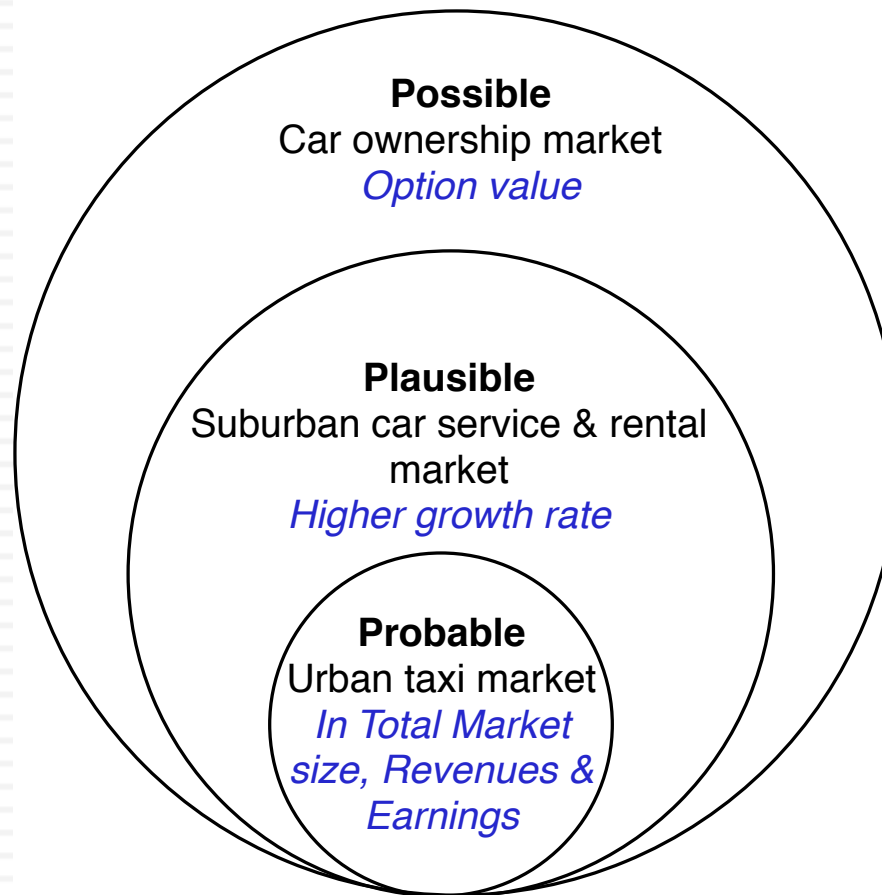
Assuming that you can generate high returns in a business with no risk.

The Improbable



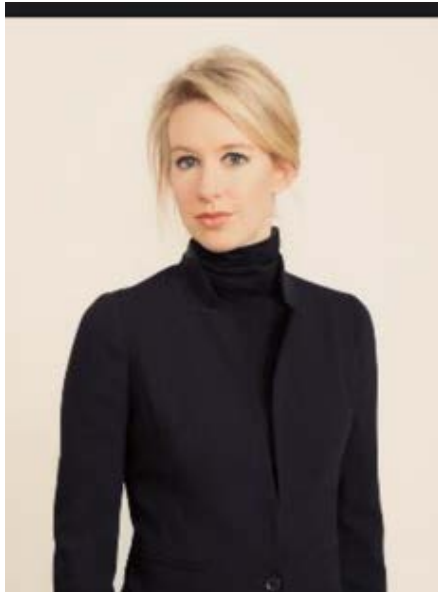
Uber: Possible, Plausible and Probable

Uber (My narrative))



The Impossible: The Runaway Story

The Story



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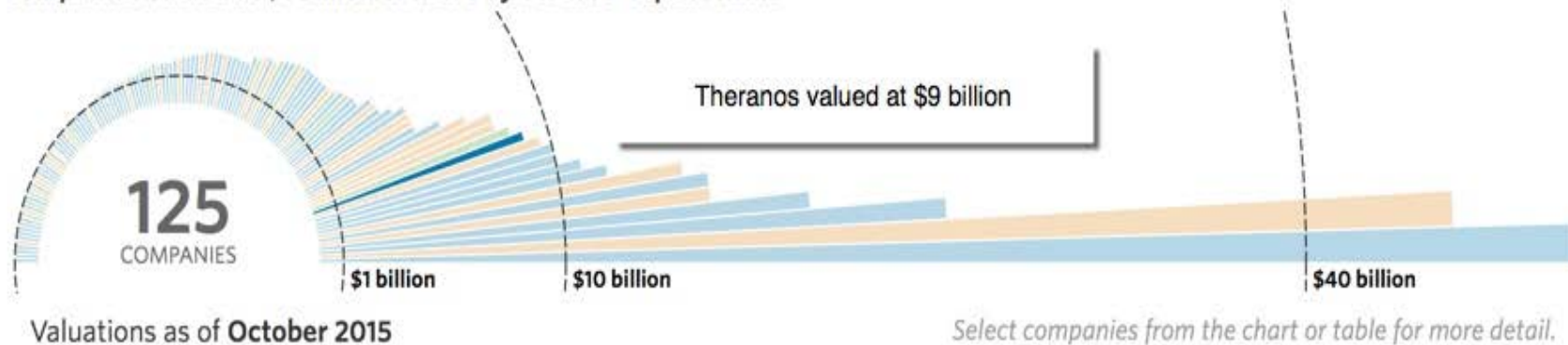
The Checks (?)

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

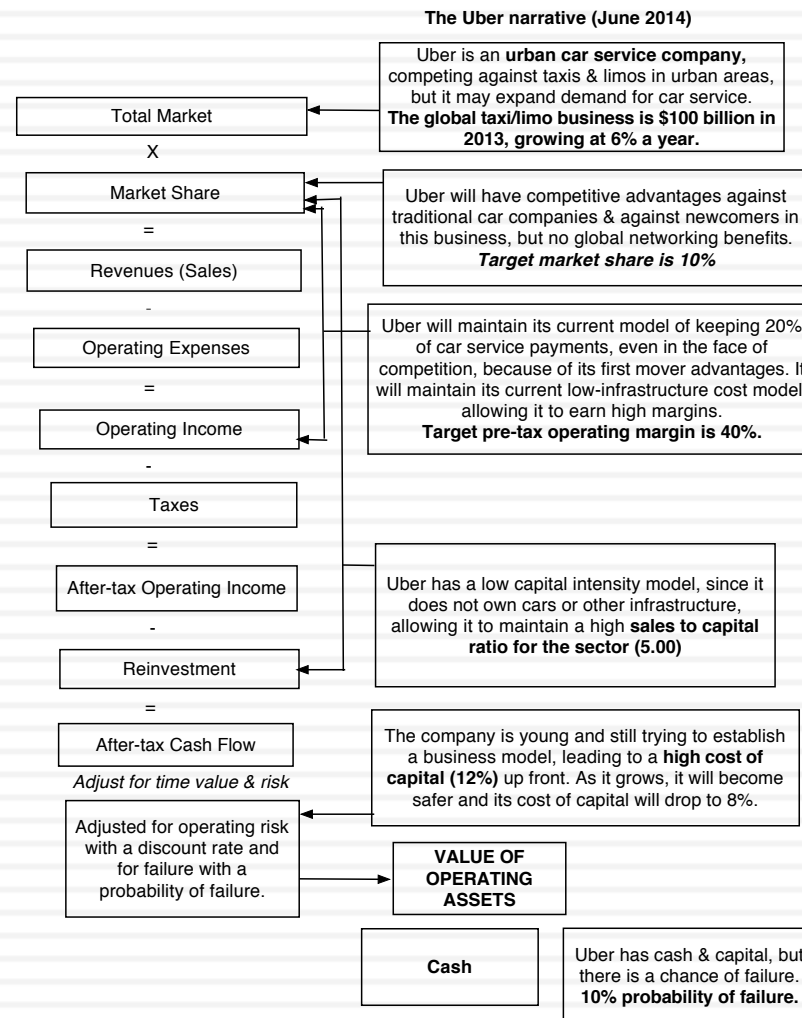
+

Money

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



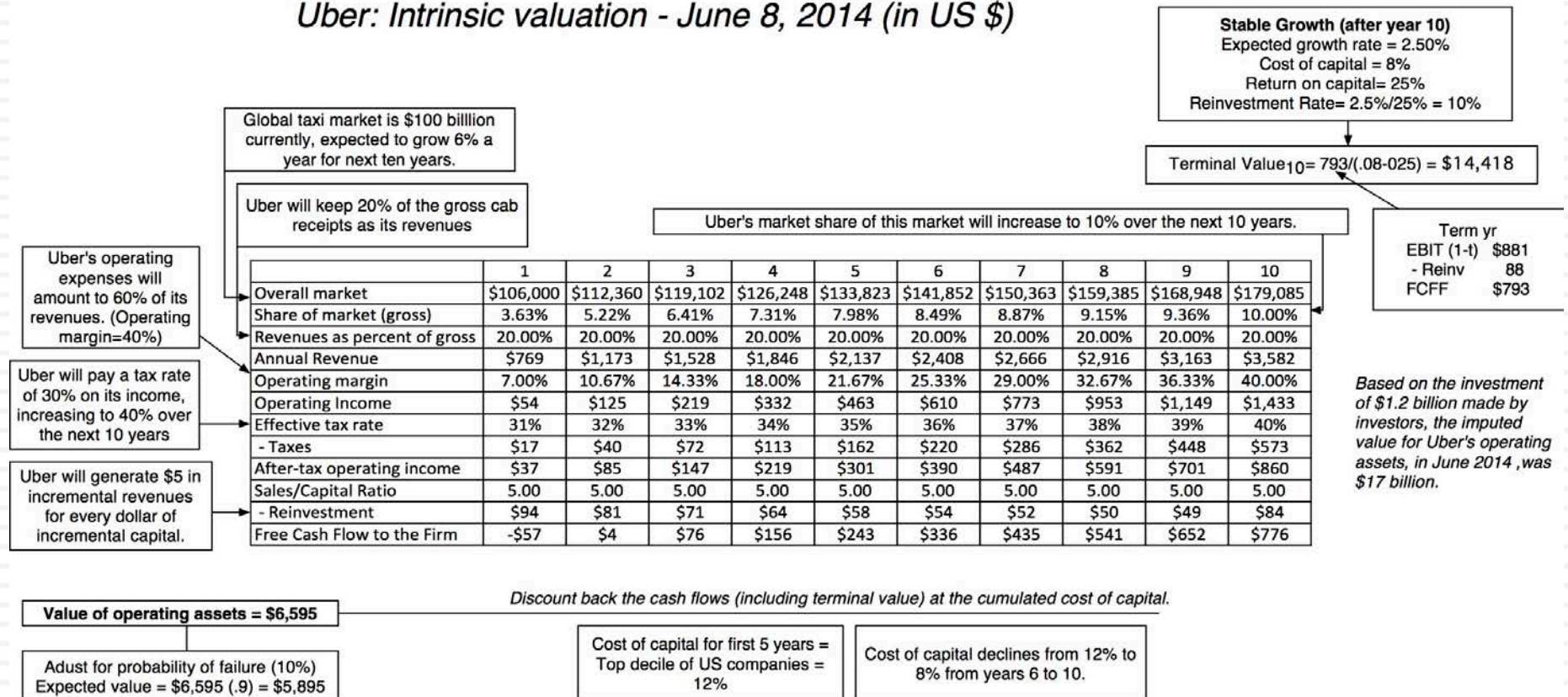
Step 3: Connect your narrative to key drivers of value



Step 4: Value the company (Uber)

55

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 Gurley Pushback

58

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</u> to gain a <u>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</u> to gain a <u>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</u> to get a <u>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 Real World Intrudes: Be ready to modify narrative as events unfold

61

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

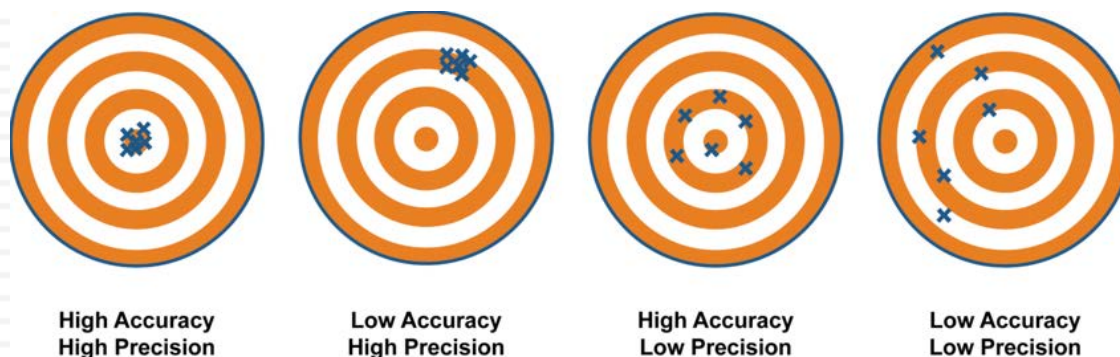
Datalab						
The Story						
Datalab is a small business software company that will find a niche in the business to grow moderately over the next decade, while seeing its margins revert back to historical averages, as it competes against much bigger players. The negative risk free rate notwithstanding, it has a high cost of capital, by Euro standards and it will remain high as the company matures. Finally, there is the possibility that a macroeconomic shock to Slovenia could cause the company to fail, though that probability remains low.						
The Assumptions						
	Base year	Years 1-5	Years 6-10		After year 10	Link to story
Revenues (a)	€ 11.69	6.00% → -0.24%			-0.24%	Small company in a big & growing market. Size and capital constraints keep a cap on growth.
Operating margin (b)	18.58%	18.58% → 10.17%			10.17%	Competitive pressure from larger players
Tax rate	19.00%	19.00% → 19.00%			19.00%	Slovenian tax rate
Reinvestment (c)		Sales to capital ratio 0.87		RIR =	-3.00%	Matches global industry averages
Return on capital	11.31%	Marginal ROIC =	-5.91%		8.00%	Product name allows for excess returns, but they fade over time.
Cost of capital (d)		8.69% → 8.00%			8.00%	Negative risk free rate + High risk business + Slovenian country risk
The Cash Flows						
	Revenues	Operating Margin	EBIT	EBIT (1-t)	Reinvestment	FCFF
1	€ 12.39	16.89%	€ 2.09	€ 1.70	€ 0.81	€ 0.89
2	€ 13.14	15.21%	€ 2.00	€ 1.62	€ 0.86	€ 0.76
3	€ 13.93	13.53%	€ 1.88	€ 1.53	€ 0.91	€ 0.62
4	€ 14.76	11.85%	€ 1.75	€ 1.42	€ 0.96	€ 0.46
5	€ 15.65	10.17%	€ 1.59	€ 1.29	€ 1.02	€ 0.27
6	€ 16.39	10.17%	€ 1.67	€ 1.35	€ 0.86	€ 0.49
7	€ 16.97	10.17%	€ 1.73	€ 1.40	€ 0.66	€ 0.74
8	€ 17.35	10.17%	€ 1.76	€ 1.43	€ 0.44	€ 0.99
9	€ 17.52	10.17%	€ 1.78	€ 1.44	€ 0.20	€ 1.24
10	€ 17.48	10.17%	€ 1.78	€ 1.44	€ (0.05)	€ 1.49
Terminal year	€ 17.44	10.17%	€ 1.77	€ 1.44	€ -	€ 1.44
The Value						
Terminal value	€ 17.43					
PV(Terminal value)	€ 7.72					
PV (CF over next 10 years)	€ 4.93					
Value of operating assets =	€ 12.65					
Adjustment for distress	€ 0.32			Probability of failure =	5.00%	
- Debt & Minority Interests	€ 3.12					
+ Cash & Other Non-operating assets	€ 1.20					
Value of equity	€ 10.42					
- Value of equity options	€ -					
Number of shares	2.19					
Value per share	€ 4.77			Stock was trading at =	€ 4.00	

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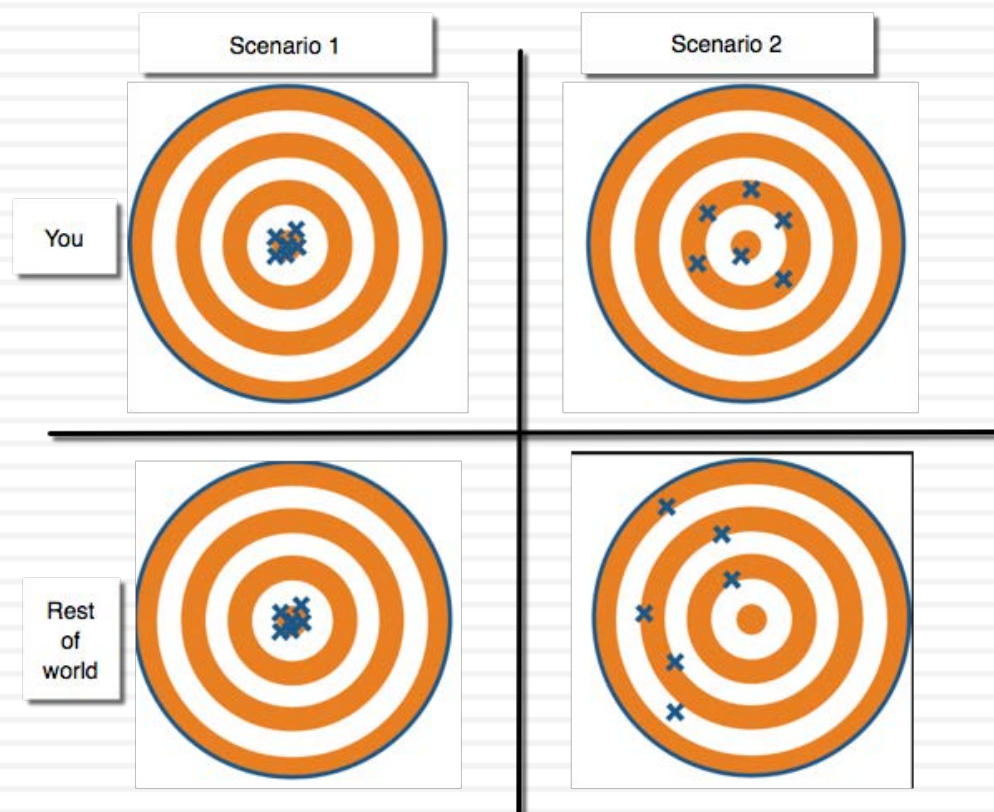
IV. Don't mistake precision for accuracy.. And accuracy for payoff..

63

Better accurate
than precise



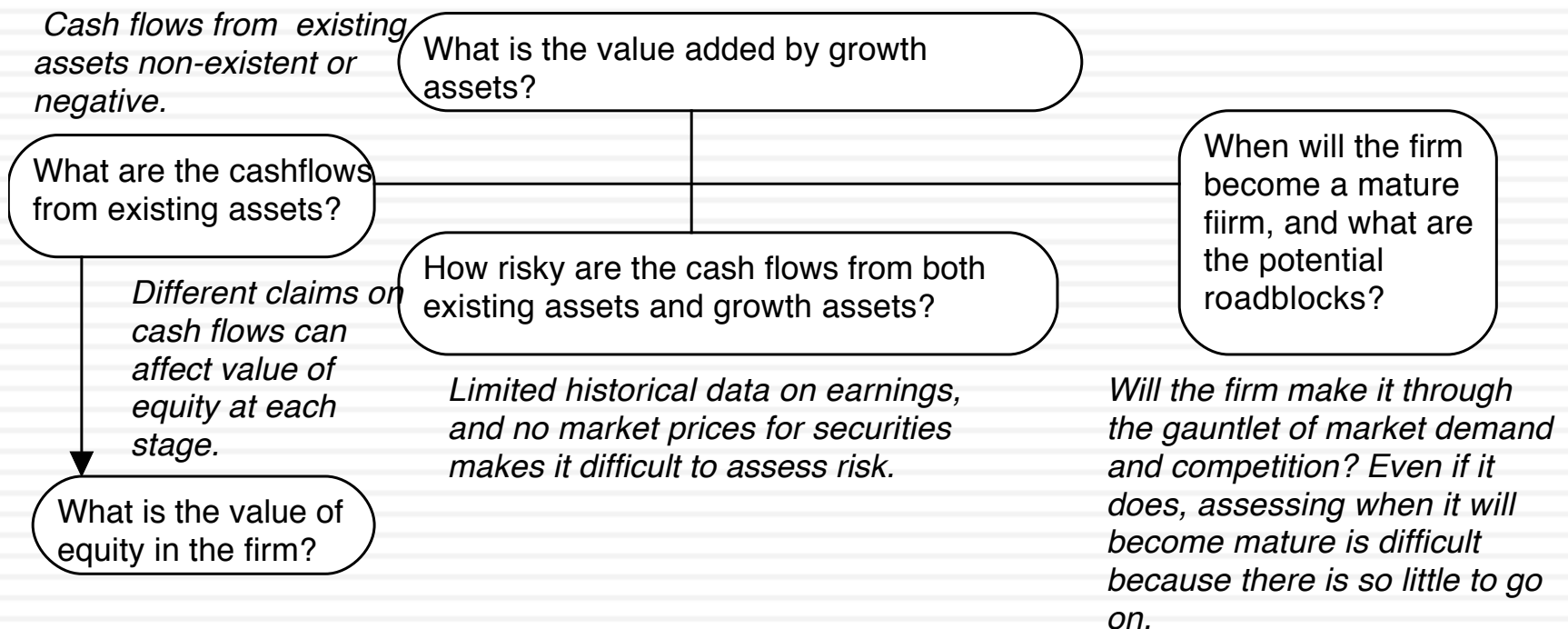
It's all relative



Valuing a start up is hard to do..

Figure 3: Estimation Issues - Young and Start-up Companies

Making judgments on revenues/ profits difficult because you cannot draw on history. If you have no product/service, it is difficult to gauge market potential or profitability. The company's entire value lies in future growth but you have little to base your estimate on.



And the dark side will beckon..

65

- With young start up companies, you will be told that it is “too difficult” or even “impossible” to value these companies, because there is so little history and so much uncertainty in the future.
- Instead, you will be asked to come over to the “dark side”, where
 - ▣ You will see value metrics that you have never seen before
 - ▣ You will hear “macro” stories, justifying value
 - ▣ You will be asked to play the momentum game
- While all of this behavior is understandable, none of it makes the uncertainty go away. You have a choice. You can either hide from uncertainty or face up to it.

Twitter: Setting the table in October 2013

	Last 10K	Trailing 12 month
Revenues	\$316.93	\$534.46
Operating Income	(\$77.06)	(\$134.91)
Adjusted Operating Income		\$7.66
Invested Capital		\$955.00
Adjusted Operating Margin		1.44%
Sales/ Invested Capital		\$0.56

Twitter: Priming the Pump for Valuation

1. Make small revenues into big revenues

	2011		2012		2013	
	%	\$	%	\$	%	\$
Google	32.09%	\$27.74	31.46%	\$32.73	33.24%	\$38.83
Facebook	3.65%	\$3.15	4.11%	\$4.28	5.04%	\$5.89
Yahoo!	3.95%	\$3.41	3.37%	\$3.51	3.10%	\$3.62
Microsoft	1.27%	\$1.10	1.63%	\$1.70	1.78%	\$2.08
IAC	1.15%	\$0.99	1.39%	\$1.45	1.47%	\$1.72
AOL	1.17%	\$1.01	1.02%	\$1.06	0.95%	\$1.11
Amazon	0.48%	\$0.41	0.59%	\$0.61	0.71%	\$0.83
Pandora	0.28%	\$0.24	0.36%	\$0.37	0.50%	\$0.58
Twitter	0.16%	\$0.14	0.28%	\$0.29	0.50%	\$0.58
Linkedin	0.18%	\$0.16	0.25%	\$0.26	0.32%	\$0.37
Millennial Media	0.05%	\$0.04	0.07%	\$0.07	0.10%	\$0.12
Other	55.59%	\$48.05	55.47%	\$57.71	52.29%	\$61.09
Total Market	100%	\$86.43	100.00%	\$104.04	100.00%	\$116.82

		Annual growth rate in Global Advertising Spending				
		2.00%	2.50%	3.00%	3.50%	4.00%
Online advertising share of market	20%	\$124.78	\$131.03	\$137.56	\$144.39	\$151.52
	25%	\$155.97	\$163.79	\$171.95	\$180.49	\$189.40
	30%	\$187.16	\$196.54	\$206.34	\$216.58	\$227.28
	35%	\$218.36	\$229.30	\$240.74	\$252.68	\$265.16
	40%	\$249.55	\$262.06	\$275.13	\$288.78	\$303.04

My estimate for 2023: Overall online advertising market will be close to \$200 billion and Twitter will have about 5.7% (\$11.5 billion)

Aswath Damodaran

2. Make losses into profits

Company	Operating Margin
Google Inc. (NasdaqGS:GOOG)	22.82%
Facebook, Inc. (NasdaqGS:FB)	29.99%
Yahoo! Inc. (NasdaqGS:YHOO)	13.79%
Netfix	3.16%
Groupon	2.53%
LinkedIn Corporation (NYSE:LNKD)	5.18%
Pandora Media, Inc. (NYSE:P)	-9.13%
Yelp, Inc. (NYSE:YELP)	-6.19%
OpenTable, Inc. (NasdaqGS:OPEN)	24.90%
RetailMeNot	45.40%
Travelzoo Inc. (NasdaqGS:TZOO)	15.66%
Zillow, Inc. (NasdaqGS:Z)	-66.60%
Trulia, Inc. (NYSE:TRLA)	-6.79%
Aggregate	20.40%

My estimate for Twitter: Operating margin of 25% in year 10

3. Reinvest for growth

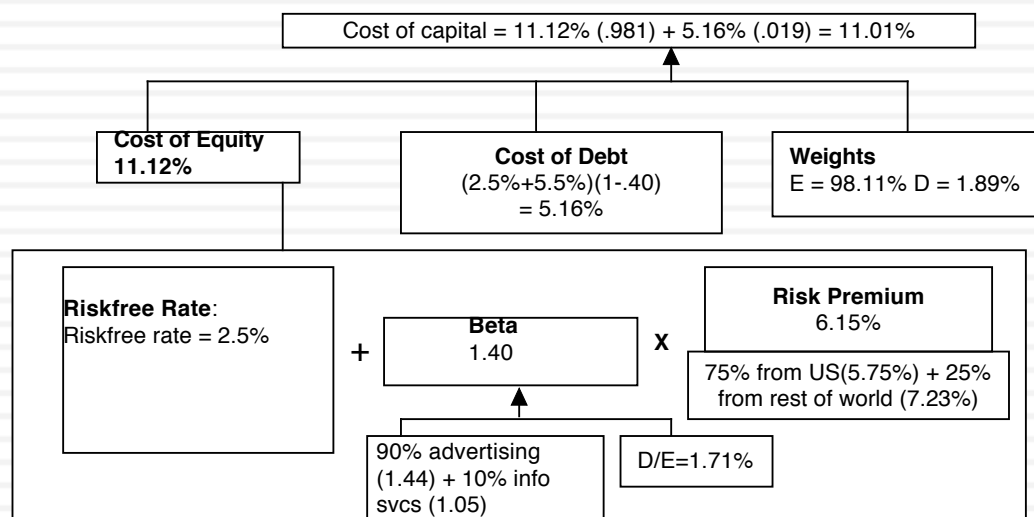
	Sales/ Invested Capital
Twitter (2013)	1.10
Advertising Companies	1.40
Social Media Companies	1.05

My estimate for Twitter: Sales/Capital will be 1.50 for next 10 years

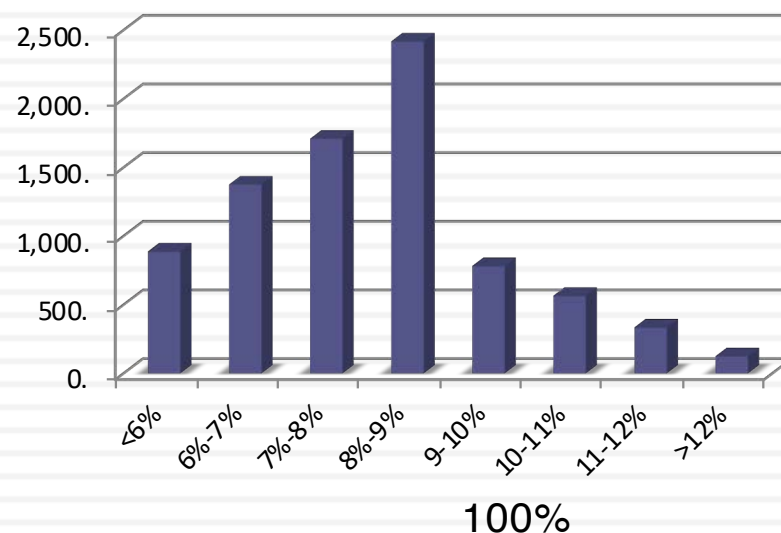
The Cost of Capital for Twitter

Risk in the discount rate

My estimate for Twitter



Cost of Capital: US - Nov '13



0%

Survival Risk

100%

Probability that the firm will not make it as a going concern

Certain to make it as going concern

Certain to fail

My assumption for Twitter

Starting numbers

	Last 10K	Trailing 12 month
Revenues	\$316.93	\$534.46
Operating income	-\$77.06	-\$134.91
Adjusted Operating Income		\$7.67
Invested Capital		\$955.00
Adjusted Operatng Margin		1.44%
Sales/ Invested Capital		0.56
Interest expenses	\$2.49	\$5.30

Revenue growth of 51.5% a year for 5 years, tapering down to 2.5% in year 10

Pre-tax operating margin increases to 25% over the next 10 years

Sales to capital ratio of **1.50** for incremental sales

Stable Growth
 $g = 2.5\%$; $\text{Beta} = 1.00$;
 Cost of capital = 8%
 $\text{ROC} = 12\%$;
 $\text{Reinvestment Rate} = 2.5\%/12\% = 20.83\%$

Terminal Value₁₀ = $1466 / (.08 - .025) = \$26,657$

		1	2	3	4	5	6	7	8	9	10	
Operating assets	\$9,705	Revenues	\$ 810	\$1,227	\$1,858	\$2,816	\$4,266	\$6,044	\$7,973	\$9,734	\$10,932	\$11,205
+ Cash	321	Operating Income	\$ 31	\$ 75	\$ 158	\$ 306	\$ 564	\$ 941	\$1,430	\$1,975	\$ 2,475	\$ 2,801
+ IPO Proceeds	1295	Operating Income after tax	\$ 31	\$ 75	\$ 158	\$ 294	\$ 395	\$ 649	\$ 969	\$1,317	\$ 1,624	\$ 1,807
- Debt	214	- Reinvestment	\$ 183	\$ 278	\$ 421	\$ 638	\$ 967	\$1,186	\$1,285	\$1,175	\$ 798	\$ 182
Value of equity	11,106	FCFF	\$(153)	\$(203)	\$(263)	\$(344)	\$(572)	\$(537)	\$(316)	\$ 143	\$ 826	\$ 1,625
- Options	713											
Value in stock	10,394											
/ # of shares	582.46											
Value/share	\$17.84											

Cost of capital = 11.12% (.981) + 5.16% (.019) = 11.01%

Cost of 8% from

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

Cost of capital = $11.12\% (.981) + 5.16\% (.019) = 11.01\%$

Cost of capital decreases to 8% from years 6-10

Cost of Equity
11.12%

Cost of Debt
 $(2.5\% + 5.5\%)(1 - .40)$
 $= 5.16\%$

Weights
 $E = 98.1\%$ $D = 1.9\%$

Riskfree Rate:
 Riskfree rate = 2.5%

Beta
1.40

Risk Premium
6.15%

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

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

D/E = 1.71%

A sobering reminder: You will be “wrong” and it is okay

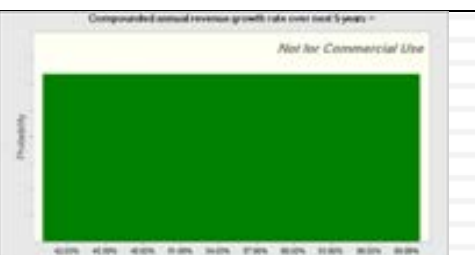
70

- No matter how careful you are in getting your inputs and how well structured your model is, your estimate of value will change both as new information comes out about the company, the business and the economy.
- As information comes out, you will have to adjust and adapt your model to reflect the information. Rather than be defensive about the resulting changes in value, recognize that this is the essence of risk.
- Remember that it is not just your value that is changing, but so is the price, and the price will change a great deal more than the value.

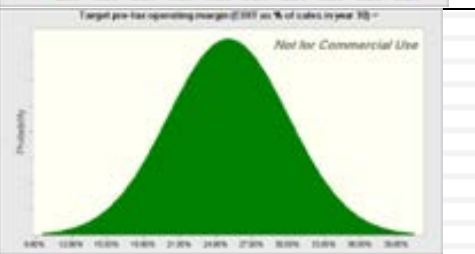
And your value is not a fact, but an estimate..

71

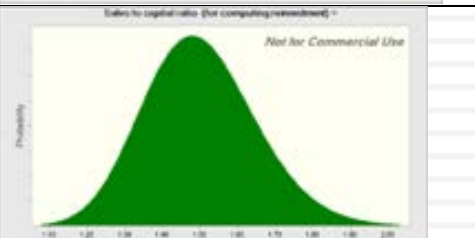
Revenue Growth Rate
Distribution: Uniform
Expected Value = 55%
Minimum Value: 40%
Maximum Value: 70%



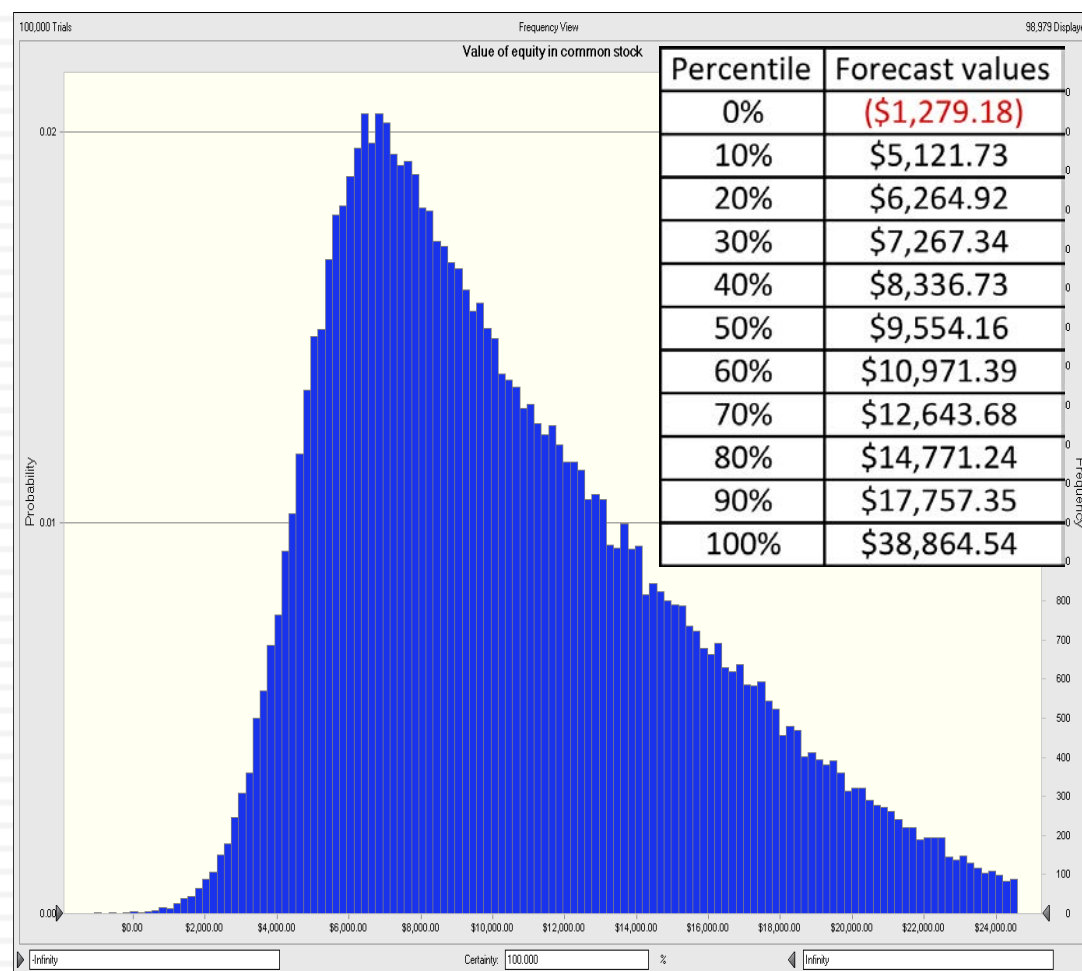
Target Operating Margin
Distribution: Normal
Expected Value = 25%
Standard Deviation = 5%



Sales to Capital Ratio
Distribution: Lognormal
Expected value: 1.50
Standard deviation: 0.15



Cost of Capital
Distribution: Triangular
Expected value: 11.22%
Minimum value: 10.02%
Maximum value: 12.22%



Forecasting in the face of uncertainty. A test:

72

- In which of these two cities would you find it easier to forecast the weather?

Weather changeability for Honolulu, Hawaii

Temperature	Last Month	Last Year
Average change in high temperature day-to-day	1.7°	1.2°
Average change in low temperature day-to-day	1.5°	2.0°

Precipitation	Last Month	Last Year
Chance of dry day after a precip day	67%	81%
Chance of precip day after a dry day	7%	13%

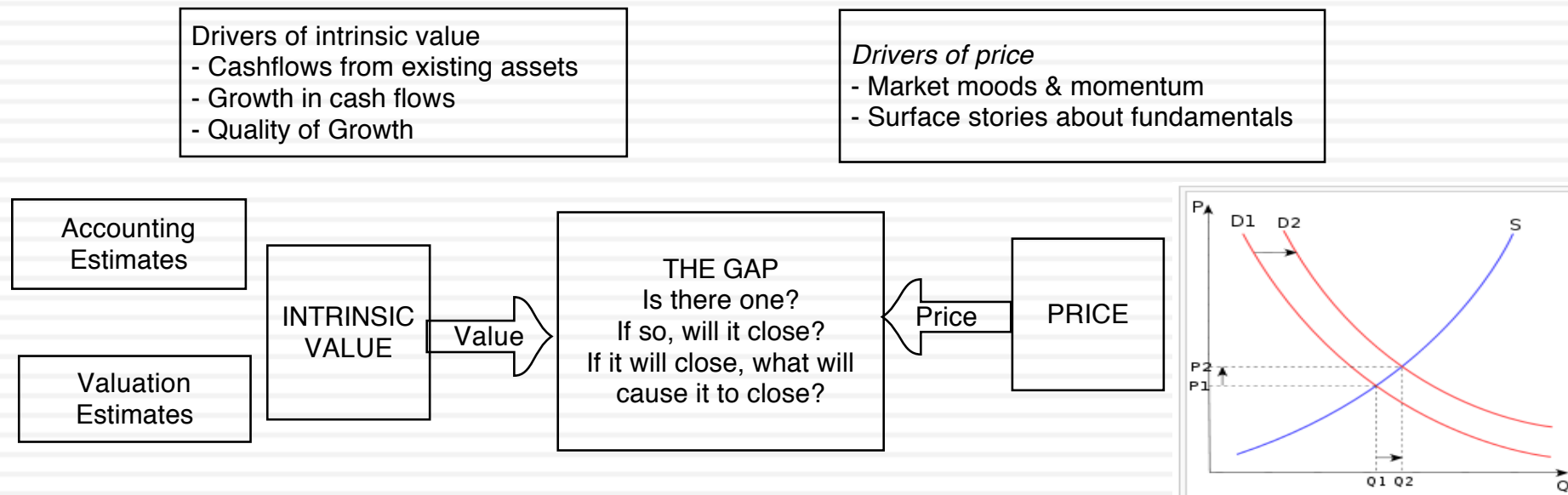
Weather changeability for Epping, North Dakota

Temperature	Last Month	Last Year
Average change in high temperature day-to-day	8.5°	7.7°
Average change in low temperature day-to-day	7.1°	8.6°

Precipitation	Last Month	Last Year
Chance of dry day after a precip day	50%	65%
Chance of precip day after a dry day	38%	20%

V. Price $\neq$ Value

73



Test 1: Are you pricing or valuing?

74

**5369 La Jolla Mesa Dr**
La Jolla, CA 92037
Status: Active

\$995,000
Price

3
Beds

2.5
Baths

1,440 Sq. Ft.
\$691 / Sq. Ft.

Built: 1955 Lot Size: 3,000 Sq. Ft. On Redfin: 12 days

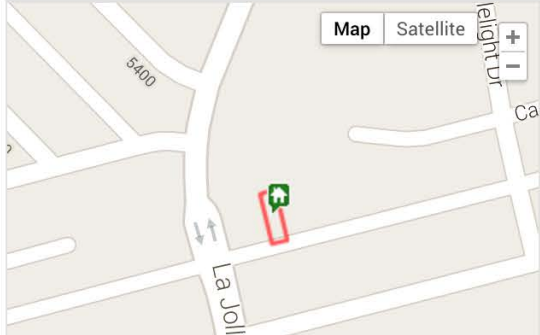
Favorite X-Out Share... Tour Home

Overview Property Details Tour Insights Property History Public Records Activity Schools Neighborhood & Offer Insights Similar Homes



**Lisa Padilla**
REDFIN Real Estate Agent
★★★★★
47 client reviews
\$8,726 commission refund
Go Tour This Home
[Ask Lisa a Question](#) or [Start an Offer](#)

1 of 4 Redfin Agents in this area



1 of 25  **Play Video**

Test 2: Are you pricing or valuing?

75

Europe
Switzerland

Biotechnology
Biotechnology

Reuters
BION.S

Bloomberg
BION SW

Exchange
SWX
Ticker
BION

Strong sector and stock-picking continue

Impressive performance

Over the past two years, BB Biotech shares have roughly tripled, which could tempt investors to take profits. However, this performance has been well backed by a deserved revival of the biotech industry, encouraging fundamental news, M&A, and increased money flow into health care stocks. In addition, BBB returned to index outperformance by modifying its stock-picking approach. Hence, despite excellent performance, the shares still trade at a 23% discount to the net asset value of the portfolio. Hence, the shares are an attractive value vehicle to capture growth opportunities in an attractive sector.

Biotech industry remains attractive

With the re-rating of the pharma sector, investors have also showed increased interest in biotech stocks. Established biotech stocks have delivered encouraging financial results and approvals, while there has also been substantial industry consolidation, which is not surprising in times of "cheap" money and high liquidity. BB Biotech remains an attractive vehicle to capture the future potential of the biotech sector. In addition, investors benefit from a 23% discount to NAV and attractive cash distribution policy of 5% yield p.a. Hence, we reiterate our Buy on BB Biotech shares.

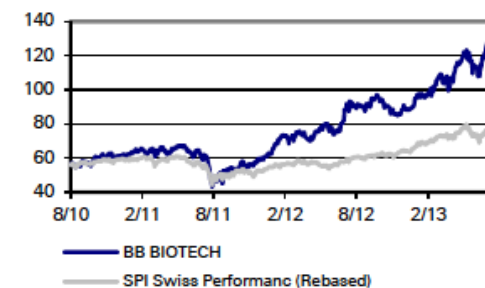
Price at 12 Aug 2013 (CHF)	124.00
Price Target (CHF)	164.50
52-week range (CHF)	128.40 - 84.90

Key changes

Target Price	106.50 to 164.50	↑	54.5%
--------------	------------------	---	-------

Source: Deutsche Bank

Price/price relative



Performance (%)	1m	3m	12m
Absolute	-1.4	5.4	37.4

The determinants of price

76

Mood and Momentum

Price is determined in large part by mood and momentum, which, in turn, are driven by behavioral factors (panic, fear, greed).

Liquidity & Trading Ease

While the value of an asset may not change much from period to period, liquidity and ease of trading can, and as it does, so will the price.

The Market Price

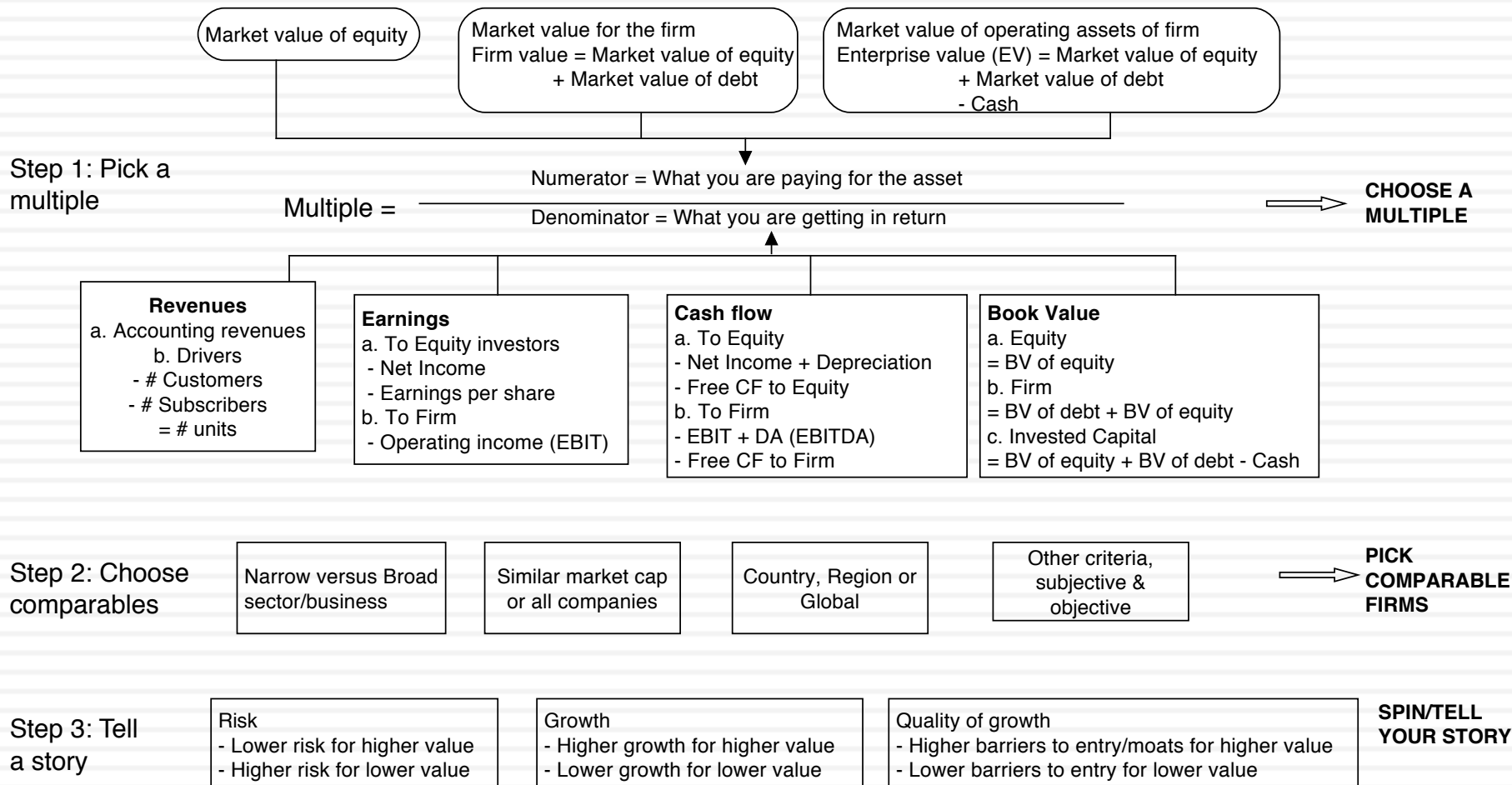
Incremental information

Since you make money on price changes, not price levels, the focus is on incremental information (news stories, rumors, gossip) and how it measures up, relative to expectations

Group Think

To the extent that pricing is about gauging what other investors will do, the price can be determined by the "herd".

Multiples and Comparable Transactions



To be a better pricer, here are four suggestions

- Check your multiple or consistency/uniformity
 - In use, the same multiple can be defined in different ways by different users. When comparing and using multiples, estimated by someone else, it is critical that we understand how the multiples have been estimated
- Look at all the data, not just the key statistics
 - Too many people who use a multiple have no idea what its cross sectional distribution is. If you do not know what the cross sectional distribution of a multiple is, it is difficult to look at a number and pass judgment on whether it is too high or low.
- Don't forget the fundamentals ultimately matter
 - It is critical that we understand the fundamentals that drive each multiple, and the nature of the relationship between the multiple and each variable.
- Don't define comparables based only on sector
 - Defining the comparable universe and controlling for differences is far more difficult in practice than it is in theory.

Classifying Investments

1. Cash flow generating assets: Generate cash flows now or are expected to do so in the future. Can be a fixed cash flow claim, a residual claim or a contingent claim.
2. Commodities: Used as raw material to meet another need (energy, food etc.).
3. Currencies: Measure of cash flows, medium of exchange or store of value.
4. Collectibles: May have aesthetic or emotional value but derives its pricing from its scarcity (supply) and the perception of others that it is wanted.

Value versus Price

	To value	To price
Assets	Can be valued based upon expected cashflows, with higher cashflows & lower risk = higher value.	Can be priced against similar assets, after controlling for cash flows and risk.
Commodity	Can be valued, based upon utilitarian demand and supply, but with long lags in both.	Can be priced against its own history (normalized price over time)
Currency	Cannot be valued	Can be priced against other currencies, with greater acceptance & more stable purchasing power = higher price.
Collectible	Cannot be valued	Can be priced based upon scarcity and desirability.

Trading versus Investing

	The Pricing Game	The Value Game
Underlying philosophy	The price is the only real number that you can act on. No one knows what the value of an asset is and estimating it is of little use.	Every asset has a fair or true value. You can estimate that value, albeit with error, and price has to converge on value (eventually).
To play the game	You try to guess which direction the price will move in the next period(s) and trade ahead of the movement. To win the game, you have to be right more often than wrong about direction and to exit before the winds shift.	You try to estimate the value of an asset, and if it is under(over) value, you buy (sell) the asset. To win the game, you have to be right about value (for the most part) and the market price has to move to that value
Key drivers	Price is determined by demand & supply, which in turn are affected by mood and momentum.	Value is determined by cash flows, growth and risk.
Information effect	Incremental information (news, stories, rumors) that shifts the mood will move the price, even if it has no real consequences for long term value.	Only information that alter cash flows, growth and risk in a material way can affect value.
Tools of the game	(1) Technical indicators, (2) Price Charts (3) Investor Psychology	(1) Ratio analysis, (2) DCF Valuation (3) Accounting Research
Time horizon	Can be very short term (minutes) to mildly short term (weeks, months).	Long term
Key skill	Be able to gauge market mood/momentum shifts earlier than the rest of the market.	Be able to “value” assets, given uncertainty.
Key personality traits	(1) Market amnesia (2) Quick Acting (3) Gambling Instincts	(1) Faith in “value” (2) Faith in markets (3) Patience (4) Immunity from peer pressure
Biggest Danger(s)	Momentum shifts can occur quickly, wiping out months of profits in a few hours.	The price may not converge on value, even if your value is “right”.
Added bonus	Capacity to move prices (with lots of money and lots of followers).	Can provide the catalyst that can move price to value.
Most Delusional Player	A trader who thinks he is trading based on value.	A value investor who thinks he can reason with markets.

The determinants of price

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Mood and Momentum

Price is determined in large part by mood and momentum, which, in turn, are driven by behavioral factors (panic, fear, greed).

Liquidity & Trading Ease

While the value of an asset may not change much from period to period, liquidity and ease of trading can, and as it does, so will the price.

The Market Price

Incremental information

Since you make money on price changes, not price levels, the focus is on incremental information (news stories, rumors, gossip) and how it measures up, relative to expectations

Group Think

To the extent that pricing is about gauging what other investors will do, the price can be determined by the "herd".

Infosys: Priced against other Indian tech firms

	Trailing PE	PEG	PBV	EV/Sales	Expected Growth	ROE	Operating Margin
Infosys	15.42	1.99	3.97	3.40	8.90%	25.49%	24.29%
TCS	21.02	1.90	6.72	4.60	10.90%	33.23%	25.02%
HCL	15.22	1.34	3.82	2.99	12.30%	30.14%	20.11%
Wipro	14.72	1.83	2.63	2.47	9.12%	17.81%	16.23%
IT India (99 companies)							
25th Percentile	13.75	0.57	1.00	0.72	11.10%	0.88%	1.61%
Median	18.92	1.33	1.83	1.52	13.80%	11.45%	7.69%
75th Percentile	26.94	1.99	3.44	2.68	36.00%	21.13%	14.56%

Controlling for Differences?

- There are clear differences in fundamentals across IT companies, especially when it comes to margins and ROE, which may explain variation in pricing multiples.
- Regressing EV/Sales against pre-tax operating margin, for instance:

$$\text{EV/ Sales} = \begin{matrix} 0.924 \\ (2.82) \end{matrix} + \begin{matrix} 12.93 \\ (8.74) \end{matrix} \text{ Operating Margin} \quad R^2 = 44.5\%$$

- Plugging in Infosys operating margin (24.29%) into the regression, we get:

$$\text{EV/ Sales} = 0.924 + 12.93 (.2429) = 3.04$$

At 3.40 times sales, Infosys looks over priced by about 10% against other Indian IT companies.

Pricing Twitter: Start with the “comparables”

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<i>Company</i>	<i>Market Cap</i>	<i>Enterprise value</i>	<i>Revenues</i>	<i>EBITDA</i>	<i>Net Income</i>	<i>Number of users (millions)</i>	<i>EV/User</i>	<i>EV/Revenue</i>	<i>EV/EBITDA</i>	<i>PE</i>
Facebook	\$173,540.00	\$160,090.00	\$7,870.00	\$3,930.00	\$1,490.00	1230.00	\$130.15	20.34	40.74	116.47
Linkedin	\$23,530.00	\$19,980.00	\$1,530.00	\$182.00	\$27.00	277.00	\$72.13	13.06	109.78	871.48
Pandora	\$7,320.00	\$7,150.00	\$655.00	-\$18.00	-\$29.00	73.40	\$97.41	10.92	NA	NA
Groupon	\$6,690.00	\$5,880.00	\$2,440.00	\$125.00	-\$95.00	43.00	\$136.74	2.41	47.04	NA
Netflix	\$25,900.00	\$25,380.00	\$4,370.00	\$277.00	\$112.00	44.00	\$576.82	5.81	91.62	231.25
Yelp	\$6,200.00	\$5,790.00	\$233.00	\$2.40	-\$10.00	120.00	\$48.25	24.85	2412.50	NA
Open Table	\$1,720.00	\$1,500.00	\$190.00	\$63.00	\$33.00	14.00	\$107.14	7.89	23.81	52.12
Zynga	\$4,200.00	\$2,930.00	\$873.00	\$74.00	-\$37.00	27.00	\$108.52	3.36	39.59	NA
Zillow	\$3,070.00	\$2,860.00	\$197.00	-\$13.00	-\$12.45	34.50	\$82.90	14.52	NA	NA
Trulia	\$1,140.00	\$1,120.00	\$144.00	-\$6.00	-\$18.00	54.40	\$20.59	7.78	NA	NA
Tripadvisor	\$13,510.00	\$12,860.00	\$945.00	\$311.00	\$205.00	260.00	\$49.46	13.61	41.35	65.90
						Average	\$130.01	11.32	350.80	267.44
						Median	\$97.41	10.92	44.20	116.47

Read the tea leaves: See what the market cares about

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	<i>Market Cap</i>	<i>Enterprise value</i>	<i>Revenues</i>	<i>EBITDA</i>	<i>Net Income</i>	<i>Number of users (millions)</i>
<i>Market Cap</i>	<i>1.</i>					
<i>Enterprise value</i>	<i>0.9998</i>	<i>1.</i>				
<i>Revenues</i>	<i>0.8933</i>	<i>0.8966</i>	<i>1.</i>			
<i>EBITDA</i>	<i>0.9709</i>	<i>0.9701</i>	<i>0.8869</i>	<i>1.</i>		
<i>Net Income</i>	<i>0.8978</i>	<i>0.8971</i>	<i>0.8466</i>	<i>0.9716</i>	<i>1.</i>	
<i>Number of users (millions)</i>	<i>0.9812</i>	<i>0.9789</i>	<i>0.8053</i>	<i>0.9354</i>	<i>0.8453</i>	<i>1.</i>

Twitter had 240 million users at the time of its IPO. What price would you attach to the company?

Use the “market metric” and “market price”

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- The most important variable, in late 2013, in determining market value and price in this sector (social media, ill defined as that is) is the number of users that a company has.
- Looking at comparable firms, it looks like the market is paying about \$100/user in valuing social media companies, with a premium for “predictable” revenues (subscriptions) and user intensity.
- Twitter has about 240 million users and can be valued based on the \$100/user:
- Enterprise value = $240 * 100 = \$24 \text{ billion}$

What is Bitcoin?

- Bitcoin is not an asset, since it does not generate cash flows standing alone for those who hold it (until you sell it) and it is not a commodity, because it is not raw material that can be used in the production of something useful.
- The choice then becomes whether it is a currency or a collectible.
 - ▣ Bitcoin can be a currency, but it is not a good one yet, insofar as it has only limited acceptance as a medium of exchange and it is too volatile to be a store of value.
 - ▣ Bitcoin can be a collectible, like gold, that people will flee to, when they stop trusting central banks and fiat currencies.

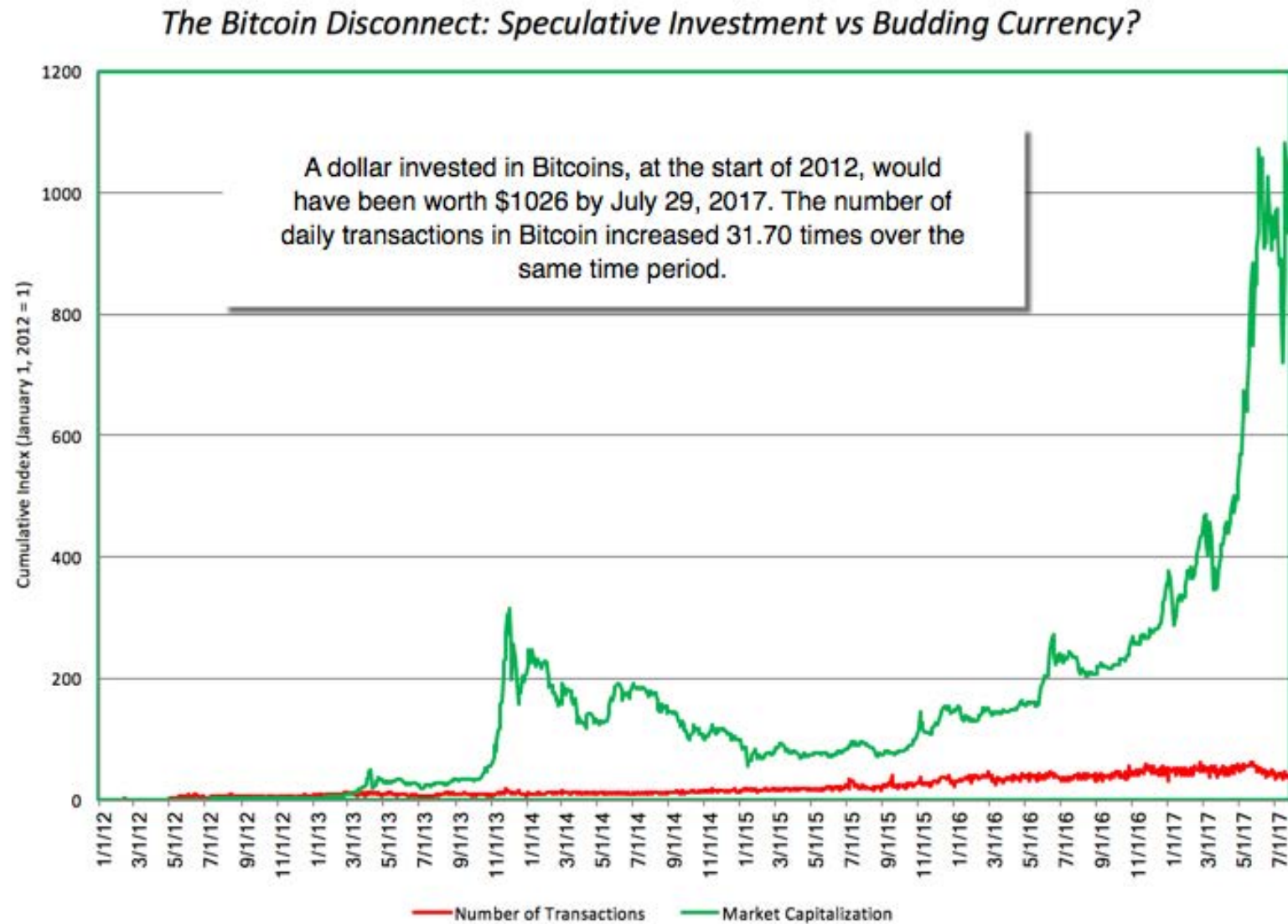
Three Pathways for Bitcoin

- The Global Digital Currency: Bitcoin gains wide acceptance in transactions across the world, becoming a widely used global digital currency. If that happens, it could compete with fiat currencies and given the algorithm set limits on its creation, its high price could be justified.
- Gold for Millennials: Bitcoin becomes a haven for those who do not trust central banks, governments and fiat currencies. In short, it takes on the role that gold has, historically, for those who have lost trust in or fear centralized authority. If this scenario unfolds, and Bitcoin shows the same staying power as gold, it will behave like gold does, rising during crises and dropping in more sanguine time periods.
- The 21st Century Tulip Bulb: In this, the worst case scenario, Bitcoin is like a shooting star, attracting more money as it soars, from those who see it as a source of easy profits, but just as quickly flares out as these traders move on to something new and different. If this happens, Bitcoin could very well become the equivalent of Tulip Bulbs, a speculative asset that saw its prices soar in the sixteen hundreds in Holland, before collapsing in the aftermath.

If Bitcoin is a currency, its pricing over time will depend upon how good it is a currency

- The goodness of a currency is measured on three dimensions:
 - ▣ Medium of exchange: A currency has to be accepted as payment for goods and services, with more acceptance going with better currencies.
 - ▣ Store of value: The quality of a currency will be proportional to its capacity to hold its purchasing power. Inflation in a currency makes it a less attractive choice.
- Over time, you should expect to see currencies that are more widely accepted as mediums of exchange and have lower inflation appreciate against currencies that don't measure up well on either dimension.

Bitcoin is not yet a good medium of exchange...



Nor a good store of value..

- It is true that people who put their money in Bitcoin early in the game have made huge amounts of money, but that is a characteristic for a good speculative investment, not a currency.
- Put differently, an investor who put bitcoin in his pocket in January 2018 and forgot about it for two months would have found that it lost more than half of its purchasing power in those two months.

A Currency Comparison

<i>Currency</i>	<i>Issuing Entity</i>	<i>Transaction Capability</i>	<i>Security, Storage & Convertibility</i>
<i>US Dollar (Euro)</i>	<u>Issuing Entity</u> : The Federal Reserve (ECB) <u>Trust</u> : Has ebbed & flowed over time, depending upon how independent the Fed (ECB) is perceived to be and how focused it is on protecting the dollar's (Euro's) buying power. It is possible that the shift to protecting the US (EU) economy (with quantitative easing) over the last few years has reduced this trust.	Almost universal acceptance, reflecting the size of the US (EU) economy & the depth of financial markets in the US (Euro Region).	Can be saved relatively securely (in insured bank accounts & treasuries), while earning market-set interest rates.
<i>Chinese Yuan</i>	<u>Issuing Entity</u> : The People's Bank of China <u>Trust</u> : While the Chinese Central Bank gets in the news with its currency interventions, the perception (fair or unfair) is that it is a creature of the Chinese Government and will do its bidding.	Acceptance within Chinese borders but only limited acceptance outside China.	Can be saved in Chinese banks or government securities, but at rates influenced or set by the government.
<i>Argentine Peso</i>	<u>Issuing Entity</u> : Central Bank of Argentina <u>Trust</u> : Controlled by the Argentine government. Any attempt at independence is <u>quickly countered</u> .	Accepted in Argentina, but even Argentines may prefer to be paid in other currencies.	Can be saved, but security can be undercut by government decree.
<i>Gold</i>	<u>Issuing Entity</u> : Nature <u>Trust</u> : Absolute, unless the alchemists finally succeed	Almost universal for big transactions, but	Compact & portable. Can be stored but with a cost to the saver, not a return.
<i>Bitcoin</i>	<u>Issuing Entity</u> : Computer Algorithm <u>Trust</u> : Perhaps higher among tech true believers than the rest of us, but depends ultimately on how impervious the algorithm is to internal manipulation or external assault.	Limited to a small subset of transactions among the technologically adept.	Stored on compute servers, with no return to savers. Unregulated nature of business exposes users to risk.

Why is Bitcoin not working as a currency?

- Price volatility: The same volatility that draws investors into playing the Bitcoin pricing game works against it as a currency. Currencies should be boring, not exciting.
- Design flaws: The process by which Bitcoin transactions are checked, with miners competing to solve algorithms, and being rewarded with Bitcoin is not compatible with low enough transactions costs in the long term to be competitive with good currencies.
- Absolute limit: A currency that has an absolute limit on its quantity will result in deflation over time. Even Milton Friedman, who mistrusted central banks, allowed money supply to grow with the real economy.

IV. Valuation is a craft, and you should never stop learning

- In a science, if you get the inputs right, you should get the output right. The laws of physics and mathematics are universal and there are no exceptions. **Valuation is not a science.**
- In an art, there are elements that can be taught but there is also a magic that you either have or you do not. The essence of an art is that you are either a great artist or you are not. **Valuation is not an art.**
- A craft is a skill that you learn by doing. The more you do it, the better you get at it. **Valuation is a craft.**

Uber

Uber: Personal Mobility Player?

Uber is primarily a ride sharing company, with ambitions of being a global logistics player. Its revenue growth has been astonishing, though it is starting to slow, but it remains a big money loser, as it searches for a business model that delivers more stickiness. In this story, Uber uses a combination of economies of scale and a more capital intensive business model to create a pathway to profitability. Along the way, it will become a less risky company, though its losses leave it exposed to a 5% chance of failure.

The Assumptions

	Base year	Years 1-5	Years 6-10	After year 10	Story link
Total Market	\$400,000	Grow 10.39% a year		Grows 2.75% a year	Global logistics
Gross Market Share	12.45%	6.71%>30%		30%	Global Network benefits
Revenue Share	20.13%	Unchanged		20.13%	Market dominance keeps billing share high.
Operating Margin	-24.39%	-24.39% ->20%		15.00%	Full employee & more regulations
Reinvestment	NA	Sales to capital ratio of 4.00		Reinvestment rate = 7.5%	Low capital investment model
Cost of capital	NA	9.97%	9,97%->8.24%	8.24%	At 75th percentile of US firms
Risk of failure	5% chance of failure, if pricing meltdown leads to capital being cut off				Cash on hand + Capital access

The Cash Flows

	Total Market	Market Share	Revenues	EBIT (1-t)	Reinvestment	FCFF
1	\$ 441,560	14.20%	\$ 12,627	\$ (2,369)	\$ 650	\$ (3,019)
2	\$ 487,438	15.96%	\$ 15,661	\$ (2,057)	\$ 759	\$ (2,816)
3	\$ 538,083	17.71%	\$ 19,189	\$ (1,441)	\$ 882	\$ (2,323)
4	\$ 593,990	19.47%	\$ 23,281	\$ (438)	\$ 1,023	\$ (1,461)
5	\$ 655,705	21.22%	\$ 28,017	\$ 1,050	\$ 1,184	\$ (134)
6	\$ 723,833	22.98%	\$ 33,485	\$ 3,139	\$ 1,367	\$ 1,771
7	\$ 799,039	24.73%	\$ 39,787	\$ 5,292	\$ 1,576	\$ 3,716
8	\$ 882,059	26.49%	\$ 47,037	\$ 5,292	\$ 1,813	\$ 3,479
9	\$ 973,705	28.24%	\$ 55,365	\$ 6,229	\$ 2,082	\$ 4,147
10	\$1,074,873	30.00%	\$ 64,915	\$ 7,303	\$ 2,387	\$ 4,915
Terminal year	\$1,101,745	30.00%	\$ 66,537	\$ 7,485	\$ 936	\$ 6,550

The Value

Terminal value	\$ 114,108		
PV(Terminal value)	\$ 46,258		
PV (CF over next 10 years)	\$ 501		
Value of operating assets =	\$ 46,759		
Probability of failure	5%		
Value in case of failure	\$ -		
Adjusted Value for operating assets	\$ 44,421		
+ Cash on hand	\$ 6,406		
+ Cross holdings	\$ 8,700		
+ IPO Proceeds	\$ 9,000		
- Debt	\$ 6,869		
Value of equity	\$ 61,658		
Value per share	\$ 27.67		

Push back on Uber Valuation

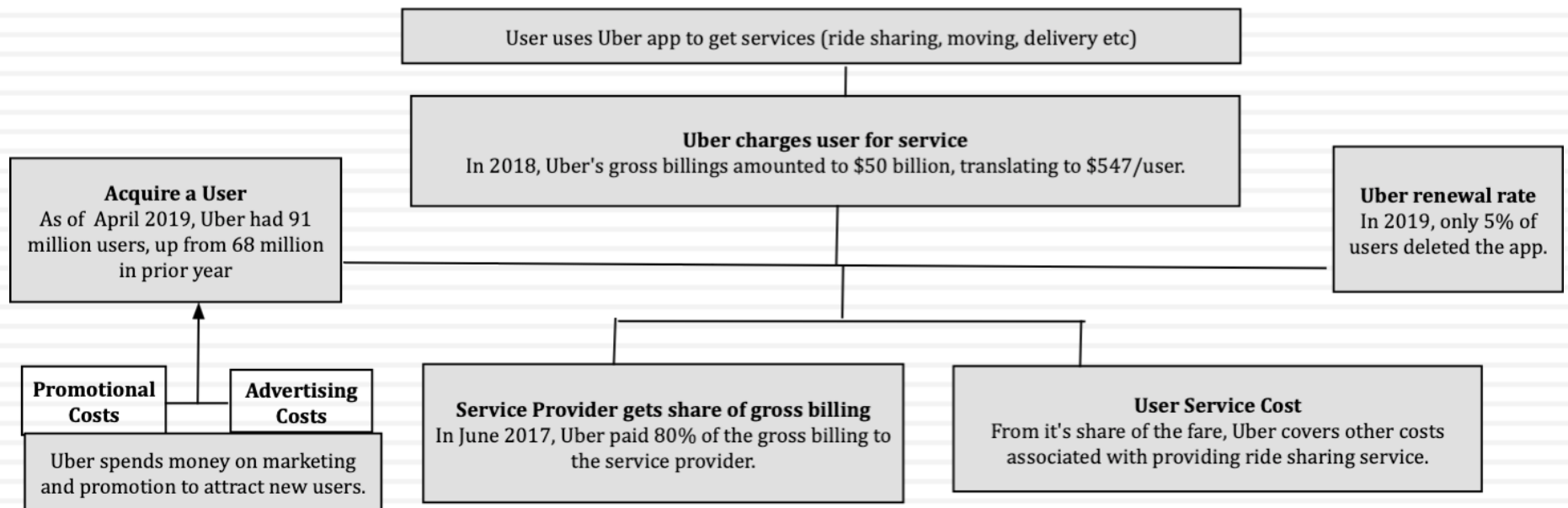
- Input disagreement: Lots of inputs and assumptions and I could be wrong on any or all of them..
- Model debate: DCF was designed for old economy companies and not suited to new economy firms that are more focused on accumulating users & subscribers, making them stick with the firm and sell them products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

User/ Subscriber/Member Based Valuation

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

Uber User Economics

Figure 4: The Mechanics of Uber's Business



Uber's Income Statement (from Prospectus)

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

Uber: Deconstructing the Financials

Costs of Servicing Existing Users

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

Costs of Adding New Users

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

Corporate Expenses

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

Uber's Existing User Value

Growth rate in Operating Expenses

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

Growth rate in Revenues

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

User Lifetime

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

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

Survival-adjusted PV

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

Risk Adjusted Discount Rate

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

Uber's New User Value

Value Added by New Users at Uber

Base year Value/ New User

Value of User = \$487.25

Cost of adding New User = \$113.71

Value added by new user = \$373.54

User Growth rates

Years 1-5: 12%

Years 6-10: 6%

Cost of capital

Used 9.97%, the 75th percentile of US companies

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

Beyond year 10
User growth
continues at 2.5%
a year

Uber Corporate Expense Value (Drag)

Base Year Expenses
From Prospectus for 2018

Growth rate of 7%
Economies of scale

Tax Rate
Assumed =25%

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

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

Uber Valuation

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

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

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

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

Follow the yellow brick road..

