



MY VALUATION JOURNEY: HAVE FAITH, YOU MUST!

January 2018

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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.

Shell's accounting balance sheet: December 31, 2015

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| CONSOLIDATED BALANCE SHEET | | \$ MILLION | |
|---|-------|----------------|----------------|
| | NOTES | Dec 31, 2015 | Dec 31, 2014 |
| Assets | | | |
| Non-current assets | | | |
| Intangible assets | 7 | 6,283 | 7,076 |
| Property, plant and equipment | 8 | 182,838 | 192,472 |
| Joint ventures and associates | 9 | 30,150 | 31,558 |
| Investments in securities | 10 | 3,416 | 4,115 |
| Deferred tax | 16 | 11,033 | 8,131 |
| Retirement benefits | 17 | 4,362 | 1,682 |
| Trade and other receivables | 11 | 8,717 | 8,304 |
| | | 246,799 | 253,338 |
| Current assets | | | |
| Inventories | 12 | 15,822 | 19,701 |
| Trade and other receivables | 11 | 45,784 | 58,470 |
| Cash and cash equivalents | 13 | 31,752 | 21,607 |
| | | 93,358 | 99,778 |
| Total assets | | 340,157 | 353,116 |
| Liabilities | | | |
| Non-current liabilities | | | |
| Debt | 14 | 52,849 | 38,332 |
| Trade and other payables | 15 | 4,528 | 3,582 |
| Deferred tax | 16 | 8,976 | 12,052 |
| Retirement benefits | 17 | 12,587 | 16,318 |
| Decommissioning and other provisions | 18 | 26,148 | 23,834 |
| | | 105,088 | 94,118 |
| Current liabilities | | | |
| Debt | 14 | 5,530 | 7,208 |
| Trade and other payables | 15 | 52,770 | 64,864 |
| Taxes payable | 16 | 8,233 | 9,797 |
| Retirement benefits | 17 | 350 | 377 |
| Decommissioning and other provisions | 18 | 4,065 | 3,966 |
| | | 70,948 | 86,212 |
| Total liabilities | | 176,036 | 180,330 |
| Equity | | | |
| Share capital | 20 | 546 | 540 |
| Shares held in trust | 21 | (584) | (1,190) |
| Other reserves | 22 | (17,186) | (14,365) |
| Retained earnings | | 180,100 | 186,981 |
| Equity attributable to Royal Dutch Shell plc shareholders | | 162,876 | 171,966 |
| Non-controlling interest | | 1,245 | 820 |
| Total equity | | 164,121 | 172,786 |
| Total liabilities and equity | | 340,157 | 353,116 |

Infosys: Balance Sheet in March 2018

| Particulars | Note | As at March 31, | | As at April 1, |
|---|------|-----------------|---------------|----------------|
| | | 2017 | 2016 | 2015 |
| ASSETS | | | | |
| Non-current assets | | | | |
| Property, plant and equipment | 2.4 | 9,751 | 8,637 | 7,685 |
| Capital work-in-progress | | 1,365 | 960 | 776 |
| Goodwill | 2.5 | 3,652 | 3,764 | 3,091 |
| Other intangible assets | 2.5 | 776 | 985 | 638 |
| Investment in associate | 2.25 | 71 | 103 | 93 |
| Financial assets | | | | |
| Investments | 2.6 | 6,382 | 1,714 | 1,305 |
| Loans | 2.7 | 29 | 25 | 31 |
| Other financial assets | 2.8 | 309 | 286 | 173 |
| Deferred tax assets (net) | 2.17 | 540 | 536 | 536 |
| Income tax assets (net) | 2.17 | 5,716 | 5,230 | 4,089 |
| Other non-current assets | 2.11 | 1,059 | 1,357 | 698 |
| Total non-current assets | | 29,650 | 23,597 | 19,115 |
| Current assets | | | | |
| Financial assets | | | | |
| Investments | 2.6 | 9,970 | 75 | 874 |
| Trade receivables | 2.9 | 12,322 | 11,330 | 9,713 |
| Cash and cash equivalents | 2.10 | 22,625 | 32,697 | 30,367 |
| Loans | 2.7 | 272 | 303 | 222 |
| Other financial assets | 2.8 | 5,980 | 5,190 | 4,527 |
| Other current assets | 2.11 | 2,536 | 2,158 | 1,541 |
| Total current assets | | 53,705 | 51,753 | 47,244 |
| Total assets | | 83,355 | 75,350 | 66,359 |
| EQUITY AND LIABILITIES | | | | |
| Equity | | | | |
| Equity share capital | 2.13 | 1,144 | 1,144 | 572 |
| Other equity | | 67,838 | 60,600 | 54,198 |
| Total equity attributable to equity holders of the Company | | 68,982 | 61,744 | 54,770 |
| Non-controlling interests | | — | — | — |
| Total equity | | 68,982 | 61,744 | 54,770 |
| Liabilities | | | | |
| Non-current liabilities | | | | |
| Financial liabilities | | | | |
| Other financial liabilities | 2.14 | 70 | 69 | — |
| Deferred tax liabilities (net) | 2.17 | 207 | 252 | 159 |
| Other non-current liabilities | 2.15 | 83 | 46 | 47 |
| Total non-current liabilities | | 360 | 367 | 206 |
| Current liabilities | | | | |
| Financial liabilities | | | | |
| Trade payables | | 367 | 386 | 140 |
| Other financial liabilities | 2.14 | 6,349 | 6,302 | 5,983 |
| Other current liabilities | 2.15 | 3,007 | 2,629 | 1,964 |
| Provisions | 2.16 | 405 | 512 | 478 |
| Income tax liabilities (net) | 2.17 | 3,885 | 3,410 | 2,818 |
| Total current liabilities | | 14,013 | 13,239 | 11,383 |
| Total equity and liabilities | | 83,355 | 75,350 | 66,359 |

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.

Royal Dutch: Financial Balance Sheet on December 31, 2015

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| <i>Assets</i> | <i>31-Dec-15</i> | <i>Liabilities</i> | <i>31-Dec-15</i> |
|---------------------|------------------|--------------------|------------------|
| Upstream Assets | \$ 183,653 | Debt | \$ 58,379 |
| Downstream Assets | | Minority Interests | \$ 1,245 |
| Subsidiary Holdings | \$ 33,566 | Equity | \$ 189,347 |
| Cash | \$ 31,752 | | |
| | \$ 248,971 | | \$ 248,971 |

Infosys: Financial Balance Sheet

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| | Value | | Value |
|-----------------------------|-----------|--------|-----------|
| Assets in Place | ₹ 167,961 | Debt | ₹ - |
| Growth Assets | ₹ 47,751 | Equity | ₹ 244,893 |
| Cash & Non-operating Assets | ₹ 29,181 | | |

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

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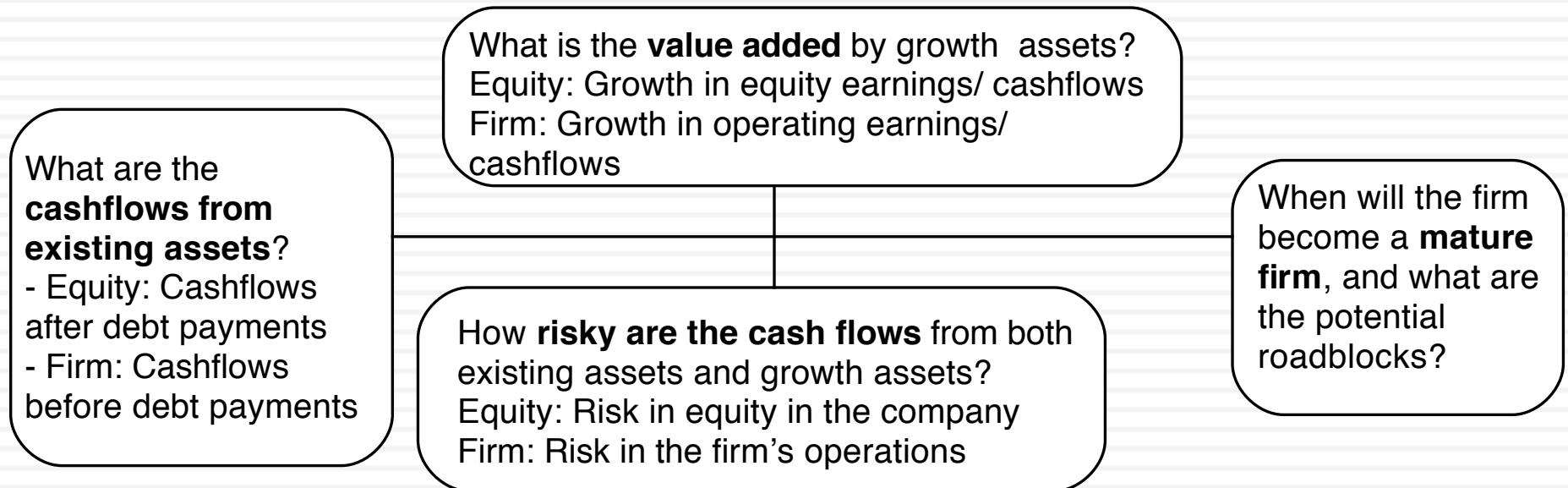
- The value of a risky asset can be estimated by discounting the expected cash flows on the asset over its life at a risk-adjusted discount rate:

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

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.

1. 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

2. 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.

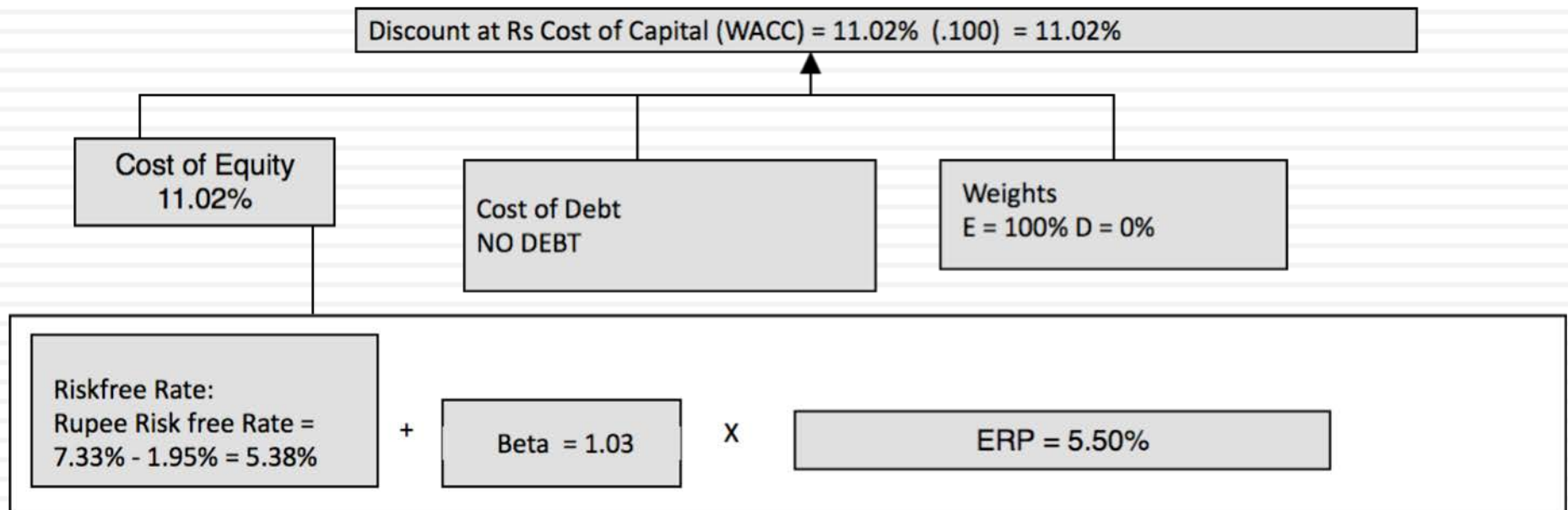
Shell's cost of capital

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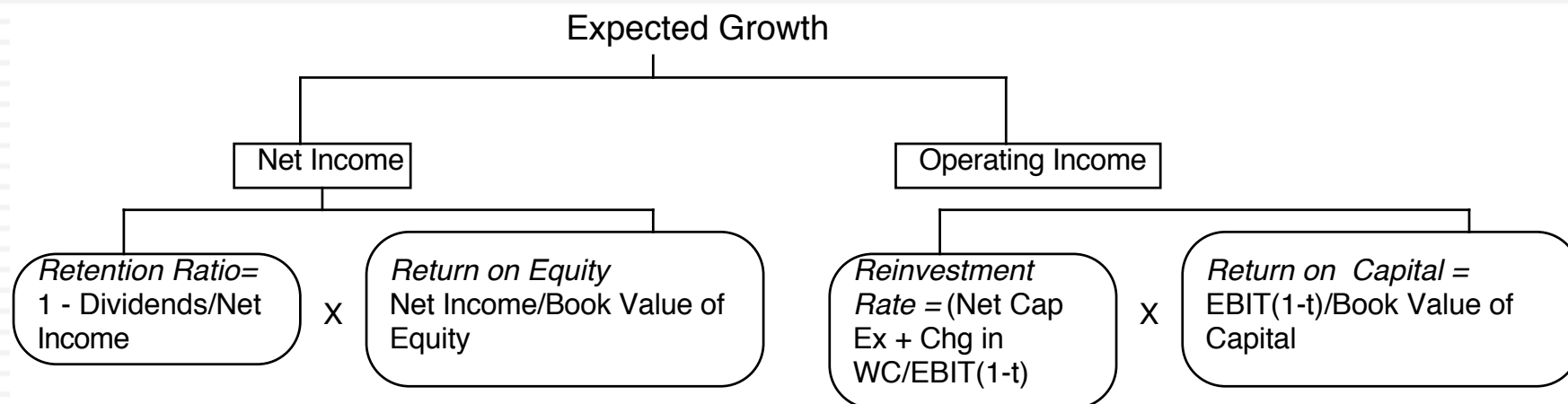
| Business | % of Company | Unlevered Beta | D/E Ratio | Beta | Cost of Equity (in US\$) | |
|------------|----------------|----------------|----------------------|------------------------|--------------------------|-----------------|
| Upstream | 56.56% | 1.13 | 30.63% | 1.39 | 13.47% | |
| Downstream | 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

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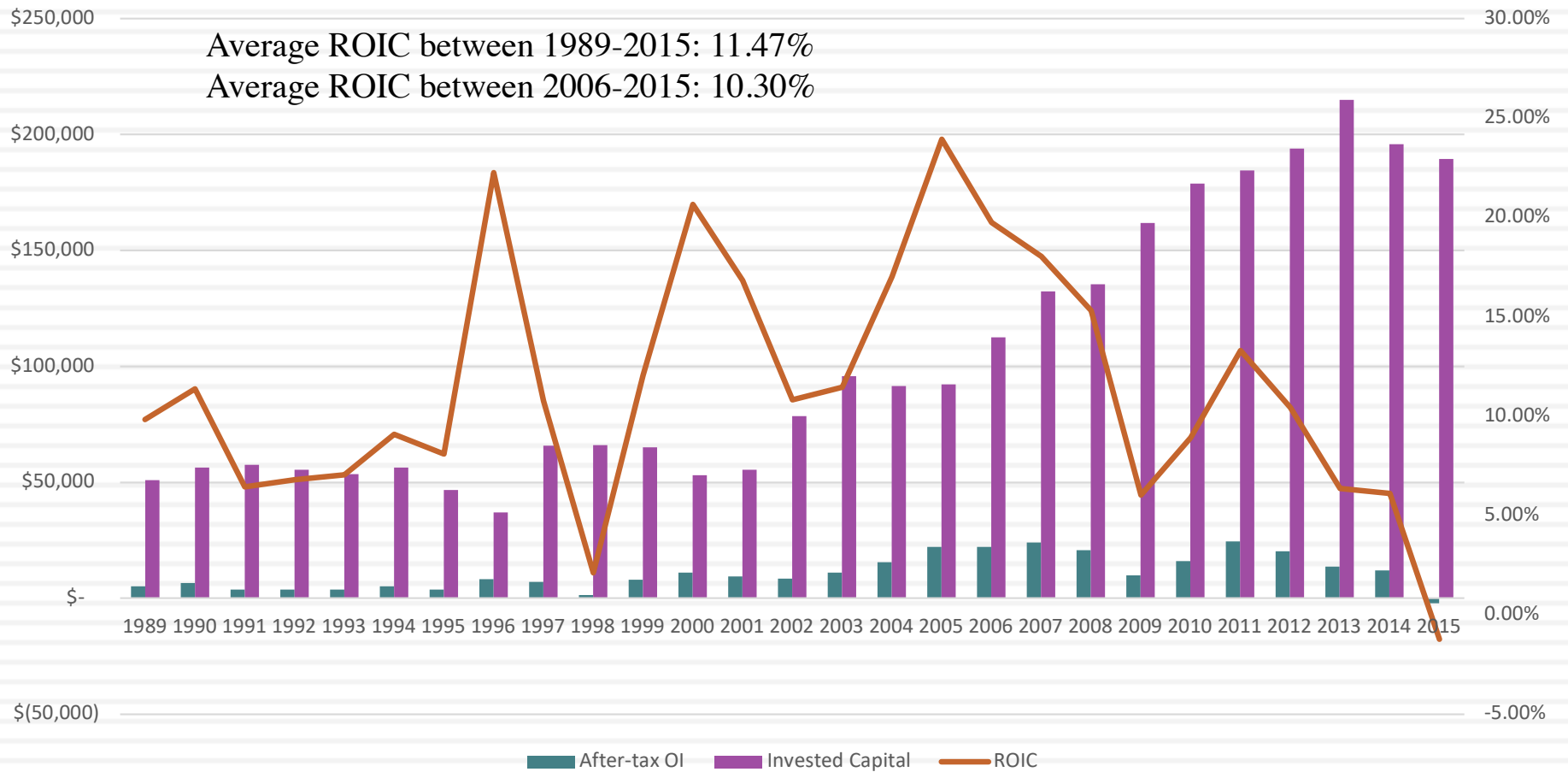
3. Expected Growth



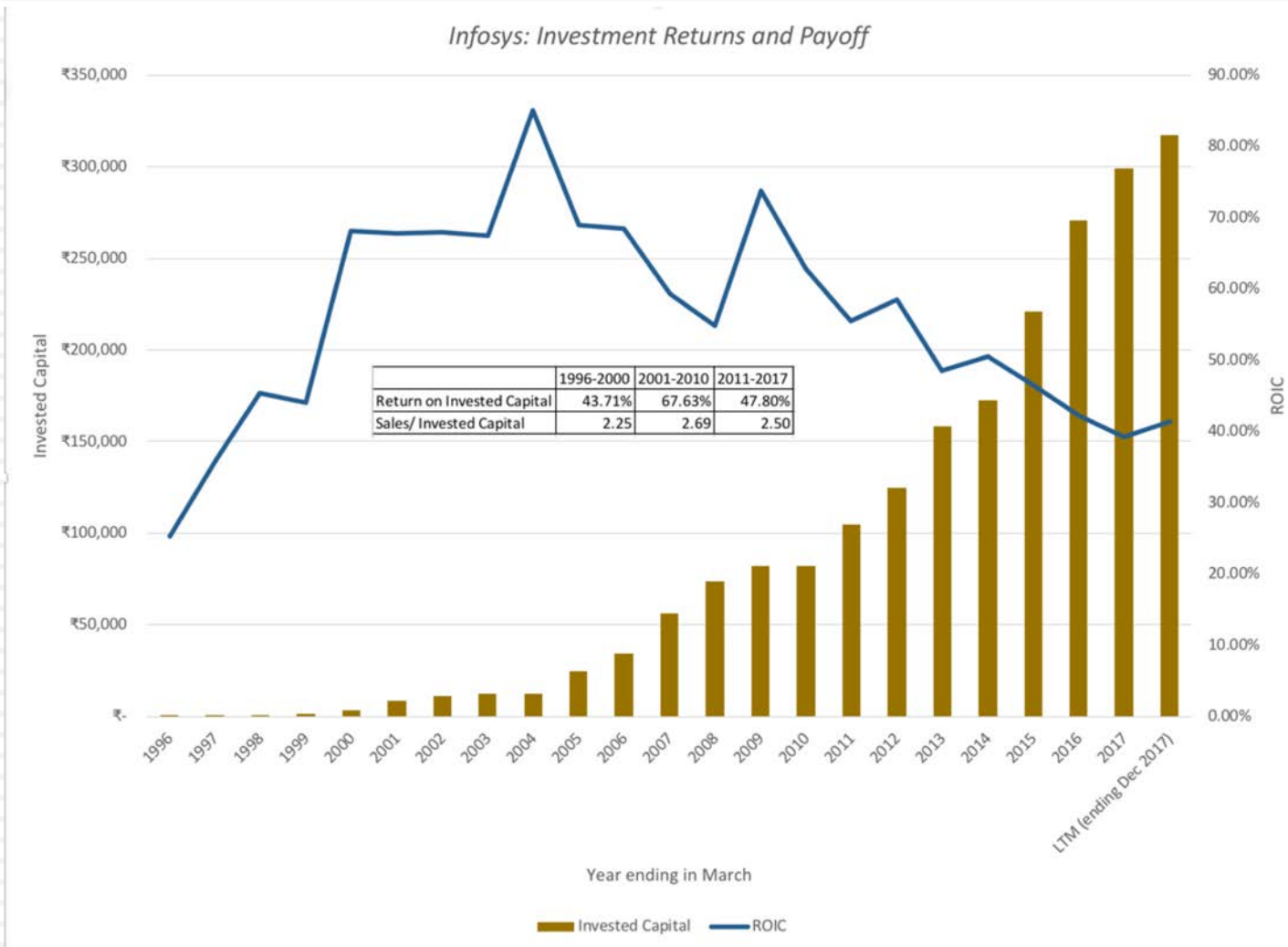
- Quality growth is rare and requires that a firm be able to reinvest a lot and reinvest well (earnings more than your cost of capital) at the same time.
- The larger you get, the more difficult it becomes to maintain quality growth.
- You can grow while destroying value at the same time.

Shell's return on capital

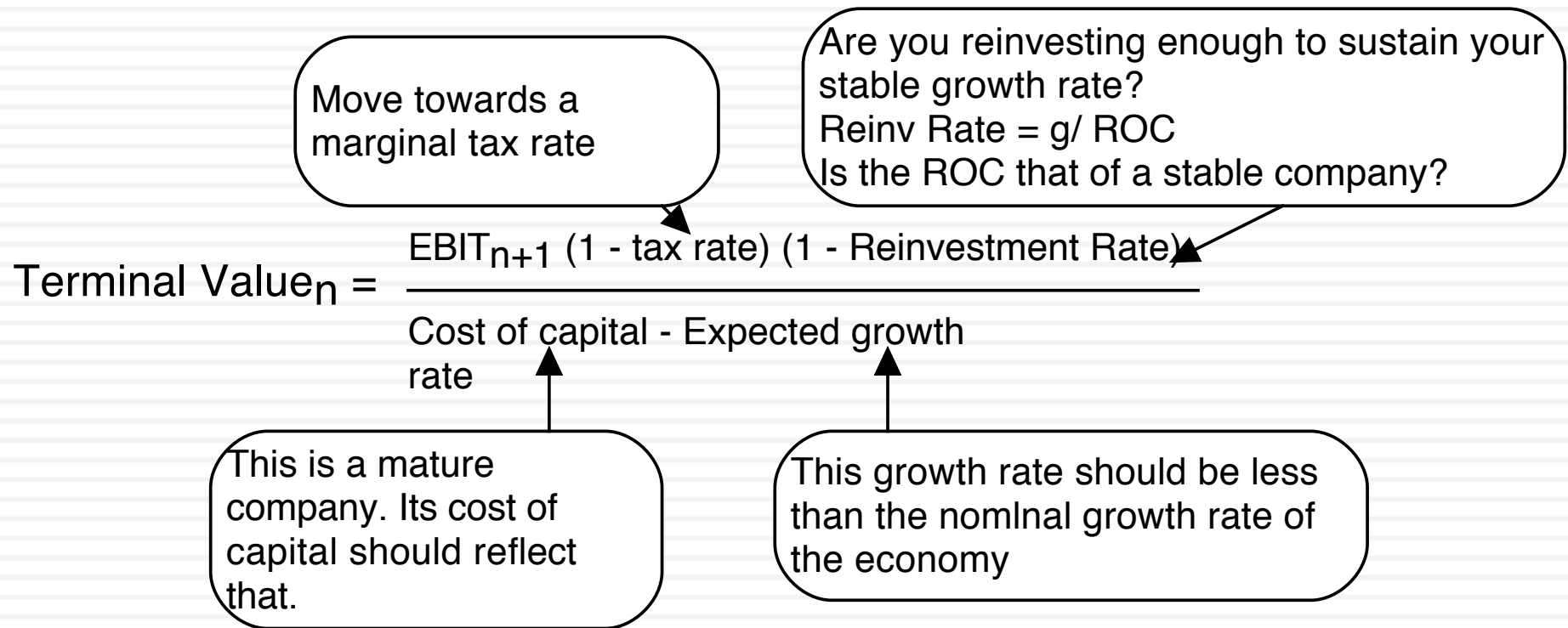
Shell's ROIC over time



Infosys: Return on Invested Capital

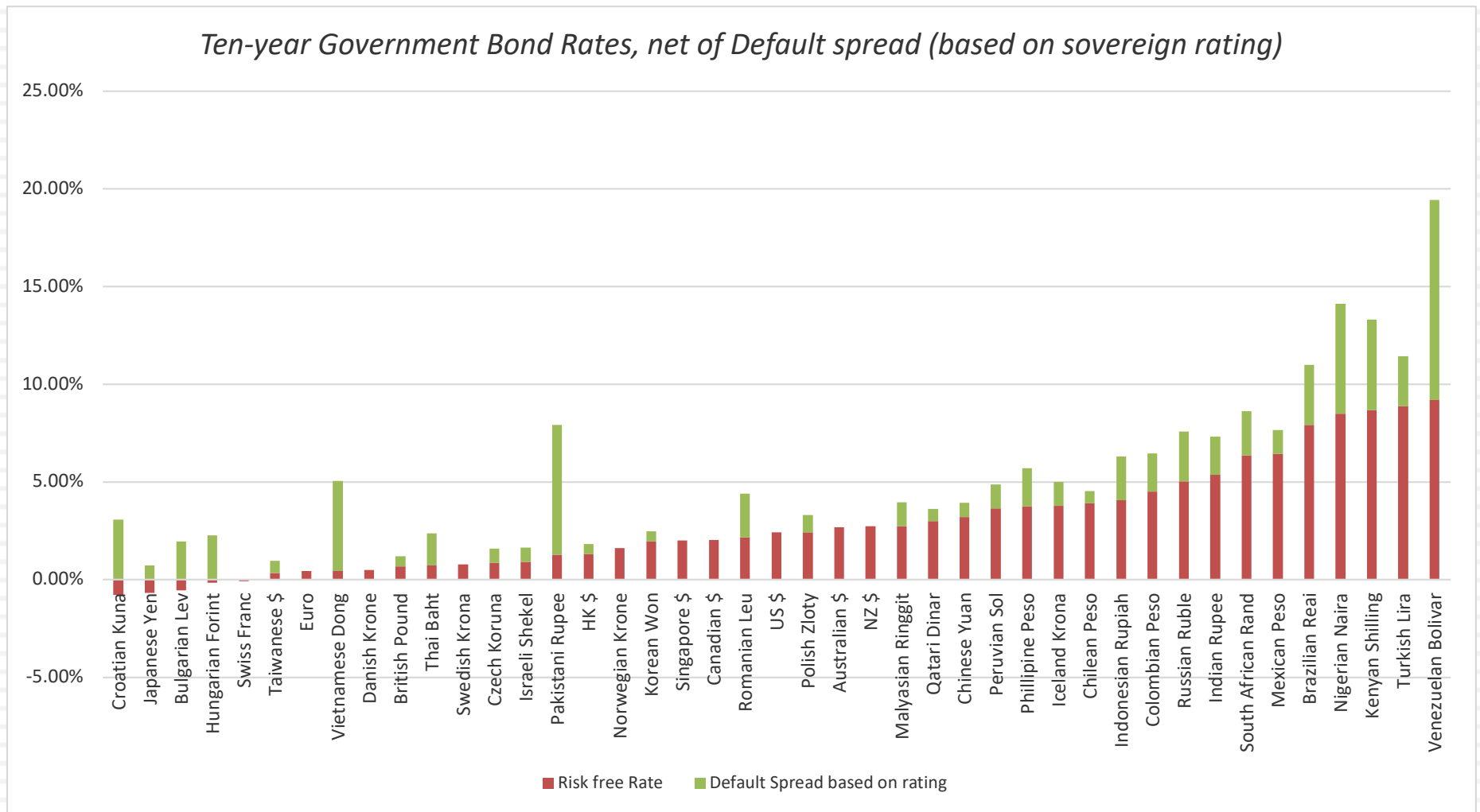


4. The Terminal Value

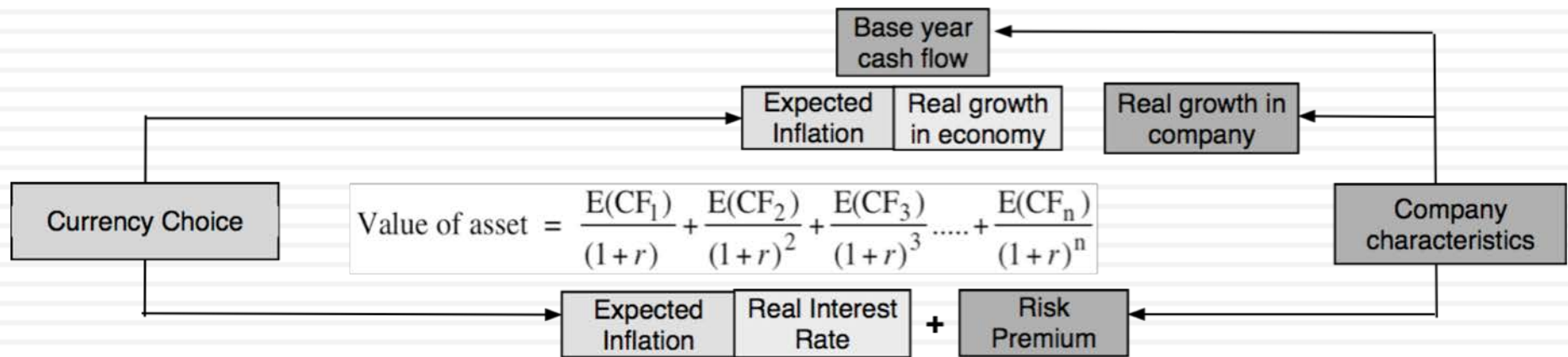


1. Match your cash flows to your discount rates..

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The Currency Effect



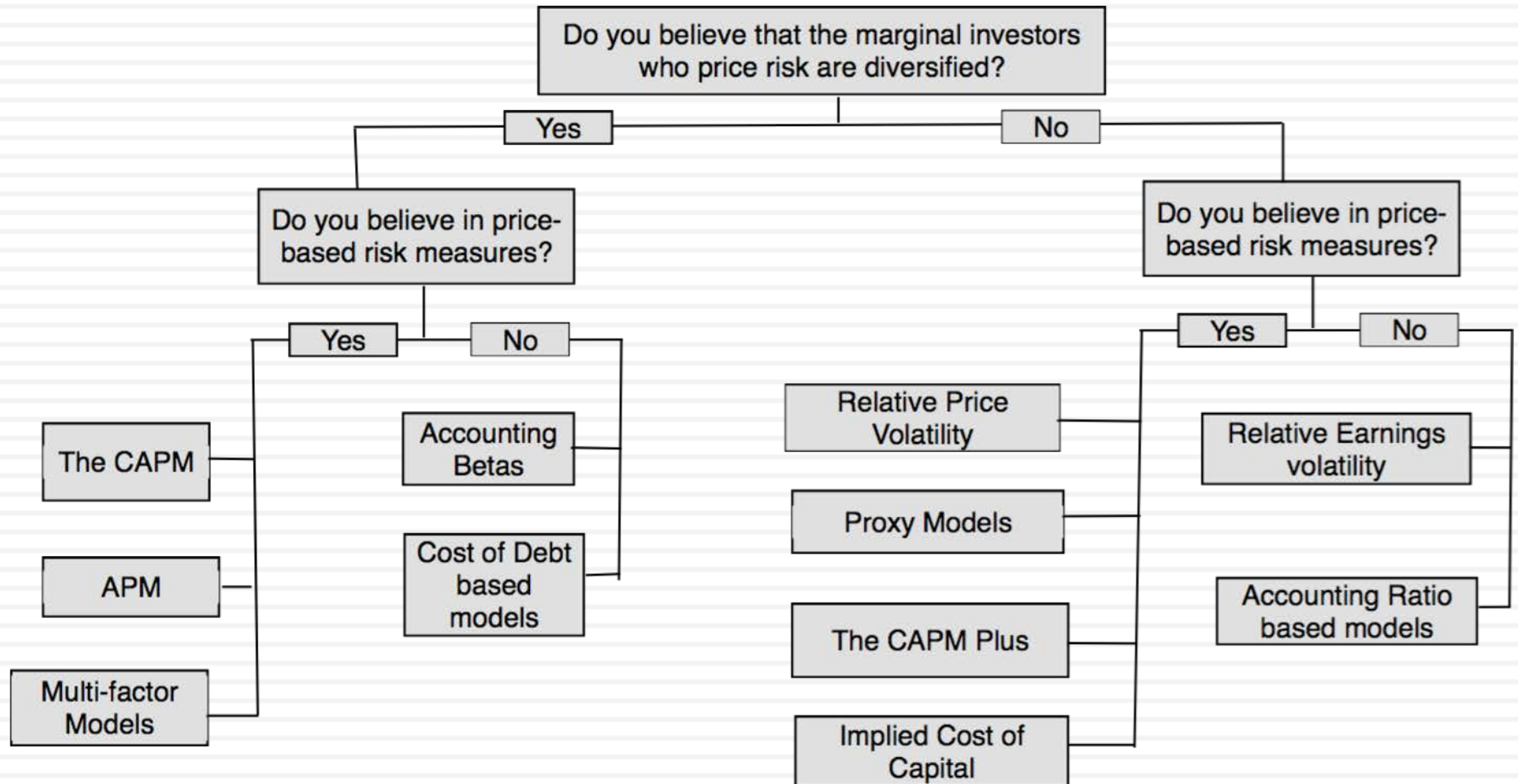
Valuing Infosys in Rupees and Dollars

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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 |

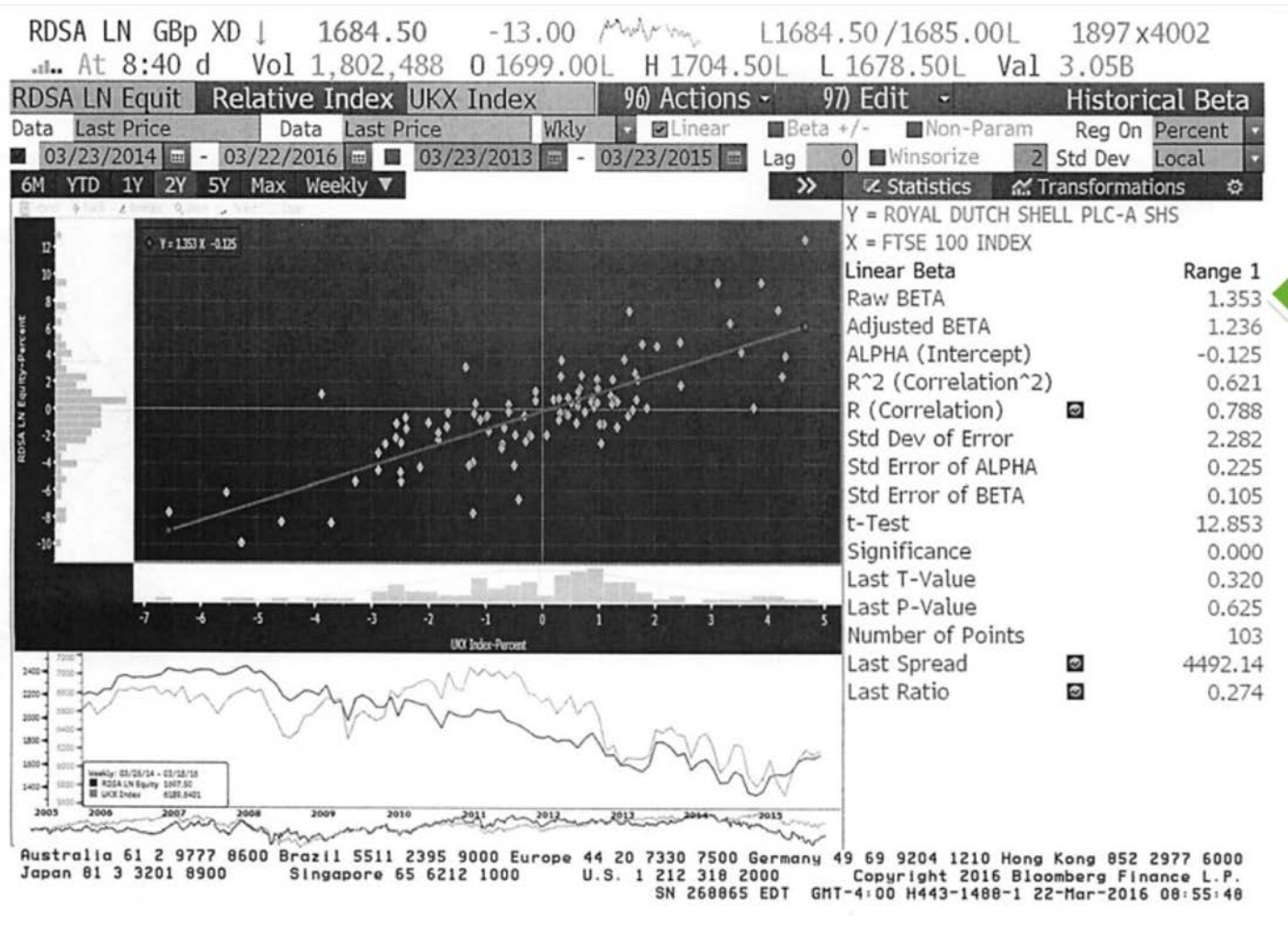
2. Don't let your "beta" dislike get in the way of assessing risk

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And if you do use betas, don't use a regression beta

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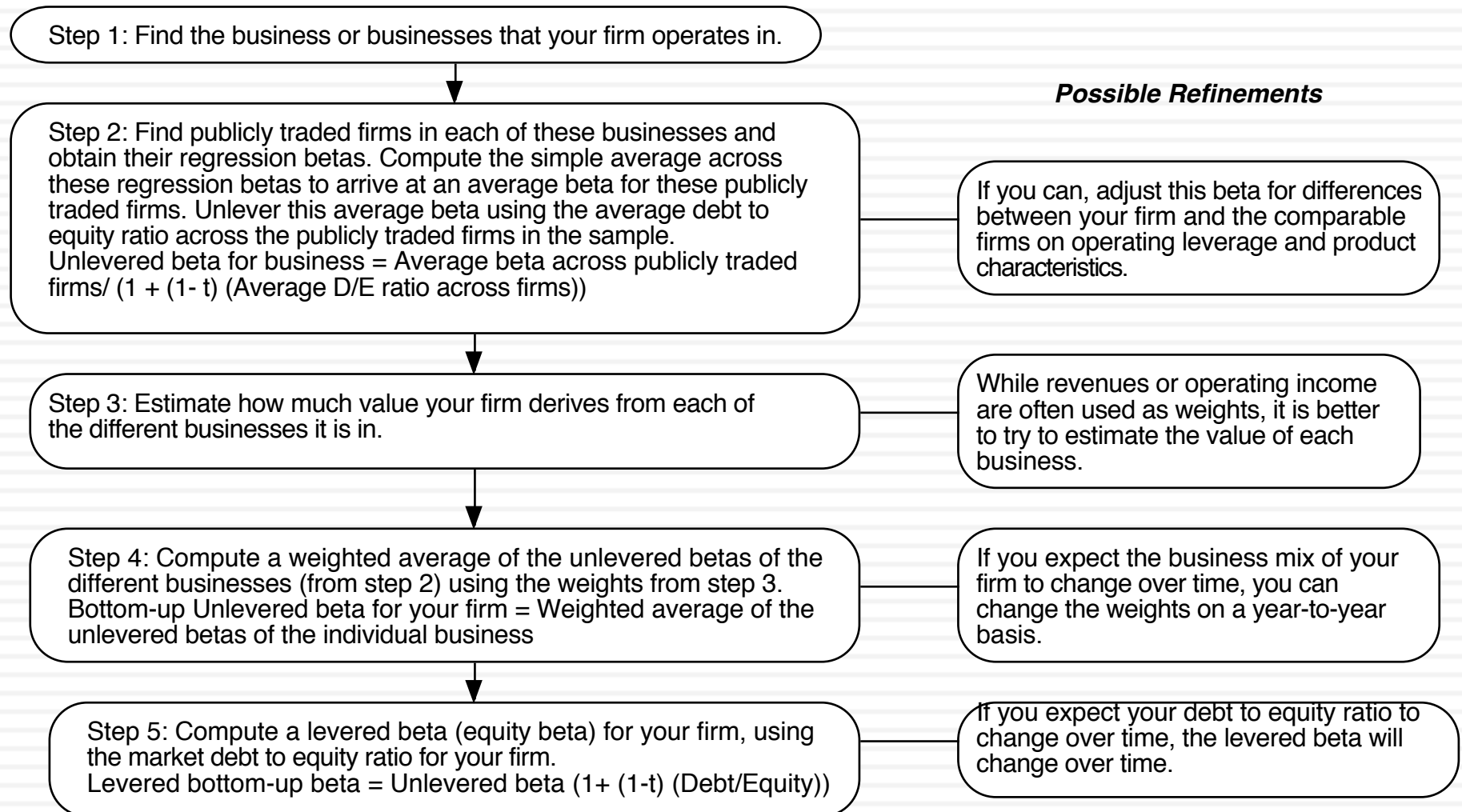
And if you do use betas, don't use a regression beta

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Bottom-up Betas

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Infosys: A Bottom up Beta

- Based on its business breakdown into software and services.

| 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 |

$$\text{Levered Beta} = 1.03 (1 + (1 - .30)(0)) = 1.03$$

- Infosys provides a breakdown of its clients, by business type.

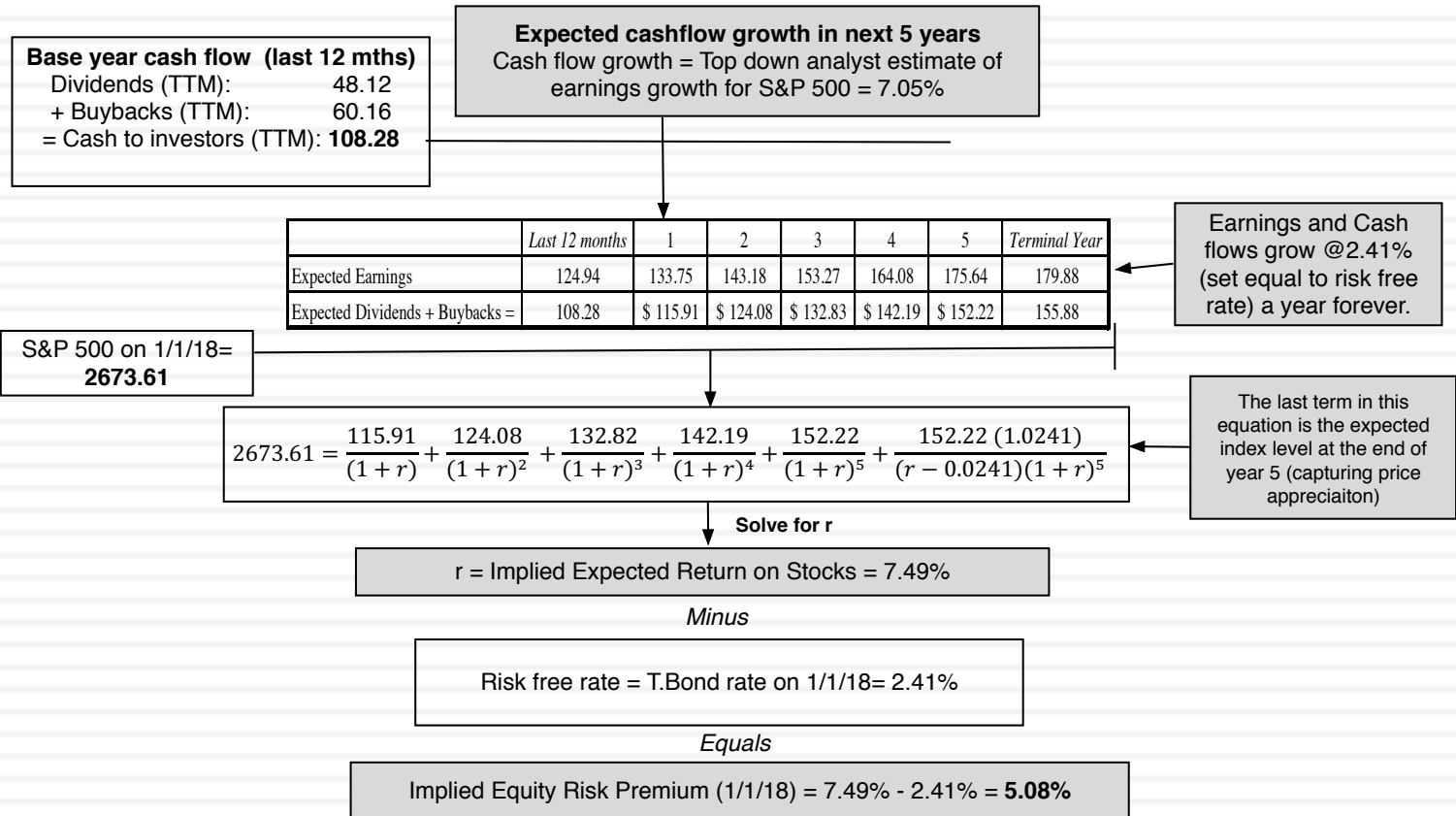
| <i>Business</i> | <i>Revenues</i> | <i>Weight</i> | <i>Unlevered Beta</i> |
|--------------------|-----------------|---------------|-----------------------|
| Financial Services | ₹ 18,555 | 28.00% | 1.0703 |
| Manufacturing | ₹ 7,507 | 11.33% | 1.0377 |
| Energy | ₹ 15,430 | 23.28% | 0.9133 |
| Retail | ₹ 11,225 | 16.94% | 0.6958 |
| Healthcare | ₹ 8,437 | 12.73% | 0.7202 |
| Hi-tech | ₹ 5,122 | 7.73% | 0.8837 |
| Company | ₹ 66,276 | | 0.9076 |

3. 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% | | |

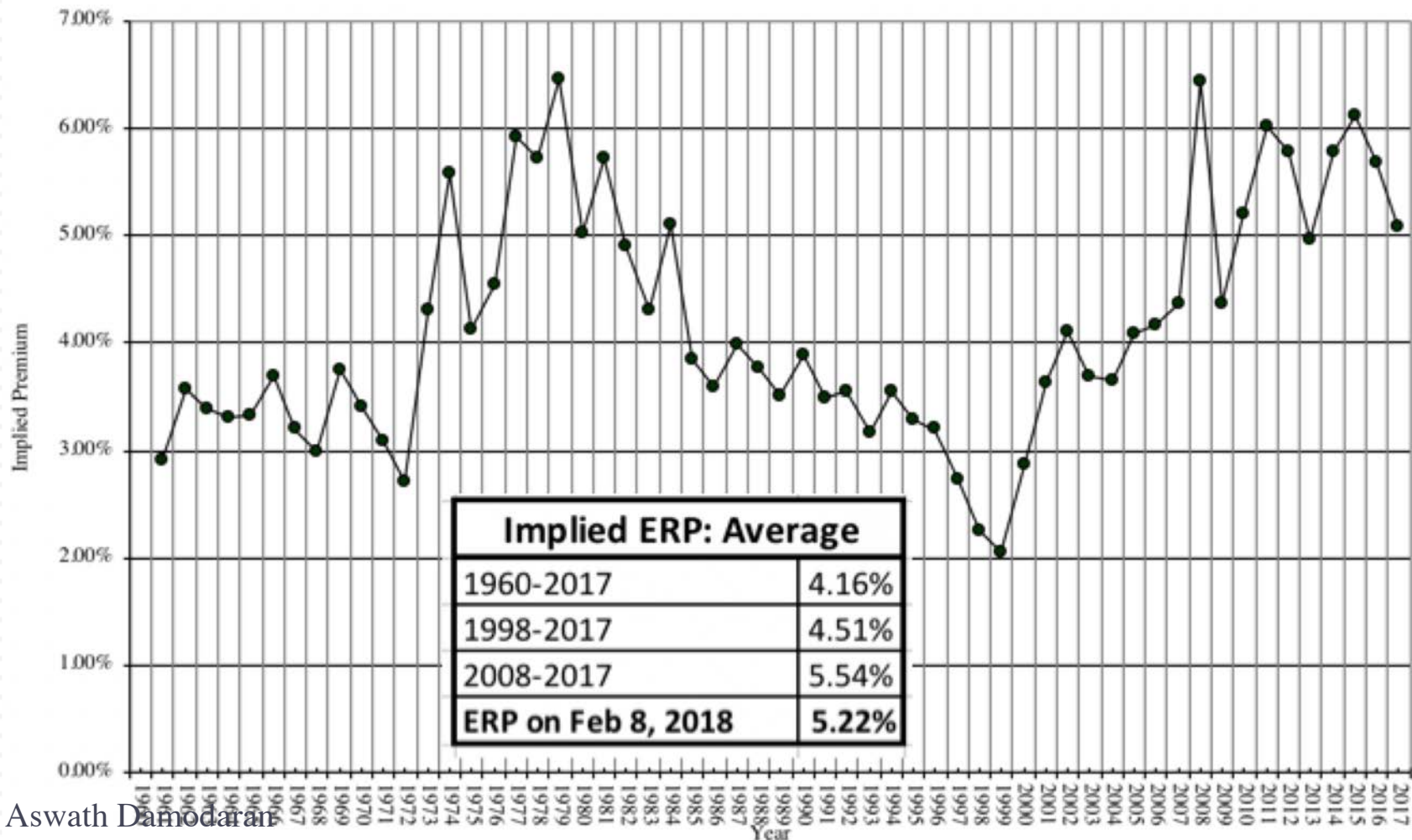
- If you are going to use a historical risk premium, make it
 - ▣ Long term (because of the standard error)
 - ▣ Consistent with your risk free rate
 - ▣ A “compounded” average
- No matter which estimate you use, recognize that it is backward looking, is noisy and may reflect selection bias.

But in the future..



Implied ERP for the S&P 500: History

Implied Premium for US Equity Market: 1960-2017



4. 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.

ERP : Jan 2018

| | | | | | | | |
|-------------|------|--------|--------|-----------------------|------|-------|-------|
| Andorra | Baa2 | 7.27% | 2.19% | Jersey | Aa3 | 5.78% | 0.70% |
| Austria | Aa1 | 5.54% | 0.46% | Liechtenstein | Aaa | 5.08% | 0.00% |
| Belgium | Aa3 | 5.78% | 0.70% | Luxembourg | Aaa | 5.08% | 0.00% |
| Cyprus | Ba3 | 9.23% | 4.15% | Malta | A3 | 6.46% | 1.38% |
| Denmark | Aaa | 5.08% | 0.00% | Netherlands | Aaa | 5.08% | 0.00% |
| Finland | Aa1 | 5.54% | 0.46% | Norway | Aaa | 5.08% | 0.00% |
| France | Aa2 | 5.65% | 0.57% | Portugal | Ba1 | 7.96% | 2.88% |
| Germany | Aaa | 5.08% | 0.00% | Spain | Baa2 | 7.27% | 2.19% |
| Greece | Caa2 | 15.46% | 10.38% | Sweden | Aaa | 5.08% | 0.00% |
| Guernsey | Aa3 | 5.78% | 0.70% | Switzerland | Aaa | 5.08% | 0.00% |
| Iceland | A3 | 6.46% | 1.38% | Turkey | Ba1 | 7.96% | 2.88% |
| Ireland | A2 | 6.06% | 0.98% | United Kingdom | Aa2 | 5.65% | 0.57% |
| Isle of Man | Aa2 | 5.65% | 0.57% | Western Europe | | 6.01% | 0.93% |
| Italy | Baa2 | 7.27% | 2.19% | | | | |

| | | | |
|----------------------|-----|-------|-------|
| Canada | Aaa | 5.08% | 0.00% |
| United States | Aaa | 5.08% | 0.00% |
| North America | | 5.08% | 0.00% |

| | | | |
|------------------|--|--------|-------|
| Caribbean | | 11.39% | 6.31% |
|------------------|--|--------|-------|

| | | | |
|----------------------|------|--------|--------|
| Argentina | B2 | 11.42% | 6.34% |
| Belize | B3 | 12.58% | 7.50% |
| Bolivia | Ba3 | 9.23% | 4.15% |
| Brazil | Ba2 | 8.54% | 3.46% |
| Chile | Aa3 | 5.78% | 0.70% |
| Colombia | Baa2 | 7.27% | 2.19% |
| Costa Rica | Ba2 | 8.54% | 3.46% |
| Ecuador | B3 | 12.58% | 7.50% |
| El Salvador | Caa1 | 13.72% | 8.64% |
| Guatemala | Ba1 | 7.96% | 2.88% |
| Honduras | B1 | 10.27% | 5.19% |
| Mexico | A3 | 6.46% | 1.38% |
| Nicaragua | B2 | 11.42% | 6.34% |
| Panama | Baa2 | 7.27% | 2.19% |
| Paraguay | Ba1 | 7.96% | 2.88% |
| Peru | A3 | 6.46% | 1.38% |
| Suriname | B1 | 10.27% | 5.19% |
| Uruguay | Baa2 | 7.27% | 2.19% |
| Venezuela | Caa3 | 16.60% | 11.52% |
| Latin America | | 8.63% | 3.55% |

| | | | |
|----------------|--|--------|--------|
| Angola | | 11.42% | 6.34% |
| Botswana | | 6.06% | 0.98% |
| Burkina Faso | | 11.42% | 6.34% |
| Cameroon | | 11.42% | 6.34% |
| Cape Verde | | 11.42% | 6.34% |
| Congo (DR) | | 12.58% | 7.50% |
| Congo (Rep of) | | 15.46% | 10.38% |
| Côte d'Ivoire | | 9.23% | 4.15% |
| Egypt | | 12.58% | 7.50% |
| Ethiopia | | 10.27% | 5.19% |
| Gabon | | 12.58% | 7.50% |
| Ghana | | 12.58% | 7.50% |
| Kenya | | 10.27% | 5.19% |
| Morocco | | 7.96% | 2.88% |
| Mozambique | | 16.60% | 11.52% |
| Namibia | | 7.96% | 2.88% |
| Nigeria | | 11.42% | 6.34% |
| Rwanda | | 11.42% | 6.34% |
| Senegal | | 9.23% | 4.15% |
| South Africa | | 7.62% | 2.54% |
| Swaziland | | 5.08% | 11.42% |
| Tunisia | | 10.27% | 5.19% |
| Uganda | | 11.42% | 6.34% |
| Zambia | | 12.58% | 7.50% |
| Africa | | 10.63% | 5.58% |

| | | | |
|------------------|------|--------|--------|
| Albania | B1 | 10.27% | 5.19% |
| Armenia | B1 | 10.27% | 5.19% |
| Azerbaijan | Ba2 | 8.54% | 3.46% |
| Belarus | Caa1 | 13.72% | 8.64% |
| Bosnia | B3 | 12.58% | 7.50% |
| Bulgaria | Baa2 | 7.27% | 2.19% |
| Croatia | Ba2 | 8.54% | 3.46% |
| Czech Republic | A1 | 5.89% | 0.81% |
| Estonia | A1 | 5.89% | 0.81% |
| Georgia | Ba2 | 8.54% | 3.46% |
| Hungary | Baa3 | 7.62% | 2.54% |
| Kazakhstan | Baa3 | 7.62% | 2.54% |
| Kyrgyzstan | B2 | 11.42% | 6.34% |
| Latvia | A3 | 6.46% | 1.38% |
| Lithuania | A3 | 6.46% | 1.38% |
| Macedonia | Ba3 | 9.23% | 4.15% |
| Moldova | B3 | 12.58% | 7.50% |
| Montenegro | B1 | 10.27% | 5.19% |
| Poland | A2 | 6.06% | 0.98% |
| Romania | Baa3 | 7.62% | 2.54% |
| Russia | Ba1 | 7.96% | 2.88% |
| Serbia | Ba3 | 9.23% | 4.15% |
| Slovakia | A2 | 6.06% | 0.98% |
| Slovenia | Baa1 | 6.92% | 1.84% |
| Tajikistan | B3 | 7.96% | 2.88% |
| Ukraine | Caa2 | 15.46% | 10.38% |
| E. Europe | | 7.75% | 2.69% |

| | | | |
|----------------------|------|--------|-------|
| Abu Dhabi | Aa2 | 5.65% | 0.57% |
| Bahrain | B1 | 10.27% | 5.19% |
| Iraq | Caa1 | 13.72% | 8.64% |
| Israel | A1 | 5.89% | 0.81% |
| Jordan | B1 | 10.27% | 5.19% |
| Kuwait | Aa2 | 5.65% | 0.57% |
| Lebanon | B3 | 12.58% | 7.50% |
| Oman | Baa2 | 7.27% | 2.19% |
| Qatar | Aa3 | 5.78% | 0.70% |
| Ras Al Khaimah | A2 | 6.06% | 0.98% |
| Saudi Arabia | A1 | 5.89% | 0.81% |
| Sharjah | A3 | 6.46% | 1.38% |
| United Arab Emirates | Aa2 | 5.65% | 0.57% |
| Middle East | | 6.69% | 1.61% |

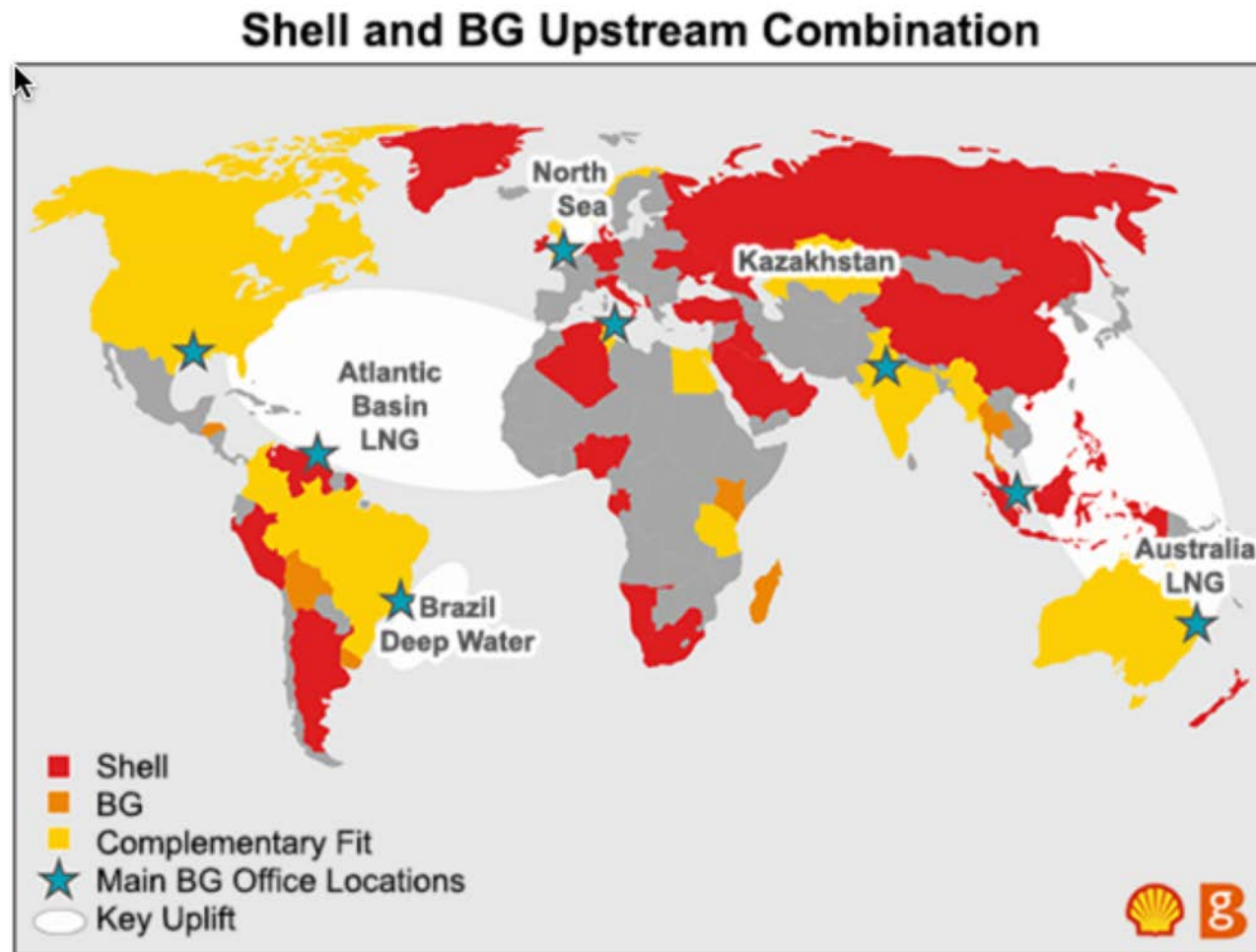
| Country | PRS | ERP | CRP | Country | PRS | ERP | CRP |
|---------------|------|--------|--------|-----------------|------|--------|--------|
| Algeria | 62.3 | 12.58% | 7.50% | Malawi | 61.3 | 13.73% | 8.65% |
| Brunei | 76.3 | 6.06% | 0.98% | Mali | 60.8 | 13.73% | 8.65% |
| Gambia | 59.3 | 15.46% | 10.38% | Myanmar | 63.8 | 12.58% | 7.50% |
| Guinea | 58.3 | 15.46% | 10.38% | Niger | 53.7 | 18.91% | 13.83% |
| Guinea-Bissau | 63.8 | 12.58% | 7.50% | Sierra Leone | 54.3 | 18.91% | 13.83% |
| Guyana | 68.5 | 9.23% | 4.15% | Somalia | 52 | 18.91% | 13.83% |
| Haiti | 61.8 | 13.73% | 8.65% | Sudan | 48 | 25.32% | 20.24% |
| Iran | 73.3 | 7.27% | 2.19% | Syria | 47 | 25.32% | 20.24% |
| Korea, D.P.R. | 56 | 16.60% | 11.52% | Tanzania | 63.3 | 12.58% | 7.50% |
| Liberia | 53 | 18.91% | 13.83% | Togo | 61 | 13.73% | 8.65% |
| Libya | 62 | 13.73% | 8.65% | Yemen, Republic | 49.3 | 25.32% | 20.24% |
| Madagascar | 64.5 | 11.42% | 6.34% | Zimbabwe | 58.5 | 15.46% | 10.38% |

| | | | |
|------------------|------|--------|-------|
| Bangladesh | Ba3 | 9.23% | 4.15% |
| Cambodia | B2 | 11.42% | 6.34% |
| China | A1 | 5.89% | 0.81% |
| Fiji | Ba3 | 9.23% | 4.15% |
| Hong Kong | Aa2 | 5.65% | 0.57% |
| India | Baa2 | 7.27% | 2.19% |
| Indonesia | Baa3 | 7.62% | 2.54% |
| Japan | A1 | 5.89% | 0.81% |
| Korea | Aa2 | 5.65% | 0.57% |
| Macao | Aa3 | 5.78% | 0.70% |
| Malaysia | A3 | 6.46% | 1.38% |
| Mauritius | Baa1 | 6.92% | 1.84% |
| Mongolia | Caa1 | 13.72% | 8.64% |
| Pakistan | B3 | 12.58% | 7.50% |
| Papua New Guinea | B2 | 11.42% | 6.34% |
| Philippines | Baa2 | 7.27% | 2.19% |
| Singapore | Aaa | 5.08% | 0.00% |
| Sri Lanka | B1 | 10.27% | 5.19% |
| Taiwan | Aa3 | 5.78% | 0.70% |
| Thailand | Baa1 | 6.92% | 1.84% |
| Vietnam | B1 | 10.27% | 5.19% |
| Asia | | 6.27% | 1.19% |

| | | | |
|------------------------------------|-----|--------|-------|
| Australia | Aaa | 5.08% | 0.00% |
| Cook Islands | B1 | 10.27% | 5.19% |
| New Zealand | Aaa | 5.08% | 0.00% |
| Australia & New Zealand | | 5.08% | 0.00% |

Red #: Country risk premium
Regional #: GDP weighted average

The geography of Shell's reserves..



Operation-based ERP for Infosys

| <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% |

1. By focusing on revenues, are we misestimating country risk exposure?
2. As the company looks to grow in Latin America and Asia, how do you see this premium evolving?

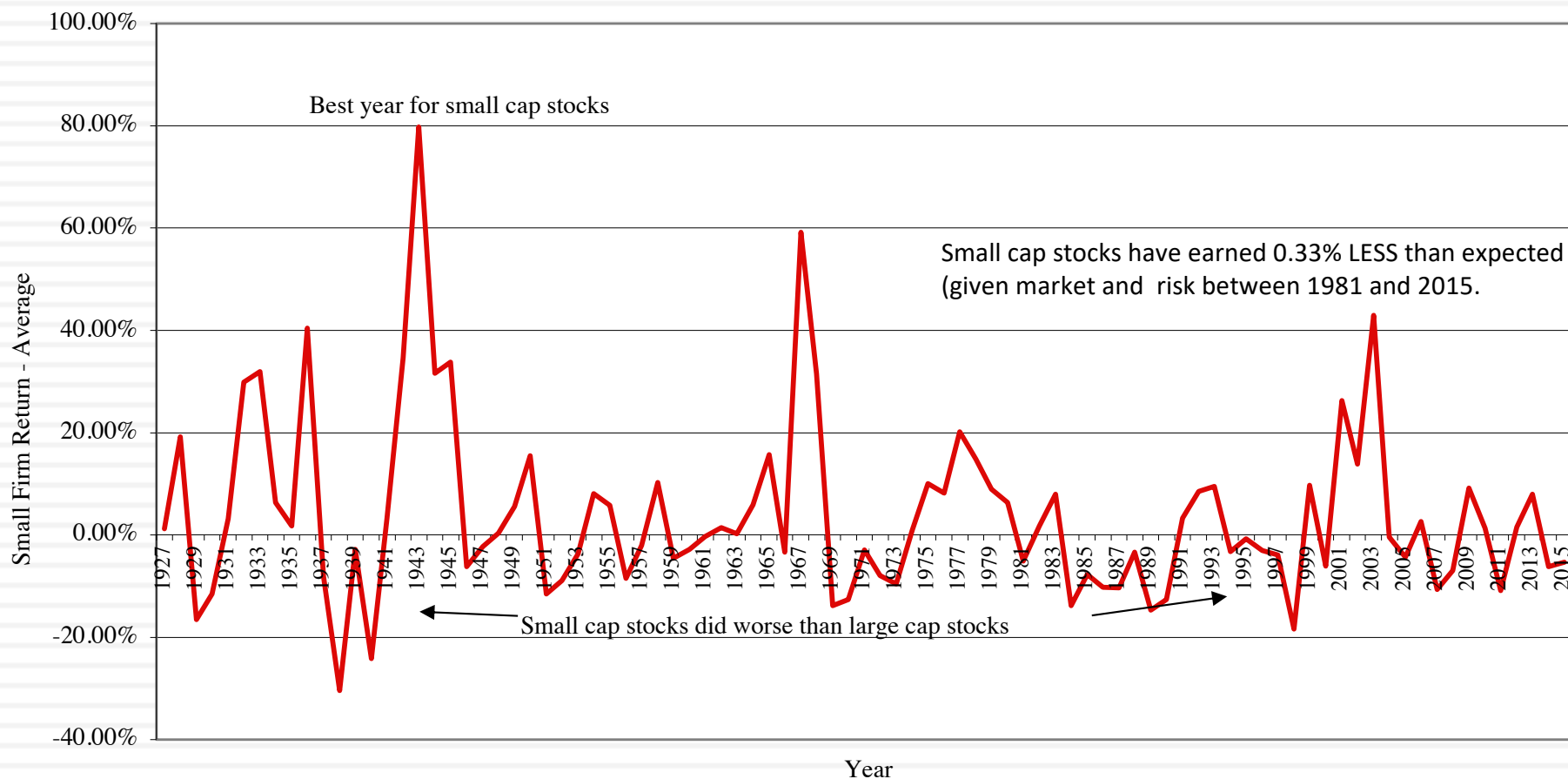
Shell: Equity Risk Premium- March 2016

| <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% |

5. Everyone may do it, but that does not make it right.. The small cap premium

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Figure 4: Small Firm Premium over time- 1927 -2015



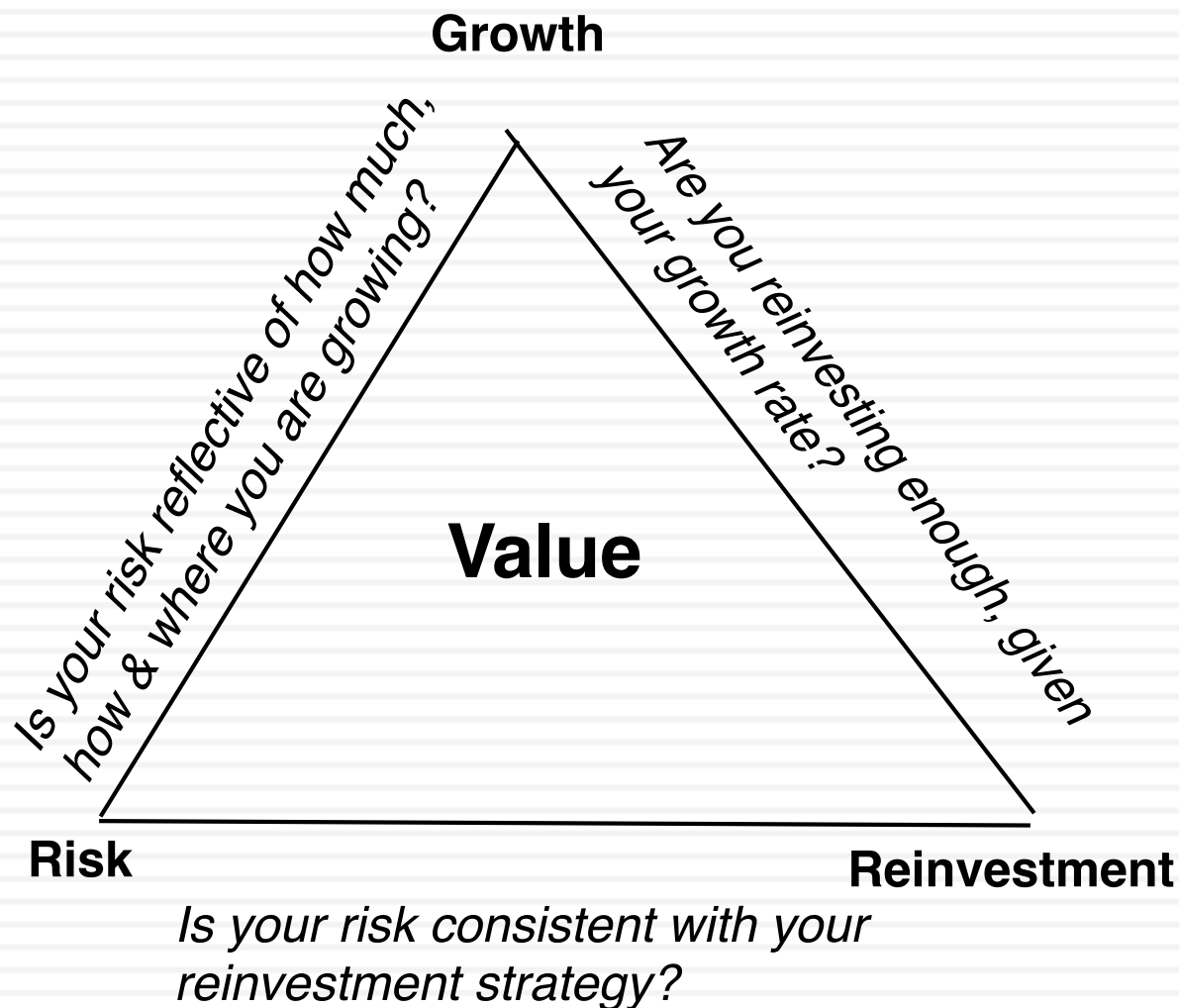
The Inertia of Practice

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- Once bad practices get embedded into valuation, it is very difficult to remove them.
- This is especially true if you are doing accounting or legal valuations, where rules and precedents are given more respect than good sense.
- It is easier to defend a bad valuation that is based on established practices than a good valuation that upends the existing rules.

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

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The Improbable: Willy Wonkitis

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

| | FY 2013 | FY 2014 | FY 2015 | FY 2016 | FY 2017 | FY 2018 | FY 2019 | FY 2020 | FY 2021 | FY 2022 | FY 2023 | FY 2024 | FY 2025 | FY 2026 | FY 2027 | FY 2028 |
|-------------------------------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Unit Volume | 24,298 | 36,883 | 64,684 | 86,713 | 149,869 | 214,841 | 291,861 | 384,747 | 466,559 | 550,398 | 643,850 | 726,655 | 820,645 | 922,481 | 1,034,215 | 1,137,780 |
| % Growth | | 52% | 79% | 34% | 73% | 43% | 36% | 32% | 21% | 18% | 17% | 13% | 12% | 12% | 12% | 10% |
| Automotive Revenue Per Unit (\$) | 93,403 | 85,342 | 83,432 | 78,932 | 65,465 | 58,258 | 56,407 | 55,553 | 55,991 | 56,586 | 56,969 | 57,540 | 58,138 | 58,603 | 59,002 | 59,554 |
| % Growth | | -9% | -2% | -5% | -17% | -11% | -3% | -2% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Automotive Sales | 2,462 | 3,321 | 5,613 | 7,051 | 10,025 | 12,720 | 16,685 | 21,595 | 26,347 | 31,357 | 36,897 | 42,022 | 47,949 | 54,283 | 61,221 | 67,980 |
| Development Service Sales | 16 | 40 | 42 | 44 | 46 | 49 | 51 | 54 | 56 | 59 | 62 | 65 | 68 | 72 | 75 | 79 |
| Total Sales | 2,478 | 3,361 | 5,655 | 7,095 | 10,072 | 12,768 | 16,736 | 21,648 | 26,403 | 31,416 | 36,959 | 42,087 | 48,017 | 54,355 | 61,296 | 68,059 |
| % Growth | | 36% | 60% | 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% | 59% | 65% | 62% | 69% | 78% | 86% | 79% | 77% | 75% | 76% | 76% | 76% | 76% | 77% |
| EBIT | 45 | 259 | 748 | 839 | 1,285 | 1,796 | 2,749 | 3,529 | 4,252 | 5,027 | 5,517 | 6,244 | 7,056 | 8,429 | 9,423 | 10,439 |
| % Margin | 1.8% | 7.7% | 13.2% | 11.8% | 12.8% | 14.1% | 16.4% | 16.3% | 16.1% | 15.0% | 14.0% | 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) | (189) | (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% | -9% | -12% | -4% | -2% | -1% | -6% | -6% | -6% | -4% | -5% | -5% | -6% |
| Capital Expenditures | 250 | 200 | 312 | 312 | 486 | 510 | 497 | 623 | 765 | 906 | 1,078 | 1,236 | 1,437 | 1,660 | 1,898 | 2,149 |
| % of Sales | 10% | 6% | 6% | 4% | 5% | 4% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Unlevered Free Cash Flow | 78 | 229 | 750 | 863 | 1,186 | 1,702 | 2,343 | 2,884 | 3,314 | 4,113 | 4,472 | 4,959 | 5,456 | 6,597 | 7,315 | 8,005 |

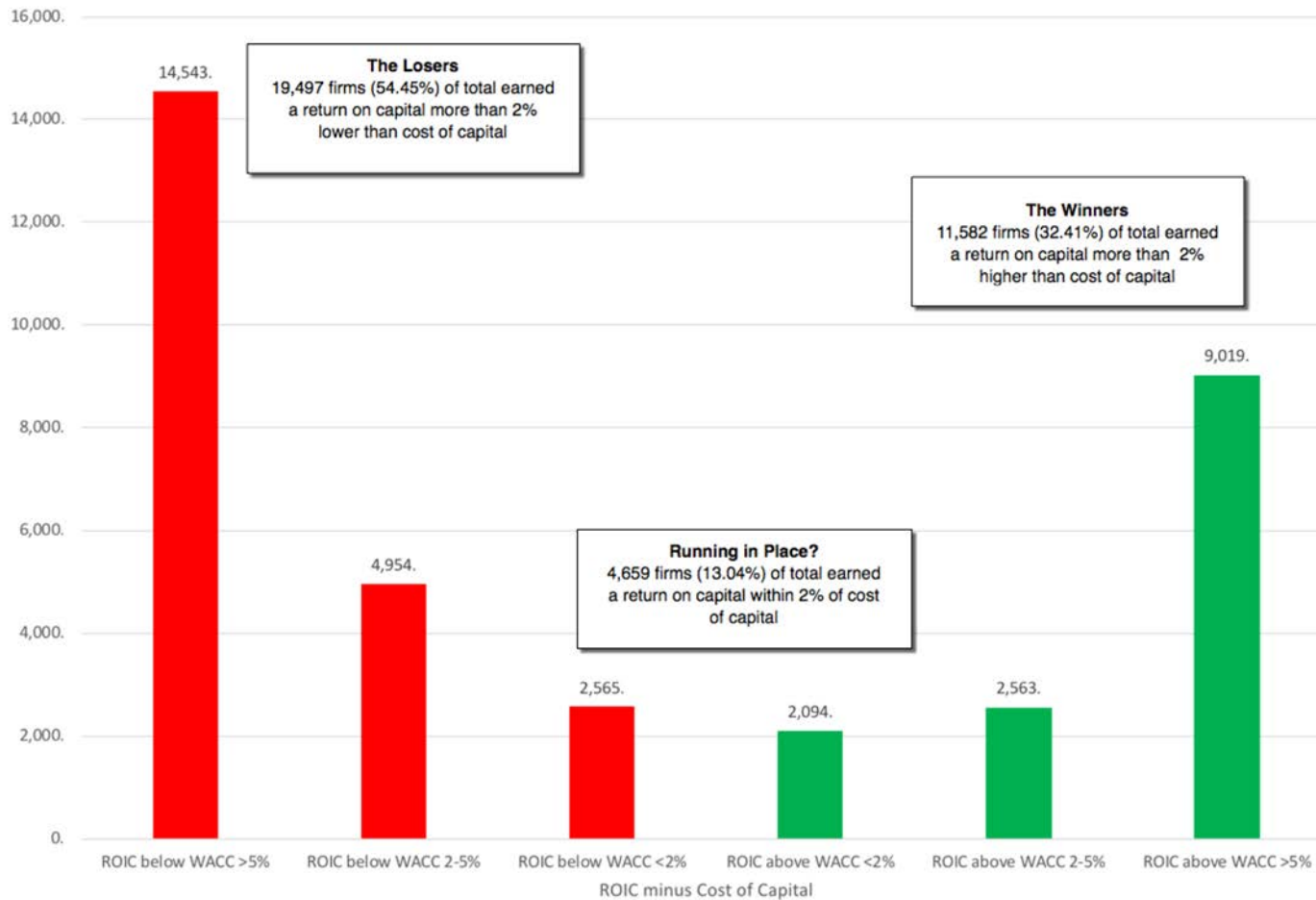
| | |
|----------------------|--------|
| EBITDA | 12,099 |
| Sales | 68,059 |
| Net Debt (Cash) | (260) |
| Tesla Diluted Shares | 142 |

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

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

And consider the trade offs..

ROIC minus Cost of Capital - Global Firms in January 2018



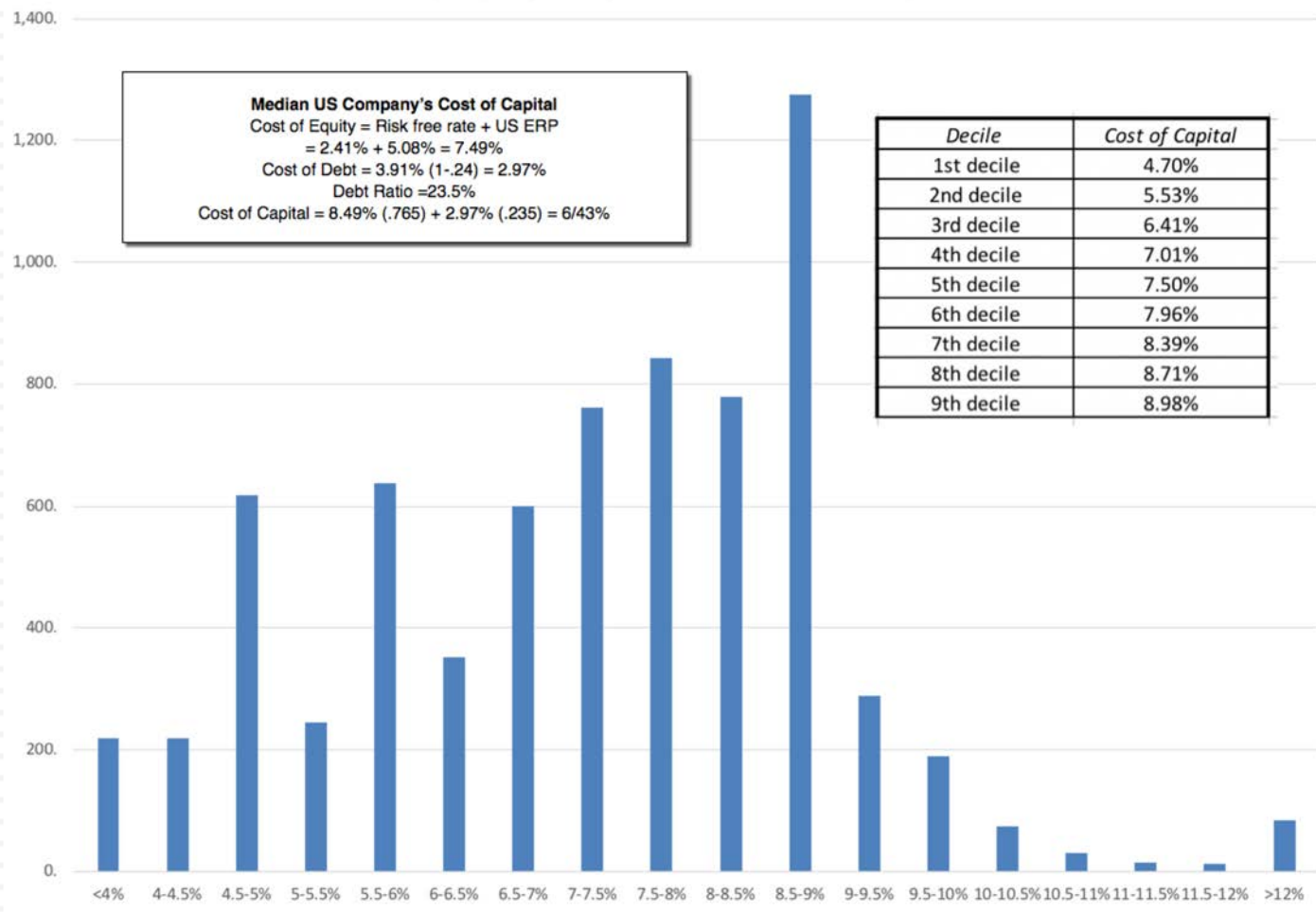
Shell and its peers

| Company Name | ROIC | Cost of capital in US\$ | ROIC - Cost of Capital |
|--|---------|-------------------------|------------------------|
| Exxon Mobil Corporation (NYSE:XOM) | 7.38% | 9.94% | -2.56% |
| PetroChina Co. Ltd. (SEHK:857) | 2.74% | 11.07% | -8.33% |
| Chevron Corporation (NYSE:CVX) | 0.55% | 9.69% | -9.14% |
| Royal Dutch Shell plc (ENXTAM:RDSA) | 0.67% | 9.91% | -9.24% |
| TOTAL S.A. (ENXTPA:FP) | 3.40% | 10.52% | -7.11% |
| BP p.l.c. (LSE:BP.) | -4.85% | 10.59% | -15.44% |
| China Petroleum & Chemical Corp. (SEHK:386) | 0.35% | 10.76% | -10.41% |
| Eni SpA (BIT:ENI) | 1.63% | 13.73% | -12.10% |
| Occidental Petroleum Corporation (NYSE:OXY) | -16.29% | 9.82% | -26.11% |
| BG Group plc (LSE:BG.) | 3.58% | 10.85% | -7.27% |
| Statoil ASA (OB:STL) | 3.93% | 9.57% | -5.64% |
| Public Joint Stock Company Gazprom (MICEX:GAZP) | 4.73% | 15.95% | -11.23% |
| Suncor Energy Inc. (TSX:SU) | 2.74% | 9.95% | -7.22% |
| Imperial Oil Ltd. (TSX:IMO) | 4.86% | 9.92% | -5.06% |
| Public Joint Stock Company Oil Company LUKOIL (MICEX:LKOH) | 2.19% | 15.51% | -13.32% |
| PTT Public Company Limited (SET:PTT) | 3.31% | 13.90% | -10.59% |
| Sasol Ltd. (JSE:SOL) | 17.16% | 13.68% | 3.48% |
| Open Joint Stock Company Surgutneftegas (MICEX:SNGS) | 4.92% | 15.36% | -10.43% |
| Repsol, S.A. (CATS:REP) | 1.79% | 13.99% | -12.20% |
| Ecopetrol SA (BVC:ECOPETROL) | 3.39% | 13.96% | -10.57% |

7. Don't sweat the small stuff – Costs of Capital histogram for the US

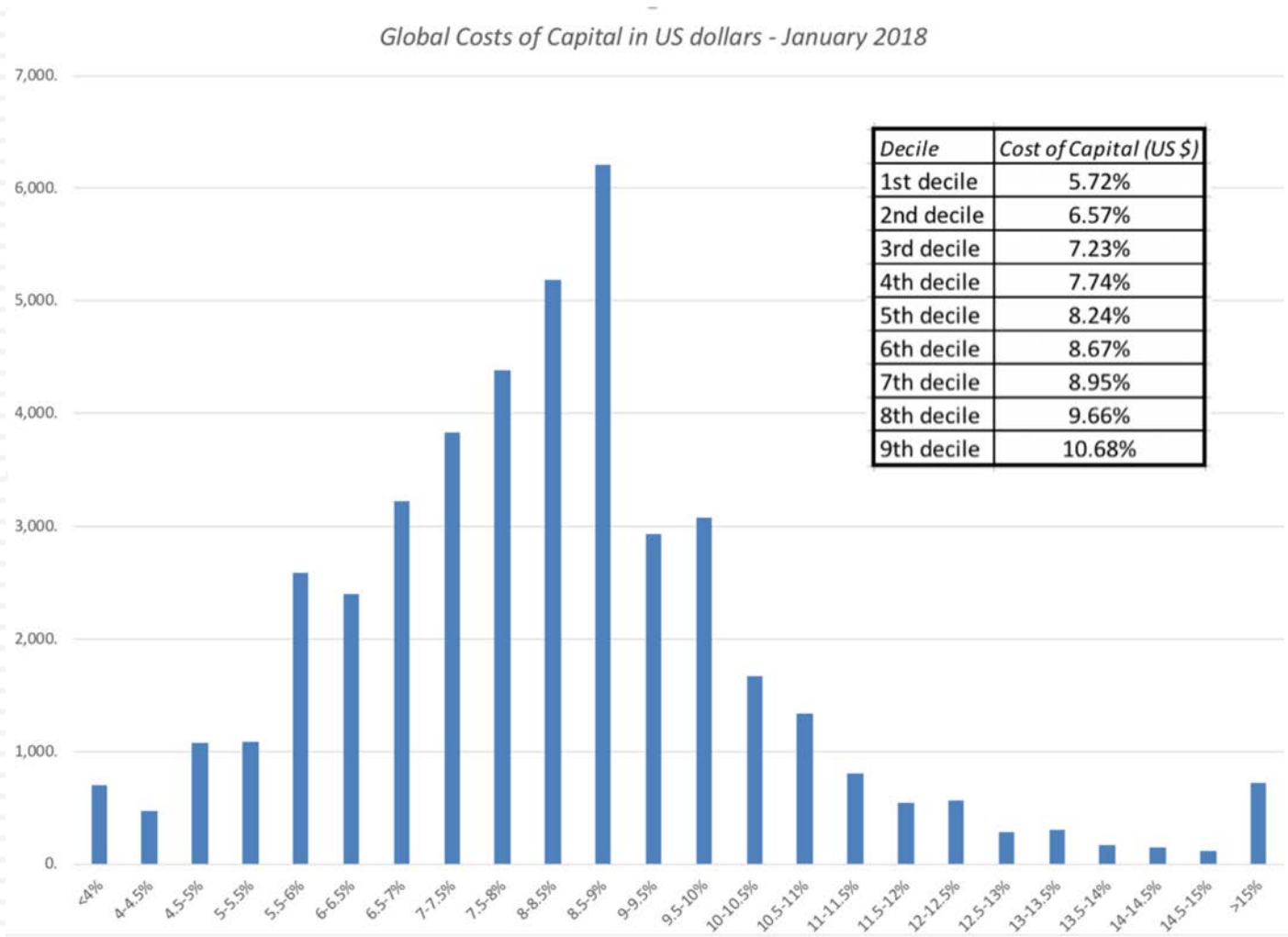
43

Costs of Capital for US firms in US dollars - January 2018



And for global companies

44



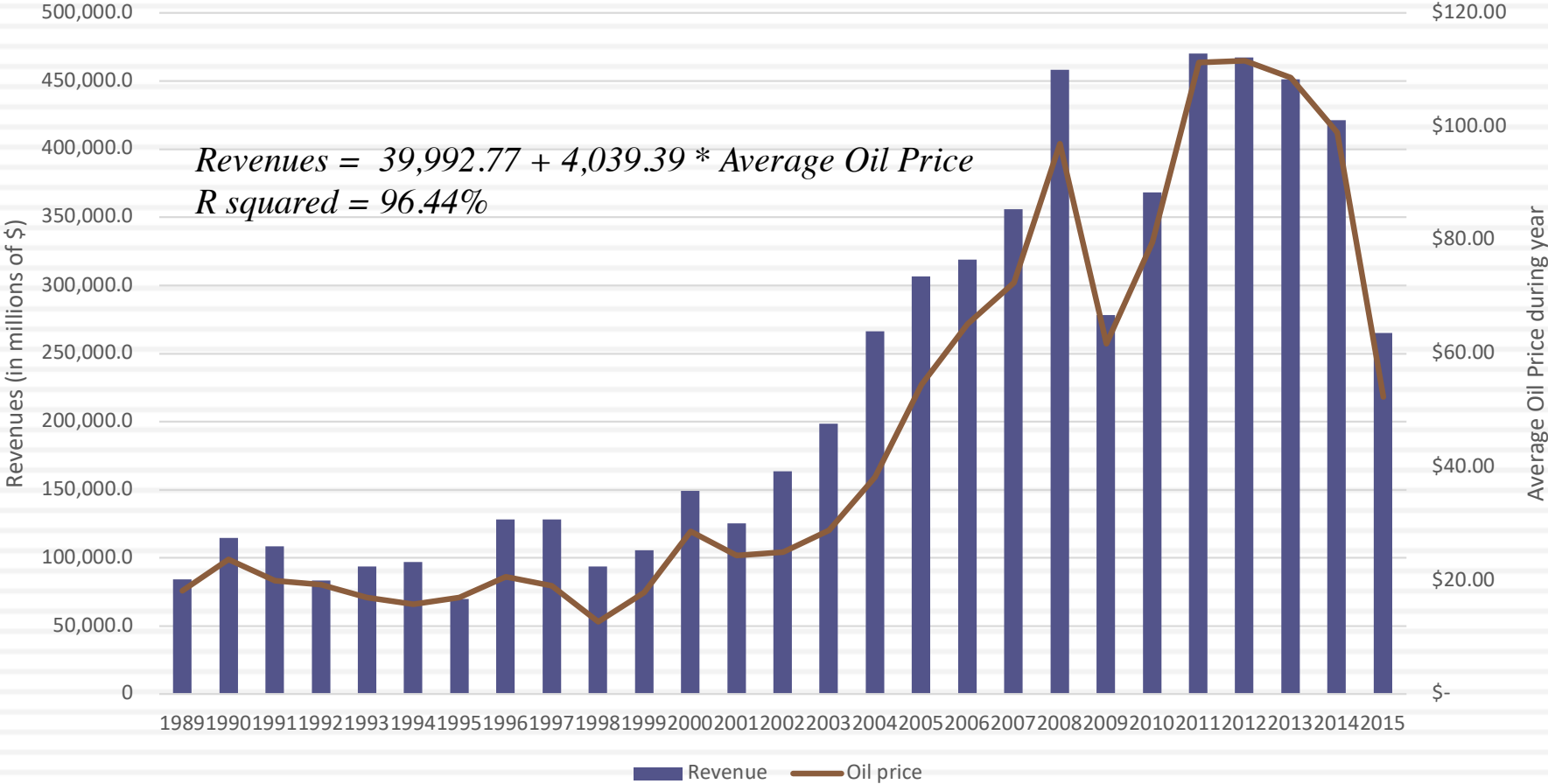
8. Don't let your macro views drown out your micro views..

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- 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.

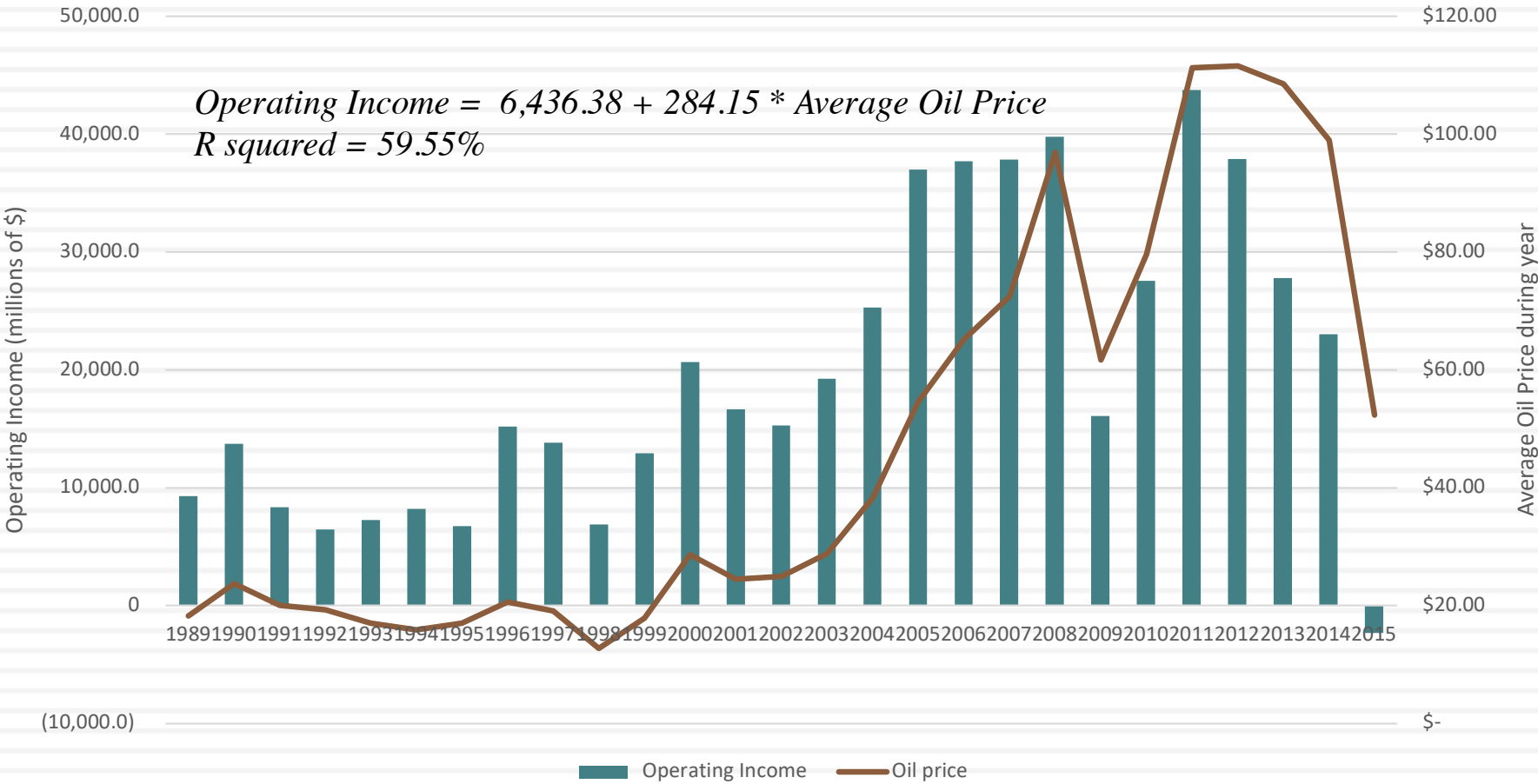
The biggest driver for Shell (and no surprise) is..

Shell: Revenues vs Oil Price



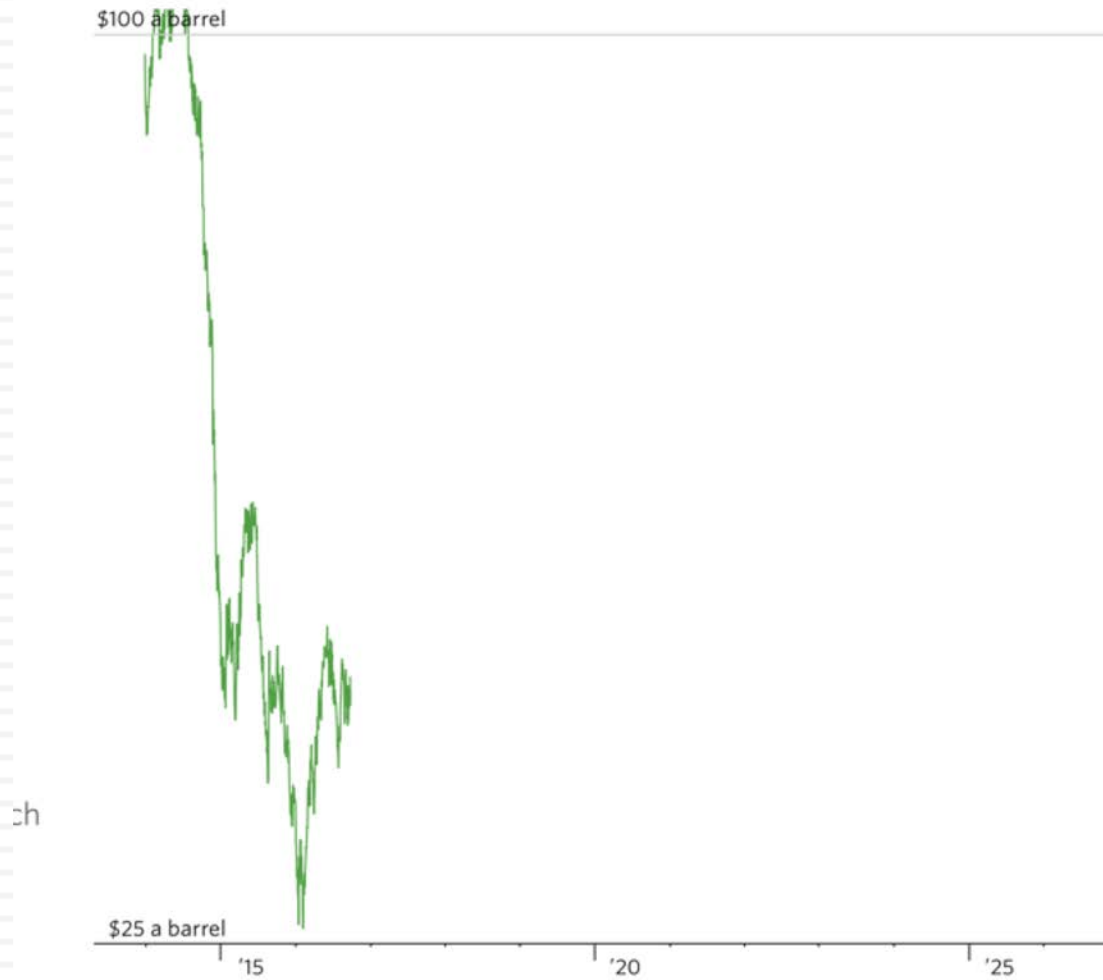
Though they do have some power to alter your income..

Operating Income and Oil Prices - Shell from 1989 to 2015



Oil Prices: An Epic Fall..

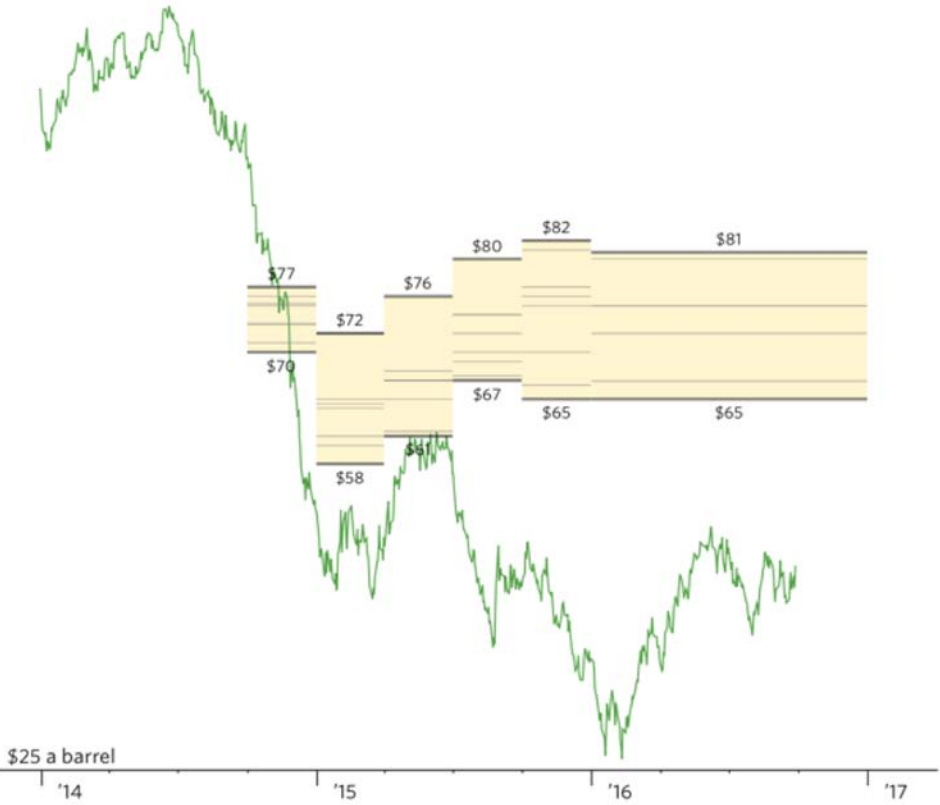
48



That no one foresaw in December 2014..

Forecasts as of December 2014

\$115 a barrel



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*\$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

Revenues will grow 10% a year for next 5 years, tapering down to 5.38% growth in year 10

Operating margin (per-tax) will continue to decline from 24.29% to 23%

Sales/Invested Capital will stay at ten-year average of 1.81

Maturity and Closure

Stable Growth $g = 5.38\%$;
 Cost of capital = 9.88%
 ROC = 15%;
 Reinvestment Rate = $g/ROC = 5.83\%/15.00\% = 35.87\%$

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

Rupee Cashflows

| | 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 | ₹ 94,867 |
| FCFF | | ₹ 92,887 | ₹ 101,407 | ₹ 110,702 | ₹ 120,841 | ₹ 131,902 | ₹ 146,747 | ₹ 161,927 | ₹ 177,198 | ₹ 192,289 | ₹ 206,905 | ₹ 169,632 |
| 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 | |

| | |
|---------------------------------|-------------|
| PV(Terminal value) | ₹ 1,366,411 |
| PV (CF over next 10 years) | ₹ 790,711 |
| Value of operating assets = | ₹ 2,157,122 |
| - Debt | ₹ - |
| - Minority interests | ₹ - |
| + Cash | ₹ 230,727 |
| + Non-operating assets | ₹ 61,081 |
| Value of equity | ₹ 2,448,930 |
| - Value of options | ₹ 945 |
| Value of equity in common stock | ₹ 2,447,985 |
| Number of shares | ₹ 2,283 |
| Estimated value /share | ₹ 1,072.22 |

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% |



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

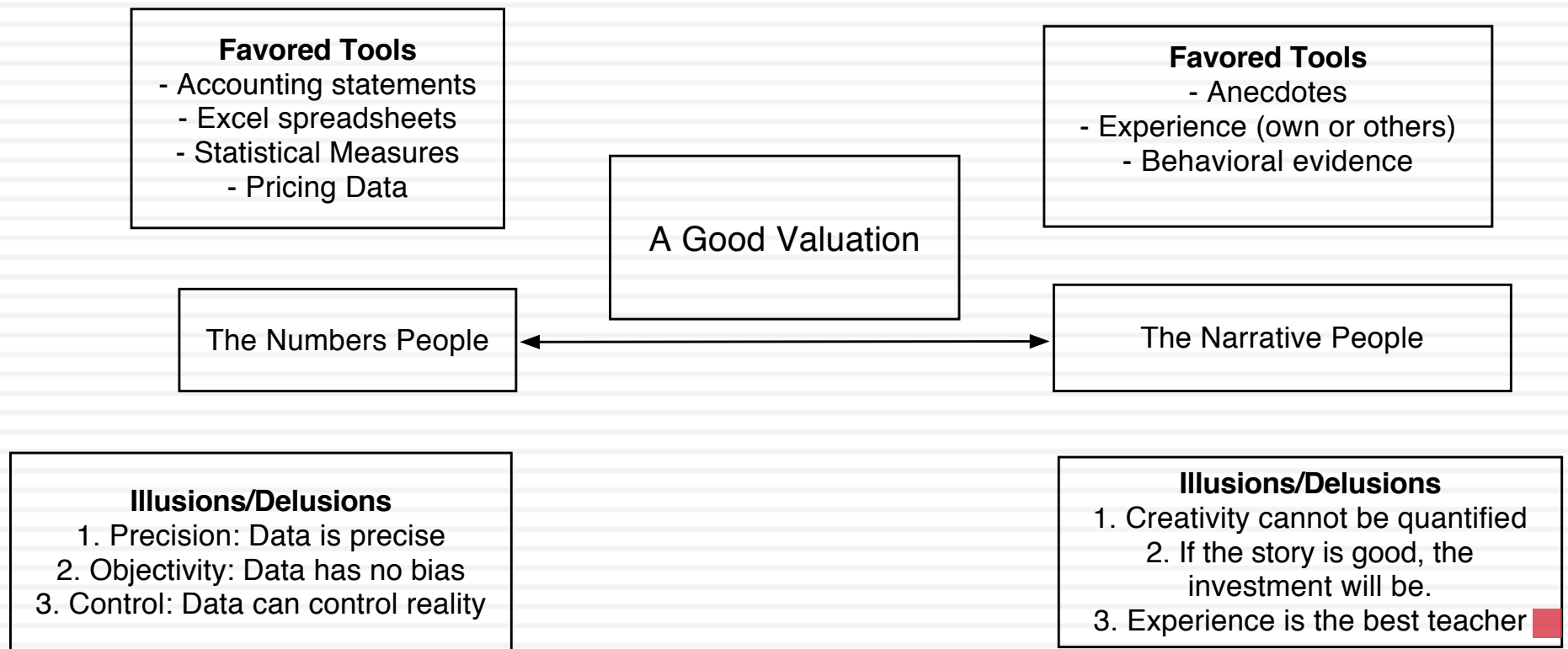


In a **Dissonant DCF**, assumptions about growth, risk and cash flows are not consistent with each other, with little or no explanation given for the mismatch.



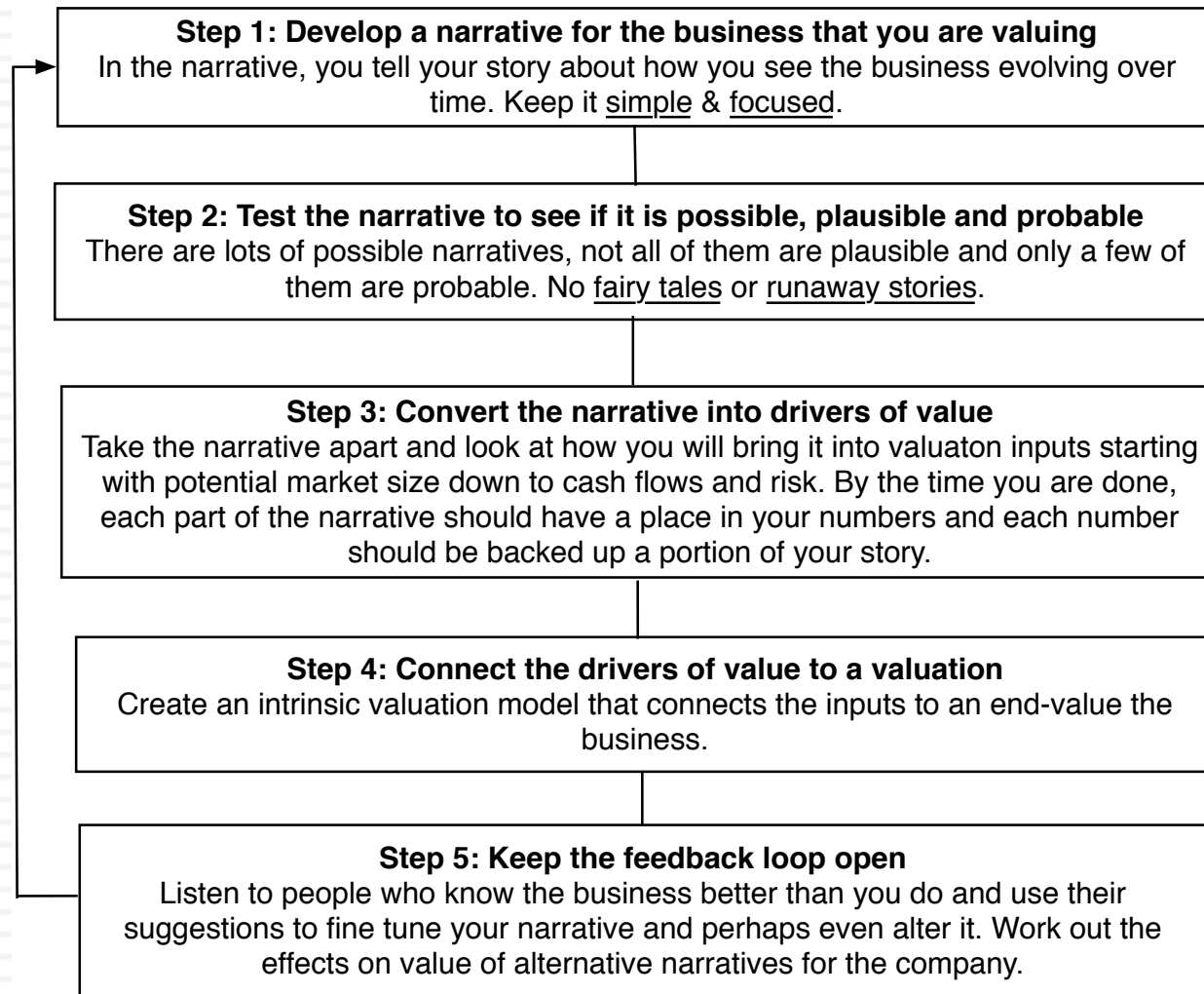
A **Mutant DCF** is a collection of numbers where items have familiar names (free cash flow, cost of capital) but the analyst putting it together has neither a narrative nor a sense of the basic principles of

III. Don't mistake modeling for valuation



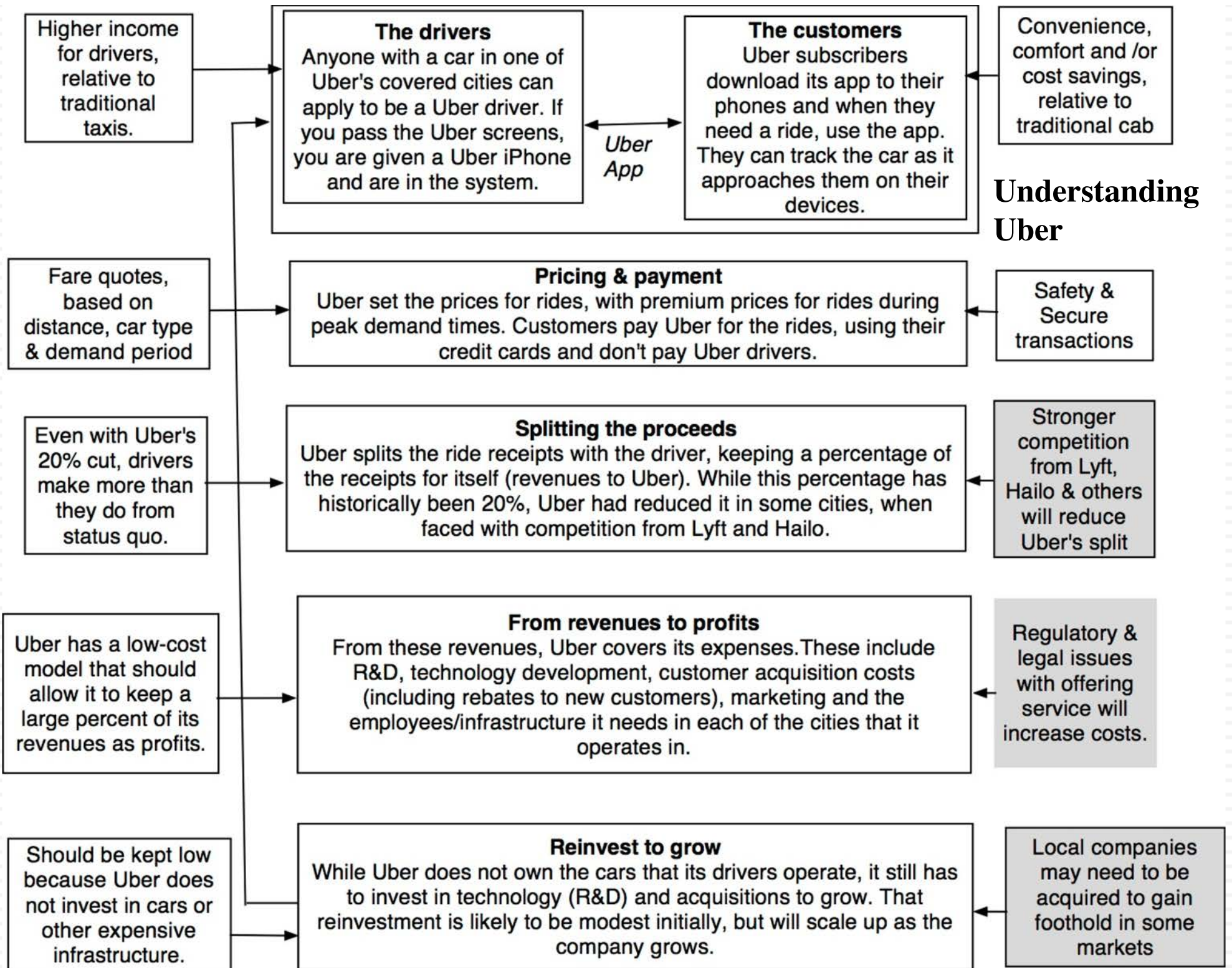
From story to numbers and beyond..

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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

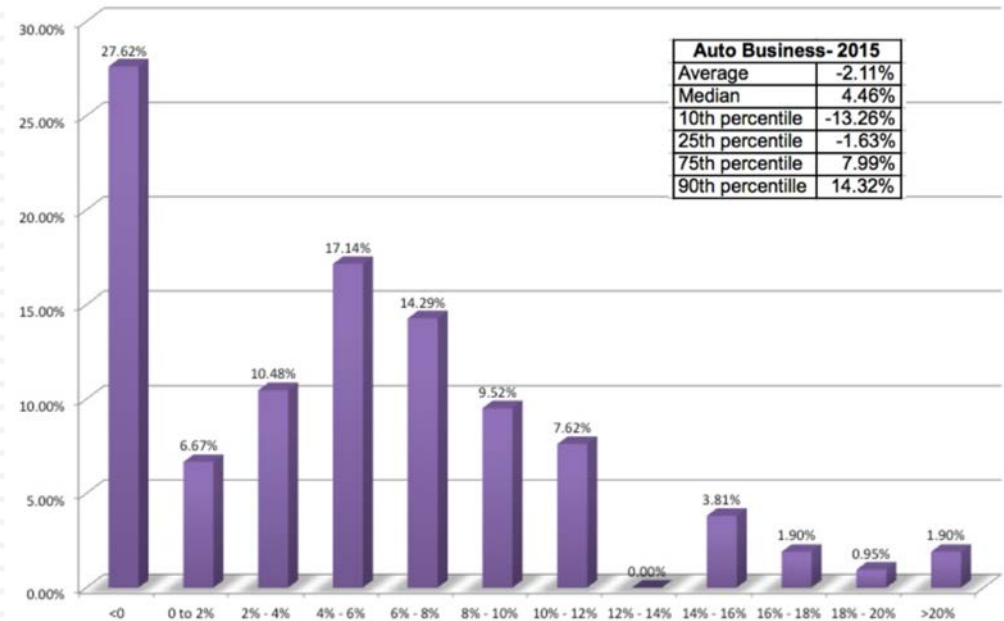
The Auto Business

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

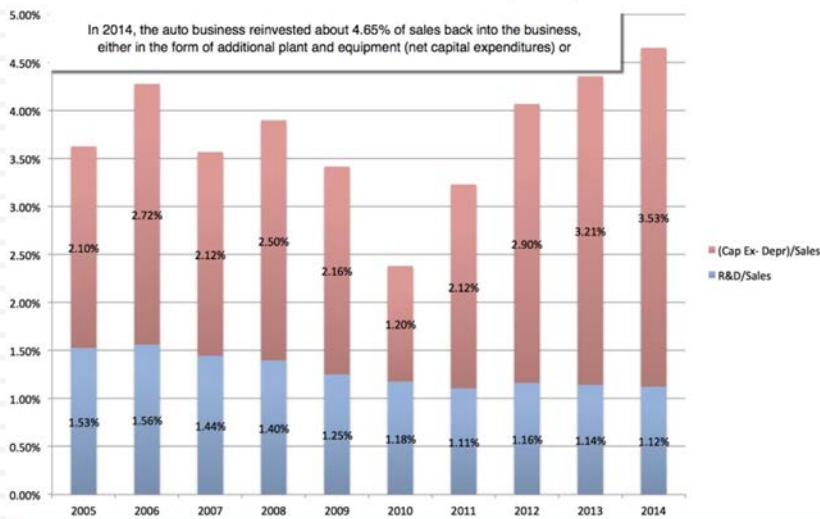


| Auto Business-2015 | |
|--------------------|---------|
| Average | -2.11% |
| Median | 4.46% |
| 10th percentile | -13.26% |
| 25th percentile | -1.63% |
| 75th percentile | 7.99% |
| 90th percentile | 14.32% |

High & Increasing Reinvestment

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% |

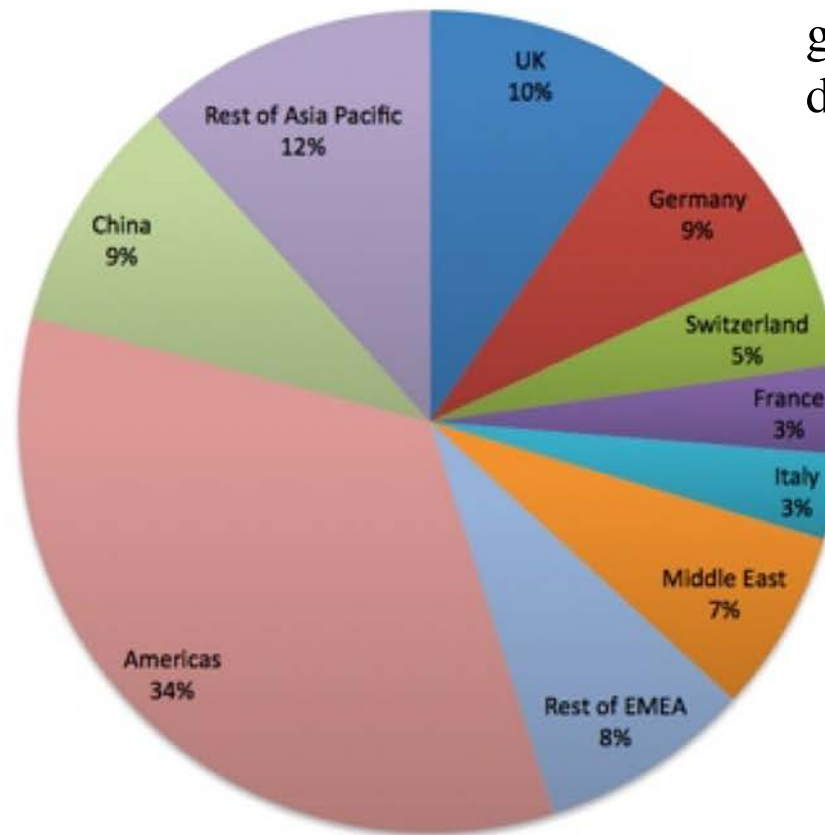
Only once in the last 10 years have auto companies collectively earned more than their cost of capital

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.

Shell: The Oil Business

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Its collective fortunes rest almost entirely **on commodity prices** (oil & gas), which are volatile and impossible to predict.

The **competitive advantages** in this business come from

- a. Access to lower-cost reserves, which you either acquire or are endowed with.
- b. Survival skills, to weather the inevitable drops in oil prices, which will be a function of size and leverage
- c. Only marginally from management skills, to the extent that they affect the first two.

The **risks in this business** come from the swings in oil prices for all firms, but there is a risk of a collision with nature. Your supplies of fossil fuels are finite, and you have the added issue of global warming (whatever your views on it) and how it will play out as higher costs and more restrictions.

Shell: The Clean Energy Business

60

Its collective fortunes rest first **on commodity prices** (oil & gas), which are volatile and impossible to predict. It is aided and abetted by subsidies from governments and other entities.

The **competitive advantages** in this business come from

- a. Technology, to deliver energy at lower cost & higher output.
- b. Cost advantages, in established green energy businesses, either because you have a natural advantage or because of economies of scale.
- c. Playing the subsidy game better.

The **risks in this business** come from technological uncertainty (if you are playing the technology game), from your competitors being able to reduce costs more than you are or a tilting of the subsidy game away from you.

Step 1: Create a narrative for the future

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

The Uber Narrative in June 2014

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 at the time of its IPO in October 2015

- 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.

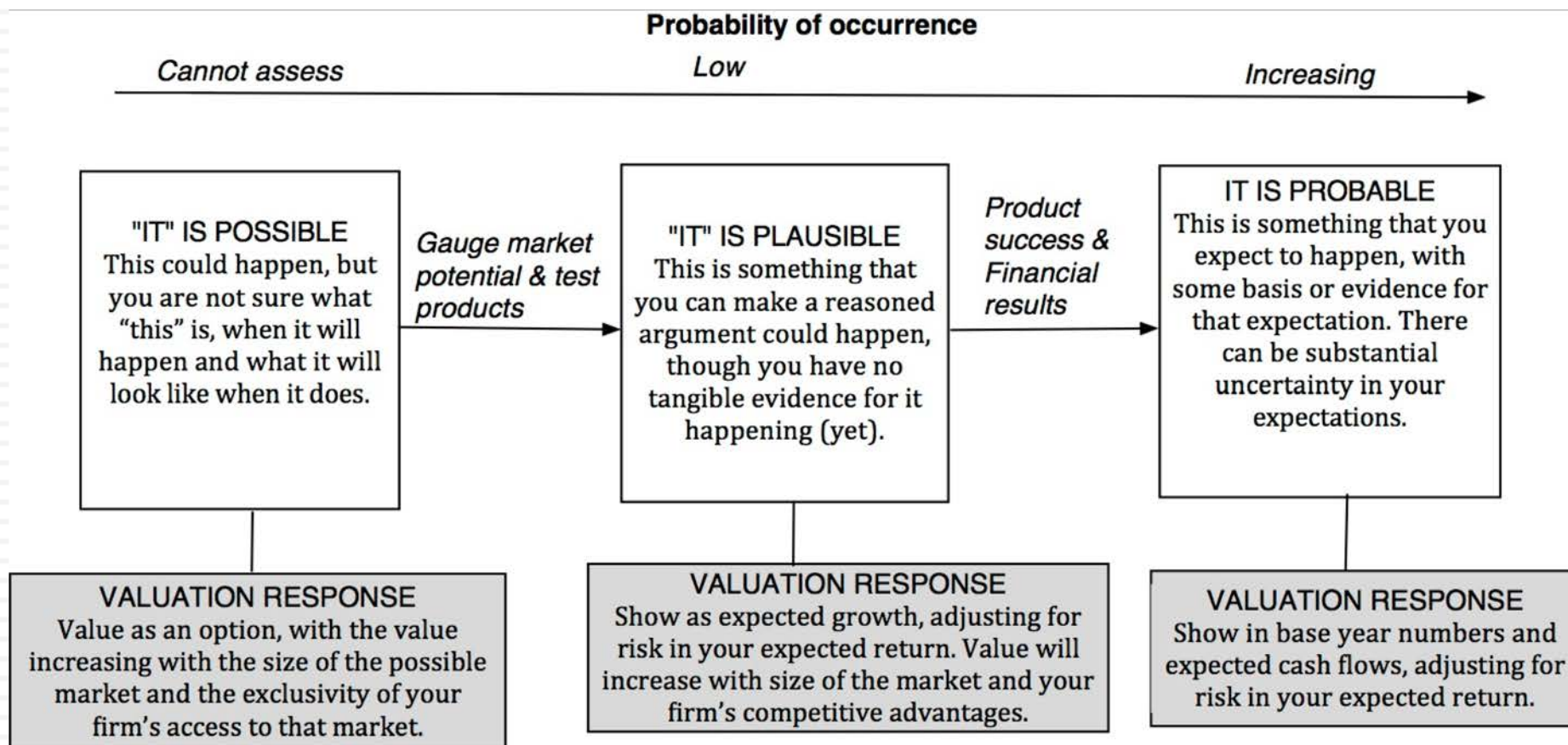
The Shell Narrative in 2016

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- What business is Shell in?
 - ▣ The Oil Business
 - ▣ The Energy Business
- What are its competitive advantages?
 - ▣ How strong are they?
 - ▣ How sustainable are they?
- How do you see the company evolving in this business?
 - ▣ Shrinking (If so, how?)
 - ▣ Holding your own
 - ▣ Growing (If so, how?)

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

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The Impossible, The Implausible and the Improbable

66

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.

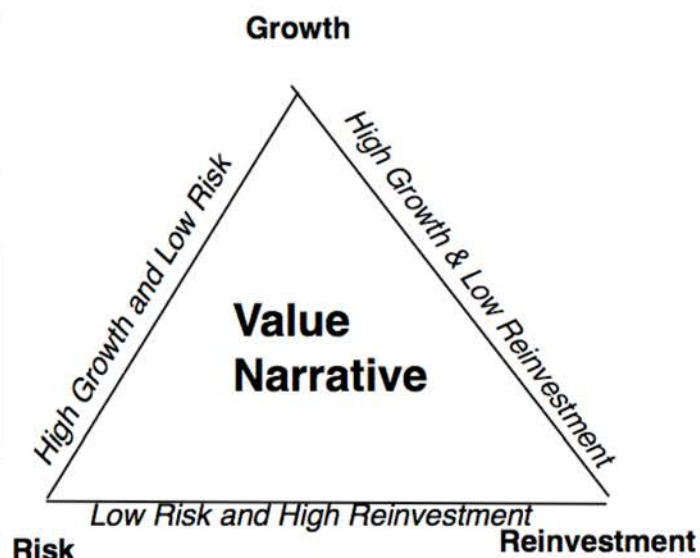
Profits without competition

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

Returns without risk

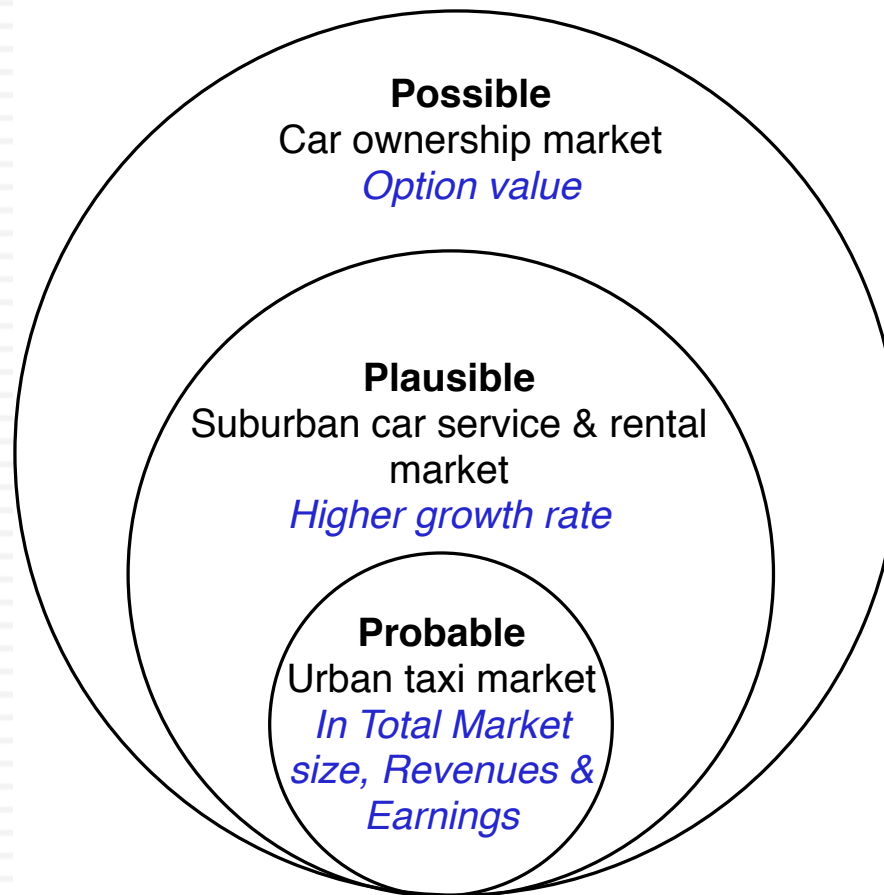
Assuming that you can generate high returns in a business with no risk.

The Improbable



Uber: Possible, Plausible and Probable

Uber (My narrative))



The Impossible: The Runaway Story

The Story



The Checks (?)

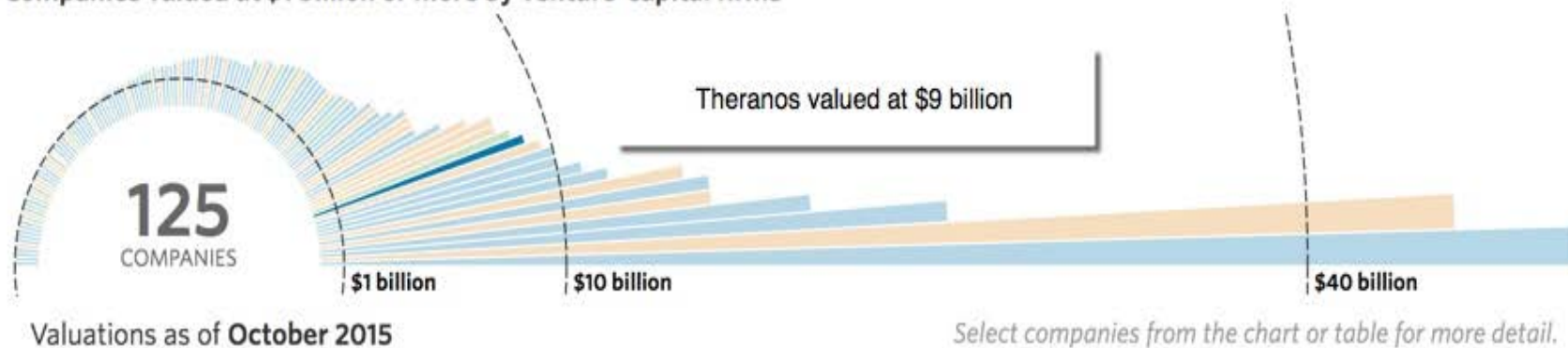
| Board Member | Designation | Age |
|------------------|-------------------------------|-----|
| Henry Kissinger | Former Secretary of State | 92 |
| Bill Perry | Former Secretary of Defense | 88 |
| George Schultz | Former Secretary of State | 94 |
| Bill Frist | Former Senate Majority Leader | 63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

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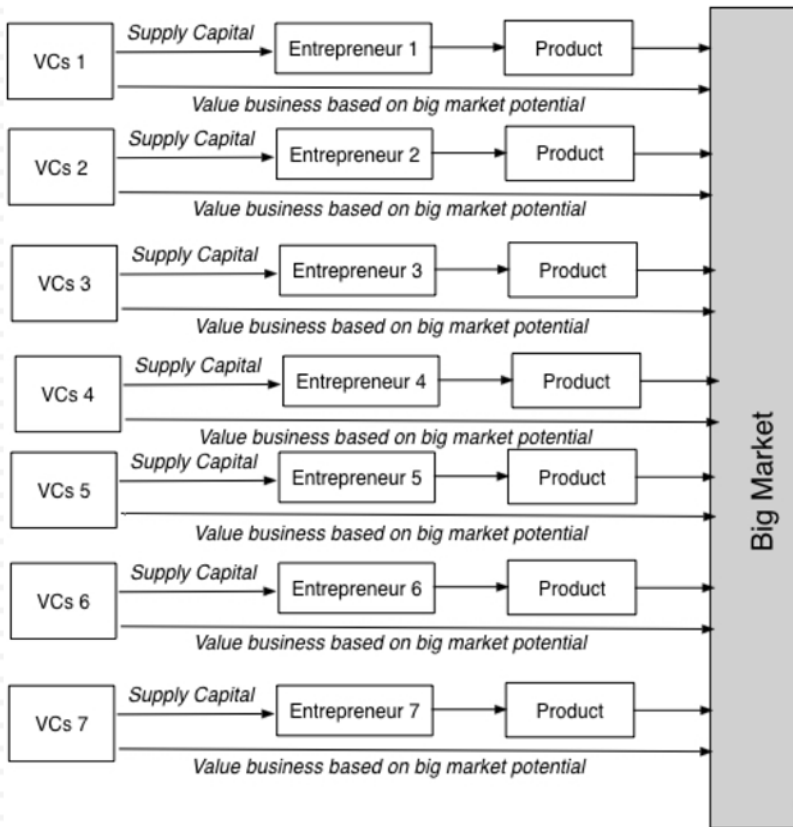
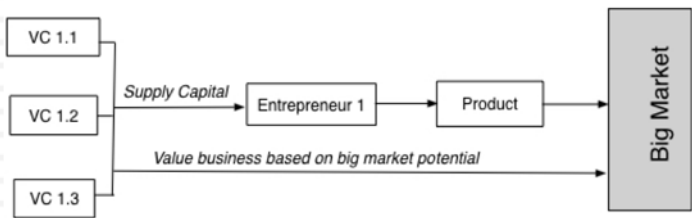
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Money

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



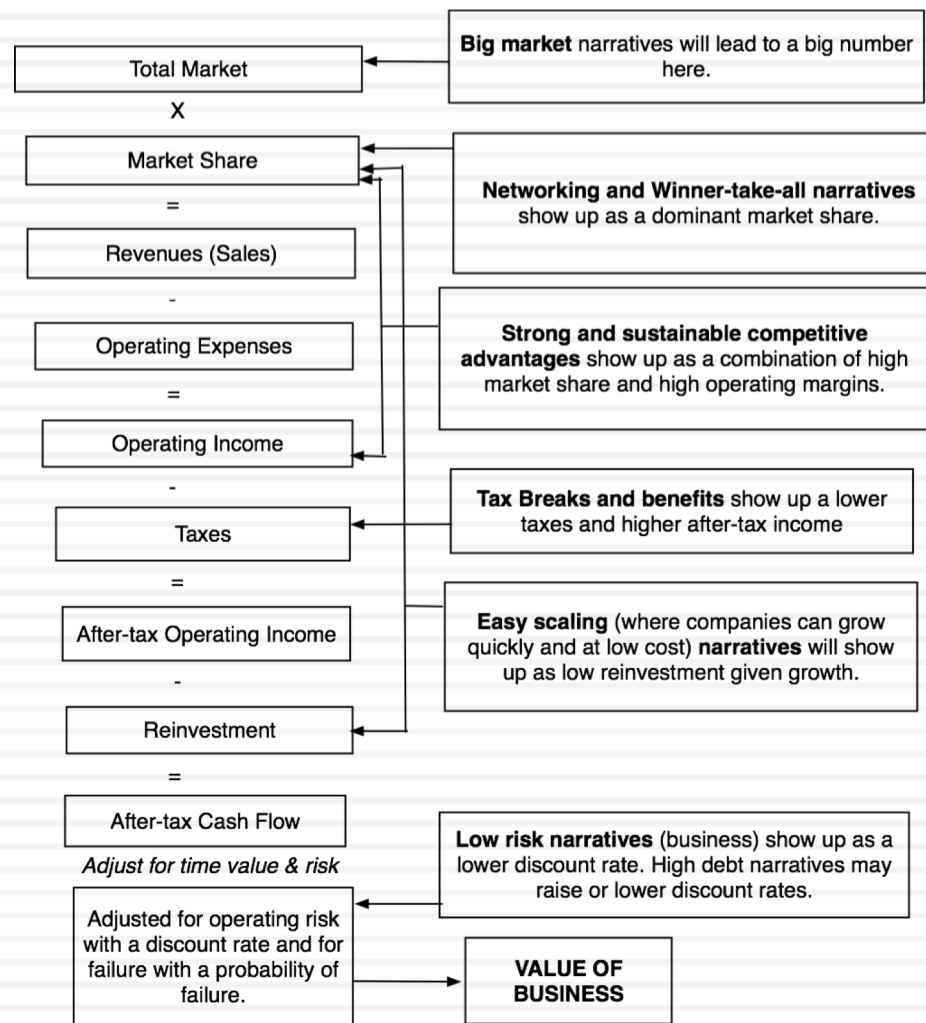
The Implausible: The Big Market Delusion



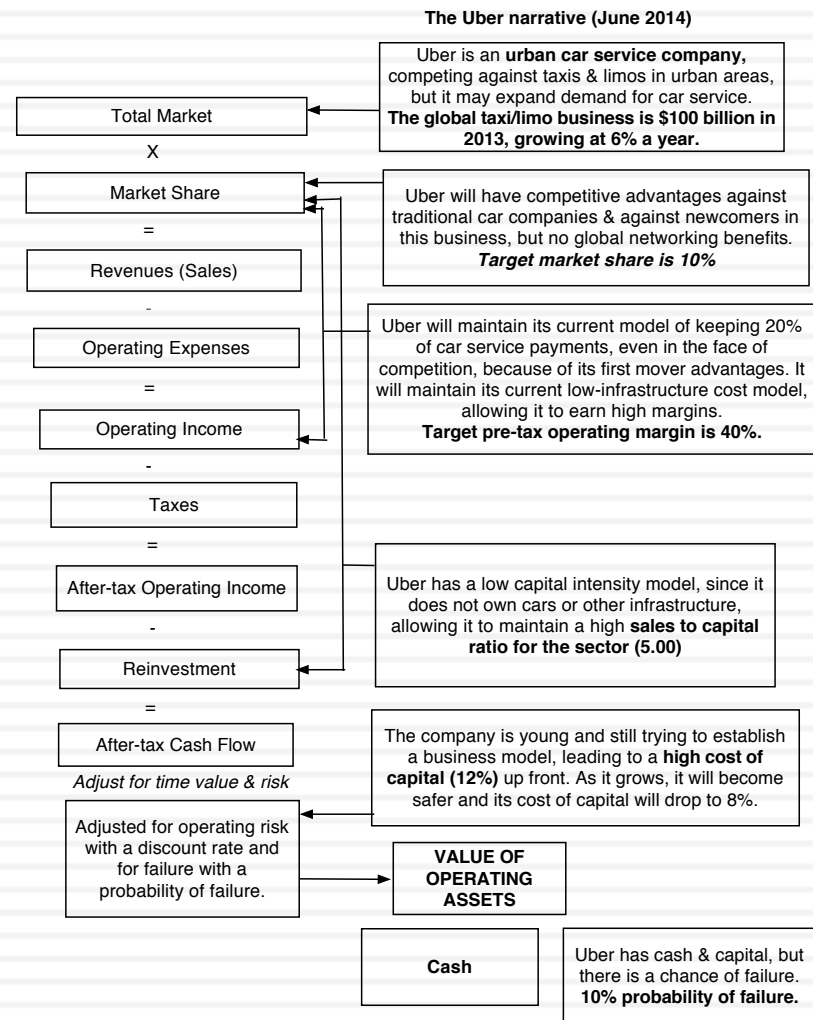
| Company | Market Cap | Enterprise Value | Current Revenues | Breakeven Revenues (2025) | % from Online Advertising | Imputed Online Ad Revenue (2025) |
|---------------------|-----------------------|-----------------------|---------------------|---------------------------|---------------------------|----------------------------------|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



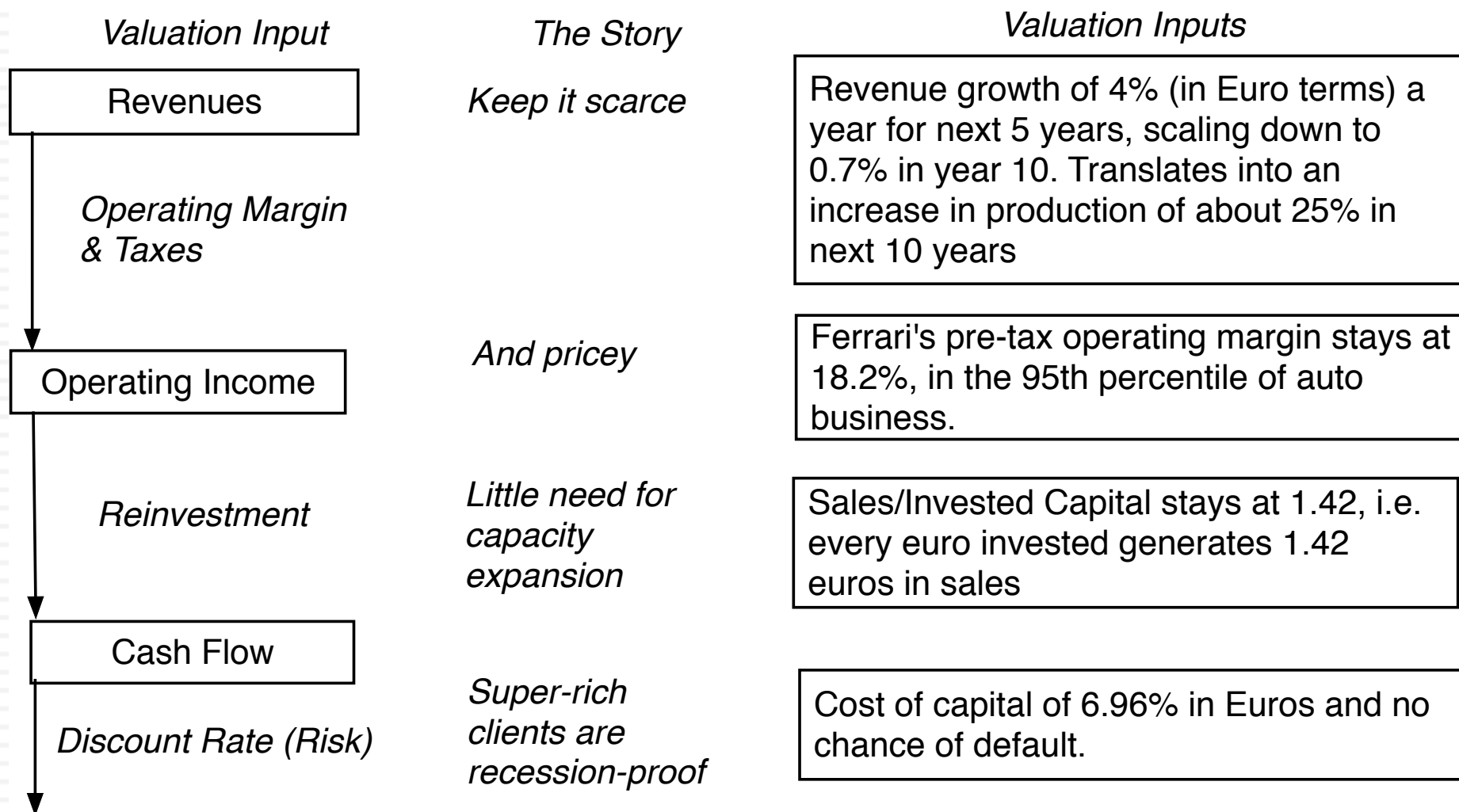
Step 3: Connect your narrative to key drivers of value



Uber: From Story to Numbers

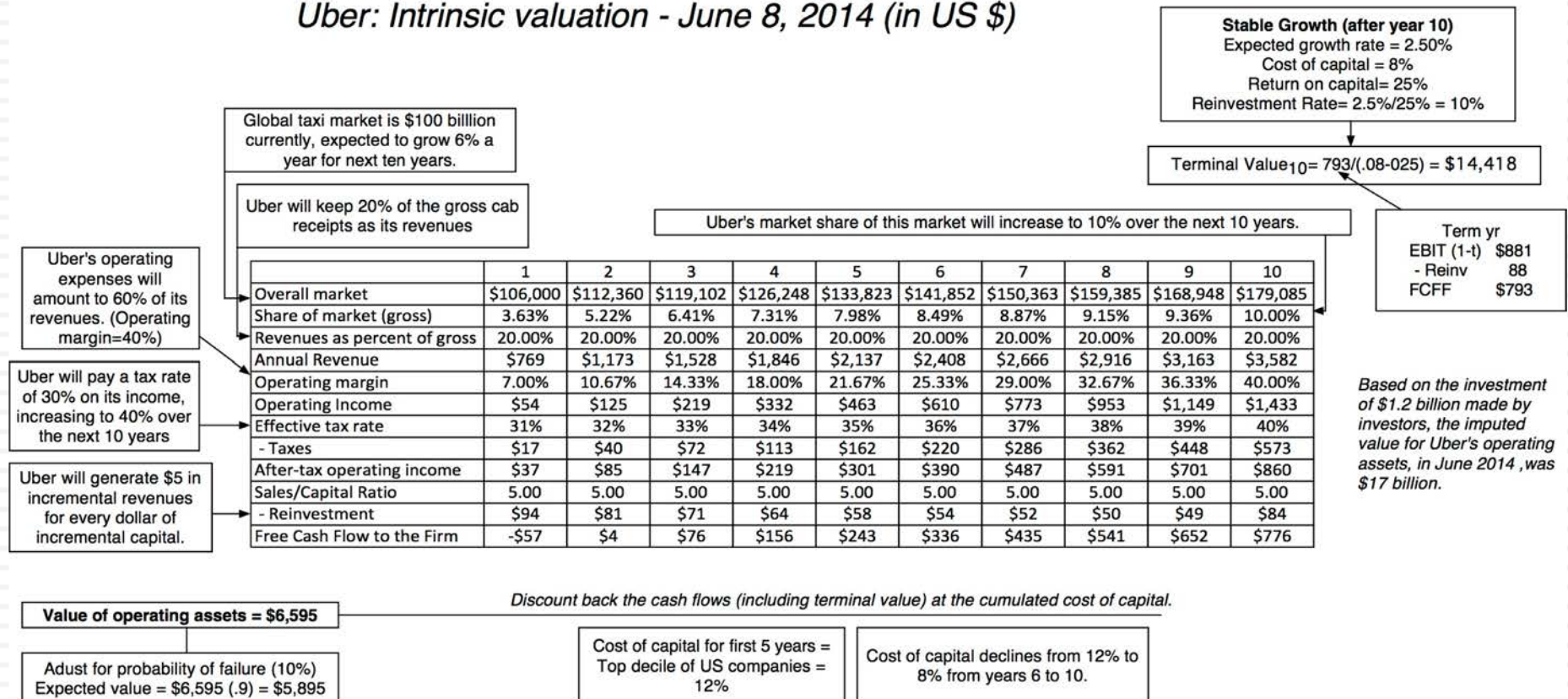


Ferrari: From story to numbers



Step 4: Value the company (Uber)

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

Shell: The Oil Play

Revenue calculated from prevailing oil price of \$40/barrel in March 2016
 Revenue = 39992.77+4039.40*\$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

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

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

Valuing Bill Gurley's Uber narrative

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

Different narratives, Different Numbers

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

The Real World Intrudes: Be ready to modify narrative as events unfold

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| Narrative Break/End | Narrative Shift | Narrative Change (Expansion or Contraction) |
|---|--|--|
| Events, external (legal, political or economic) or internal (management, competitive, default), that can cause the narrative to break or end. | Improvement or deterioration in initial business model, changing market size, market share and/or profitability. | Unexpected entry/success in a new market or unexpected exit/failure in an existing market. |
| Your valuation estimates (cash flows, risk, growth & value) are no longer operative | Your valuation estimates will have to be modified to reflect the new data about the company. | Valuation estimates have to be redone with new overall market potential and characteristics. |
| Estimate a probability that it will occur & consequences | Monte Carlo simulations or scenario analysis | Real Options |

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, The Global Logistics Company with a behavior problem (June 2017)

The Story

Uber is a logistics company, doubling the market size by drawing in new users. It will enjoy weak global networking benefits while seeing its slice of revenues slip (85/15), higher costs (with drivers as partial employees) and low capital intensity. *The extracurricular problems at the company, with its legal tangle with Google's Waymo division and accusations of condoning of sexual harassment will slow the company down in the near term but not damage it enough to alter its story significantly.*

The Assumptions

| | Base year | Years 1-5 | Years 6-10 | After year 10 | Story link |
|--------------------|---|--------------------------------|------------|--------------------------|---------------------------------|
| Total Market | \$200,000 | Grow 10.39% a year | | Grow 1.5% a year | Delivery & Moving + Ridesharing |
| Gross Market Share | 10.00% | 10%>40% | | 40% | Big player |
| Revenue Share | 20.00% | 20% -> 15% | | 15.00% | Lower revenue share |
| Operating Margin | -43.08% | -43.08% ->20% | | 20.00% | Cost pressures continue |
| Reinvestment | NA | Sales to capital ratio of 3.00 | | Reinvestment rate = 7.5% | More capital investment model |
| Cost of capital | NA | 10.00% | 10%->8.00% | 8.00% | 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 (15% of Gross) | EBIT (1-t) | Reinvestment | FCFF |
|---------------|--------------|--------------|-------------------------|------------|--------------|------------|
| 1 | \$ 220,780 | 13.00% | \$ 8,826 | \$ (2,105) | \$ 775 | \$ (2,880) |
| 2 | \$ 243,719 | 16.00% | \$ 11,309 | \$ (1,983) | \$ 828 | \$ (2,811) |
| 3 | \$ 269,041 | 19.00% | \$ 13,930 | \$ (1,564) | \$ 874 | \$ (2,438) |
| 4 | \$ 296,995 | 22.00% | \$ 16,661 | \$ (820) | \$ 911 | \$ (1,731) |
| 5 | \$ 327,853 | 25.00% | \$ 19,466 | \$ 270 | \$ 935 | \$ (665) |
| 6 | \$ 361,917 | 28.00% | \$ 22,294 | \$ 1,715 | \$ 943 | \$ 772 |
| 7 | \$ 399,520 | 31.00% | \$ 25,080 | \$ 3,511 | \$ 929 | \$ 2,583 |
| 8 | \$ 441,030 | 34.00% | \$ 27,741 | \$ 3,884 | \$ 887 | \$ 2,997 |
| 9 | \$ 486,853 | 37.00% | \$ 30,173 | \$ 4,224 | \$ 811 | \$ 3,414 |
| 10 | \$ 537,437 | 40.00% | \$ 32,246 | \$ 4,514 | \$ 691 | \$ 3,823 |
| Terminal year | \$ 548,723 | 40.00% | \$ 32,923 | \$ 4,609 | \$ 484 | \$ 4,125 |

The Value

| | | | |
|-------------------------------------|------------------|--|--|
| Terminal value | \$ 69,920 | | |
| PV(Terminal value) | \$ 28,479 | | |
| PV (CF over next 10 years) | \$ (2,103) | | |
| Value of operating assets = | \$ 26,376 | | |
| Probability of failure | 5% | | |
| Value in case of failure | \$ - | | |
| Adjusted Value for operating assets | \$ 25,057 | | |
| + Cash on hand | \$ 5,000 | | |
| + Cross holdings | \$ 6,000 | | |
| Value of all assets | \$ 36,057 | Most recent pricing put the price at greater than \$70 billion | |

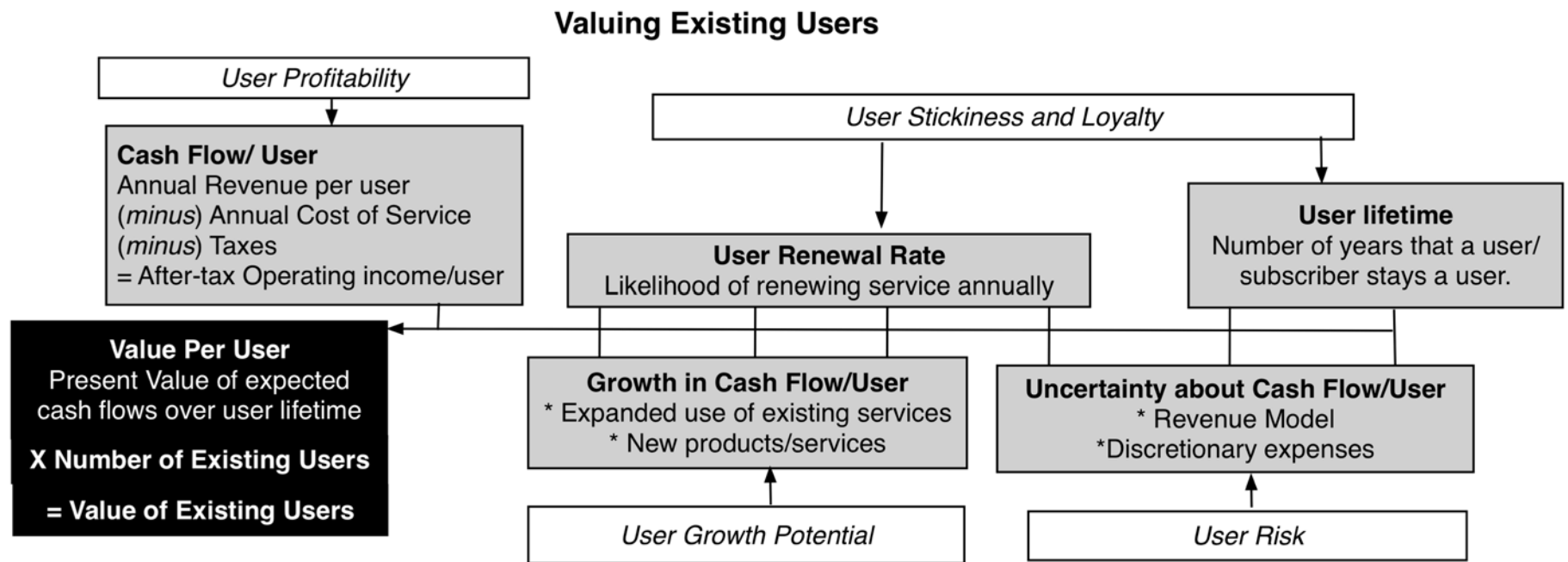
Push back on Uber Valuation

- 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.

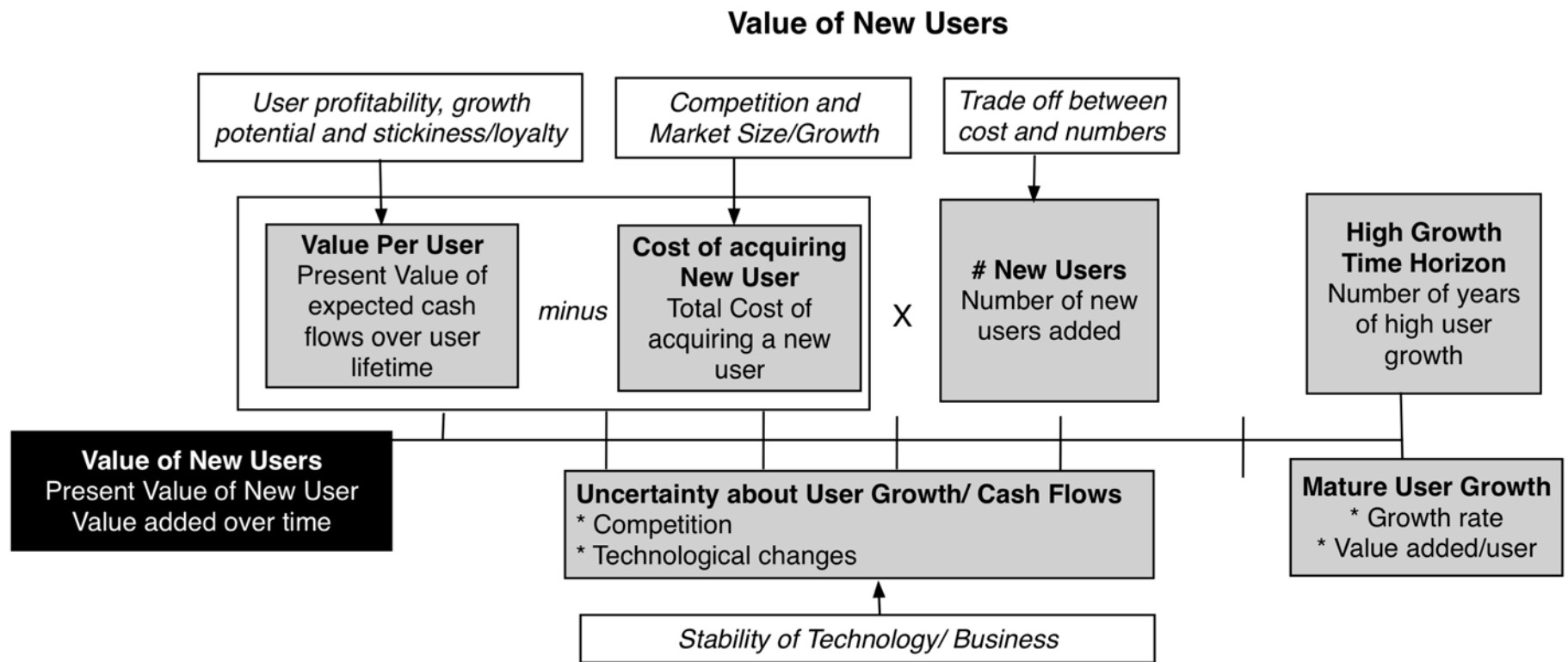
User/ Subscriber/Member Based Valuation

- 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.

Valuing Existing Users



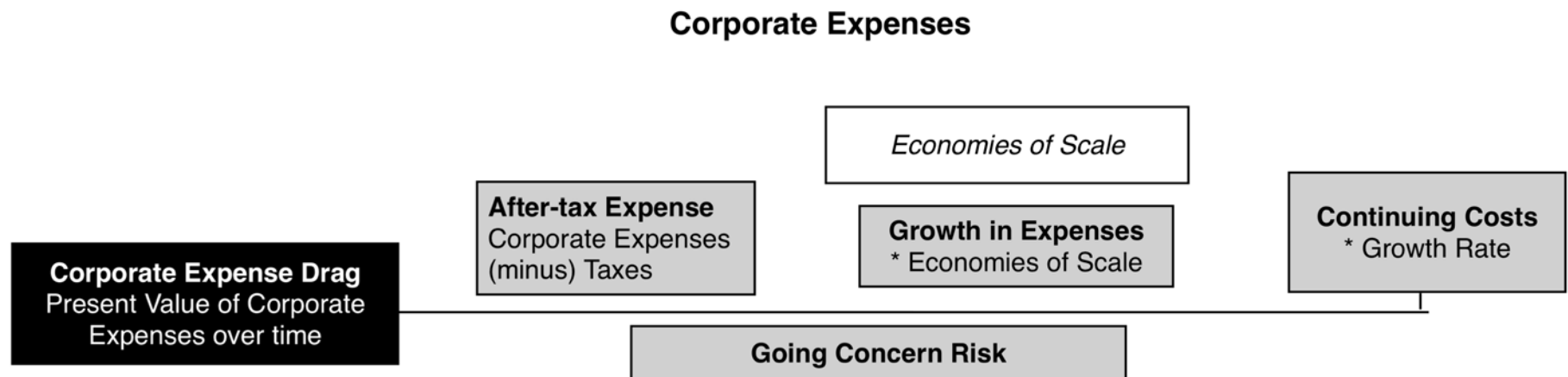
Valuing New Users



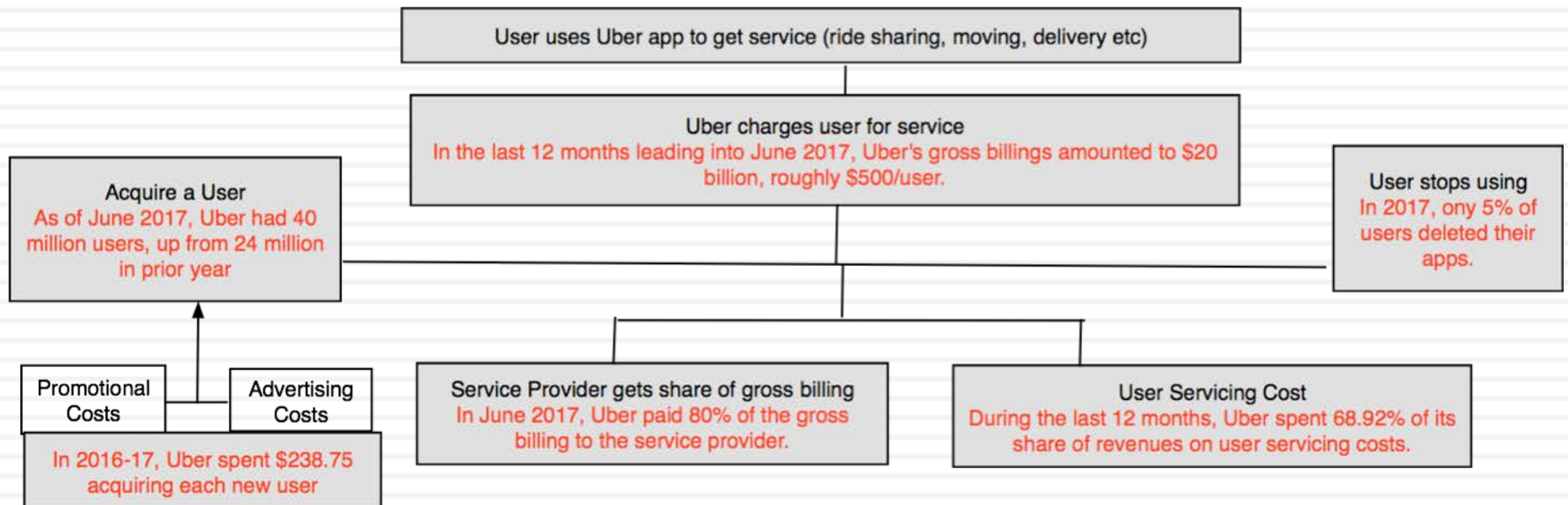
Valuing Corporate Drag

What are these?

A user/subscriber/member based company usually has expenses that are not directly related to acquiring or keeping its constituents, but are central to keeping the business going.

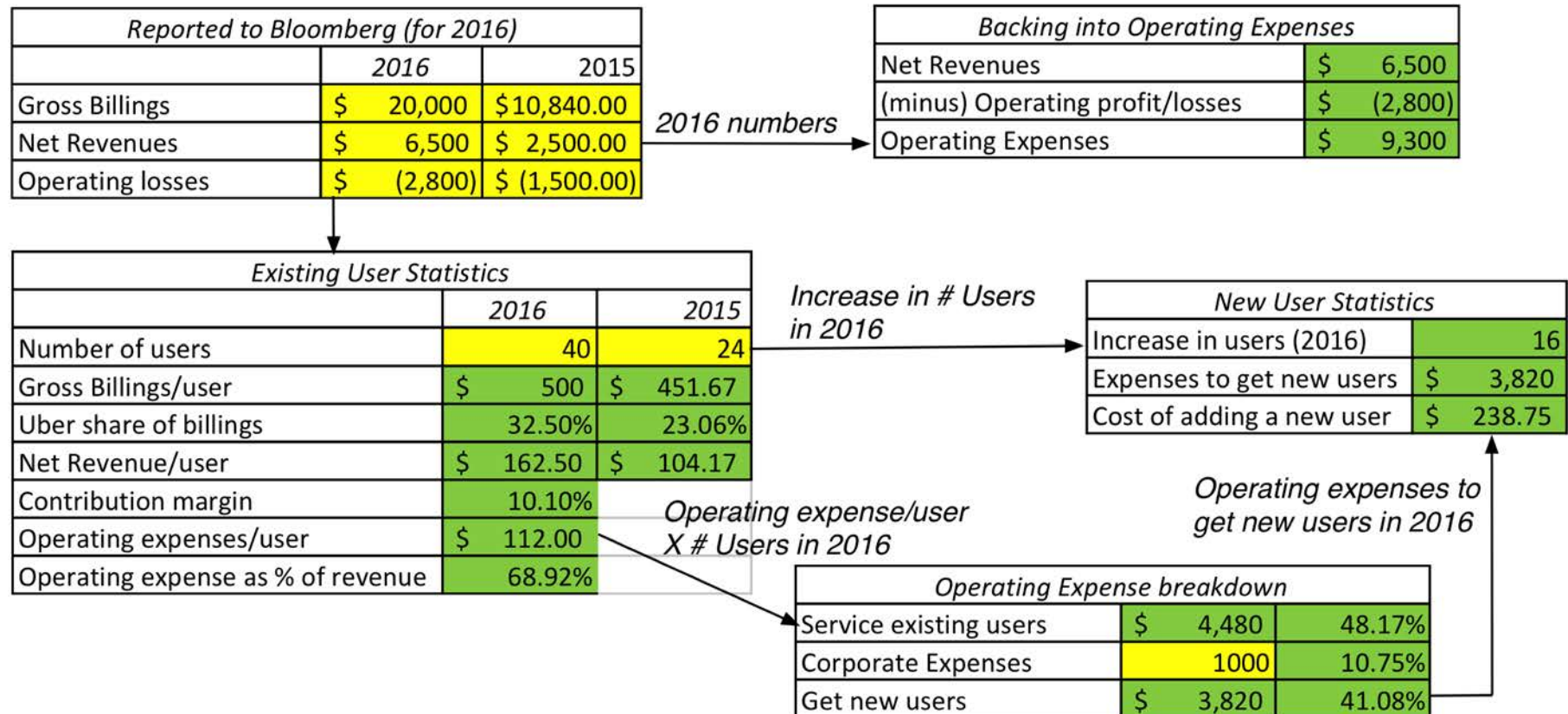


Uber User Economics



Uber: Deconstructing the Financials

Deconstructing Uber's Financials



Uber's Existing User Value

Growth rate in Operating Expenses
Assumed that 80% of operating expenses are variable. Growth rate is 9.9% /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%.

Value of Existing Users: Uber

| | Base | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Gross Billings | \$ 500.00 | \$ 560.00 | \$ 627.20 | \$ 702.46 | \$ 786.76 | \$ 881.17 | \$ 986.91 | \$ 1,105.34 | \$ 1,237.98 | \$ 1,386.54 | \$ 1,552.92 | \$ 1,739.27 | \$ 1,947.99 | \$ 2,181.75 | \$ 2,443.56 | \$ 2,736.78 |
| Net Revenue | \$ 100.00 | \$ 112.00 | \$ 125.44 | \$ 140.49 | \$ 157.35 | \$ 176.23 | \$ 197.38 | \$ 221.07 | \$ 247.60 | \$ 277.31 | \$ 310.58 | \$ 347.85 | \$ 389.60 | \$ 436.35 | \$ 488.71 | \$ 547.36 |
| Cost of Service | \$ 48.17 | \$ 52.94 | \$ 58.18 | \$ 63.94 | \$ 70.27 | \$ 77.23 | \$ 84.87 | \$ 93.27 | \$ 102.51 | \$ 112.66 | \$ 123.81 | \$ 136.07 | \$ 149.54 | \$ 164.34 | \$ 180.61 | \$ 198.49 |
| Operating Profit | \$ 51.83 | \$ 59.06 | \$ 67.26 | \$ 76.55 | \$ 87.08 | \$ 99.01 | \$ 112.51 | \$ 127.79 | \$ 145.09 | \$ 164.65 | \$ 186.78 | \$ 211.79 | \$ 240.06 | \$ 272.01 | \$ 308.10 | \$ 348.87 |
| Operating Profit after tax | \$ 36.28 | \$ 41.34 | \$ 47.08 | \$ 53.59 | \$ 60.96 | \$ 69.31 | \$ 78.76 | \$ 89.46 | \$ 101.56 | \$ 115.26 | \$ 130.74 | \$ 148.25 | \$ 168.04 | \$ 190.41 | \$ 215.67 | \$ 244.21 |
| PV of operating profit | | \$ 37.58 | \$ 38.91 | \$ 40.26 | \$ 41.63 | \$ 43.03 | \$ 44.46 | \$ 45.91 | \$ 47.38 | \$ 48.88 | \$ 50.41 | \$ 51.96 | \$ 53.54 | \$ 55.15 | \$ 56.79 | \$ 58.46 |
| Value of user (full life) | \$ 714.36 | | | | | | | | | | | | | | | |
| Probability of full life | 46.33% | | | | | | | | | | | | | | | |
| Expected life of dropouts | 3.75 | | | | | | | | | | | | | | | |
| Value per existing user | \$ 410.31 | | | | | | | | | | | | | | | |
| Number of existing users | 40.00 | | | | | | | | | | | | | | | |
| Value of existing users | \$ 16,412 | | | | | | | | | | | | | | | |

Adjustment for drop outs
Users who don't make it through full life are assigned an expected life of 25% of the full life, an approximation.

Risk Adjusted Discount Rate
Used a 10% cost of capital, set at 75th percentile of US companies.

Uber's New User Value

Base year Value/ New User
 Value of User = \$410.31
 Cost of adding New User = \$238.78
 Value added by new user = \$171.53

Value Added by New Users: Uber in June 2017

User Growth rates
 Years 1-5: 25%
 Years 6-10: 10%

Cost of capital
 Used 12%, the 90th percentile of US companies

| | Base Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------------------------|------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Total Users | 40.00 | 48.00 | 60.10 | 75.75 | 95.56 | 120.57 | 129.57 | 137.56 | 145.88 | 154.70 | 164.04 |
| New Users | 0.00 | 10.00 | 14.50 | 18.65 | 23.60 | 29.79 | 15.04 | 14.46 | 15.20 | 16.11 | 17.08 |
| Value per new user | \$171.53 | \$174.11 | \$176.72 | \$179.37 | \$182.06 | \$184.79 | \$187.56 | \$190.38 | \$193.23 | \$196.13 | \$199.07 |
| Value added by new users | | \$1,741 | \$2,562 | \$3,345 | \$4,296 | \$5,505 | \$2,820 | \$2,753 | \$2,937 | \$3,159 | \$3,400 |
| Terminal Value | | | | | | | | | | | \$7,031 |
| Present Value | | \$1,555 | \$2,043 | \$2,381 | \$2,730 | \$3,124 | \$1,429 | \$1,245 | \$1,186 | \$1,139 | \$3,359 |
| Value Added by New Users | \$ 20,191 | | | | | | | | | | |

Beyond year 10
 User growth continues at 2.1% a year

Uber Corporate Expense Value (Drag)

| | | <div style="border: 1px solid black; padding: 5px; display: inline-block;"> Base year number Absent information, assumed </div> | | | | | | | | | | |
|------------------------------------|---------------------------------|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| | | <i>Base year</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> | <i>6</i> | <i>7</i> | <i>8</i> | <i>9</i> | <i>10</i> |
| Tax Rate Assumed =30% | Corporate Expenses | -\$1,000 | -\$1,040 | -\$1,081 | -\$1,125 | -\$1,170 | -\$1,216 | -\$1,265 | -\$1,316 | -\$1,368 | -\$1,423 | -\$1,480 |
| | After-tax Corporate Expenses | | -\$728 | -\$757 | -\$787 | -\$819 | -\$851 | -\$886 | -\$921 | -\$958 | -\$996 | -\$1,036 |
| | Terminal Value | | | | | | | | | | | -\$13,388 |
| Cost of capital Used 10% | PV of Corporate Expenses | | -\$662 | -\$626 | -\$591 | -\$559 | -\$529 | -\$500 | -\$473 | -\$447 | -\$422 | -\$5,561 |
| | Value drag from expenses | -\$10,369 | | | | | | | | | | |

Uber Valuation

| | <i>User Value</i> | <i>Asset value</i> | <i>Company Value</i> | <i>Equity Value</i> |
|--------------------------|-------------------|--------------------|----------------------|---------------------|
| Existing Users | \$16,412.49 | | | |
| New Users | \$20,190.70 | | | |
| User Value | \$36,603.19 | \$36,603.19 | | |
| - Corporate Expense Drag | | \$(10,369.28) | | |
| Uber Operating Assets | | \$26,233.91 | \$26,233.91 | |
| + Cash | | | \$5,000.00 | |
| + Didi Cross Holding | | | \$6,000.00 | |
| Uber Firm Value | | | \$37,233.91 | \$37,233.91 |
| - Debt | | | | \$- |
| Value of Equity | | | | \$37,233.91 |

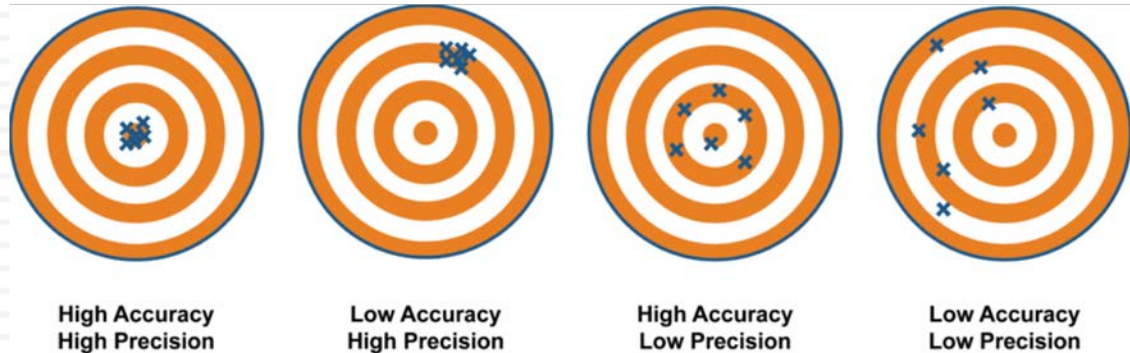
An Aside: The Value of an Indian Uber User

- Uber's biggest growth market (in terms of potential) is India and it is in a battle with Ola, the Indian ride sharing company which has more presence in India than Uber.
- The average Indian user spends about one fifth of the average overall Uber user (\$100, rather than \$500 in gross billings). Consequently, the value of an Indian user is likely to be much lower than the value of an overall Uber user.
- As Ola and Uber fight for Indian users, it is worth keeping this in mind as you value Uber and Ola, as companies.

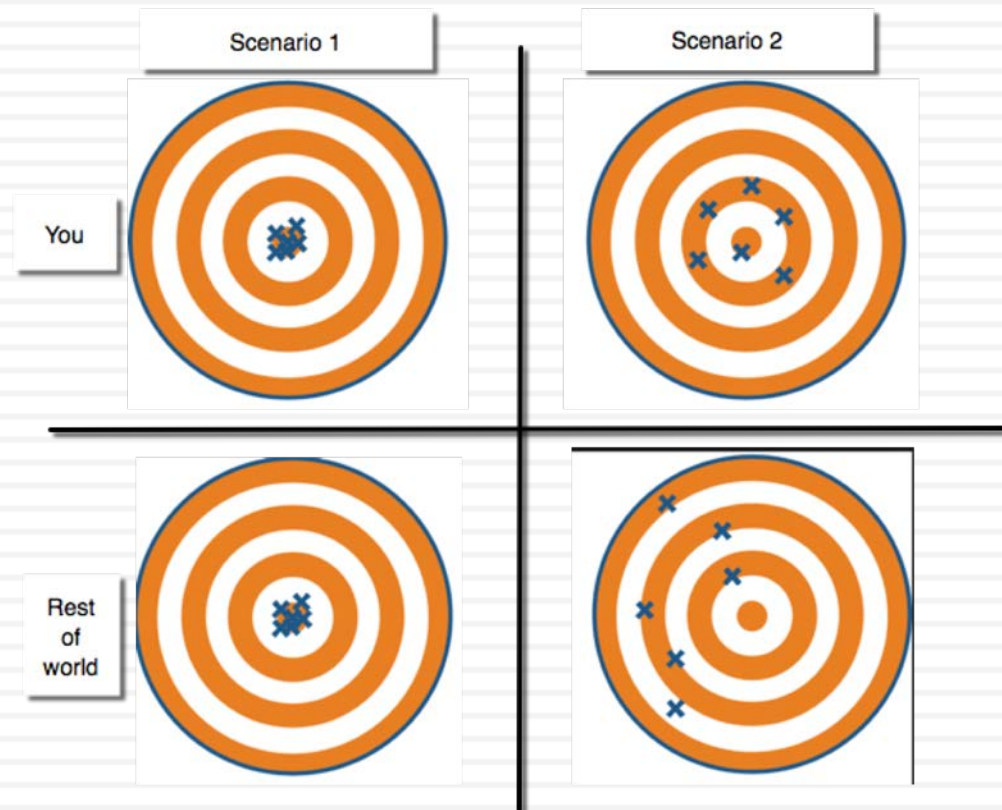
V. Don't mistake precision for accuracy.. And accuracy for payoff..

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Better accurate
than precise



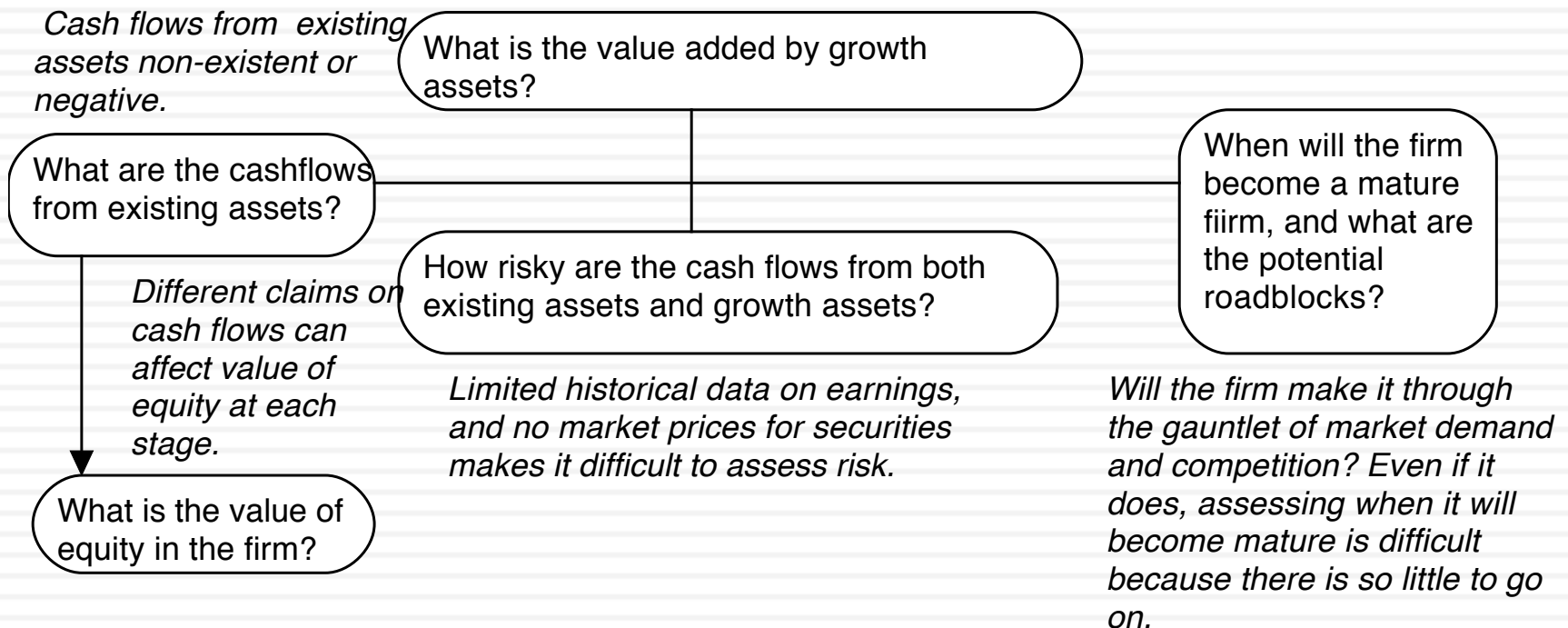
It's all relative



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..

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- 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

Income Statements

| | 2010 | 2011 | 2012 | 2012 (6 mths) | 2013 (6 mths) | Trailing 12 months |
|---|---------|----------|---------|---------------|---------------|--------------------|
| Revenues | \$28.3 | \$106.3 | \$316.9 | \$122.4 | \$253.6 | \$448.2 |
| R&D expenses | \$29.3 | \$80.2 | \$119.0 | \$46.3 | \$111.8 | \$184.5 |
| Operating income | -\$67.5 | -\$127.4 | -\$77.1 | -\$47.0 | -\$62.8 | -\$92.9 |
| Operating income adjusted for R&D & Leases | | | | | \$4.3 | |
| Adjusted EBITDA (Net Loss+Taxes+Int exp+ Depr+Stock-based employee compensation) | -\$51.2 | -\$42.8 | \$21.2 | \$6.7 | \$21.4 | \$35.9 |

Balance Sheet

| | 2011 | 2012 | 2013: Qtr 2 | 2013: Pro forma |
|------------------------------|----------------|----------------|----------------|-----------------|
| Cash & ST Investments | \$549.5 | \$424.9 | \$375.0 | \$375.0 |
| Property & Equipment | \$61.9 | \$185.6 | \$242.6 | \$242.6 |
| Intangible assets | \$6.4 | \$3.8 | \$14.4 | \$14.4 |
| Goodwill | \$36.8 | \$68.8 | \$163.7 | \$163.7 |
| <i>Capitalized R&D</i> | | | | \$248.7 |
| Total Assets | \$720.7 | \$831.6 | \$964.1 | \$964.1 |
| Capital Leases | \$21.1 | \$65.7 | \$80.1 | \$80.1 |
| <i>Capitalized Op Leases</i> | | | | \$127.1 |
| Preferred Stock | \$835.1 | \$835.4 | \$835.4 | \$0.0 |
| Shareholders equity | -\$201.8 | -\$248.2 | -\$164.4 | \$716.9 |

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 |

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% |
| Netflix | 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% |

| | | 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

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

3. Reinvest for growth

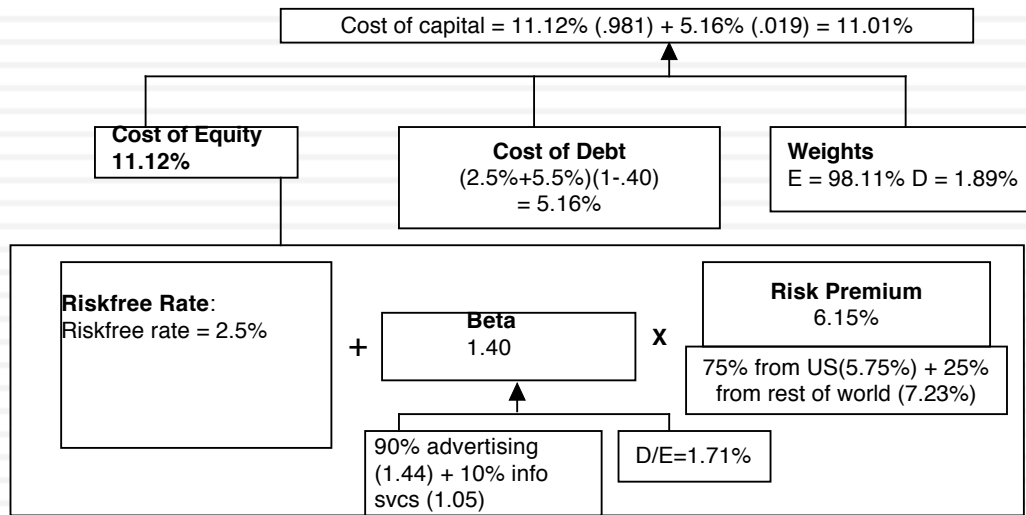
| | Sales/ Invested Capital |
|------------------------|-------------------------|
| Twitter (2013) | 1.10 |
| Advertising Companies | 1.40 |
| Social Media Companies | 1.05 |

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

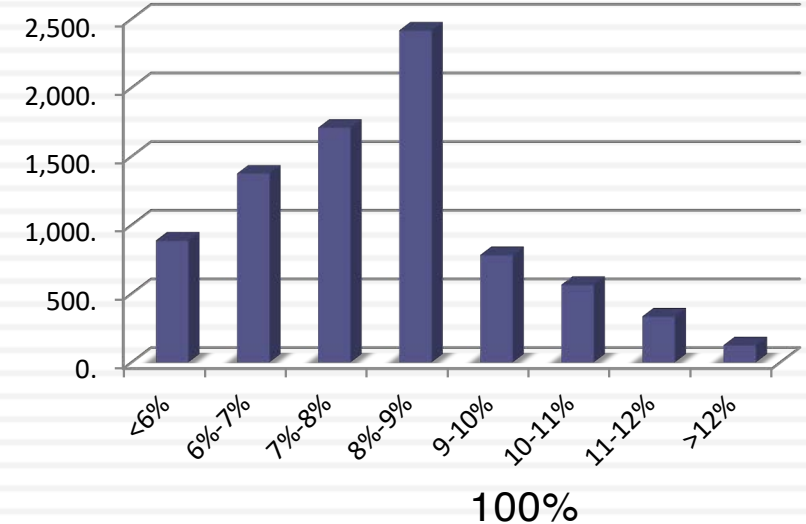
The Cost of Capital for Twitter

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

Twitter Pre-IPO Valuation: October 27, 2013

| | 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%; Beta = 1.00;
 Cost of capital = 8%
 ROC= 12%;
 Reinvestment Rate=2.5%/12% = 20.83%

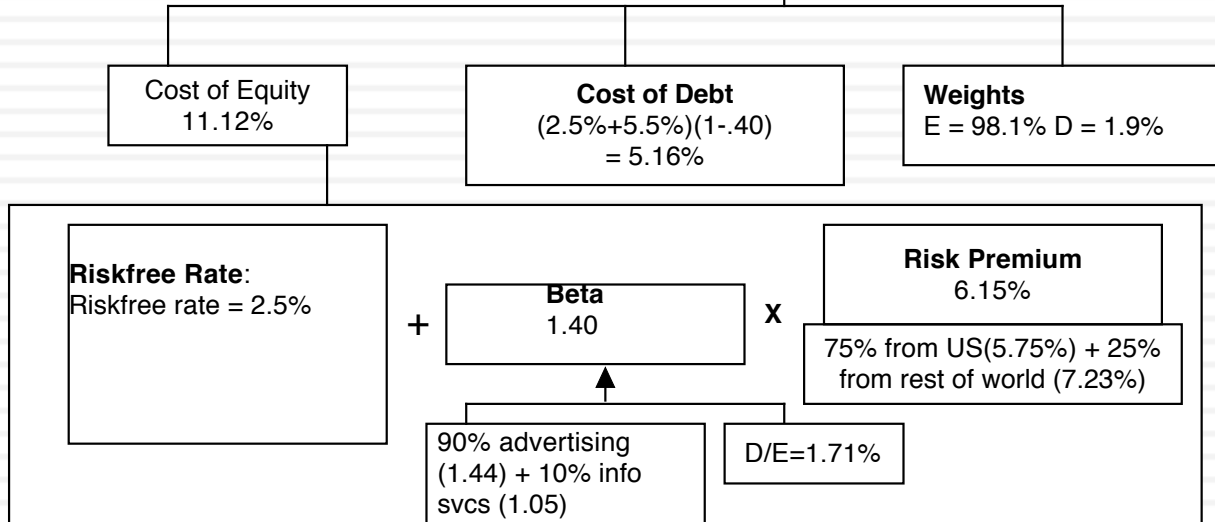
Terminal Value₁₀ = 1466/(.08-.025) = \$26,657

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

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





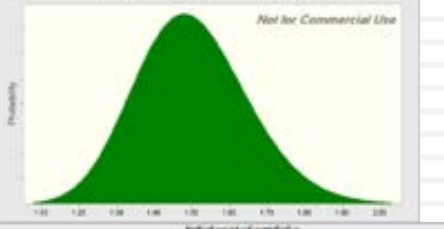
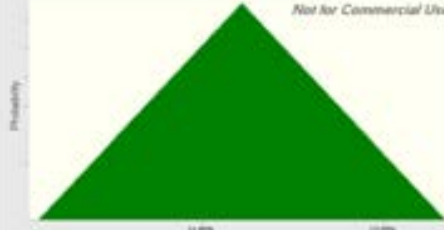
A sobering reminder: You will be “wrong” and it is okay

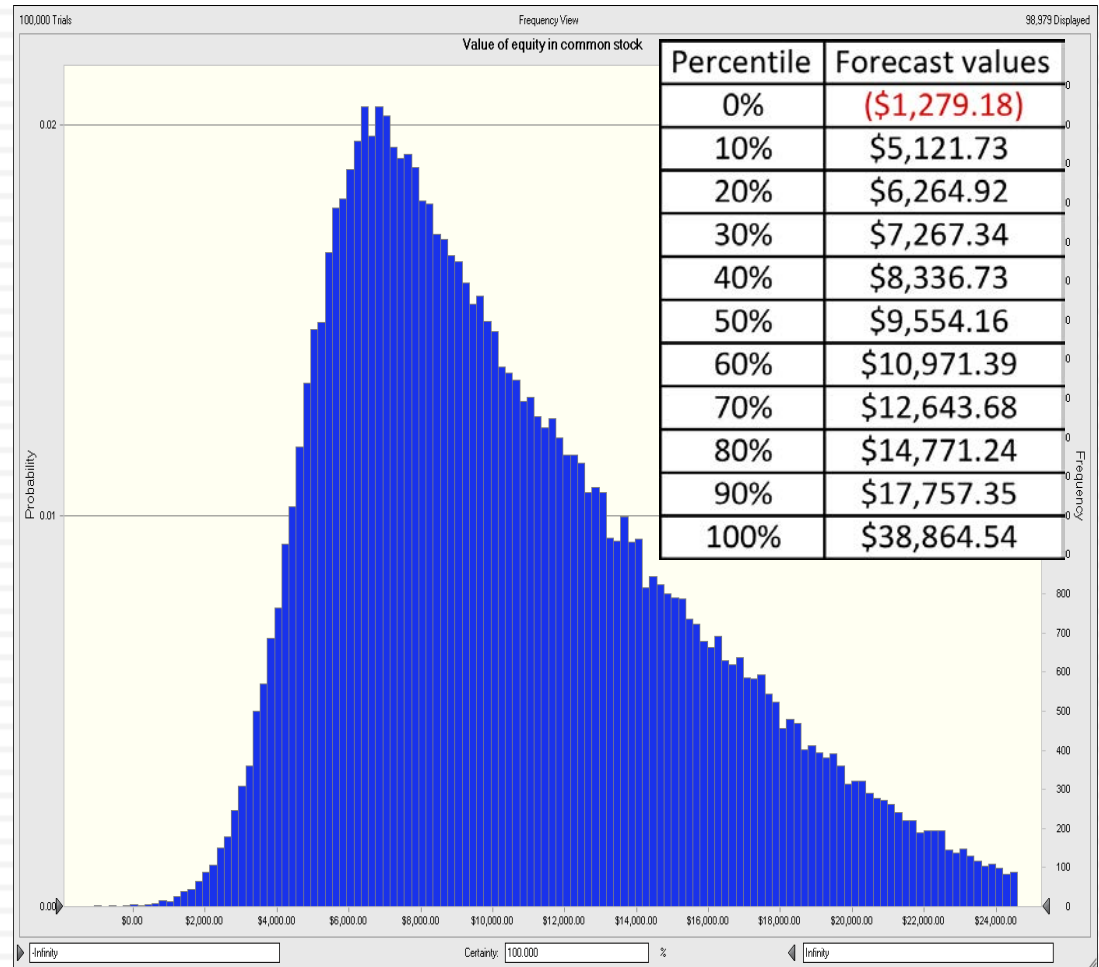
102

- 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..

103

| | |
|---|--|
| <p>Revenue Growth Rate Distribution: Uniform Expected Value = 55% Minimum Value: 40% Maximum Value: 70%</p> |  <p>Composited annual revenue growth rate over next 5 years - Not for Commercial Use</p> |
| <p>Target Operating Margin Distribution: Normal Expected Value = 25% Standard Deviation = 5%</p> |  <p>Target pre-tax operating margin (20% as % of sales in year 10) - Not for Commercial Use</p> |
| <p>Sales to Capital Ratio Distribution: Lognormal Expected value: 1.50 Standard deviation: 0.15</p> |  <p>Sales to capital ratio (not compounding interest) - Not for Commercial Use</p> |
| <p>Cost of Capital Distribution: Triangular Expected value: 11.22% Minimum value: 10.02% Maximum value: 12.22%</p> |  <p>Initial cost of capital - Not for Commercial Use</p> |



Forecasting in the face of uncertainty. A test:

104

- 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% |

But the payoff is greatest where there is the most uncertainty...

105

Weather changeability for Honolulu, Hawaii

| Temperature | Last Month | Last Year | Precipitation | Last Month | Last Year |
|---|------------|-----------|--------------------------------------|------------|-----------|
| Average change in high temperature day-to-day | 1.7° | 1.2° | Chance of dry day after a precip day | 67% | 81% |
| Average change in low temperature day-to-day | 1.5° | 2.0° | Chance of precip day after a dry day | 7% | 13% |

[Further changeability analysis >](#)

Weather forecast accuracy for Honolulu, Hawaii

| Last Month | | Last Year | |
|--------------------------|--------|--------------------------|--------|
| MeteoGroup | 88.44% | MeteoGroup | 88.50% |
| Persistence | 81.80% | CustomWeather | 85.87% |
| CustomWeather | 78.23% | AccuWeather | 81.82% |
| The Weather Channel | 73.12% | The Weather Channel | 81.56% |
| AccuWeather | 69.89% | Persistence | 80.44% |
| Weather Underground | 62.10% | Weather Underground | 67.07% |
| National Weather Service | 48.39% | National Weather Service | 59.90% |
| Foreca | 44.35% | Foreca | 57.52% |
| WeatherBug | 32.26% | WeatherBug | 37.09% |

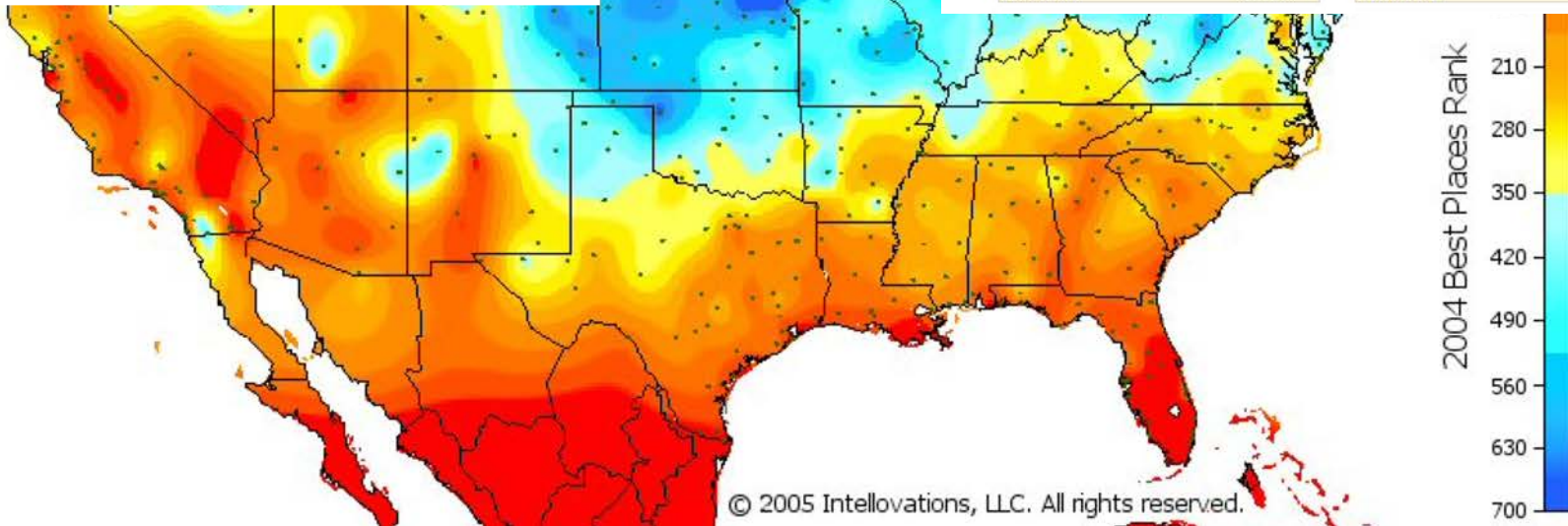
Weather changeability for Epping, North Dakota

| Temperature | Last Month | Last Year | Precipitation | Last Month | Last Year |
|---|------------|-----------|--------------------------------------|------------|-----------|
| Average change in high temperature day-to-day | 8.5° | 7.7° | Chance of dry day after a precip day | 50% | 65% |
| Average change in low temperature day-to-day | 7.1° | 8.6° | Chance of precip day after a dry day | 38% | 20% |

[Further changeability analysis >](#)

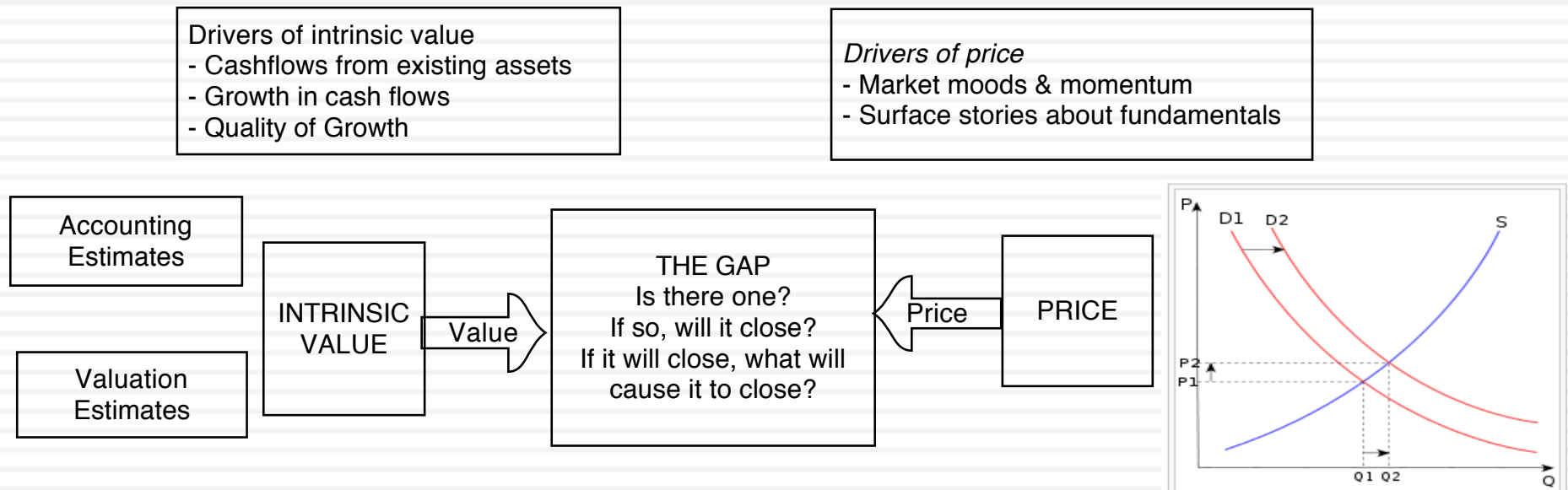
Weather forecast accuracy for Epping, North Dakota

| Last Month | | Last Year | |
|--------------------------|--------|--------------------------|--------|
| MeteoGroup | 62.50% | MeteoGroup | 66.97% |
| Foreca | 61.61% | The Weather Channel | 66.73% |
| The Weather Channel | 61.31% | AccuWeather | 64.86% |
| AccuWeather | 60.42% | WeatherBug | 64.80% |
| Weather Underground | 56.85% | Foreca | 62.75% |
| WeatherBug | 56.17% | CustomWeather | 62.70% |
| National Weather Service | 54.76% | National Weather Service | 62.64% |
| CustomWeather | 54.46% | Weather Underground | 61.38% |
| Persistence | 38.01% | Persistence | 44.09% |




VI. Don't mistake price for value!

106



Test 1: Are you pricing or valuing?

107

 **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

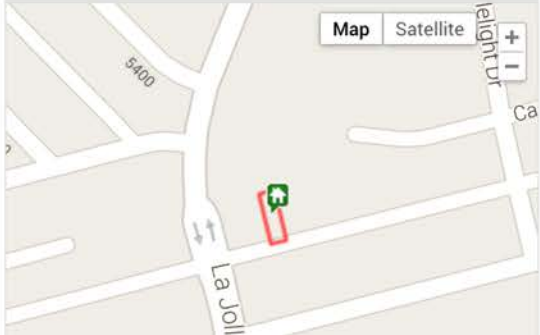
Overview Property Details Tour Insights Property History Public Records Activity Schools Neighborhood & Offer Insights Similar Homes



1 of 25  [Play Video](#)

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



Test 2: Are you pricing or valuing?

108

Europe
Switzerland

Biotechnology
Biotechnology

Reuters
BION.S

Bloomberg
BION SW

Exchange
SWX
Ticker
BION

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

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

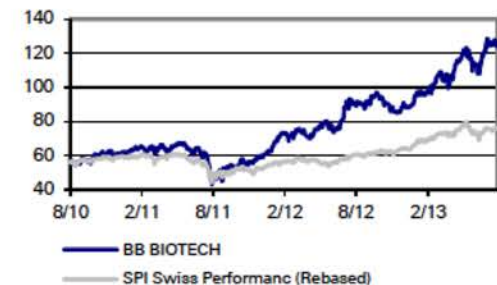
With the re-rating of the pharma sector, investors have also showed increased interest in biotech stocks. Established biotech stocks have delivered encouraging financial results and approvals, while there has also been substantial industry consolidation, which is not surprising in times of "cheap" money 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.

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 |

Test 3: Are you pricing or valuing?

109

| | 1 | 2 | 3 | 4 | 5 |
|---------------------------------|-------------------|----------|----------|----------|------------|
| EBITDA | \$100.00 | \$120.00 | \$144.00 | \$172.80 | \$207.36 |
| - Depreciation | \$20.00 | \$24.00 | \$28.80 | \$34.56 | \$41.47 |
| EBIT | \$80.00 | \$96.00 | \$115.20 | \$138.24 | \$165.89 |
| - Taxes | \$24.00 | \$28.80 | \$34.56 | \$41.47 | \$49.77 |
| EBIT (1-t) | \$56.00 | \$67.20 | \$80.64 | \$96.77 | \$116.12 |
| + Depreciation | \$20.00 | \$24.00 | \$28.80 | \$34.56 | \$41.47 |
| - Cap Ex | \$50.00 | \$60.00 | \$72.00 | \$86.40 | \$103.68 |
| - Chg in WC | \$10.00 | \$12.00 | \$14.40 | \$17.28 | \$20.74 |
| FCFF | \$16.00 | \$19.20 | \$23.04 | \$27.65 | \$33.18 |
| Terminal Value | | | | | \$1,658.88 |
| Cost of capital | 8.25% | 8.25% | 8.25% | 8.25% | 8.25% |
| Present Value | \$14.78 | \$16.38 | \$18.16 | \$20.14 | \$1,138.35 |
| Value of operating assets today | \$1,207.81 | | | | |
| + Cash | \$125.00 | | | | |
| - Debt | \$200.00 | | | | |
| Value of equity | \$1,132.81 | | | | |

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

113

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

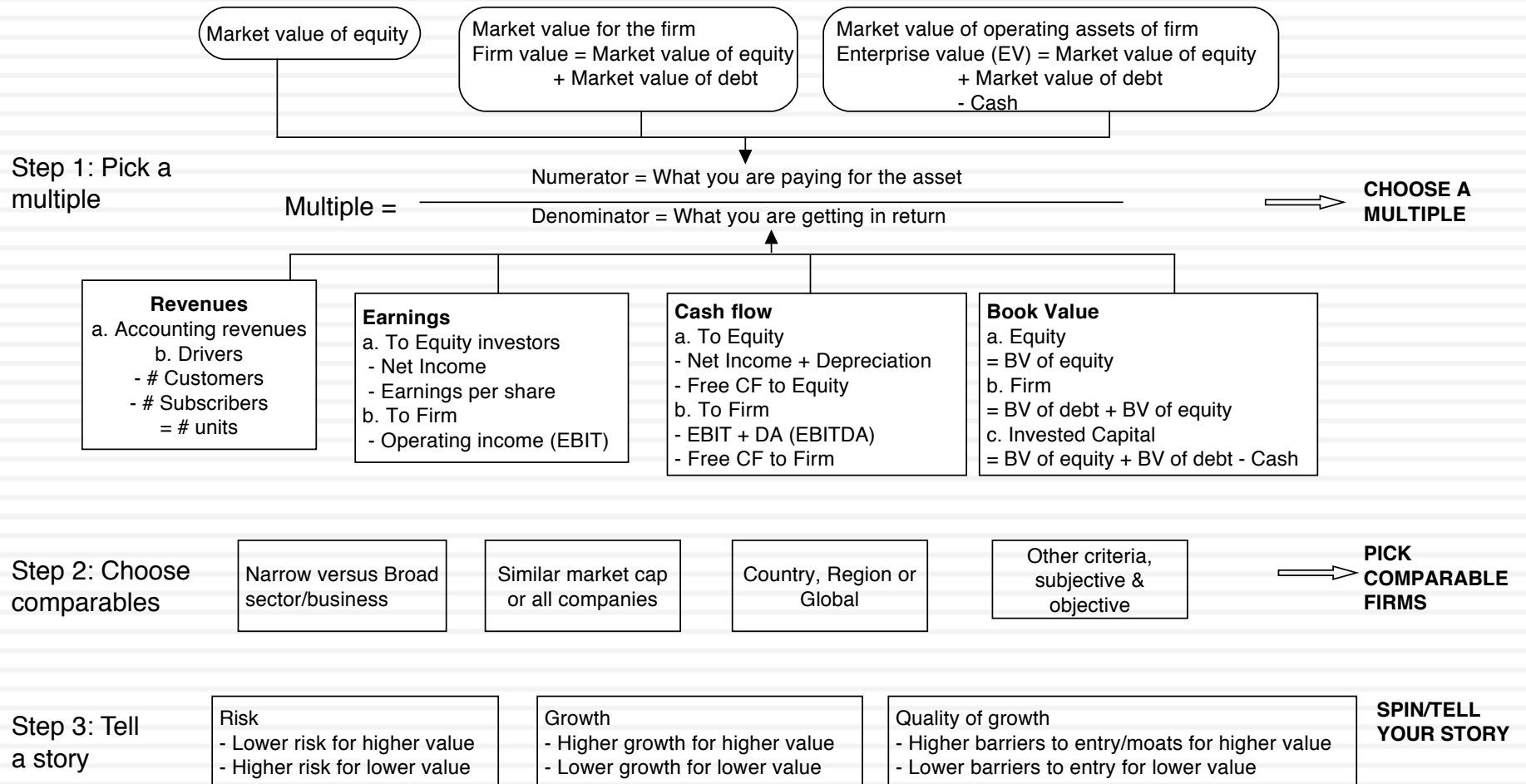
Incremental information

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



Pricing Twitter: Start with the “comparables”

115

| Company | Market Cap | Enterprise value | Revenues | EBITDA | Net Income | Number of users (millions) | EV/User | EV/Revenue | EV/EBITDA | PE |
|-------------|--------------|------------------|------------|------------|------------|----------------------------|----------|------------|-----------|--------|
| 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

116

| | <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”

117

- 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 = $240 * 100 = \$24$ 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.

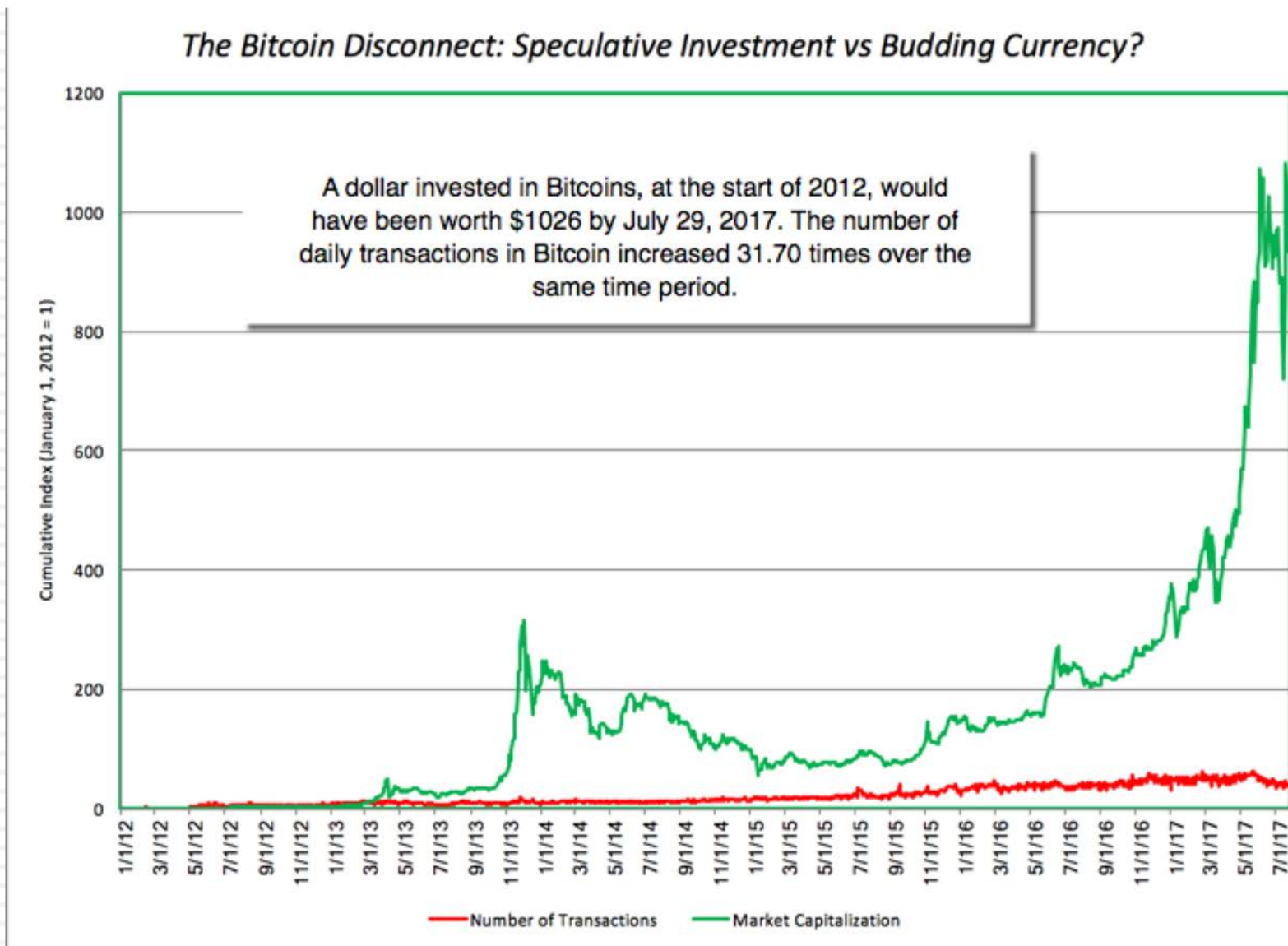
Three Pathways for Bitcoin

- 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.

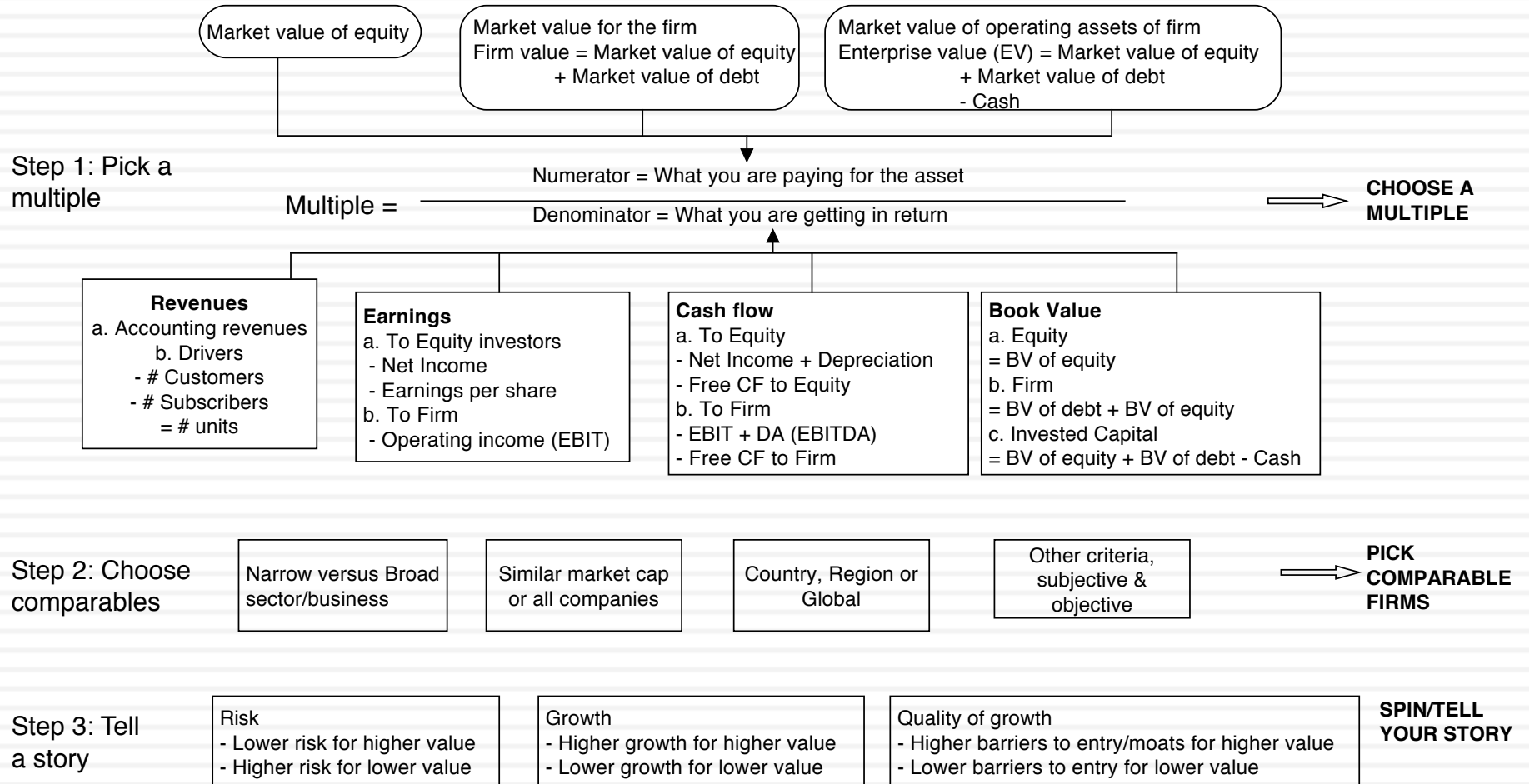
A Currency Comparison

| <i>Currency</i> | <i>Issuing Entity</i> | <i>Transaction Capability</i> | <i>Security, Storage & Convertibility</i> |
|-------------------------|---|---|--|
| <i>US Dollar (Euro)</i> | <p><u>Issuing Entity</u>: The Federal Reserve (ECB)</p> <p><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.</p> | 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> | <p><u>Issuing Entity</u>: The People's Bank of China</p> <p><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.</p> | 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> | <p><u>Issuing Entity</u>: Central Bank of Argentina</p> <p><u>Trust</u>: Controlled by the Argentine government. Any attempt at independence is <u>quickly countered</u>.</p> | 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> | <p><u>Issuing Entity</u>: Nature</p> <p><u>Trust</u>: Absolute, unless the alchemists finally succeed</p> | Almost universal for big transactions, but | Compact & portable. Can be stored but with a cost to the saver, not a return. |
| <i>Bitcoin</i> | <p><u>Issuing Entity</u>: Computer Algorithm</p> <p><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.</p> | 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.

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.

Pricing Twitter: Start with the “comparables”

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

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 = $240 * 100 = \$24$ billion

Vli. Investing is an act of faith..

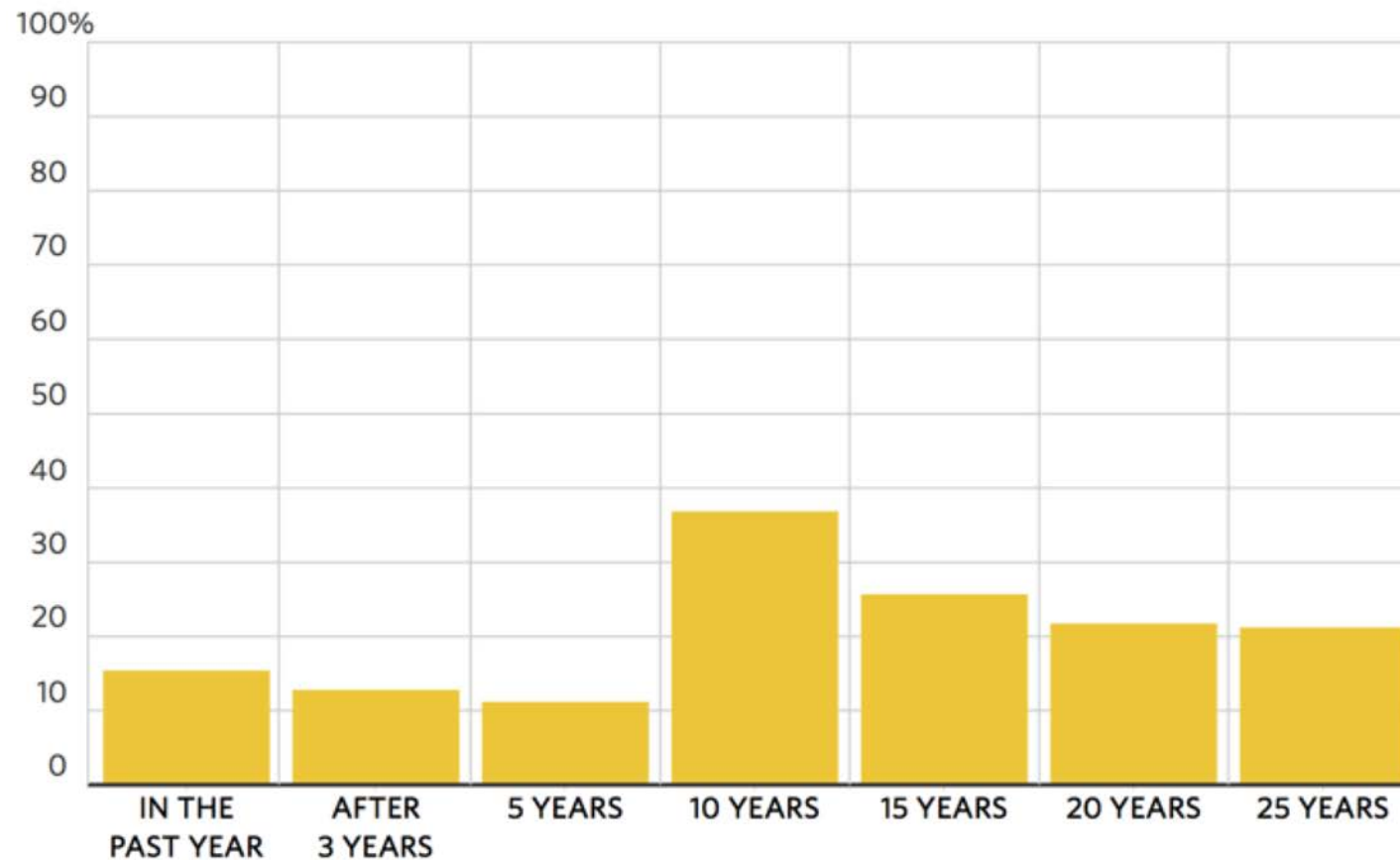
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- When investing, we are often told that if you are virtuous (careful in your research, good at valuation, have a long time horizon), you will be rewarded (with high returns).
- That pitch is amplified by anecdotal evidence of righteous ones, i.e., those who have followed the path to success.
- Those who chose not to be virtuous are labeled as “speculators”, viewed as shallow and deserving of the fate that awaits them.
- If you have faith in investing, you will be tested.

Active Investing is a loser's game

Tough to Beat

Percentage of U.S. large-company mutual funds outperforming the Vanguard 500 Index Fund



And it stays that way across styles..

| | <i>% of US Mutual Funds that trail their respective indices</i> | | | |
|-------------|---|--------|--------|--------|
| | Value | Growth | Core | All |
| Large | 82.17% | 86.54% | 88.26% | 84.15% |
| Mid-cap | 70.27% | 81.48% | 76.51% | 76.69% |
| Small | 92.31% | 91.89% | 91.44% | 90.13% |
| All Equity | | | | 88.43% |
| Real Estate | | | | 82.64% |

S&P computes these percentages for the last year, the last 3 years & the last 10 years. There is not a single period or a single fund grouping where the number is <50%.

And the "smart" money does not stay smart for very long

Funds' Flop

Three-year rolling relative performance of stock hedge funds



*Compared to a 50/50 MSCI World Net Return Local Currency/LIBOR 3 Month USD index

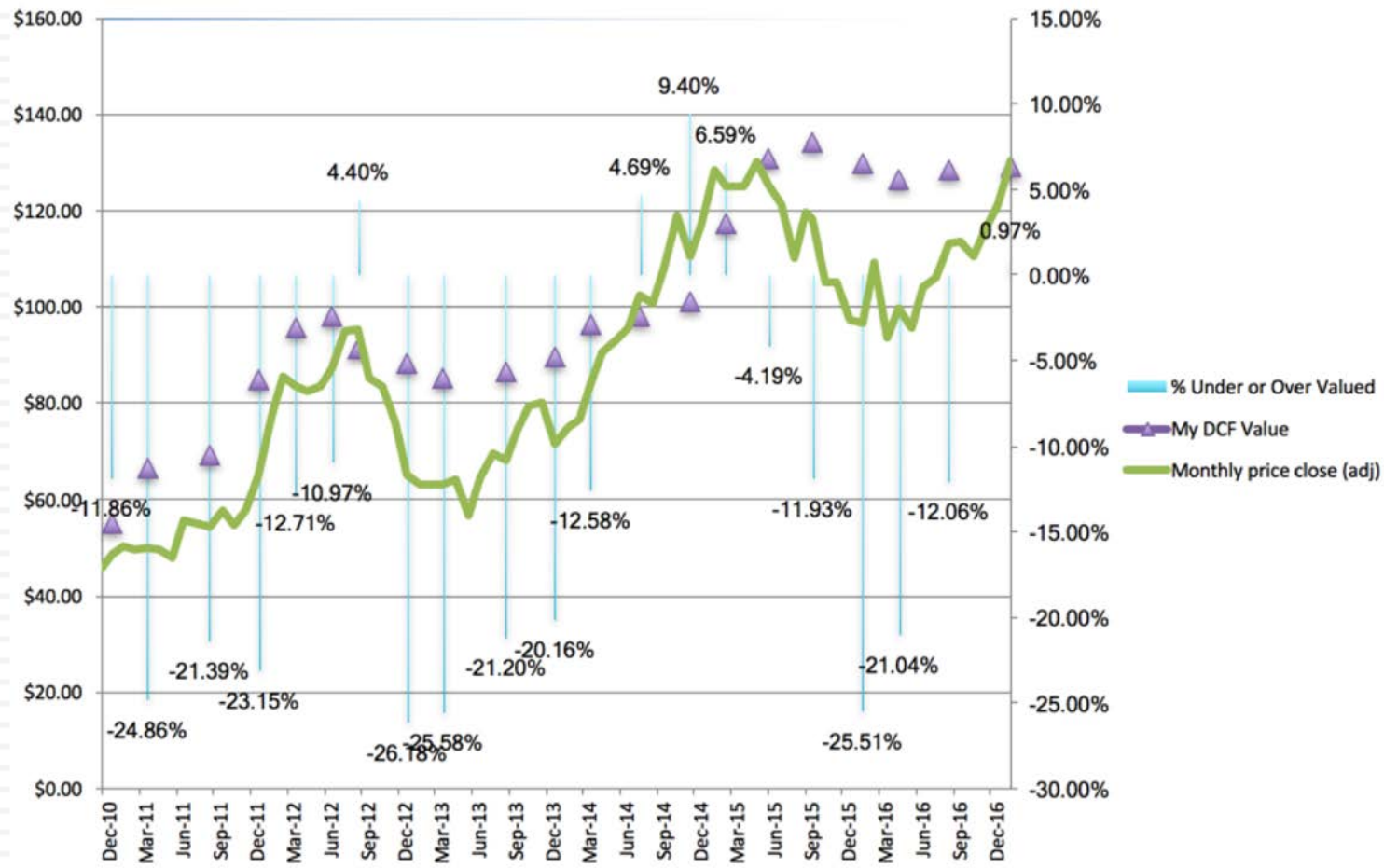
Source: Partners Capital Investment Group analysis
of data from HFR, MSCI and WSJ Market Data Group

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Investment Heaven is a promise, not a guarantee..

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Apple, Price and Value - 2010 to 2017



Follow the yellow brick road..

