VALUATION

June 2016

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The Agenda

I. Valuation Basics: Understanding the drivers of value and why not all DCF valuations are made equal.
II. Stories and Numbers: How to connect stories about companies to their values.
III. Dealing with Uncertainty: Healthy and unhealthy ways of dealing with uncertainty.
IV. Value versus Pricing: A contrast of intrinsic and relative valuation and why they may give you different numbers.
V. Acquisition Valuation: Lessons to remember when valuing acquisitions.

VALUATION BASICS: D + CF≠ DCF

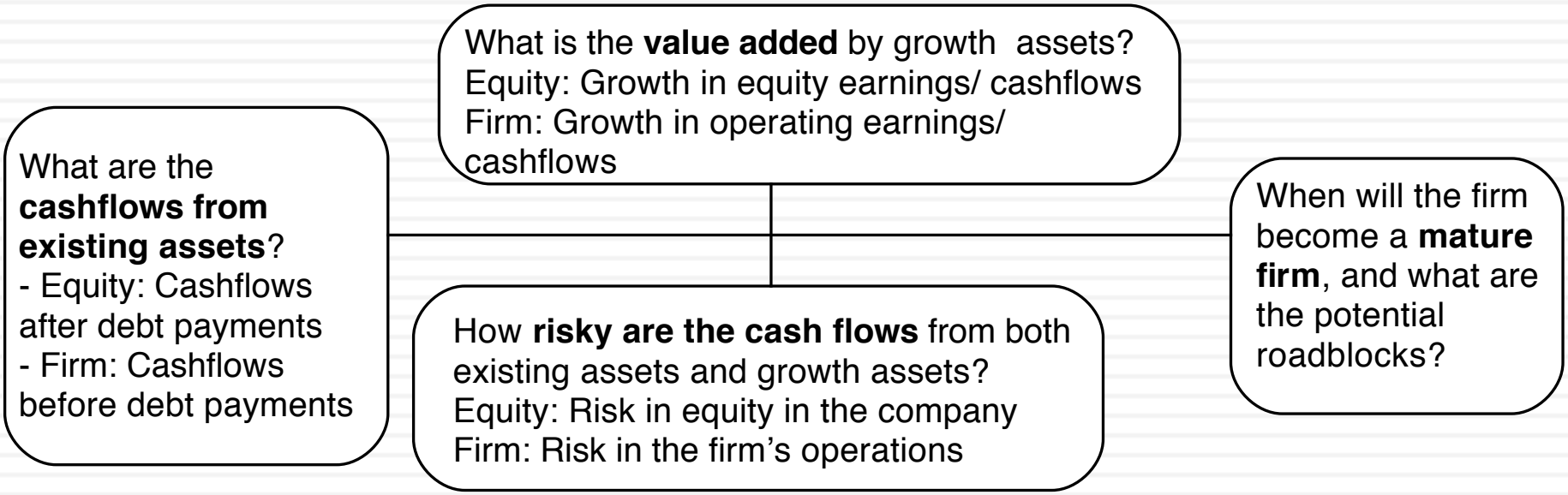
The basics of DCF

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

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

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..



DCF as a tool for intrinsic valuation

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) = Expected Earnings in year t - 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.

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

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

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).

2. Discount rates

Expected Return on a Risky Investment = Cost of Equity

=

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

Will vary across currencies and across time.

+

Beta
Relative measure of risk added to a diversified portfolio.

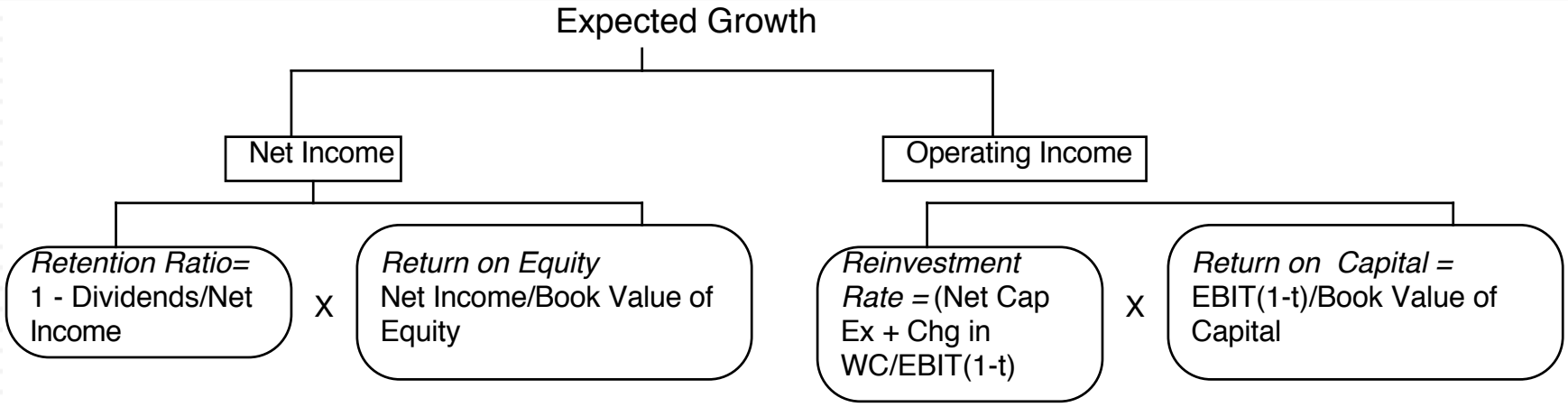
Determined by the business or businesses that you operate in, with more exposure to macro economic risk translating into a higher beta.

X

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

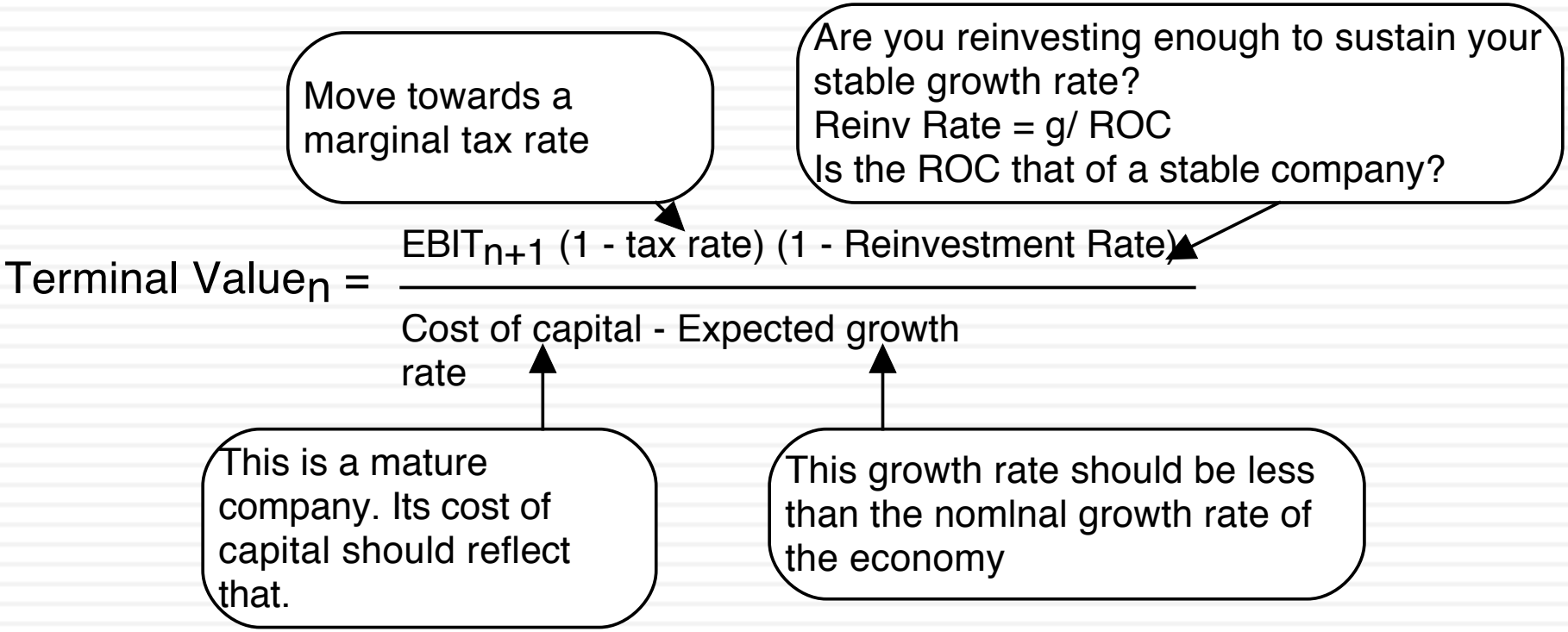
Function of the countries that you do business in and how much value you derive from each country.

3. Expected Growth



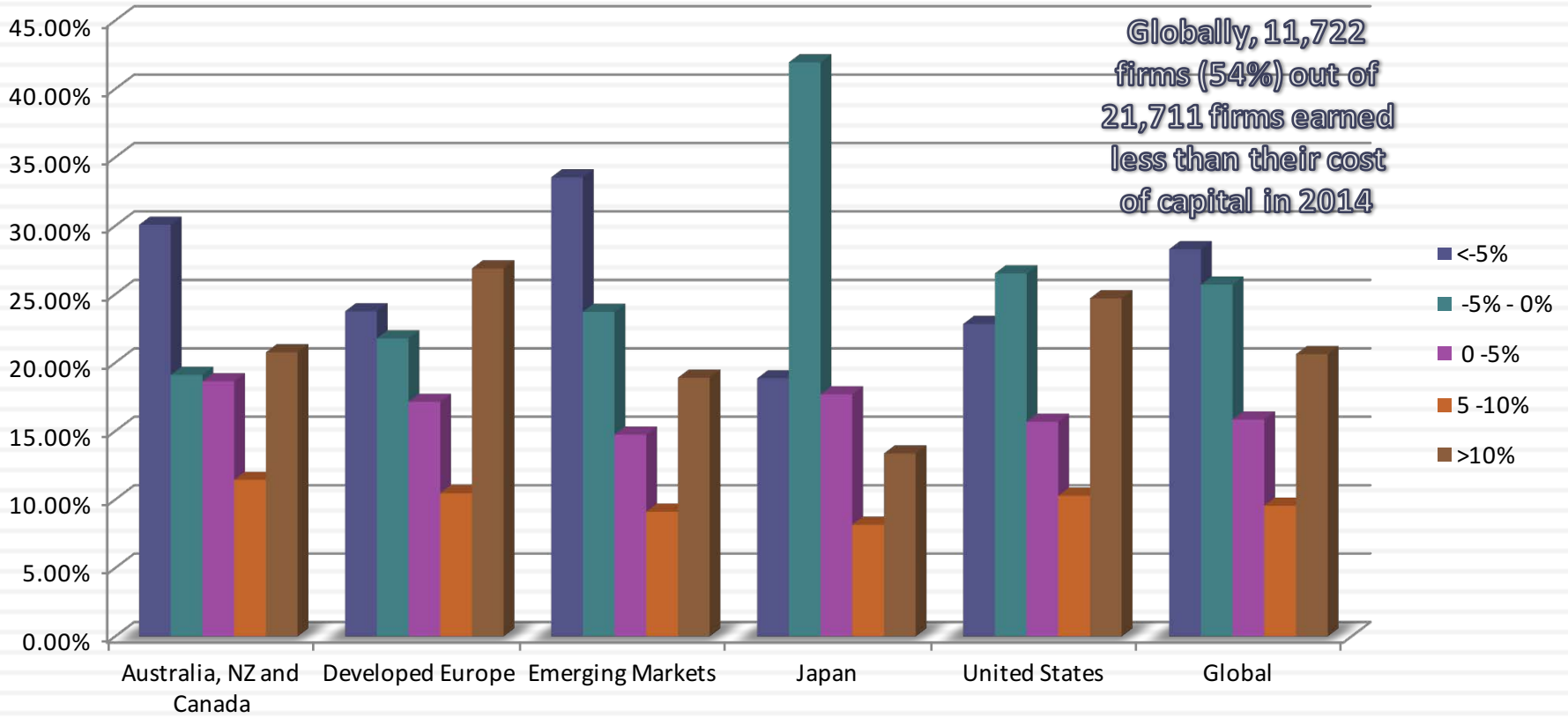
- Quality growth is rare and requires that a firm be able to reinvest a lot and reinvest well (earnings more than your cost of capital) at the same time.
- The larger you get, the more difficult it becomes to maintain quality growth.
- You can grow while destroying value at the same time.

4. The Terminal Value



And consider the trade offs..

Excess Return (ROC minus Cost of Capital) for firms with market capitalization> $50 million: Global in 2014



Natura: Valuation (February 2014)

Cash flows from Existing Assets

The End Game: Maturity & Closure

Current Cashflow to Firm
EBIT(1-t) = 1,338 (1-.3165) = R$ 914
- Nt CpX = 603- 150 = R$ 453
- Chg WC = R$ 46
= FCFF = R$415
Reinv Rate = (453+46)/914= 54.6%
Return on capital = 914/2226 = 39.66%

Reinvestment Rate 54.6%

Return on Capital 39.66%

Expected Growth from new investments .546*.3966=0.2165

Stable Growth
g = 10%; Beta = 1.00
Cost of capital = 16.35%
Tax rate = 34.00%
ROC= 25%;
Reinvestment Rate=g/ROC =10%/ 25%= 40%

Value of growth

R$ Cashflows

Terminal Value$_{10}$= 3,072/(..1635-.10) = R$48,394

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
EBIT	R$ 1,628	R$ 1,980	R$ 2,409	R$ 2,931	R$ 3,565	R$ 4,254	R$ 4,977	R$ 5,707	R$ 6,410	R$ 7,051
Tax rate	31.89%	32.12%	32.36%	32.59%	32.83%	33.06%	33.30%	33.53%	33.77%	34.00%
EBIT (1-t)	R$ 1,109	R$ 1,344	R$ 1,629	R$ 1,975	R$ 2,395	R$ 2,848	R$ 3,320	R$ 3,793	R$ 4,246	R$ 4,654
- Reinvestment	R$ 605	R$ 734	R$ 890	R$ 1,079	R$ 1,307	R$ 1,472	R$ 1,619	R$ 1,739	R$ 1,822	R$ 1,862
= FCFF	R$ 503	R$ 610	R$ 740	R$ 897	R$ 1,087	R$ 1,376	R$ 1,701	R$ 2,054	R$ 2,424	R$ 2,792

EBIT (1-t) =R$5,119
- Reinvestment =R$2,048
= FCFF = R$3,072

Op. Assets 14,397
+ Cash: 960
- Debt 2610
- Min Int 18
=Equity 12,731

Value/Share R$ 28.67

Cost of capital = 19.83% (.8665) + 9.56% (.1335) = 18.46%

Risk

Growth declines to 10% and cost of capital moves to stable period level.

On February 14, 2014 Natura Price = R$ 38.34/share

Cost of Equity 19.83%

Cost of Debt (11.28%+1.90%+1.30%)(1-.34) = 9.56%

Weights E = 86.65% D = 13.35%

Riskfree Rate: R$ Riskfree Rate= 11.28%

+

Beta 1.07

Unlevered Beta for Sectors: 0.97

Firm's D/E Ratio: 15.4%

x

Equity Risk Premium 7.98%

Brazil	88.72%	7.85%	88.72%
Argentina	2.57%	14.75%	2.57%
Chile	2.57%	5.90%	2.57%
Peru	2.57%	7.85%	2.57%
Mexico	1.79%	7.40%	1.79%
Colombia	1.79%	8.30%	1.79%
Natura	**100.00%**	**7.98%**	**100.00%**

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

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

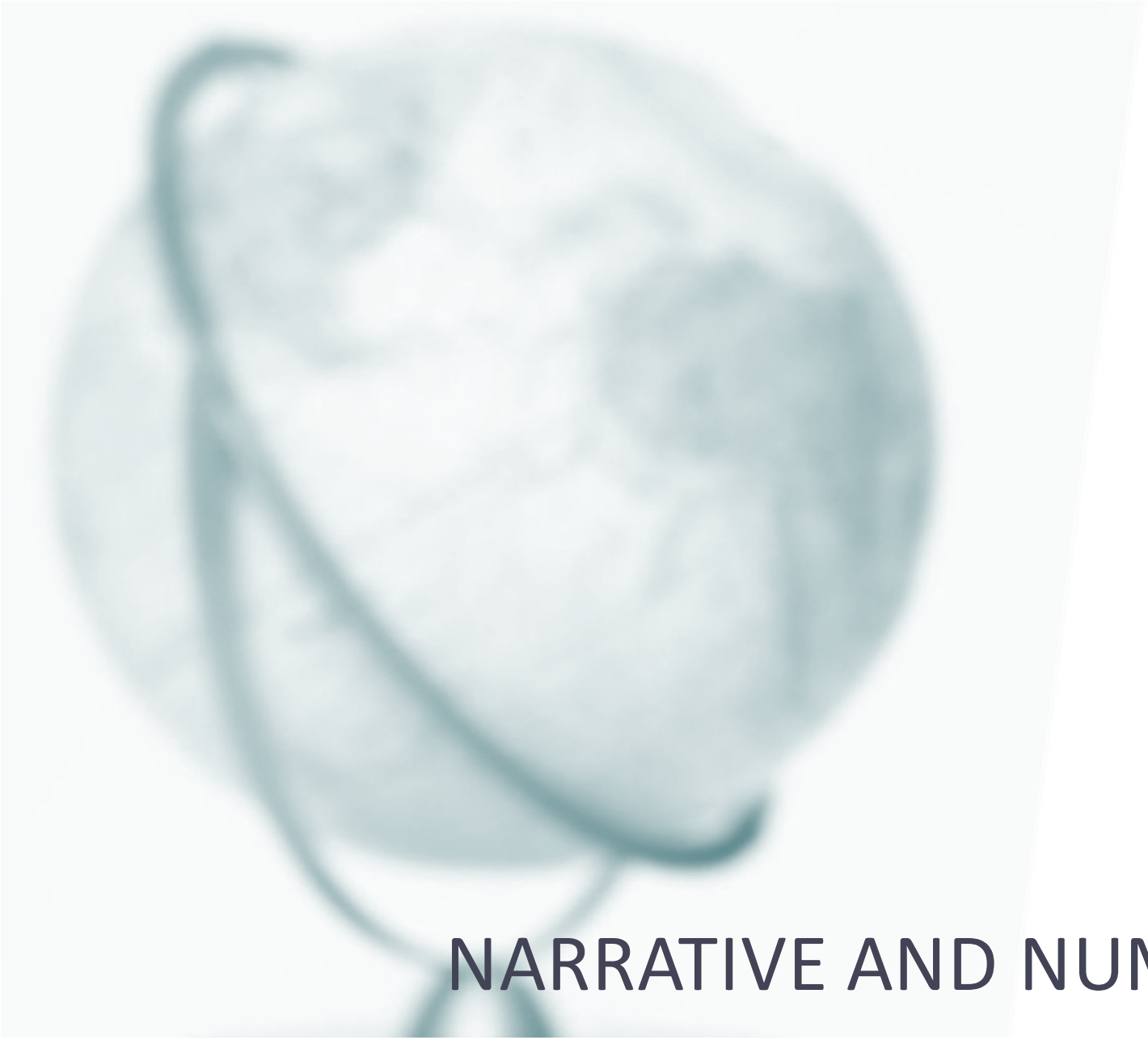
In a **Trojan Horse DCF**, Just as the Greeks used a wooden horse to smuggle soldiers into Troy, analysts use the Trojan Horse of cash flows to smuggle in a pricing (in the form of a terminal value, estimated by using a multiple).

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 ≠ DCF

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

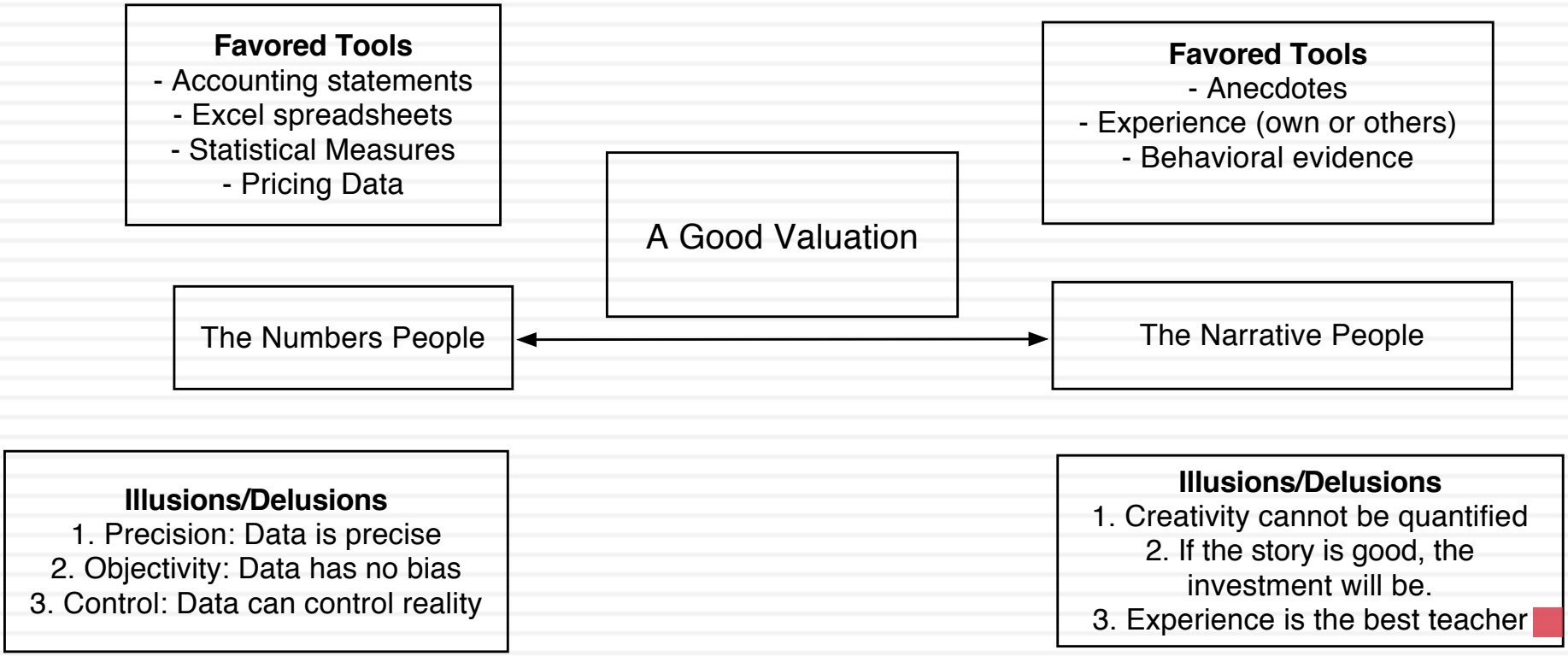
A **Mutant DCF** is a collection of numbers where items have familiar names (free cash flow, cost of capital) but the analyst putting it together has neither a narrative nor a sense of the basic principles of



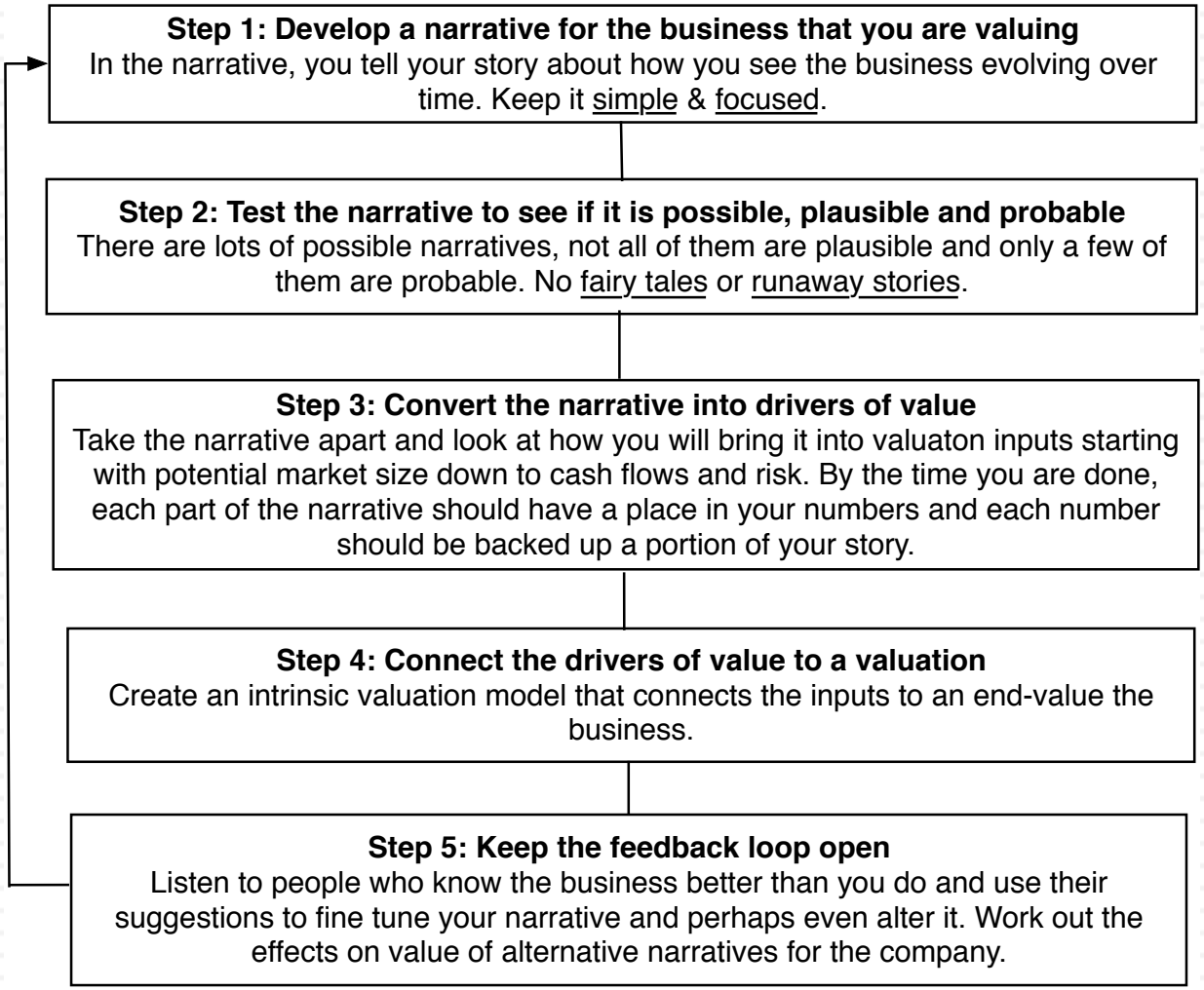
NARRATIVE AND NUMBERS

Connecting stories to numbers

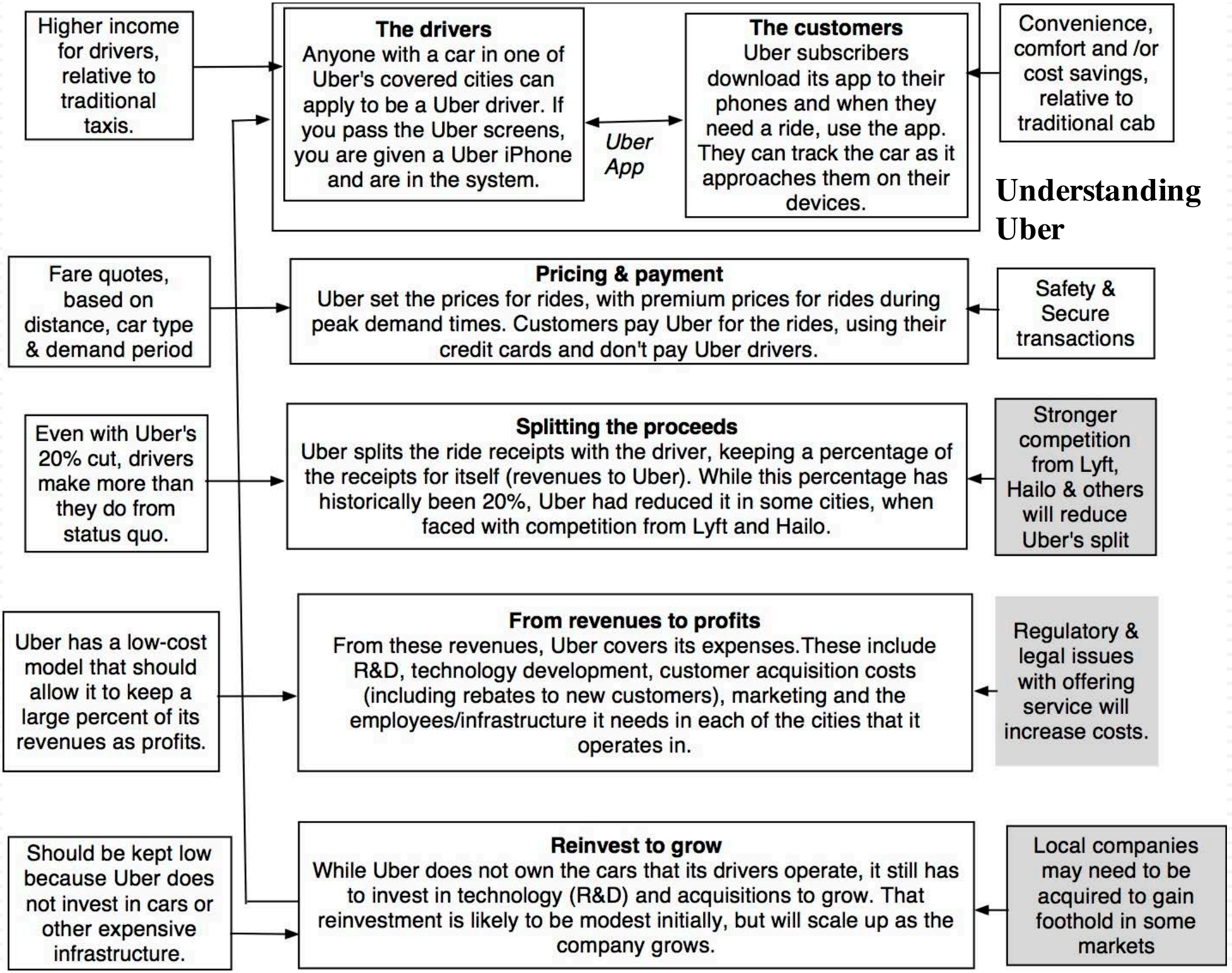
Don’t mistake modeling for valuation



From story to numbers and beyond..

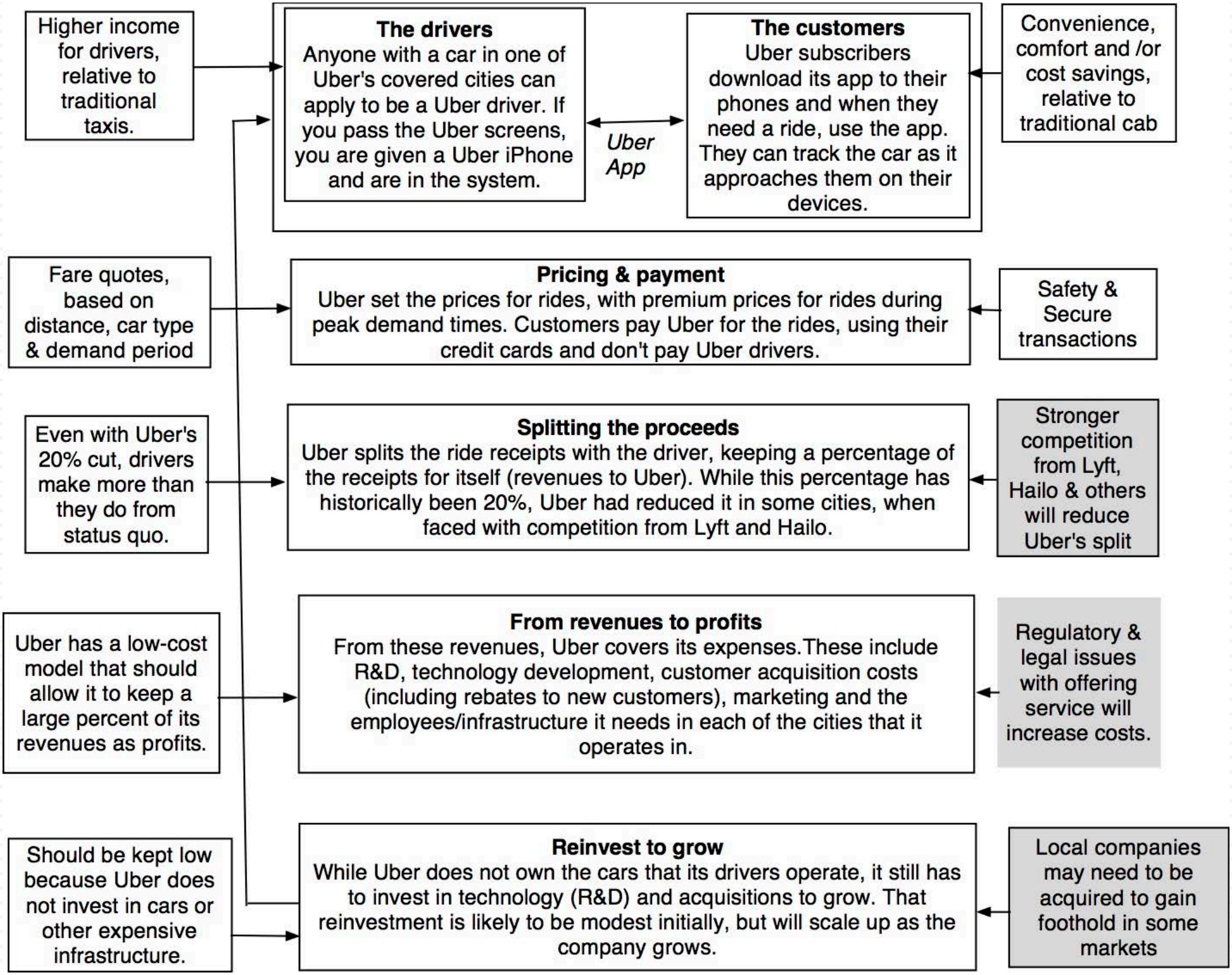


Understanding Uber



Step 1: Survey the landscape

- Every valuation starts with a narrative, a story that you see unfolding for your company in the future.
- In developing this narrative, you will be making assessments of
  - Your company (its products, its management and its history.
  - The market or markets that you see it growing in.
  - The competition it faces and will face.
  - The macro environment in which it operates.


Higher income for drivers, relative to traditional taxis.
The drivers
Anyone with a car in one of Uber's covered cities can apply to be a Uber driver. If you pass the Uber screens, you are given a Uber iPhone and are in the system.
Uber App
The customers
Uber subscribers download its app to their phones and when they need a ride, use the app. They can track the car as it approaches them on their devices.
Convenience, comfort and /or cost savings, relative to traditional cab
Fare quotes, based on distance, car type & demand period
Pricing & payment
Uber set the prices for rides, with premium prices for rides during peak demand times. Customers pay Uber for the rides, using their credit cards and don't pay Uber drivers.
Safety & Secure transactions
Even with Uber's 20% cut, drivers make more than they do from status quo.
Splitting the proceeds
Uber splits the ride receipts with the driver, keeping a percentage of the receipts for itself (revenues to Uber). While this percentage has historically been 20%, Uber had reduced it in some cities, when faced with competition from Lyft and Hailo.
Stronger competition from Lyft, Hailo & others will reduce Uber's split
Uber has a low-cost model that should allow it to keep a large percent of its revenues as profits.
From revenues to profits
From these revenues, Uber covers its expenses.These include R&D, technology development, customer acquisition costs (including rebates to new customers), marketing and the employees/infrastructure it needs in each of the cities that it operates in.
Regulatory & legal issues with offering service will increase costs.
Should be kept low because Uber does not invest in cars or other expensive infrastructure.
Reinvest to grow
While Uber does not own the cars that its drivers operate, it still has to invest in technology (R&D) and acquisitions to grow. That reinvestment is likely to be modest initially, but will scale up as the company grows.
Local companies may need to be acquired to gain foothold in some markets

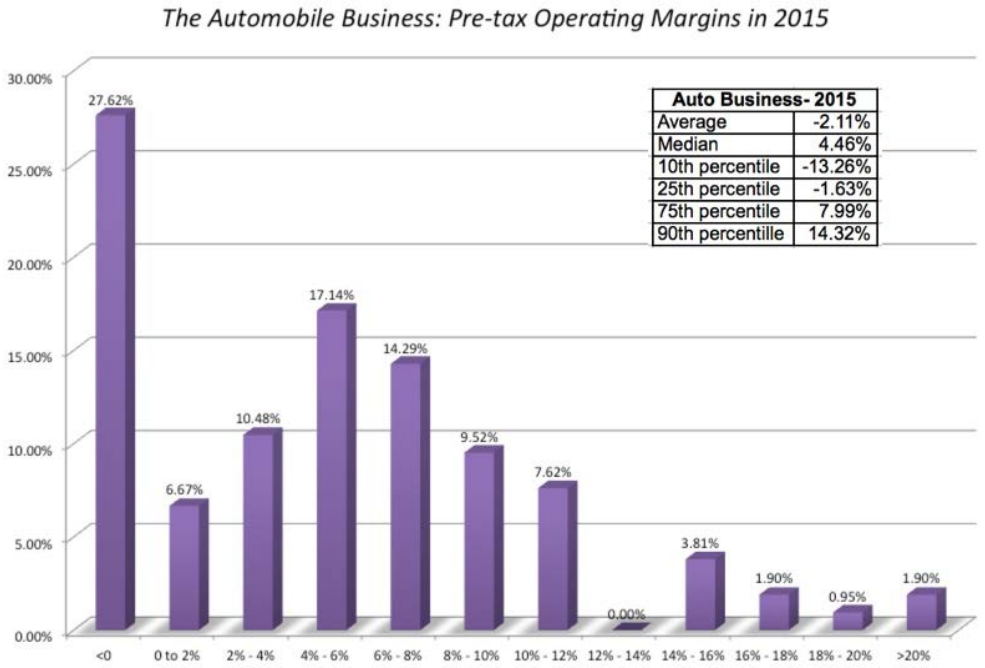
The Auto Business

Low Growth

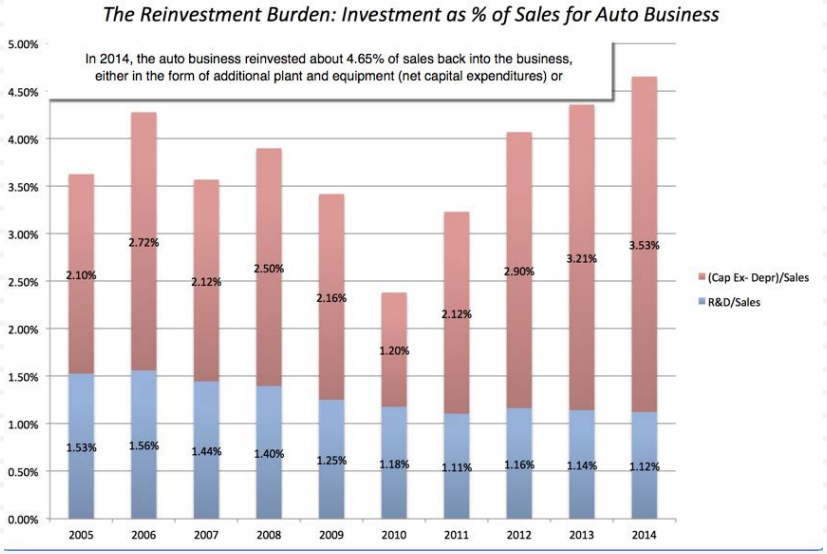
Year	Revenues ($)	% Growth Rate
2005	1,274,716.60	
2006	1,421,804.20	11.54%
2007	1,854,576.40	30.44%
2008	1,818,533.00	-1.94%
2009	1,572,890.10	-13.51%
2010	1,816,269.40	15.47%
2011	1,962,630.40	8.06%
2012	2,110,572.20	7.54%
2013	2,158,603.00	2.28%
2014	2,086,124.80	-3.36%
ounded Average =		5.63%

+

Low Margins



High & Increasing Reinvestment



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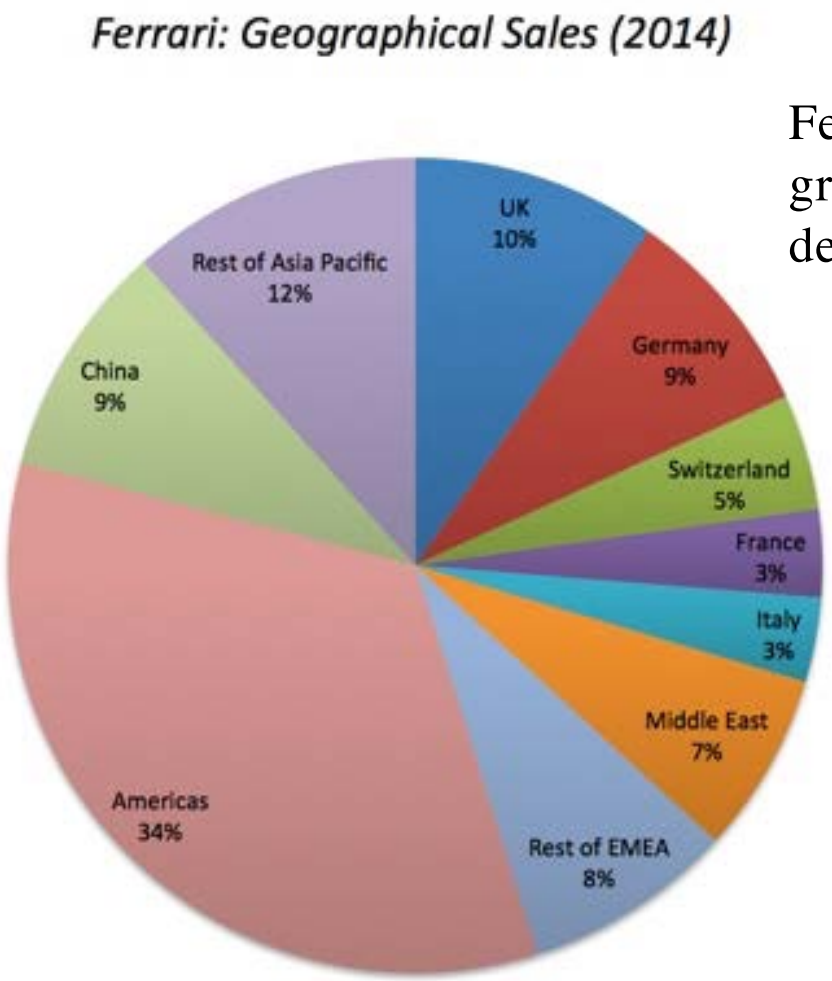
Bad Business

	ROIC	Cost of capital	ROiC - Cost of capital
2004	6.82%	7.93%	-1.11%
2005	10.47%	7.02%	3.45%
2006	4.60%	7.97%	-3.37%
2007	7.62%	8.50%	-0.88%
2008	3.48%	8.03%	-4.55%
2009	-4.97%	8.58%	-13.55%
2010	5.16%	8.03%	-2.87%
2011	7.55%	8.15%	-0.60%
2012	7.80%	8.55%	-0.75%
2013	7.83%	8.47%	-0.64%
2014	6.47%	7.53%	-1.06%

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

What makes Ferrari different?

Ferrari sold only 7,255 cars in all of 2014



Ferrari sales (in units) have grown very little in the last decade & have been stable

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 has not invested in new plants.

Step 2: Create a narrative for the future

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

The Uber Narrative

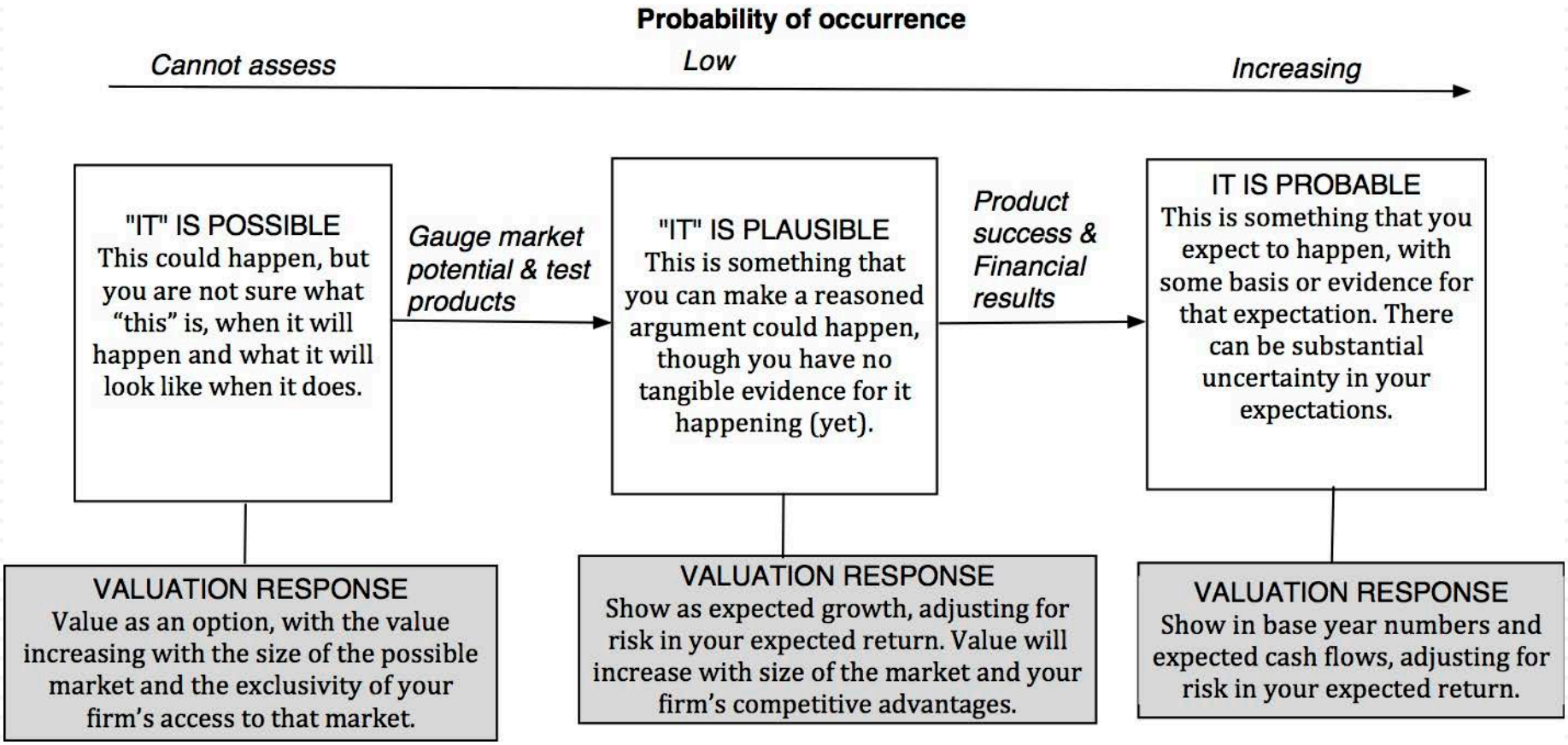
In June 2014, my initial narrative for Uber was that it would be

1. An urban car service business: I saw Uber primarily as a force in urban areas and only in the car service business.
2. Which would expand the business moderately (about 40% over ten years) by bringing in new users.
3. With local networking benefits: If Uber becomes large enough in any city, it will quickly become larger, but that will be of little help when it enters a new city.
4. Maintain its revenue sharing (20%) system due to strong competitive advantages (from being a first mover).
5. And its existing low-capital business model, with drivers as contractors and very little investment in infrastructure.

The Ferrari Narrative

- Ferrari will stay an exclusive auto club, deriving its allure from its scarcity and the fact that only a few own Ferraris.
- By staying exclusive, the company gets three benefits:
  - It can continue to charge nose bleed prices for its cars and sell them with little or no advertising.
  - It does not need to invest in new assembly plants, since it does not plan to ramp up production.
  - It sells only to the super rich, who are unaffected by overall economic conditions or market crises.

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



The Impossible, The Implausible and the Improbable

The Impossible

Bigger than the economy
Assuming Growth rate for company in perpetuity> Growth rate for economy

Bigger than the total market
Allowing a company's revenues to grow so much that it has more than a 100% market share of whatever business it is in.

Profit margin > 100%
Assuming earnings growth will exceeds revenue growth for a long enough period, and pushing margins above 100%

Depreciation without cap ex
Assuming that depreciation will exceed cap ex in perpetuity.

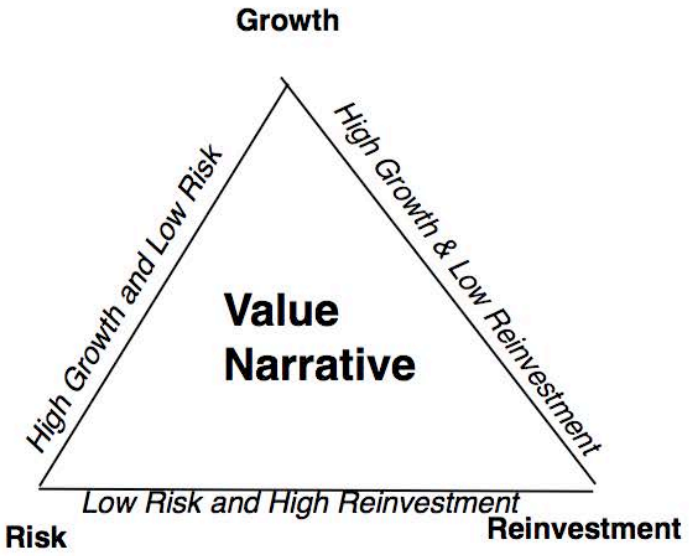
The Implausible

Growth without reinvestment
Assuming growth forever without reinvestment.

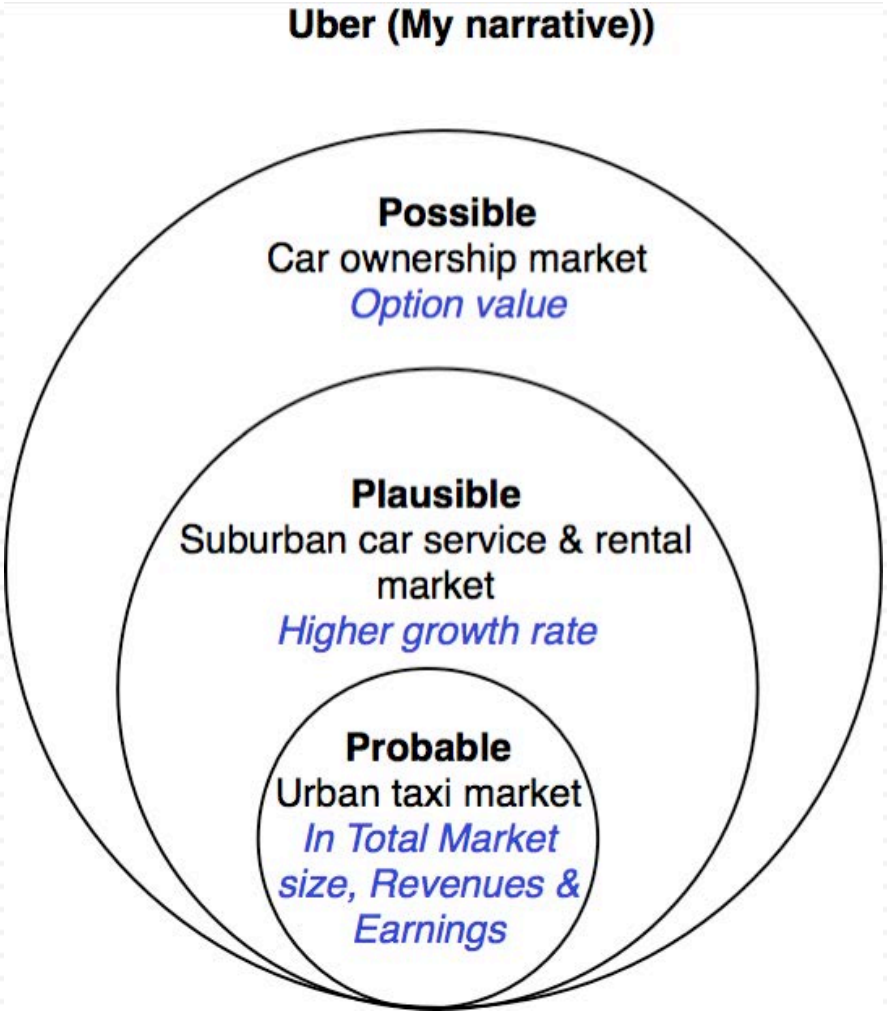
Profits without competition
Assuming that your company will grow and earn higher profits, with no competition.

Returns without risk
Assuming that you can generate high returns in a business with no risk.

The Improbable



Uber: Possible, Plausible and Probable



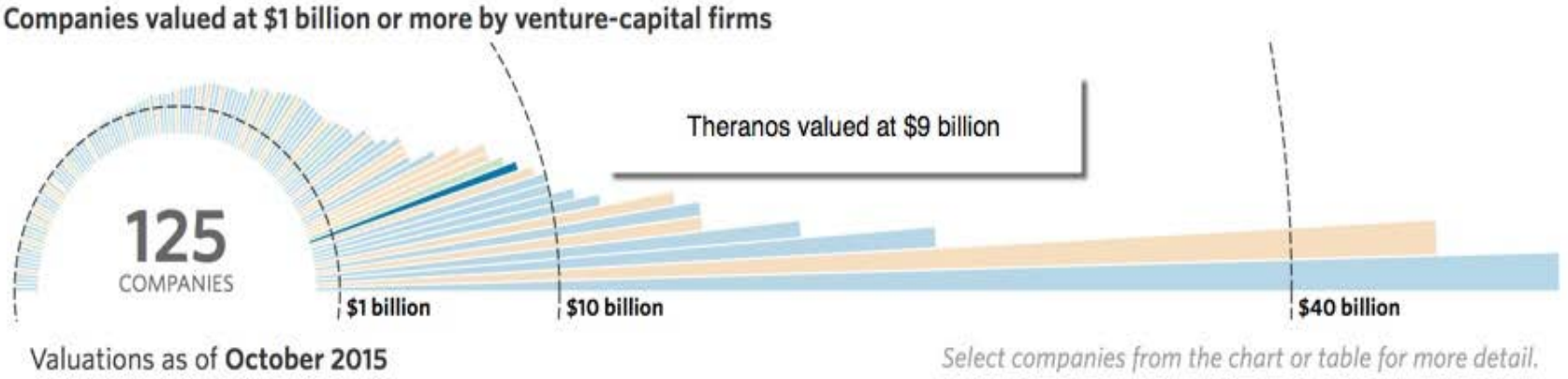
The Impossible: The Runaway Story

The Story

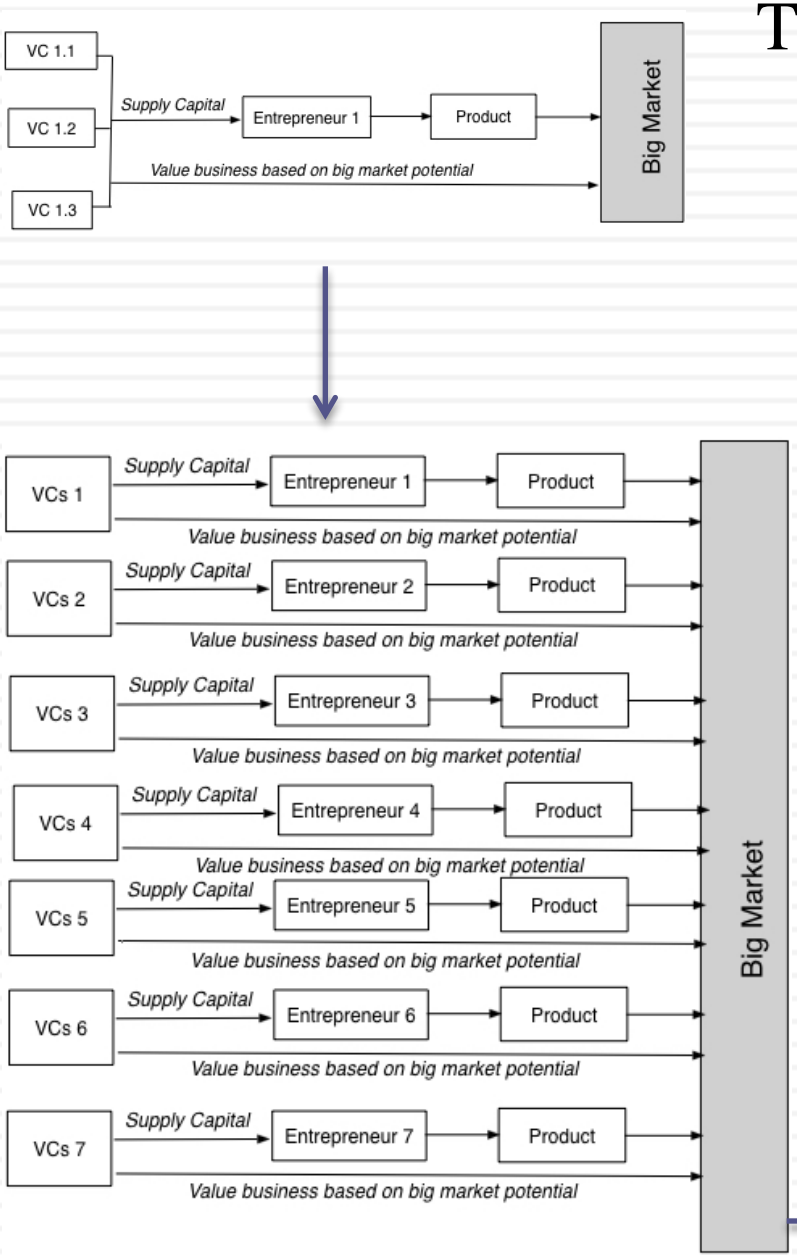
The Checks (?)

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	Epidemologist	79
Elizabeth Holmes	Founder & CEO, Theranos	31
Sunny Balwani	President & COO, Theranos	NA

+ Money



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**

The Improbable: Willy Wonkitis

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

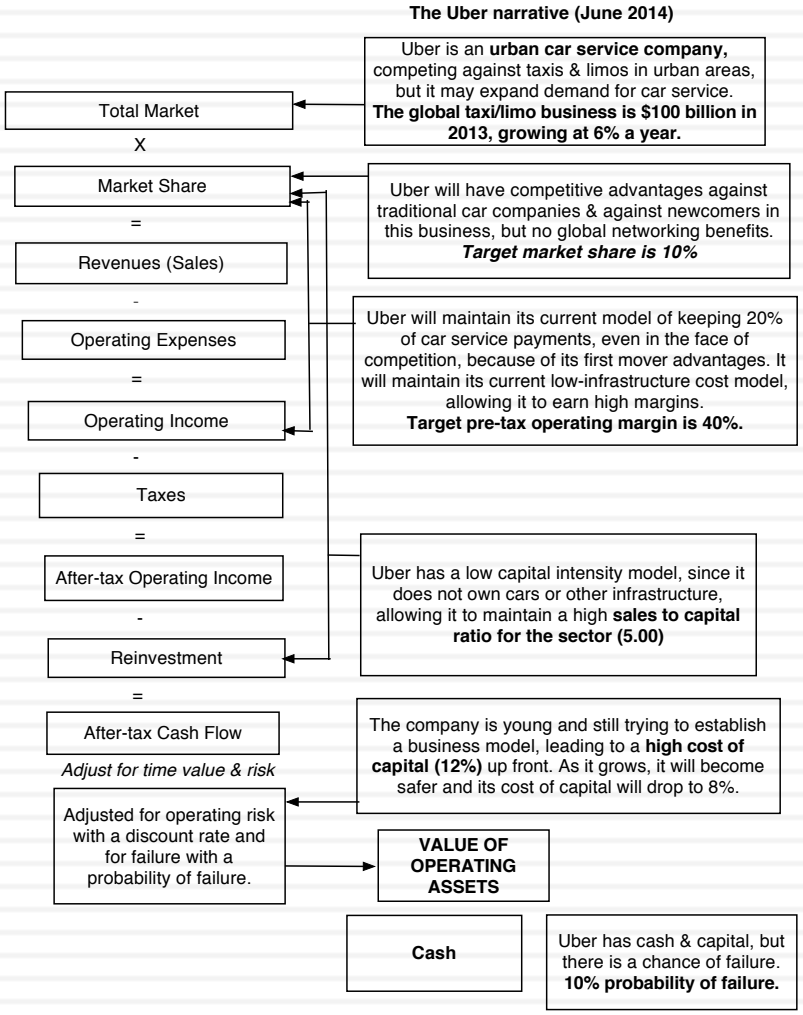
	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Unit Volume	24,298	36,883	64,684	86,713	149,869	214,841	291,861	384,747	466,559	550,398	643,850	726,655	820,645	922,481	1,034,215	1,137,780
% Growth		52%	75%	34%	73%	43%	36%	32%	21%	18%	17%	13%	13%	12%	12%	10%
Automotive Revenue Per Unit ($)	93,403	85,342	83,432	78,932	65,465	58,258	56,407	55,553	55,991	56,586	56,969	57,540	58,138	58,603	59,002	59,554
% Growth		-9%	-2%	-5%	-17%	-11%	-3%	-2%	1%	1%	1%	1%	1%	1%	1%	1%
Automotive Sales	2,462	3,321	5,613	7,051	10,025	12,720	16,685	21,595	26,347	31,357	36,897	42,022	47,949	54,283	61,221	67,980
Development Service Sales	16	40	42	44	46	49	51	54	56	59	62	65	68	72	75	79
Total Sales	**2,478**	**3,361**	**5,655**	**7,095**	**10,072**	**12,768**	**16,736**	**21,648**	**26,403**	**31,416**	**36,959**	**42,087**	**48,017**	**54,355**	**61,296**	**68,059**
% Growth		36%	68%	25%	42%	27%	31%	29%	22%	19%	18%	14%	14%	13%	13%	11%
EBITDA	**148**	**417**	**920**	**1,042**	**1,586**	**2,150**	**3,138**	**4,066**	**4,857**	**5,723**	**6,328**	**7,182**	**8,144**	**9,688**	**10,874**	**12,099**
% Margin	6.0%	12.4%	16.3%	14.7%	15.7%	16.8%	18.7%	18.8%	18.4%	18.2%	17.1%	17.1%	17.0%	17.8%	17.7%	17.8%
D&A	103	158	172	203	301	353	389	537	606	696	811	938	1,088	1,260	1,451	1,661
% of Capex	41%	79%	55%	65%	62%	69%	78%	86%	79%	77%	75%	76%	76%	76%	76%	77%
EBIT	**45**	**259**	**748**	**839**	**1,285**	**1,796**	**2,749**	**3,529**	**4,252**	**5,027**	**5,517**	**6,244**	**7,056**	**8,429**	**9,423**	**10,439**
% Margin	1.8%	7.7%	13.2%	11.8%	12.8%	14.1%	16.4%	16.3%	16.1%	16.0%	14.9%	14.8%	14.7%	15.5%	15.4%	15.3%
Net Interest Income (Expense)	(27)	(1)	9	33	47	90	108	155	199	278	358	445	542	651	784	934
Other Income	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pretax Income	**46**	**258**	**758**	**872**	**1,332**	**1,886**	**2,857**	**3,684**	**4,451**	**5,305**	**5,875**	**6,688**	**7,598**	**9,080**	**10,207**	**11,373**
Income Taxes	3	2	14	34	86	262	462	641	807	1,003	1,134	1,317	1,470	1,761	2,028	2,323
% Effective Rate	6%	1%	2%	4%	6%	14%	16%	17%	18%	19%	19%	20%	19%	19%	20%	20%
Net Income	**44**	**256**	**744**	**839**	**1,246**	**1,624**	**2,395**	**3,043**	**3,644**	**4,303**	**4,741**	**5,372**	**6,128**	**7,319**	**8,179**	**9,050**
Plus																
After-tax Interest Expense (Income)	27	1	(9)	(33)	(47)	(90)	(108)	(154)	(199)	(278)	(357)	(444)	(541)	(650)	(782)	(932)
Depreciation of PP&E	103	158	172	203	301	353	389	537	606	696	811	938	1,088	1,260	1,451	1,661
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Less																
Change in Working Capital	(155)	(14)	(157)	(167)	(172)	(325)	(163)	(81)	(28)	(299)	(356)	(328)	(219)	(329)	(365)	(376)
% of Change in Sales		-2%	-7%	-12%	-6%	-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

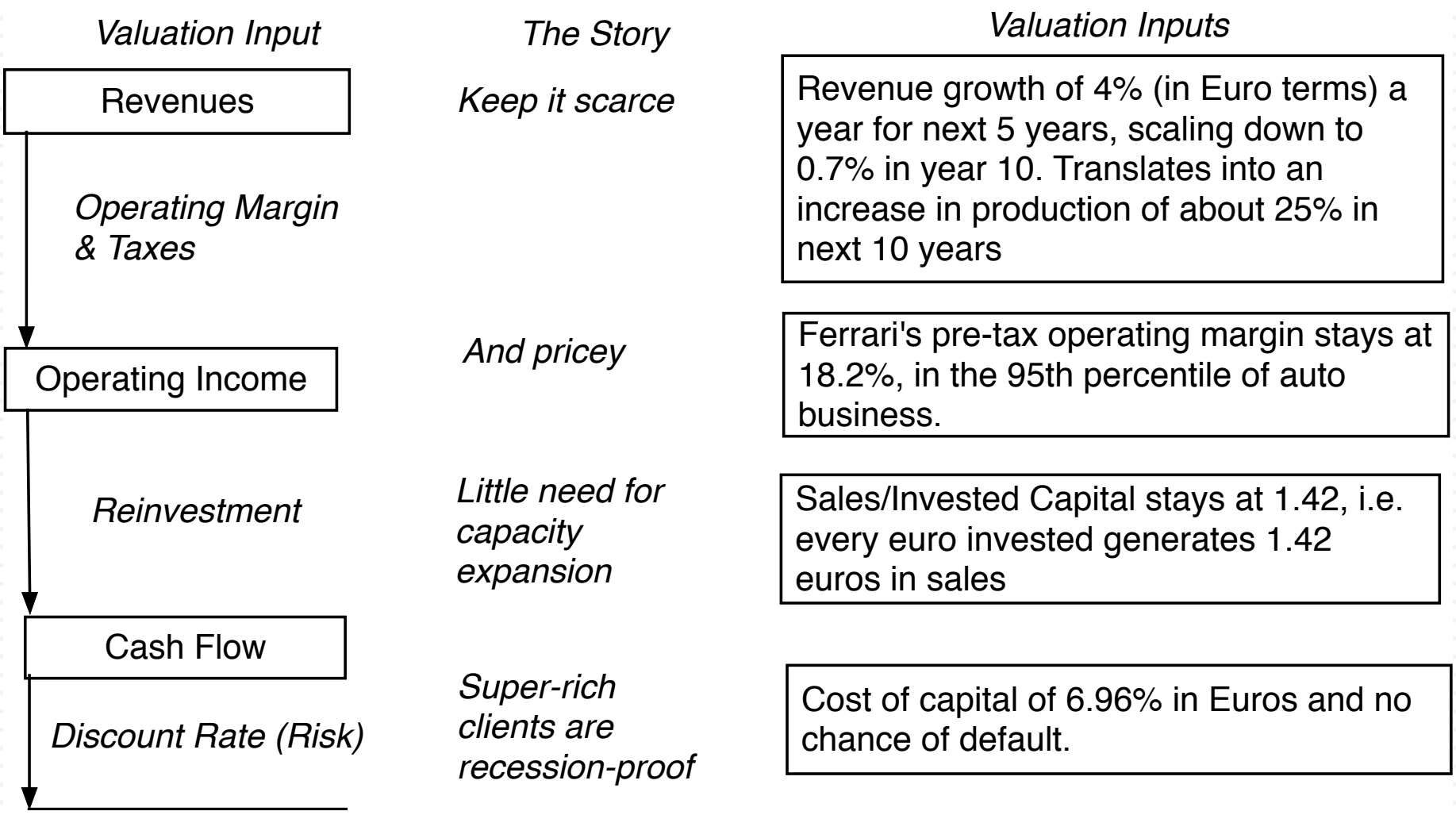
Exit EBITDA High	12.0 x	Exit PPG High	5.0%	Exit P/Sales High	180%
Exit EBITDA Low	8.0 x	Exit PPG Low	3.0%	Exit P/Sales Low	130%

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

Step 4: Connect your narrative to key drivers of value



Ferrari: From story to numbers



Step 4: Value the company (Uber)

Uber: Intrinsic valuation - June 8, 2014 (in US $)

Stable Growth (after year 10)
Expected growth rate = 2.50%
Cost of capital = 8%
Return on capital= 25%
Reinvestment Rate= 2.5%/25% = 10%

Terminal Value$_{10}$= 793/(.08-025) = $14,418

Term yr
EBIT (1-t) $881
- Reinv 88
FCFF $793

Global taxi market is $100 billion currently, expected to grow 6% a year for next ten years.

Uber will keep 20% of the gross cab receipts as its revenues

Uber's market share of this market will increase to 10% over the next 10 years.

Uber's operating expenses will amount to 60% of its revenues. (Operating margin=40%)

Uber will pay a tax rate of 30% on its income, increasing to 40% over the next 10 years

Uber will generate $5 in incremental revenues for every dollar of incremental capital.

	1	2	3	4	5	6	7	8	9	10
Overall market	$106,000	$112,360	$119,102	$126,248	$133,823	$141,852	$150,363	$159,385	$168,948	$179,085
Share of market (gross)	3.63%	5.22%	6.41%	7.31%	7.98%	8.49%	8.87%	9.15%	9.36%	10.00%
Revenues as percent of gross	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Annual Revenue	$769	$1,173	$1,528	$1,846	$2,137	$2,408	$2,666	$2,916	$3,163	$3,582
Operating margin	7.00%	10.67%	14.33%	18.00%	21.67%	25.33%	29.00%	32.67%	36.33%	40.00%
Operating Income	$54	$125	$219	$332	$463	$610	$773	$953	$1,149	$1,433
Effective tax rate	31%	32%	33%	34%	35%	36%	37%	38%	39%	40%
- Taxes	$17	$40	$72	$113	$162	$220	$286	$362	$448	$573
After-tax operating income	$37	$85	$147	$219	$301	$390	$487	$591	$701	$860
Sales/Capital Ratio	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
- Reinvestment	$94	$81	$71	$64	$58	$54	$52	$50	$49	$84
Free Cash Flow to the Firm	-$57	$4	$76	$156	$243	$336	$435	$541	$652	$776

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

Value of operating assets = $6,595

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

Adust for probability of failure (10%)
Expected value = $6,595 (.9) = $5,895

Cost of capital for first 5 years = Top decile of US companies = 12%

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

Ferrari: The "Exclusive Club" Value

Stay Super Exclusive: Revenue growth is low

	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate		4.00%	4.00%	4.00%	4.00%	4.00%	3.34%	2.68%	2.02%	1.36%	0.70%	0.70%
Revenues	€ 2,763	€ 2,874	€ 2,988	€ 3,108	€ 3,232	€ 3,362	€ 3,474	€ 3,567	€ 3,639	€ 3,689	€ 3,714	€ 3,740
EBIT (Operating) margin	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%
EBIT (Operating income)	€ 503	€ 523	€ 544	€ 566	€ 588	€ 612	€ 632	€ 649	€ 662	€ 671	€ 676	€ 681
Tax rate	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%
EBIT(1-t)	€ 334	€ 348	€ 361	€ 376	€ 391	€ 407	€ 420	€ 431	€ 440	€ 446	€ 449	€ 452
- Reinvestment		€ 78	€ 81	€ 84	€ 87	€ 91	€ 79	€ 66	€ 51	€ 35	€ 18	€ 22
FCFF		€ 270	€ 281	€ 292	€ 303	€ 316	€ 341	€ 366	€ 389	€ 411	€ 431	€ 431
Cost of capital		6.96%	6.96%	6.96%	6.96%	6.96%	6.96%	6.97%	6.98%	6.99%	7.00%	7.00%
PV(FCFF)		€ 252	€ 245	€ 238	€ 232	€ 225	€ 228	€ 228	€ 227	€ 224	€ 220	

Terminal value	€ 6,835
PV(Terminal value)	€ 3,485
PV (CF over next 10 years)	€ 2,321
Value of operating assets =	€ 5,806
- Debt	€ 623
- Minority interests	€ 13
+ Cash	€ 1,141
Value of equity	€ 6,311

High Prices + No selling cost = Preserve current operating margin

Minimal Reinvestment due to low growth

The super rich are not sensitive to economic downturns

Step 5: Keep the feedback loop open

- When you tell a story about a company (either explicitly or implicitly), it is natural to feel attached to that story and to defend it against all attacks. Nothing can destroy an investor more than hubris.
- Being open to other views about a company is not easy, but here are some suggestions that may help:
  - Face up to the uncertainty in your own estimates of value.
  - Present the valuation to people who don't think like you do.
  - Create a process where people who disagree with you the most have a say.
  - Provide a structure where the criticisms can be specific and pointed, rather than general.

The Uber Feedback Loop: Bill Gurley

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.

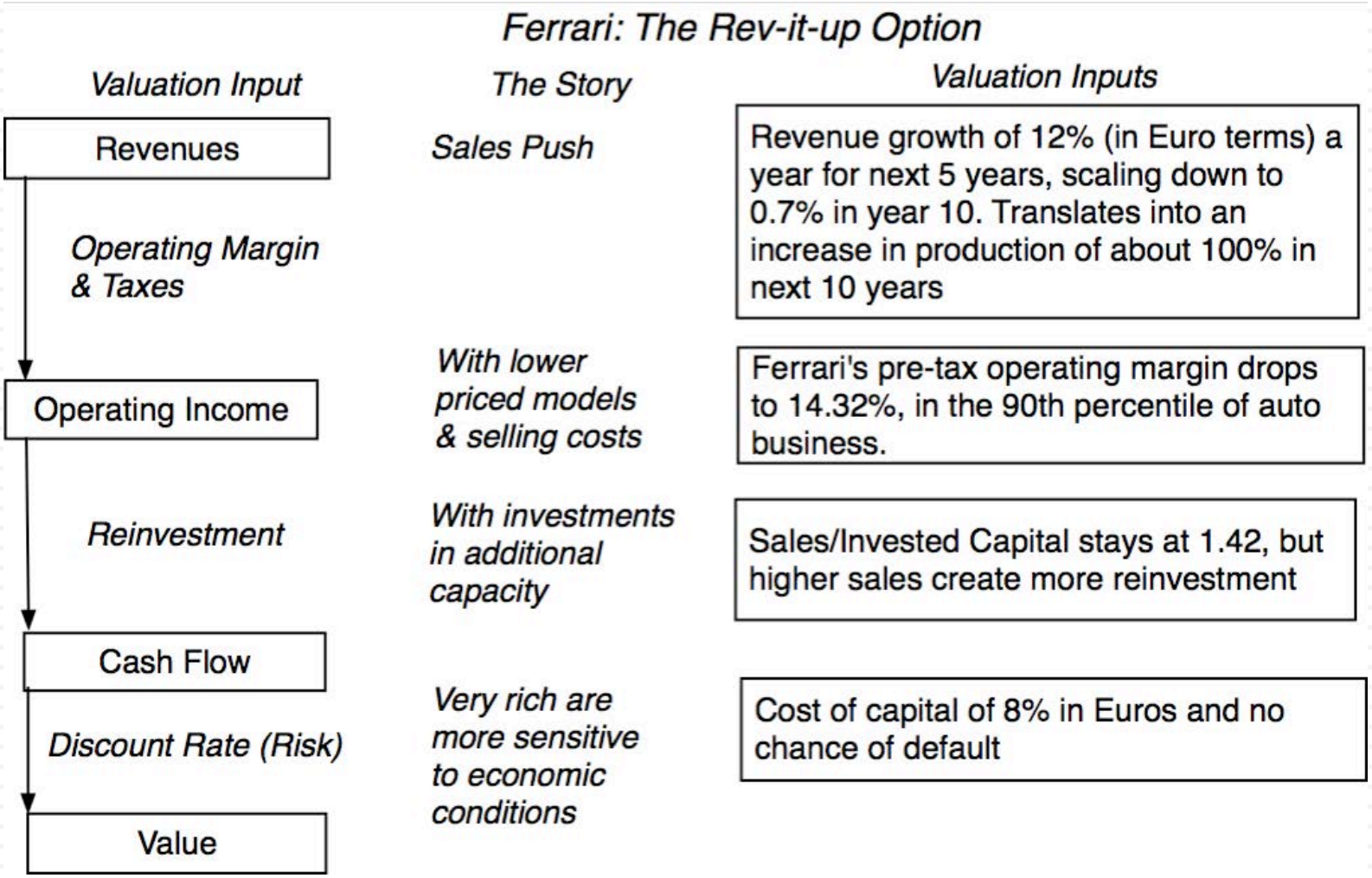
Valuing Bill Gurley's Uber narrative

	Uber (Gurley)	*Uber (Gurley Mod)*	*Uber (Damodaran)*
Narrative	Uber will expand the car service market substantially, bringing in mass transit users & non-users from the suburbs into the market, and use its networking advantage to gain a dominant market share, while maintaining its revenue slice at 20%.	Uber will expand the car service market substantially, bringing in mass transit users & non-users from the suburbs into the market, and use its networking advantage to gain a dominant market share, while cutting prices and margins (to 10%).	Uber will expand the car service market moderately, primarily in urban environments, and use its competitive advantages to get a significant but not dominant market share 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

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

The Ferrari Counter Narrative



Ferrari: The "Rev-it-up" Alternative

Get less exclusive: Double number of cars sold over next decade

	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate		12.00%	12.00%	12.00%	12.00%	12.00%	9.74%	7.48%	5.22%	2.96%	0.70%	0.70%
Revenues	€ 2,763	€ 3,095	€ 3,466	€ 3,882	€ 4,348	€ 4,869	€ 5,344	€ 5,743	€ 6,043	€ 6,222	€ 6,266	€ 6,309
EBIT (Operating) margin	18.20%	17.81%	17.42%	17.04%	16.65%	16.26%	15.87%	15.48%	15.10%	14.71%	14.32%	14.32%
EBIT (Operating income)	€ 503	€ 551	€ 604	€ 661	€ 724	€ 792	€ 848	€ 889	€ 912	€ 915	€ 897	€ 904
Tax rate	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%
EBIT(1-t)	€ 334	€ 366	€ 401	€ 439	€ 481	€ 526	€ 564	€ 591	€ 606	€ 608	€ 596	€ 600
- Reinvestment		€ 233	€ 261	€ 293	€ 328	€ 367	€ 334	€ 281	€ 211	€ 126	€ 31	€ 35
FCFF		€ 133	€ 140	€ 147	€ 153	€ 159	€ 230	€ 310	€ 395	€ 482	€ 566	€ 565
Cost of capital		8.00%	8.00%	8.00%	8.00%	8.00%	7.90%	7.80%	7.70%	7.60%	7.50%	7.50%
PV(FCFF)		€ 123	€ 120	€ 117	€ 113	€ 108	€ 145	€ 181	€ 215	€ 244	€ 266	

Terminal value	€ 8,315
PV(Terminal value)	€ 3,906
PV (CF over next 10 years)	€ 1,631
Value of operating assets =	€ 5,537
- Debt	€ 623
- Minority interests	€ 13
+ Cash	€ 1,141
Value of equity	€ 6,042

Lower Prices + Some selling cost = Lower operating margin

Reinvestment reflects higher sales

The very rich are more sensitive to economic conditions

And the world is full of feedback.. My Ferrari afterthought!

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

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

Uber: The September 2015 Update

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

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

Increases overall market to $618 billion in year 10

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

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

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

PV of cash flows during next 10 years =	$515	
PV of terminal value =	$22,914	
Value of operating assets	$23,429	
Probability of failure	0.00%	G2
Adjusted value of operating assets	$23,429	
Less Debt	$0	
Value of Equity	$23,429	

Capital Intensity
F: Status Quo: Sales/Capital = 5

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

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

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

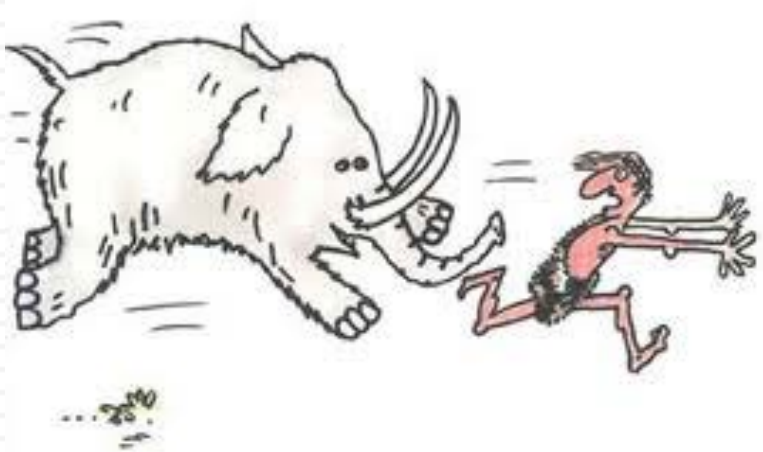
Uber Valuation: September 2015

DEALING WITH NOISE

‹#›

Uncertainty is a feature, not a bug

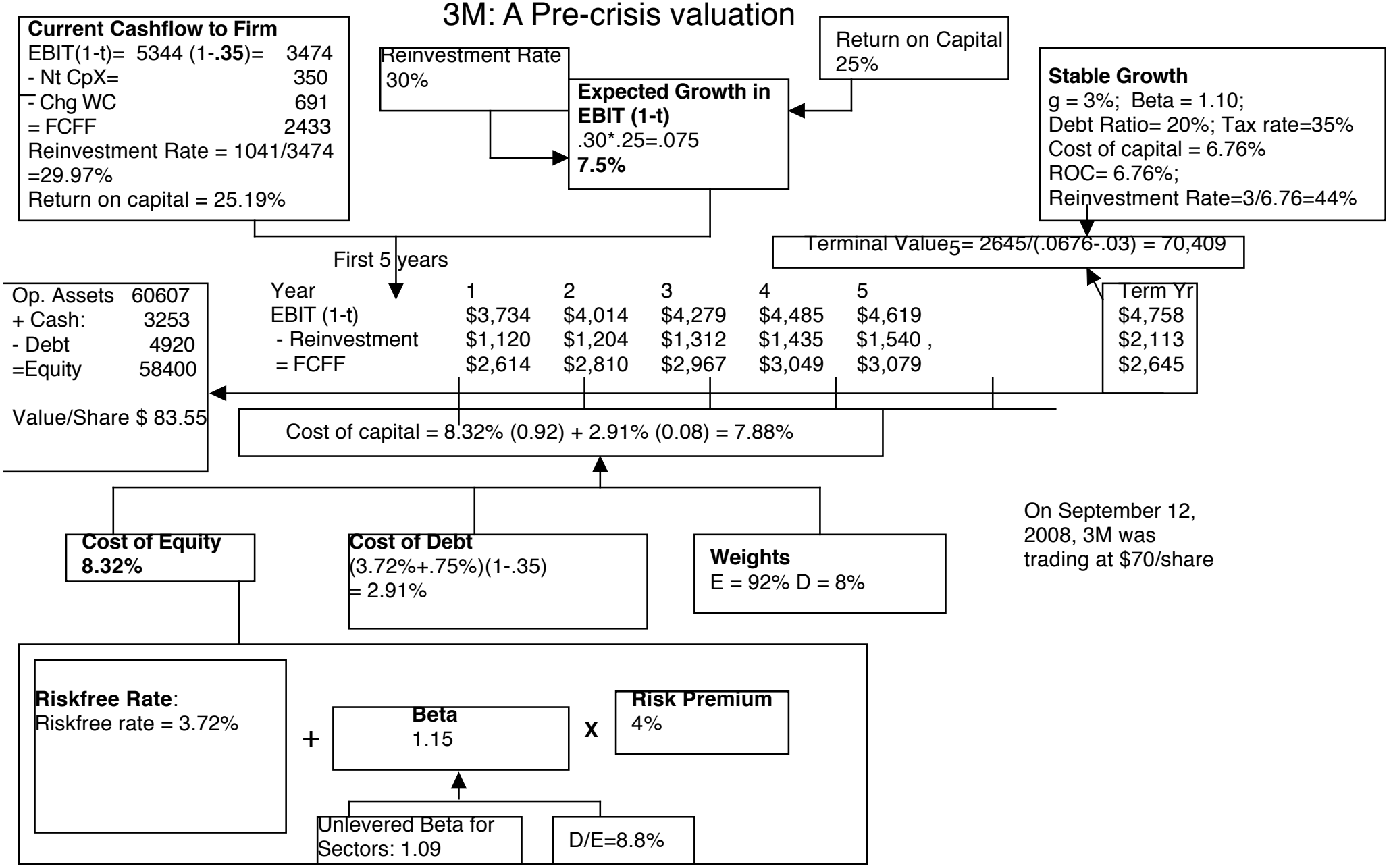
Uncertainty is a feature, not a bug.



And we deal with uncertainty as humans always have…

- Divine Intervention: Praying for intervention from a higher power is the oldest and most practiced risk management system of all.
- Paralysis & Denial: When faced with uncertainty, some of us get paralyzed. Accompanying the paralysis is the hope that if you close your eyes to it, the uncertainty will go away
- Mental short cuts (rules of thumb): Behavioral economists note that investors faced with uncertainty adopt mental short cuts that have no basis in reality. And here is the clincher. More intelligent people are more likely to be prone to this.
- Herding: When in doubt, it is safest to go with the crowd.. The herding instinct is deeply engrained and very difficult to fight.
- Outsourcing: Assuming that there are experts out there who have the answers does take a weight off your shoulders, even if those experts have no idea of what they are talking about.

3M: A Pre-crisis valuation



On September 12, 2008, 3M was trading at $70/share

Valuing Vale in September 2015 (in US dollars)

Let's start with some history & estimate what a normalized year will look like

Earning Down
Vale's earnings for the last 12 months have collapsed, with revenues & margins down.

Year	Operating Income ($)	Effective tax rate	BV of Debt	BV of Equity	Cash	Invested capital	ROIC
2010	$24,531	18.70%	$27,694	$70,773	$9,942	$88,525	22.53%
2011	$29,109	18.90%	$25,151	$78,320	$3,960	$99,511	23.72%
2012	$14,036	18.96%	$32,978	$75,130	$6,330	$101,778	11.18%
2013	$16,185	15.00%	$32,509	$64,682	$5,472	$91,719	15.00%
2014	$6,538	20.00%	$32,469	$56,526	$4,264	$84,731	6.17%
Last 12 months	$2,927	20.00%	$32,884	$49,754	$3,426	$79,211	2.96%
Average	**$15,554**	**18.59%**					**15.72%**

The China Card
The market collapse in China and the slowing economy put at risk Vale's biggest market

Estimate the costs of equity & capital for Vale

Business	Unlevered beta	Proportion of value	D/E ratio	Levered beta
Metals & Mining	0.86	16.65%	126.36%	1.5772
Iron Ore	0.83	76.20%	126.36%	1.5222
Fertilizers	0.99	5.39%	126.36%	1.8156
Logistics	0.75	1.76%	126.36%	1.3755
Vale Operations	**0.84**	**100%**	**126.36%**	**1.5405**

Region	% of total	ERP
Brazil	68%	13.00%
Rest of the world	32%	7.69%
Vale	*100%*	*11.30%*

Riskfree Rate	2.13%
Default Spread for Brazil	4.50%
Default spread for Vale	3.00%
Cost of debt for Vale (pre-tax)	9.63%

Brazil has seen its rating downgraded and the sovereign CDS spread has almost doubled over the last year.

Cost of equity = 2.13% + 1.5405 (11.30%) = 19.54%
Cost of capital = 19.54% (.5582) + 9.63% (1-.34) (.4418) = 12.18%

Assume that the company is in stable growth, growing 2% a year in perpetuity, with the last 12 months as the base year for operating income and assuming return on capital = cost of capital in perpetuity.

$$\text{Reinvestment Rate} = \frac{\text{Expected Growth Rate}}{\text{Return on Capital}} = \frac{2\%}{12.18\%} = 16.42\%$$

$$\text{Value of Operating Assets} = \frac{7{,}232\ (1.02)(1\text{-}.20)(1\text{-}.1642)}{(.1642\text{-}.02)} = \$48{,}451$$

Value of operating assets	= $ 48,451
+ Cash & Equity in Affliates	= $ 7,626
- Debt & Minority Interests	= $ 33,952
Value of equity	= $ 22,125
Value per share	=**$ 4.28**
Stock price (4/15/15)	= $ 5.05

9a. Amazon in January 2000

Current Revenue $ 1,117

Current Margin: -36.71%

From previous years

EBIT -410m

NOL: 500 m

Sales to capital ratio and expected margin are retail industry average numbers

Sales Turnover Ratio: 3.00

Revenue Growth: 42%

Competitive Advantages

Expected Margin: -> 10.00%

Stable Growth

Stable Revenue Growth: 6%

Stable Operating Margin: 10.00%

Stable ROC=20% Reinvest 30% of EBIT(1-t)

Terminal Value= 1881/(.0961-.06) =52,148

Revenue Growth	150.00%	100.00%	75.00%	50.00%	30.00%	25.20%	20.40%	15.60%	10.80%	6.00%
Revenues	$ 2,793	$ 5,585	$ 9,774	$ 14,661	$ 19,059	$ 23,862	$ 28,729	$ 33,211	$ 36,798	$ 39,006
Operating Margin	-13.35%	-1.68%	4.16%	7.08%	8.54%	9.27%	9.64%	9.82%	9.91%	9.95%
EBIT	-$373	-$94	$407	$1,038	$1,628	$2,212	$2,768	$3,261	$3,646	$3,883
EBIT(1-t)	-$373	-$94	$407	$871	$1,058	$1,438	$1,799	$2,119	$2,370	$2,524
- Reinvestment	$600	$967	$1,420	$1,663	$1,543	$1,688	$1,721	$1,619	$1,363	$961
FCFF	-$931	-$1,024	-$989	-$758	-$408	-$163	$177	$625	$1,174	$1,788
	1	2	3	4	5	6	7	8	9	10

Term. Year

6%
$ 41,346
10.00%
$4,135
$2,688
$155
$1,881

Forever

Cost of Equity	12.90%	12.90%	12.90%	12.90%	12.90%	12.42%	11.94%	11.46%	10.98%	10.50%
Cost of Debt	8.00%	8.00%	8.00%	8.00%	8.00%	7.80%	7.75%	7.67%	7.50%	7.00%
After-tax cost of debt	8.00%	8.00%	8.00%	6.71%	5.20%	5.07%	5.04%	4.98%	4.88%	4.55%
Cost of Capital	12.84%	12.84%	12.84%	12.83%	12.81%	12.13%	11.62%	11.08%	10.49%	9.61%

Value of Op Assets	$ 15,170
+ Cash	$ 26
= Value of Firm	$14,936
- Value of Debt	$ 349
= Value of Equity	$14,847
- Equity Options	$ 2,892
Value per share	$ 35.08

All existing options valued as options, using current stock price of $84.

Amazon was trading at $84 in January 2000.

Cost of Equity
12.90%

Used average interest coverage ratio over next 5 years to get BBB rating.

Cost of Debt
6.5%+1.5%=8.0%
Tax rate = 0% -> 35%

Weights
Debt= 1.2% -> 15%

Pushed debt ratio to retail industry average of 15%.

Dot.com retailers for firrst 5 years
Convetional retailers after year 5

Riskfree Rate:
T. Bond rate = 6.5%

+ **Beta**
1.60 -> 1.00

X **Risk Premium**
4%

Internet/ Retail

Operating Leverage

Current D/ E: 1.21%

Base Equity Premium

Country Risk Premium

Starting numbers

Twitter Pre-IPO Valuation: October 5, 2013

	2012	Trailing 2013
Revenues	$316.9	$448.2
Operating Income	-$77.1	-$92.9
Adj Op Inc		$4.3
Invested Capital		$549.1
Operating Margin		0.96%
Sales/Capital		0.82

Revenue growth of 55% a year for 5 years, tapering down to 2.7% 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 = 2.7%; Beta = 1.00;
Cost of capital = 8%
ROC= **12**%;
Reinvestment Rate=2.7%/12% = 22.5%

Terminal Value$_{10}$= 1433/(.08-.027) = $27.036

	1	2	3	4	5	6	7	8	9	10
Revenues	$ 694.7	$ 1,076.8	$ 1,669.1	$ 2,587.1	$ 4,010.0	$ 5,796.0	$ 7,771.3	$ 9,606.8	$10,871.1	$11,164.6
Operating Income	$ 23.3	$ 62.0	$ 136.3	$ 273.5	$ 520.3	$ 891.5	$ 1,382.2	$ 1,939.7	$ 2,456.3	$ 2,791.2
Operating Income after taxes	$ 23.3	$ 62.0	$ 136.3	$ 265.3	$ 364.2	$ 614.2	$ 937.1	$ 1,293.8	$ 1,611.4	$ 1,800.3
Reinvestment	$ 164.3	$ 254.7	$ 394.8	$ 612.0	$ 948.6	$ 1,190.7	$ 1,316.8	$ 1,223.7	$ 842.8	$ 195.7
FCFF	$ (141.0)	$ (192.7)	$ (258.5)	$ (346.6)	$ (584.4)	$ (576.5)	$ (379.7)	$ 70.0	$ 768.5	$ 1,604.6

Terminal year (11)

EBIT (1-t)	$1,849
- Reinvestment	$ 416
FCFF	$1,433

Operating assets	$9,611
+ Cash	375
+ IPO Proceeds	1000
- Debt	207
Value of equity	10,779
- Options	805
Value in stock	9,974
/ # of shares	574.44
Value/share	$17.36

Cost of capital = 11.32% (.983) + 5.16% (.017) = 11.22%

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

Cost of Equity
11.32%

Cost of Debt
(2.7%+5.3%)(1-.40)
= 5.16%

Weights
E = 98.31% D = 1.69%

Riskfree Rate:
Riskfree rate = 2.7%

+

Beta
1.40

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

D/E=1.71%

x

Risk Premium
6.15%

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

On October 5, 2013, Twitter had not been priced yet, but the company's most recent acquisition suggested a price of about $20/share.

The sources of uncertainty

- Estimation versus Economic uncertainty
  - Estimation uncertainty reflects the possibility that you could have the "wrong model" or estimated inputs incorrectly within this model.
  - Economic uncertainty comes the fact that markets and economies can change over time and that even the best medals will fail to capture these unexpected changes.
- Micro uncertainty versus Macro uncertainty
  - Micro uncertainty refers to uncertainty about the potential market for a firm's products, the competition it will face and the quality of its management team.
  - Macro uncertainty reflects the reality that your firm's fortunes can be affected by changes in the macro economic environment.
- Discrete versus continuous uncertainty
  - Discrete risk: Risks that lie dormant for periods but show up at points in time. (Examples: A drug working its way through the FDA pipeline may fail at some stage of the approval process or a company in Venezuela may be nationalized)
  - Continuous risk: Risks changes in interest rates or economic growth occur continuously and affect value as they happen.

Assessing uncertainty…

- Rank the four firms in terms of uncertainty (least to most) in your estimate:
  - 3M in 2007
  - Vale in September 2015
  - Amazon in 2000
  - Twitter in 2013
- With each company, specify the type of uncertainty that you face:

Company	Estimation or Economic	Micro or Macro	Discrete or Continuous
3M (2007)			
Vale (Sept 2015)			
Amazon (2000)			
Twitter (2013)			

Ten suggestions for dealing with uncertainty…

1. Less is more (the rule on detail….) (Revenue & margin forecasts)
2. Build in internal checks on reasonableness… (reinvestment and ROC)
3. Use the offsetting principle (risk free rates & inflation at Tata Motors)
4. Draw on economic first principles (Terminal value at all the companies)
5. Use the "market" as a crutch (equity risk premiums, country risk premiums)
6. Use the law of large numbers (Beta for all companies
7. Don't let the discount rate become the receptacle for all uncertainties.
8. Confront uncertainty, if you can
9. Don't look for precision
10. You can live with mistakes, but bias will defeat you.

1. Less is more

- The principle of parsimony: When faced with uncertainty, go for less detail, rather than more. That may sound counterintuitive, but here is why it makes sense:
  - You have a better shot at estimating an aggregate number, rather than individual numbers (Examples: Forecast the operating margin rather than individual operating expenses, total working capital instead of individual working capital items)
  - Estimation requires information and trying to estimate individual items, in the absence of information, is not only frustrating but an exercise in futility.
- Auto pilot rules: The uncertainty you face will increase as you go forward in time (it is much more difficult to estimate year 5 than year 1). Thus, it is best to create simple algorithms that estimate year-specific numbers as you go further out in time.

To illustrate: Revenues & Margins for Amazon

Year	Revenue Growth	Sales	Operating Margin	EBIT	EBIT (1-t)
Tr 12 mths		$1,117	-36.71%	-$410	-$410
1	150.00%	$2,793	-13.35%	-$373	-$373
2	100.00%	$5,585	-1.68%	-$94	-$94
3	75.00%	$9,774	4.16%	$407	$407
4	50.00%	$14,661	7.08%	$1,038	$871
5	30.00%	$19,059	8.54%	$1,628	$1,058
6	25.20%	$23,862	9.27%	$2,212	$1,438
7	20.40%	$28,729	9.64%	$2,768	$1,799
8	15.60%	$33,211	9.82%	$3,261	$2,119
9	10.80%	$36,798	9.91%	$3,646	$2,370
10	6.00%	$39,006	9.95%	$3,883	$2,524
TY	6.00%	$41,346	10.00%	$4,135	$2,688

A tougher task at Twitter

	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

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

2. Build in "internal" checks for reasonableness

- While you may be forecasting individual items in valuation, and you are uncertain about each item, you can create internal checks to make sure that your assumptions are not at war with each other.
- In particular, you should make sure that as you approach your terminal year, the company that you are creating on your spreadsheet is one that is feasible and viable in terms of
  - Size, relative to the market that it serves… Your market share obviously cannot exceed 100% but there may be tighter constraints (your market share cannot exceed that of the largest company in the sector)
  - Profitability, as measured in terms of operating margins and returns on capital. In particular, the return on capital should be supportable, given the industry average return on capital and the cost of capital.

To illustrate: The reinvestment in Amazon

Year	Revenues	Δ Revenue	Sales/Cap	Δ Investment	Invested Capital	EBIT (1-t)	Imputed ROC
Tr 12 mths	$1,117				$ 487	-$410	
1	$2,793	$1,676	3.00	$559	$ 1,045	-$373	-76.62%
2	$5,585	$2,793	3.00	$931	$ 1,976	-$94	-8.96%
3	$9,774	$4,189	3.00	$1,396	$ 3,372	$407	20.59%
4	$14,661	$4,887	3.00	$1,629	$ 5,001	$871	25.82%
5	$19,059	$4,398	3.00	$1,466	$ 6,467	$1,058	21.16%
6	$23,862	$4,803	3.00	$1,601	$ 8,068	$1,438	22.23%
7	$28,729	$4,868	3.00	$1,623	$ 9,691	$1,799	22.30%
8	$33,211	$4,482	3.00	$1,494	$ 11,185	$2,119	21.87%
9	$36,798	$3,587	3.00	$1,196	$ 12,380	$2,370	21.19%
10	$39,006	$2,208	3.00	$736	$ 13,116	$2,524	20.39%
TY	$41,346	$2,340	NA		Assumed to be =		20.00%

3. Use consistency tests…

- While you can not grade a valuation on "correctness" (since different analysts can make different assumptions about growth and risk), you can grade it on consistency.
- For a valuation to be consistent, your estimates of cash flows have to be consistent with your discount rate definition.
  1. Equity versus Firm: If the cash flows being discounted are cash flows to equity, the appropriate discount rate is a cost of equity. If the cash flows are cash flows to the firm, the appropriate discount rate is the cost of capital.
  2. Currency: The currency in which the cash flows are estimated should also be the currency in which the discount rate is estimated.
  3. Nominal versus Real: If the cash flows being discounted are nominal cash flows (i.e., reflect expected inflation), the discount rate should be nominal

4. Draw on first principles

- When doing valuation, you are free to make assumptions about how your company will evolve over time in the market that it operates, but you are not free to violate first principles in economics and mathematics.
- Put differently, there are assumptions in valuation that are either mathematically impossible or violate first laws of economics and cannot be ever justified.

To illustrate: The growth rate in terminal value

- When a firm's cash flows grow at a "constant" rate forever, the present value of those cash flows can be written as:
  - Value = Expected Cash Flow Next Period / (r - g)
- The stable growth rate cannot exceed the growth rate of the economy but it can be set lower.
  - If you assume that the economy is composed of high growth and stable growth firms, the growth rate of the latter will probably be lower than the growth rate of the economy.
  - The stable growth rate can be negative. The terminal value will be lower and you are assuming that your firm will disappear over time.
  - If you use nominal cashflows and discount rates, the growth rate should be nominal in the currency in which the valuation is denominated.
- One simple proxy for the nominal growth rate of the economy is the riskfree rate:
  - Riskfree rate = Expected inflation + Expected real interest rate
  - Nominal growth rate in GDP = Expected inflation + Expected real growth rate

And the "excess return" effect…

Stable growth rate	*3M*	*Vale*	*Amazon*	*Twitter*
0%	$70,409	$48,451	$26,390	$23,111
1%	$70,409	$48,451	$28,263	$24,212
2%	$70,409	$48,451	$30,595	$25,679
3%	$70,409		$33,594	
4%			$37,618	
5%			$43,334	
			$52,148	
Riskfree rate	3.72%	2.00%	6.60%	2.70%
ROIC	6.76%	12.18%	20%	12.00%
Cost of capital	6.76%	12.18%	9.61%	8.00%

5. Use the market as a crutch…

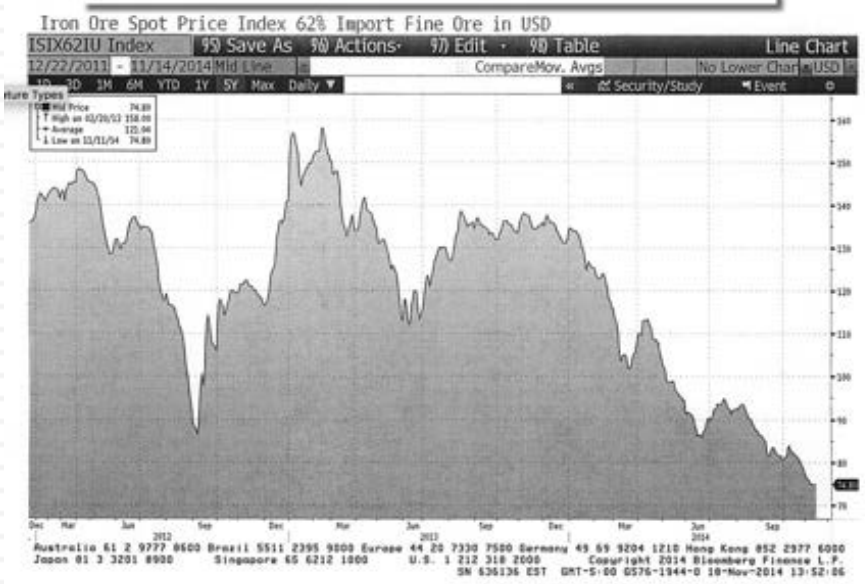
- In intrinsic valuation, you start with the presumption that the market is not always right and that your value may yield a better estimate of the "true" value of a business than the market's estimate of that value.
- While that is a reasonable (albeit debatable) belief, you can still use market values either as inputs for some variables or as checks on your inputs. That will allow you to value your company in a more bounded environment, where you are not making assumptions about variables that you either should not be bringing in your point of view on and/or are unequipped to do so.

Where the market rules..

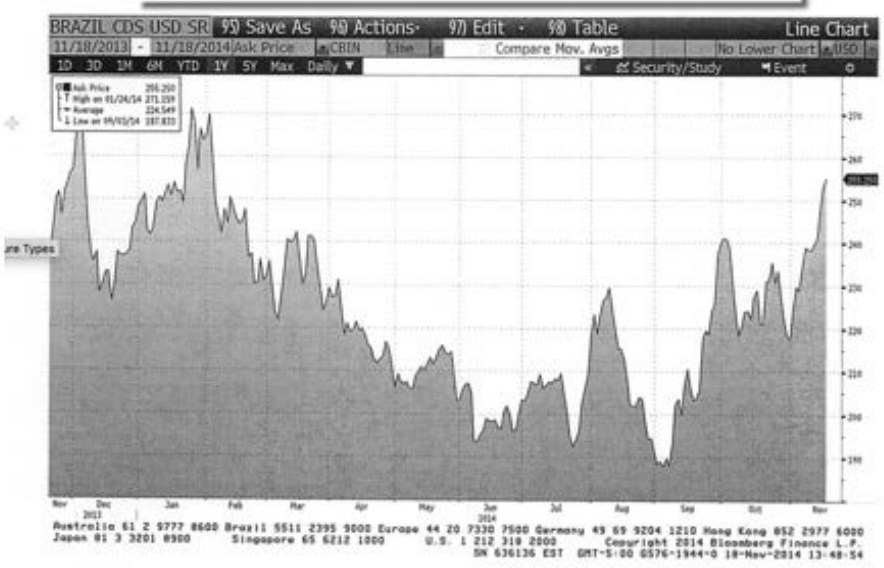
- Risk free Rates: Much as you may feel that current interest rates are too high or too low, you should draw on those current rates when valuing companies. Don't normalize risk free rates.
- Equity Risk Premiums & Default Spreads: Rather than use historical data, use the market prices for equity risk (implied premium) and default risk (default spreads in the market0
- Exchange Rates: Again, you may feel that exchange rates are too low or too high but in your valuations, you should use market-set exchange rates.

With Vale, here were the big unknowns..

Iron Ore Prices Collapse



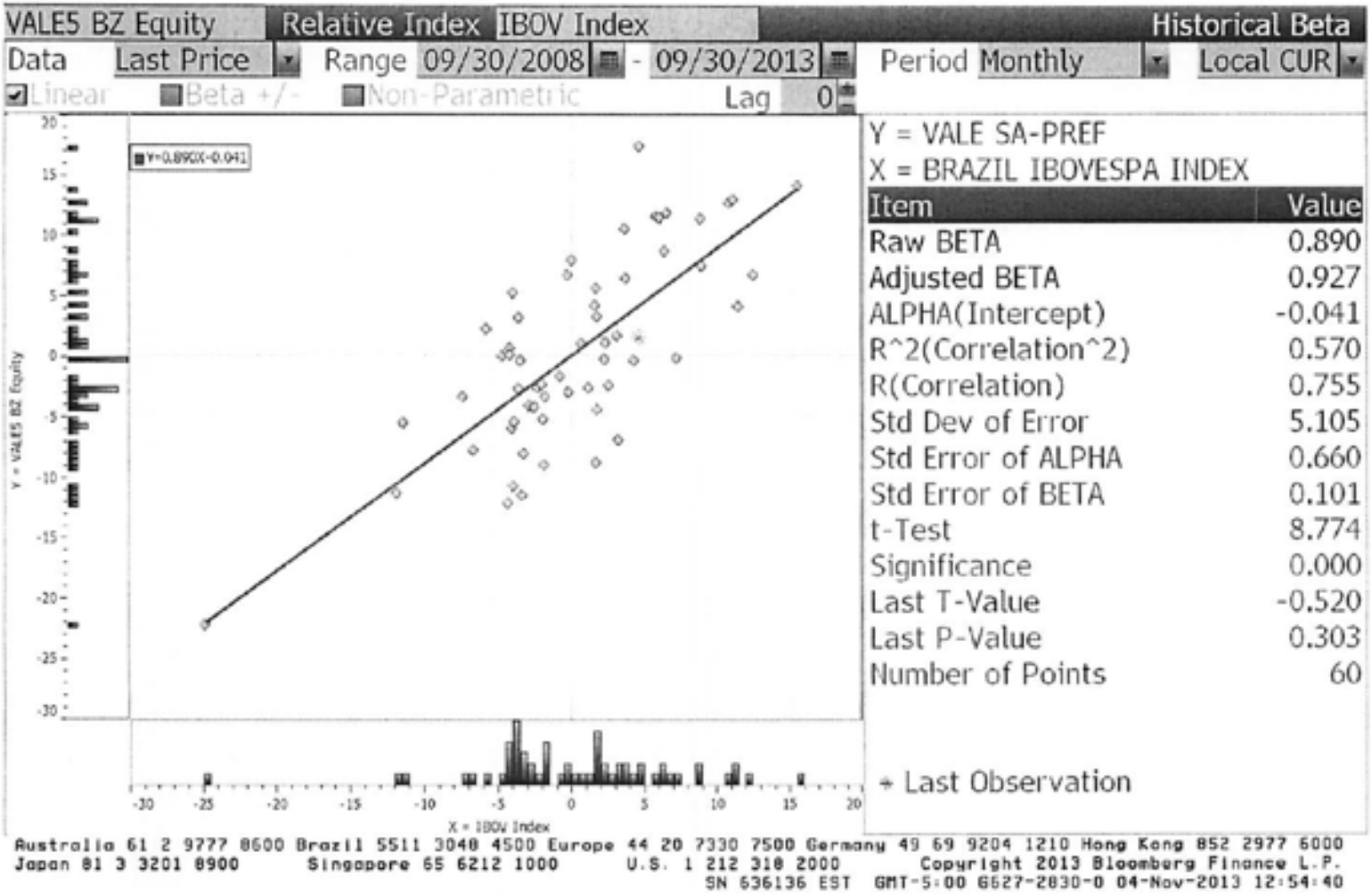
Brazil Country Risk Climbs



6. Draw on the law of large numbers…

- The law of large numbers: The "law of large numbers" is one of several theorems expressing the idea that as the number of trials of a random process increases, the percentage difference between the expected and actual values goes to zero.
- The average is your friend: In pragmatic terms, when faced with uncertainty on an input, you are better off using an average (over time or across companies) than using the actual number.

To illustrate: A single regression beta is noisy…



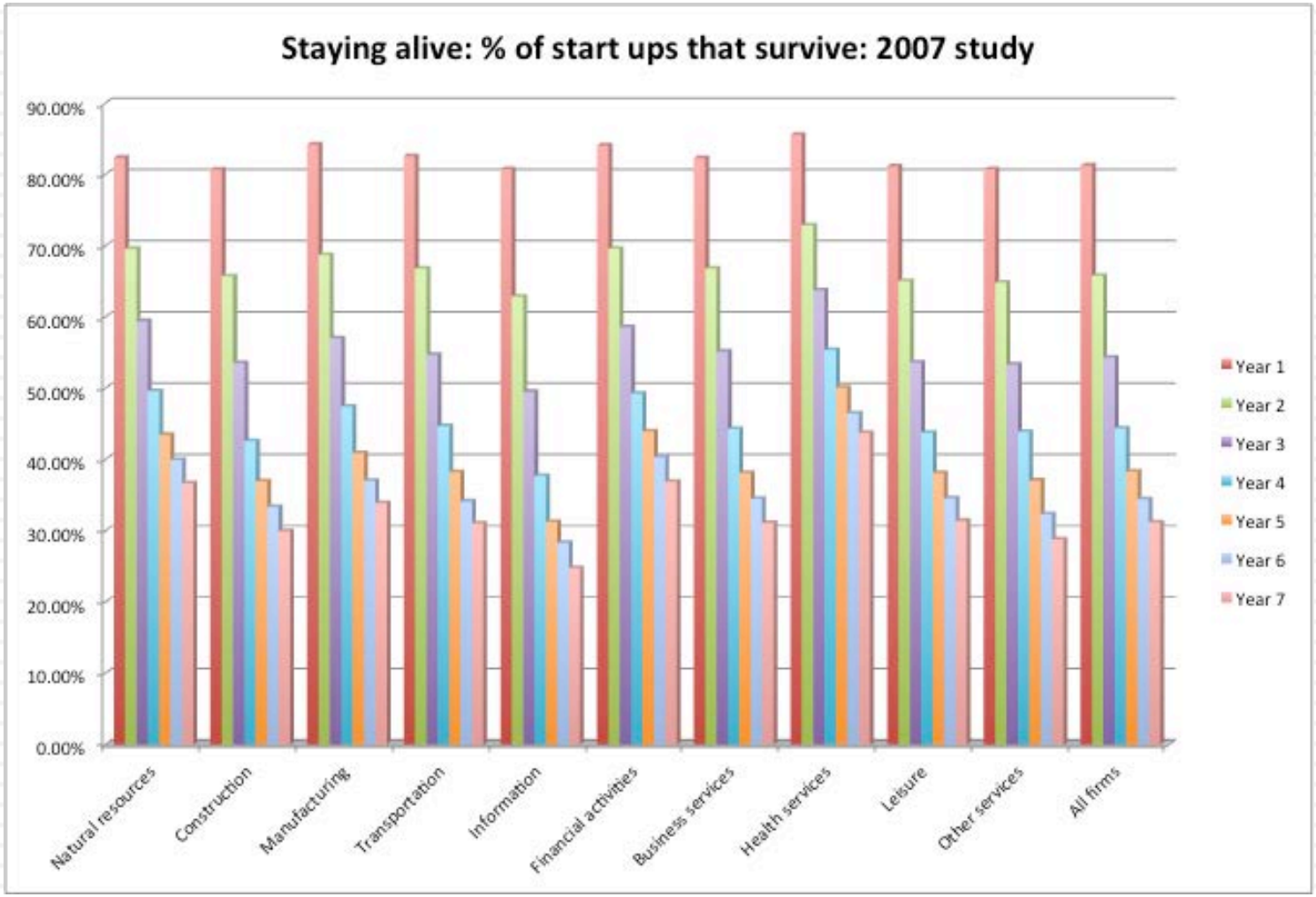
But an average beta across companies is not…

Business	*Number of firms*	Unlevered beta	Proportion of value	D/E ratio	Levered beta
Metals & Mining	52	0.86	16.65%	126.36%	1.5772
Iron Ore	86	0.83	76.20%	126.36%	1.5222
Fertilizers	655	0.99	5.39%	126.36%	1.8156
Logistics	215	0.75	1.76%	126.36%	1.3755
Vale Operations		0.84	100%	126.36%	1.5405

7. Don't let the discount rate become the receptacle for all your uncertainty…

- In discounted cash flow valuation, it is true that risk is incorporated into the discount rate. Taking that principle to its logical limits, analysts often "hike" the discount rate to reflect any uncertainty they feel about value.
- There are several dangers with doing so:
  - You may be building in risks that will disappear in a portfolio and thus unnecessarily lowering the value of some risky investments. If you are valuing a company for a diversified investor, it is macro risks that you should be capturing in the discount rate, not micro risks.
  - Adding to the proposition, adjusting discount rates is easier to do with continuous risk (that earnings will be volatile or exchange rates will change) than for discontinuous risk.

To illustrate: Survival risk at young firms…



Contrasting ways of dealing with survival risk…

- The Venture Capital approach: In the venture capital approach, you hike the "discount rate" well above what would be appropriate for a going concern and then use this "target" rate to discount your "exit value" (which is estimated using a multiple and forward earnings).
  - Value = (Forward Earnings in year n * Exit multiple)/ (1+ target rate)^n
- The decision tree approach:
  - Value the business as a "going concern", with a rate of return appropriate for a "going concern".
  - Estimate the probability of survival (and failure) and the value of the business in the event of failure.
  - Value = Going concern value (Probability of survival) + Liquidation value (Probability of failure)

Generalizing to other "truncation" risks

- Default risk for a "distressed" company: For firms that have substantial debt, there is the possibility of default. In default, you will receive a liquidation value for your assets in place, that may not reflect their going concern value, and will lose any "growth asset" value.
  - Value = Going concern value (1- Probability of default) + Liquidation value (Probability of default)
- Nationalization risk: The primary cost of being nationalized is that what you receive for your business from the nationalizing authority is less than the fair value of the business.
  - Value = Going concern value (1- Probability of nationalization) + Liquidation value (Probability of nationalization)

Exhibit 8.2: Valuing a Distressed firm: Las Vegas Sands in early 2009

Las Vegas Sands owns and operates the Venetian Casino and Sands Convention Center in Las Vegas and the Sands Macau Casino in Macau, China. While the revenues increased from $1.75 billion in 2005 to $4.39 billion in 2008 and it had two other casinos in development - it ran into significant financial trouble in the last quarter of 2008. Fears about whether the firm would be able to meet its debt obligations pushed down both stock prices (almost 90%) and bond prices (about 40%) in 2008.

Limited revenue growth (1)
Distress makes it difficult to build new casinos. So growth has to come from existing casinos.

Tax rate (3)
As tax benefits from investements fade and profits come back, tax rate rises to marginal tax rate.

Curtailed reinvestment (4)
Difficulty in raising new capital and debt repayment needs reduce cash available for reinvestment, at least for near term.

Return to financial health (5)
High debt ratio pushed up cost of equity and capital. As debt is repaid, debt ratio decreases and cost of capital drops.

Year	Revenue growth	Revenues	Operating Margin	Operating Income	Tax rate	After-tax Operating Income	Reinvestment Rate	Reinvestment	FCFF	Debt Ratio	Cost of capital	Present Value
Current		$4,390	4.76%	$209	26.00%	$155				73.50%		
1	1%	$4,434	5.81%	$258	26.00%	$191	-10.00%	-$19	$210	73.50%	9.88%	$191
2	2%	$4,523	6.86%	$310	26.00%	$229	-5.00%	-$11	$241	73.50%	9.88%	$200
3	20%	$5,427	7.90%	$429	26.00%	$317	0.00%	$0	$317	73.50%	9.88%	$239
4	20%	$6,513	8.95%	$583	26.00%	$431	5.00%	$22	$410	73.50%	9.88%	$281
5	20%	$7,815	10.00%	$782	26.00%	$578	10.00%	$58	$520	73.50%	9.88%	$325
6	5%	$8,206	11.40%	$935	28.40%	$670	10.00%	$67	$603	68.80%	9.79%	$343
7	5%	$8,616	12.80%	$1,103	30.80%	$763	20.00%	$153	$611	64.10%	9.50%	$317
8	5%	$9,047	14.20%	$1,285	33.20%	$858	25.00%	$215	$644	59.40%	9.01%	$307
9	5%	$9,499	15.60%	$1,482	35.60%	$954	30.00%	$286	$668	54.70%	8.32%	$294
10	5%	$9,974	17.00%	$1,696	38.00%	$1,051	33.30%	$350	$701	50.00%	7.43%	$7,298
Beyond	3%	$10,273	17%	$1,746	38.00%	1082.81468	33.30%	$325	$17,129	50.00%	7.43%	$9,793
Value of operating assets												$19,587
(Add) Cash												$3,040
(Subtract) Debt												$7,565
Value of equity												$5,268.01
Value per share (going concern)												$8.21
Probability of going concern												71.75%
Value per share (distress)												$0.00
Probability of distress												28.25%
Distress adjusted Value per share												$5.89

Terminal value (6)
With return to health, back to growth $\frac{1051\,(1.03)(1-.30)}{(.0743-.03)} = \$17,129$

Return to operating health (2)
Current margins are low. Operating margins improve as distress wanes and firm returns to health. The margin in year 11 is based on industry averages and the company's historical margins.

Distress sale value (8)
If the firm is unable to make debt payments, there will be no value to equity.

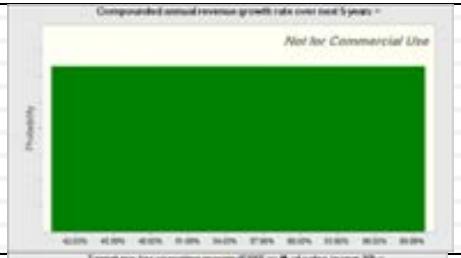
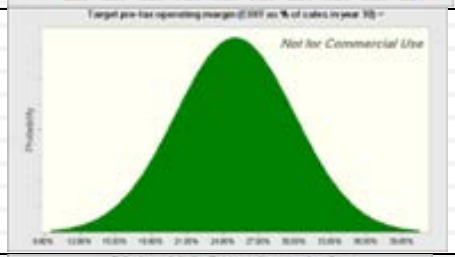
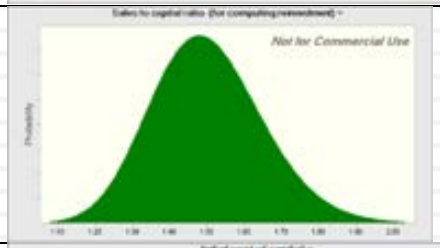
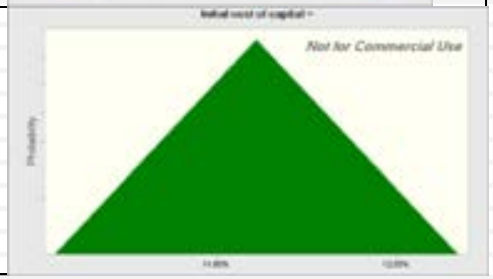
Risk of default (7)
The high debt ratio makes default a very real probability. Given the company's rating (BB), history suggests a 28.25% probability of default within 10 years.

Default adjusted value
Weighted average of going concern value and distress sale value:
$8.25(.7175)+$0(.2125)

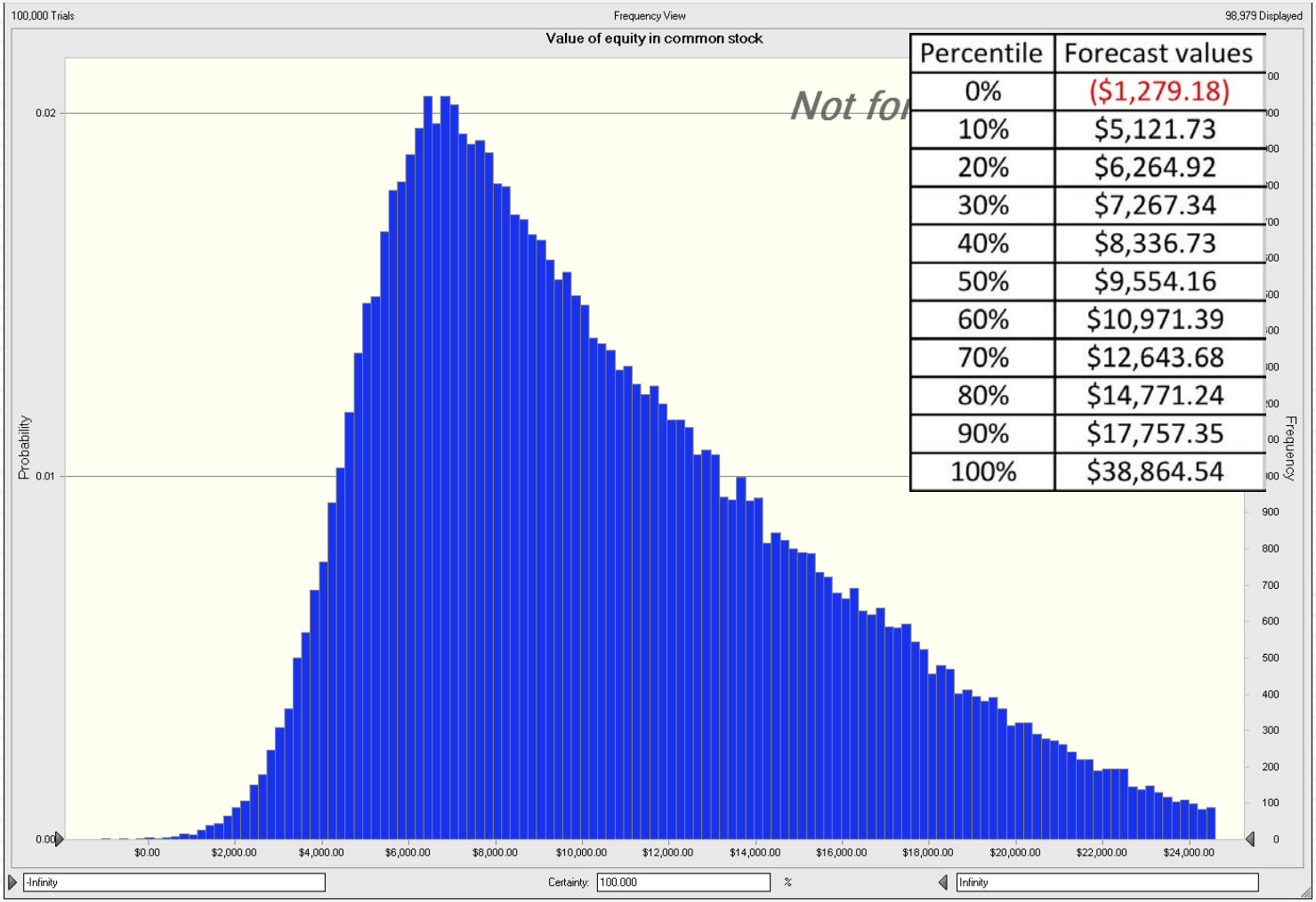
8. Confront uncertainty, if you can…

- In standard valuation, you are forced to make point estimates for inputs where you are uncertain about values. In statistical terms, you are being asked to compress a probability distribution about a variable into an expected value. You then obtain a single estimate of value, based upon your base case or expected values.
- In a simulation, you can enter distributions for variables, rather than point estimates. Rather than obtain a single estimate of value, you get a distribution of values, which can provide you with substantially more information than a single valuation.

To illustrate: Revisiting the Twitter valuation…

Revenue Growth Rate Distribution: Uniform Expected Value = 55% Minimum Value: 40% Maximum Value: 70%	
Target Operating Margin Distribution: Normal Expected Value = 25% Standard Deviation = 5%	
Sales to Capital Ratio Distribution: Lognormal Expected value: 1.50 Standard deviation: 0.15	
Cost of Capital Distribution: Triangular Expected value: 11.22% Minimum value: 10.02% Maximum value: 12.22%	

With the consequences for equity value…

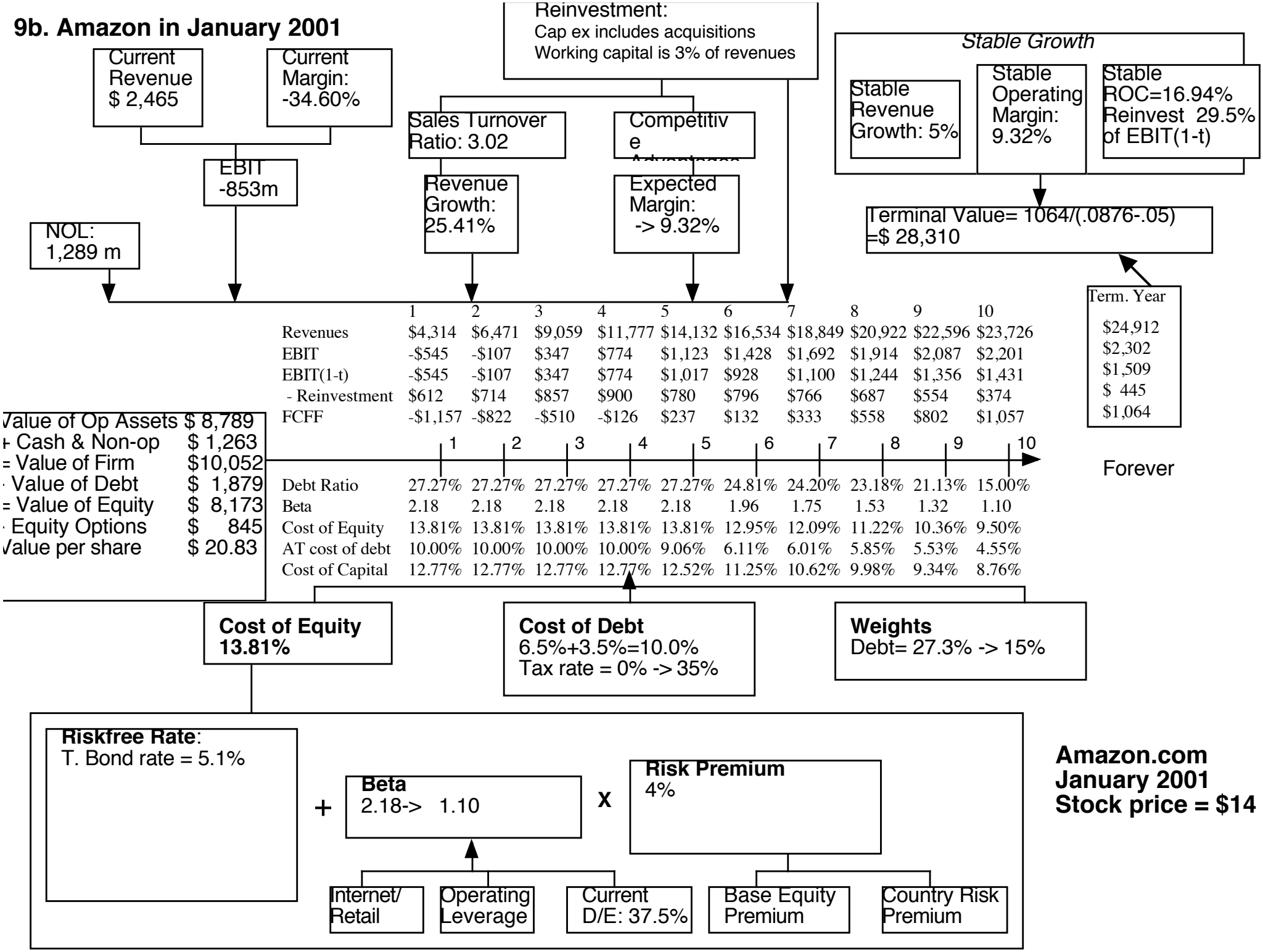


Percentile	Forecast values
0%	($1,279.18)
10%	$5,121.73
20%	$6,264.92
30%	$7,267.34
40%	$8,336.73
50%	$9,554.16
60%	$10,971.39
70%	$12,643.68
80%	$14,771.24
90%	$17,757.35
100%	$38,864.54

9. Don’t look for precision..

- 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.

9b. Amazon in January 2001

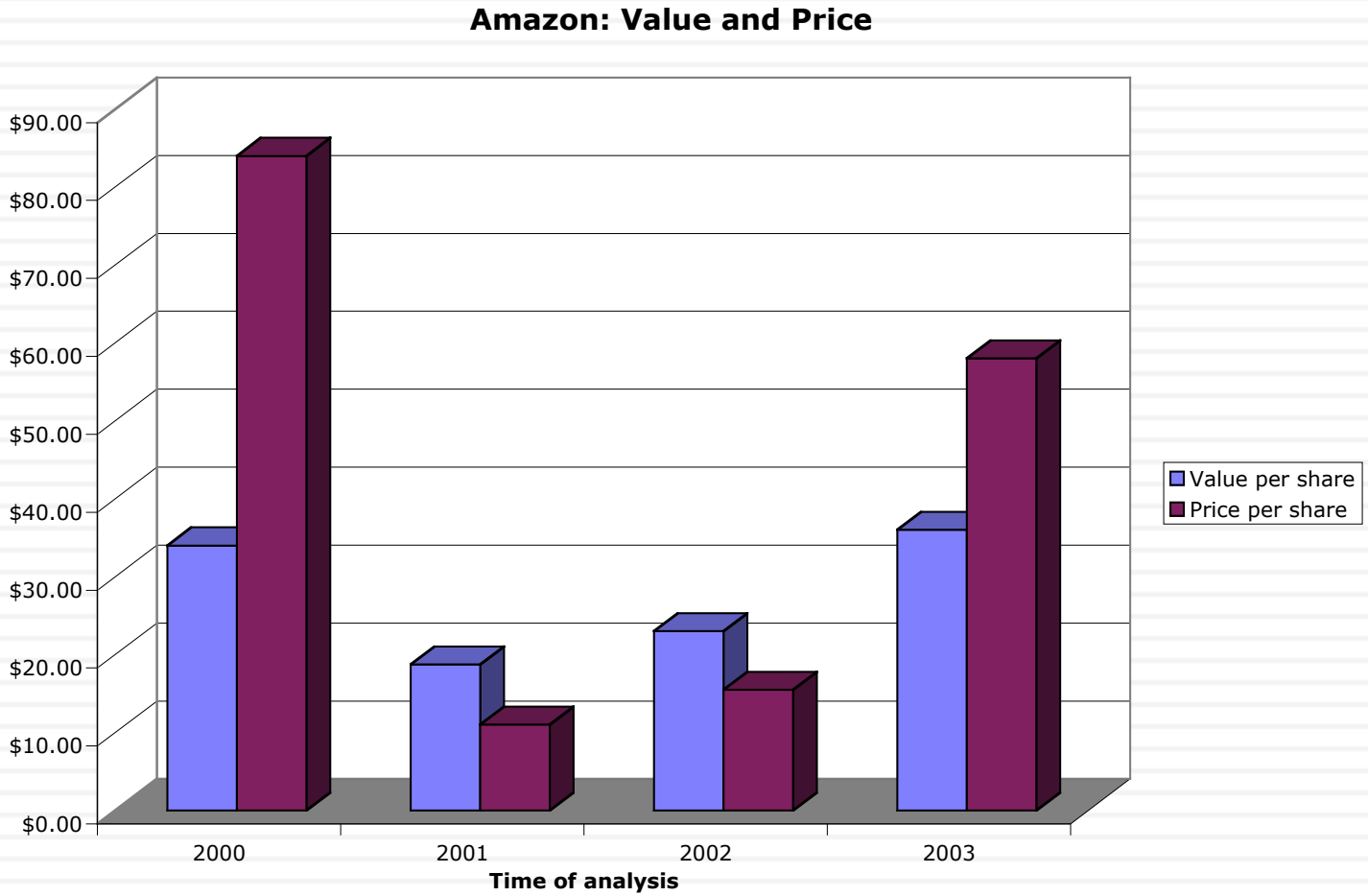


	1	2	3	4	5	6	7	8	9	10
Revenues	$4,314	$6,471	$9,059	$11,777	$14,132	$16,534	$18,849	$20,922	$22,596	$23,726
EBIT	-$545	-$107	$347	$774	$1,123	$1,428	$1,692	$1,914	$2,087	$2,201
EBIT(1-t)	-$545	-$107	$347	$774	$1,017	$928	$1,100	$1,244	$1,356	$1,431
- Reinvestment	$612	$714	$857	$900	$780	$796	$766	$687	$554	$374
FCFF	-$1,157	-$822	-$510	-$126	$237	$132	$333	$558	$802	$1,057

	1	2	3	4	5	6	7	8	9	10
Debt Ratio	27.27%	27.27%	27.27%	27.27%	27.27%	24.81%	24.20%	23.18%	21.13%	15.00%
Beta	2.18	2.18	2.18	2.18	2.18	1.96	1.75	1.53	1.32	1.10
Cost of Equity	13.81%	13.81%	13.81%	13.81%	13.81%	12.95%	12.09%	11.22%	10.36%	9.50%
AT cost of debt	10.00%	10.00%	10.00%	10.00%	9.06%	6.11%	6.01%	5.85%	5.53%	4.55%
Cost of Capital	12.77%	12.77%	12.77%	12.77%	12.52%	11.25%	10.62%	9.98%	9.34%	8.76%

Amazon.com
January 2001
Stock price = $14

To illustrate: Your mistakes versus market mistakes..



10. You can make mistakes, but try to keep bias out..

- When you are wrong on individual company valuations, as you inevitably will be, recognize that while those mistakes may cause the value to be very different from the price for an individual company, the mistakes should average out across companies.
  - Put differently, if you are an investor, you have can make the "law of large numbers" work for you by diversifying across companies, with the degree of diversification increasing as uncertainty increases.
- If you are "biased" on individual company valuations, your mistakes will not average out, no matter how diversified you get.
- **Bottom line: You are better off making large mistakes and being unbiased than making smaller mistakes, with bias.**

VALUE VERSUS PRICE

‹#›

Are you valuing or are you pricing?

Value Process versus Pricing Process

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

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

Accounting Estimates

Valuation Estimates

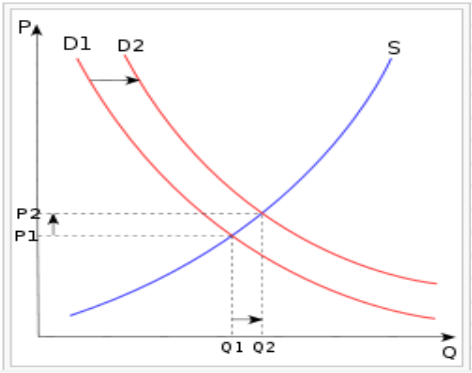
INTRINSIC VALUE

Value

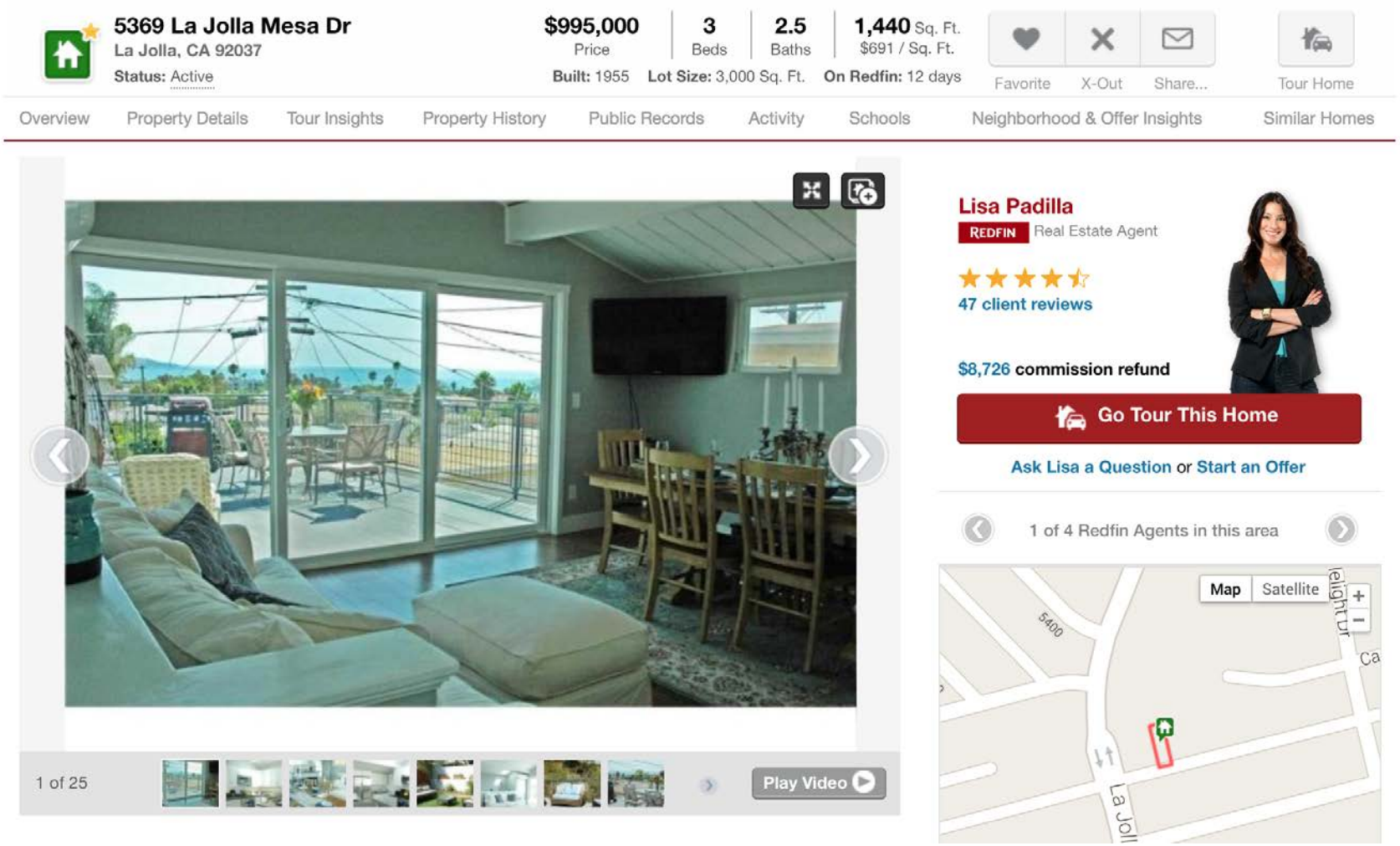
THE GAP
Is there one?
If so, will it close?
If it will close, what will cause it to close?

Price

PRICE



Test 1: Are you pricing or valuing?



Test 2: Are you pricing or valuing?

85

Europe
Switzerland

Biotechnology
Biotechnology

Reuters	Bloomberg	Exchange	Ticker
BION.S	BION SW	SWX	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

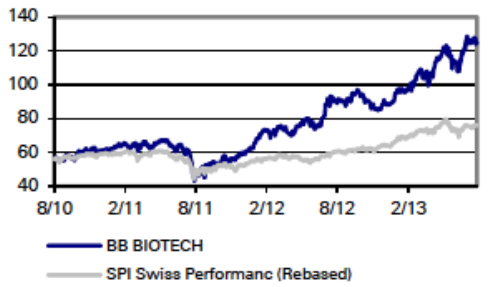
With the re-rating of the pharma sector, investors have also showed increased interest in biotech stocks. Established biotech stocks have delivered encouraging financial results and approvals, while there has also been substantial industry consolidation, which is not surprising in times of "cheap" money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

	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**				

The determinants of price

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

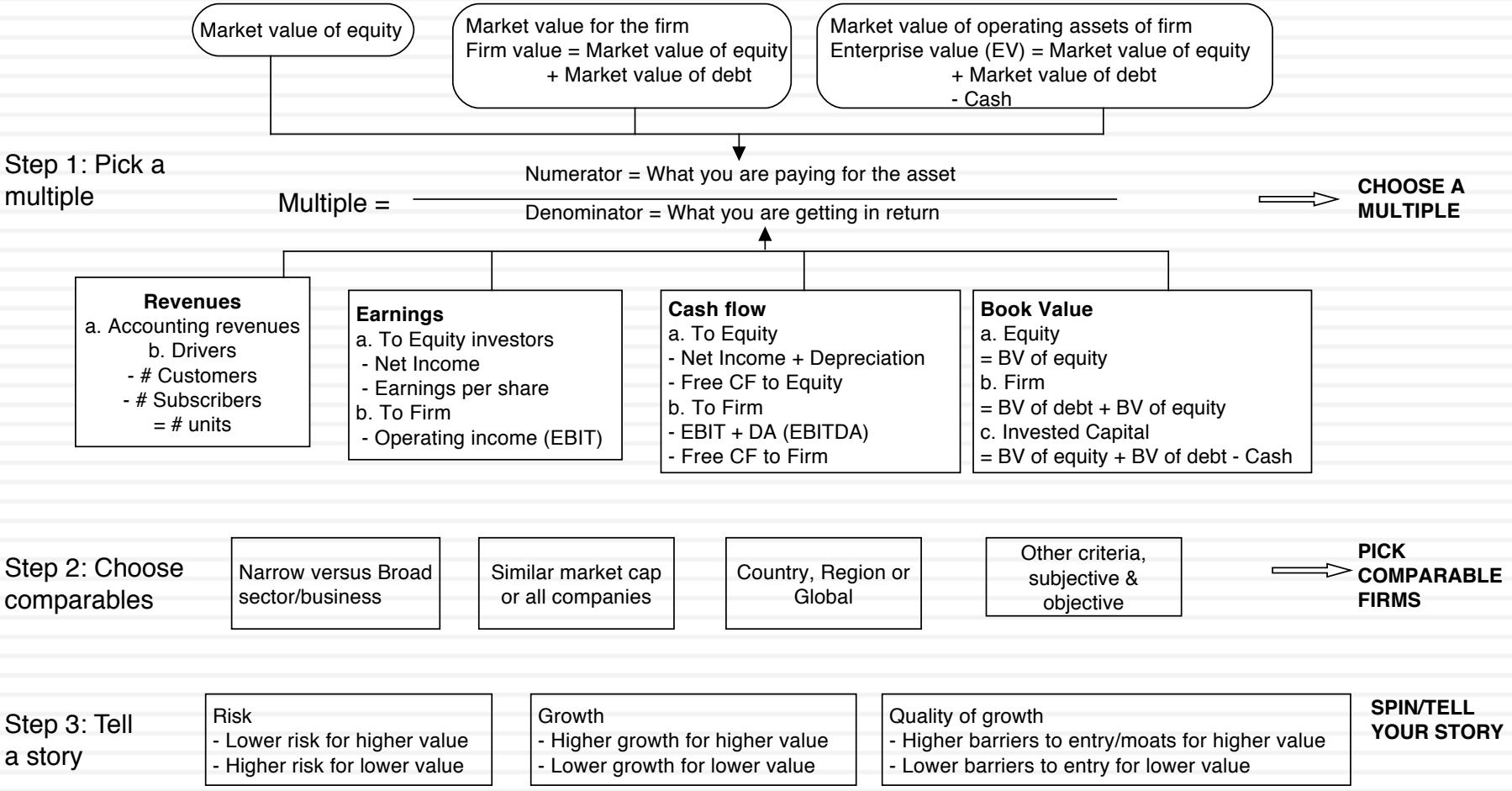
Liquidity & Trading Ease
While the value of an asset may not change much from period to period, liquidity and ease of trading can, and as it does, so will the price.

The Market Price

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

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

Multiples and Comparable Transactions



To be a better Pricer, here are four suggestions..

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

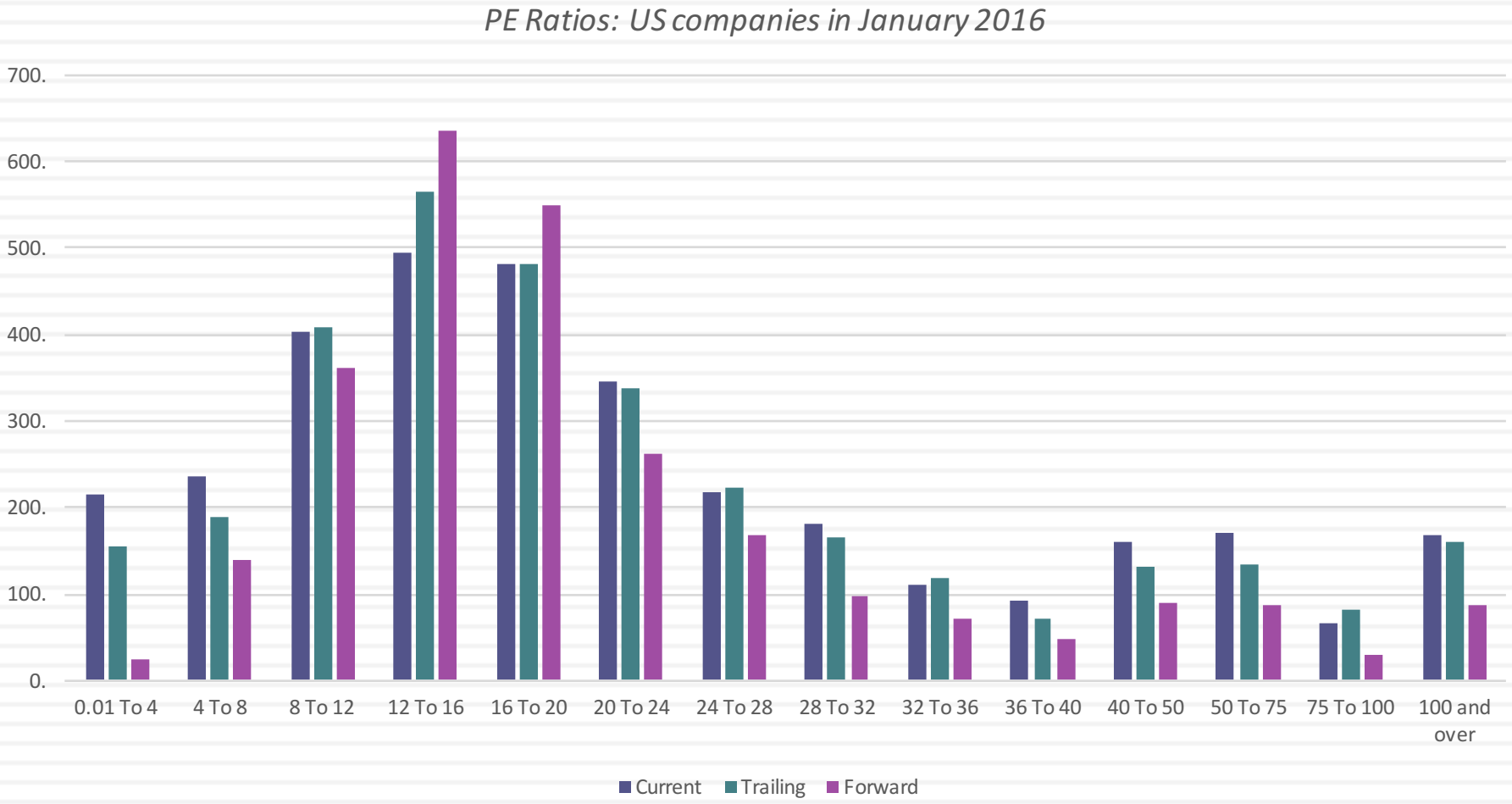
I. Check the Multiple

- Is the multiple consistently defined?
  - The consistency principle: Both the value (the numerator) and the standardizing variable (the denominator) should be to the same claimholders in the firm. In other words, the value of equity should be divided by equity earnings or equity book value, and firm value should be divided by firm earnings or book value.
  - The cost of mismatching: Assets that are not cheap(expensive) will look cheap (expensive), because your mismatch will skew the numbers.
- Is the multiple uniformly estimated?
  - The uniformity rule: The variables used in defining the multiple should be estimated uniformly across assets in the "comparable firm" list.
  - The cost of ignoring this rule: You will be comparing non-comparable numbers and drawing all the wrong conclusions.

II. Play Moneyball: Let the numbers talk (not the analysts)

- What is the average and standard deviation for this multiple, across the universe (market)?
- What is the median for this multiple?
  - The median for this multiple is often a more reliable comparison point.
- How large are the outliers to the distribution, and how do we deal with the outliers?
  - Throwing out the outliers may seem like an obvious solution, but if the outliers all lie on one side of the distribution (they usually are large positive numbers), this can lead to a biased estimate.
- Are there cases where the multiple cannot be estimated? Will ignoring these cases lead to a biased estimate of the multiple?
- How has this multiple changed over time?

a. Multiples have skewed distributions…

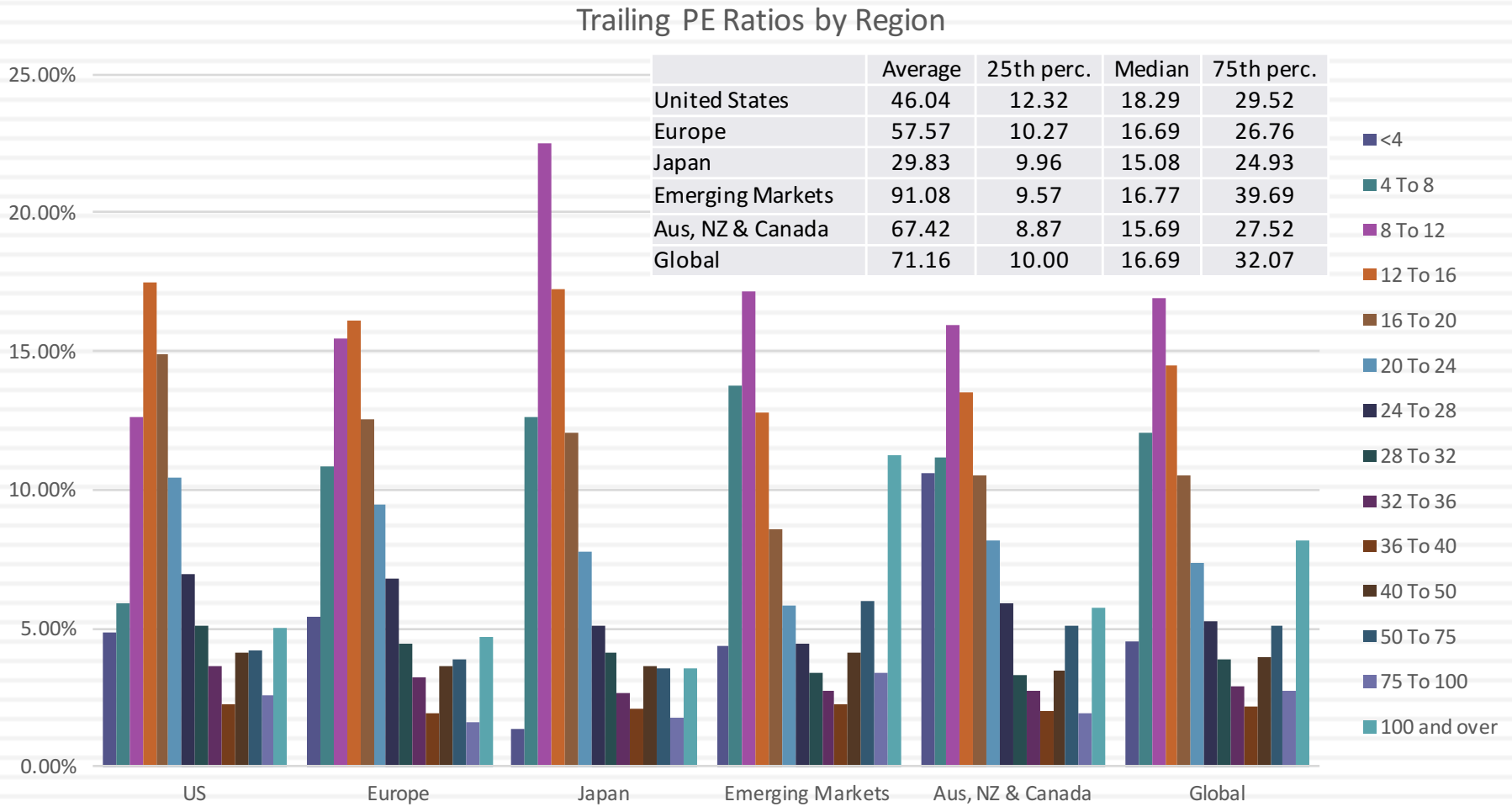


Making statistics "dicey"

	Current PE	Trailing PE	Forward PE
Number of firms	7480	7480	7480
Number with PE	3,344.	3,223.	2,647.
Average	59.42	46.04	29.63
Median	18.53	18.29	16.98
Minimum	0.11	0.28	0.15
Maximum	32,269.00	6,900.00	2,748.00
Standard deviation	777.02	256.06	81.27
Standard error	13.44	4.51	1.58
Skewness	37.27	19.9	18.74
25th percentile	11.88	12.32	13.1
75th percentile	30.25	29.52	24.28

US firms in January 2016

b. Markets have a lot in common



	Average	25th perc.	Median	75th perc.
United States	46.04	12.32	18.29	29.52
Europe	57.57	10.27	16.69	26.76
Japan	29.83	9.96	15.08	24.93
Emerging Markets	91.08	9.57	16.77	39.69
Aus, NZ & Canada	67.42	8.87	15.69	27.52
Global	71.16	10.00	16.69	32.07

III. Understand your "implicit" assumptions

- What are the fundamentals that determine and drive these multiples?
  - Proposition 1: Embedded in every multiple are all of the variables that drive every discounted cash flow valuation - growth, risk and cash flow patterns.
  - In fact, using a simple discounted cash flow model and basic algebra should yield the fundamentals that drive a multiple
- How do changes in these fundamentals change the multiple?
  - The relationship between a fundamental (like growth) and a multiple (such as PE) is seldom linear. For example, if firm A has twice the growth rate of firm B, it will generally not trade at twice its PE ratio
  - Proposition 2: It is impossible to properly compare firms on a multiple, if we do not know the nature of the relationship between fundamentals and the multiple.

PE Ratio: Understanding the Fundamentals

Equity Multiple or Firm Multiple

Equity Multiple

1. Start with an equity DCF model (a dividend or FCFE model)

$$P_0 = \frac{DPS_1}{r - g_n} \qquad P_0 = \frac{FCFE_1}{\text{Cost of equity} - g_n}$$

2. Isolate the denominator of the multiple in the model
3. Do the algebra to arrive at the equation for the multiple

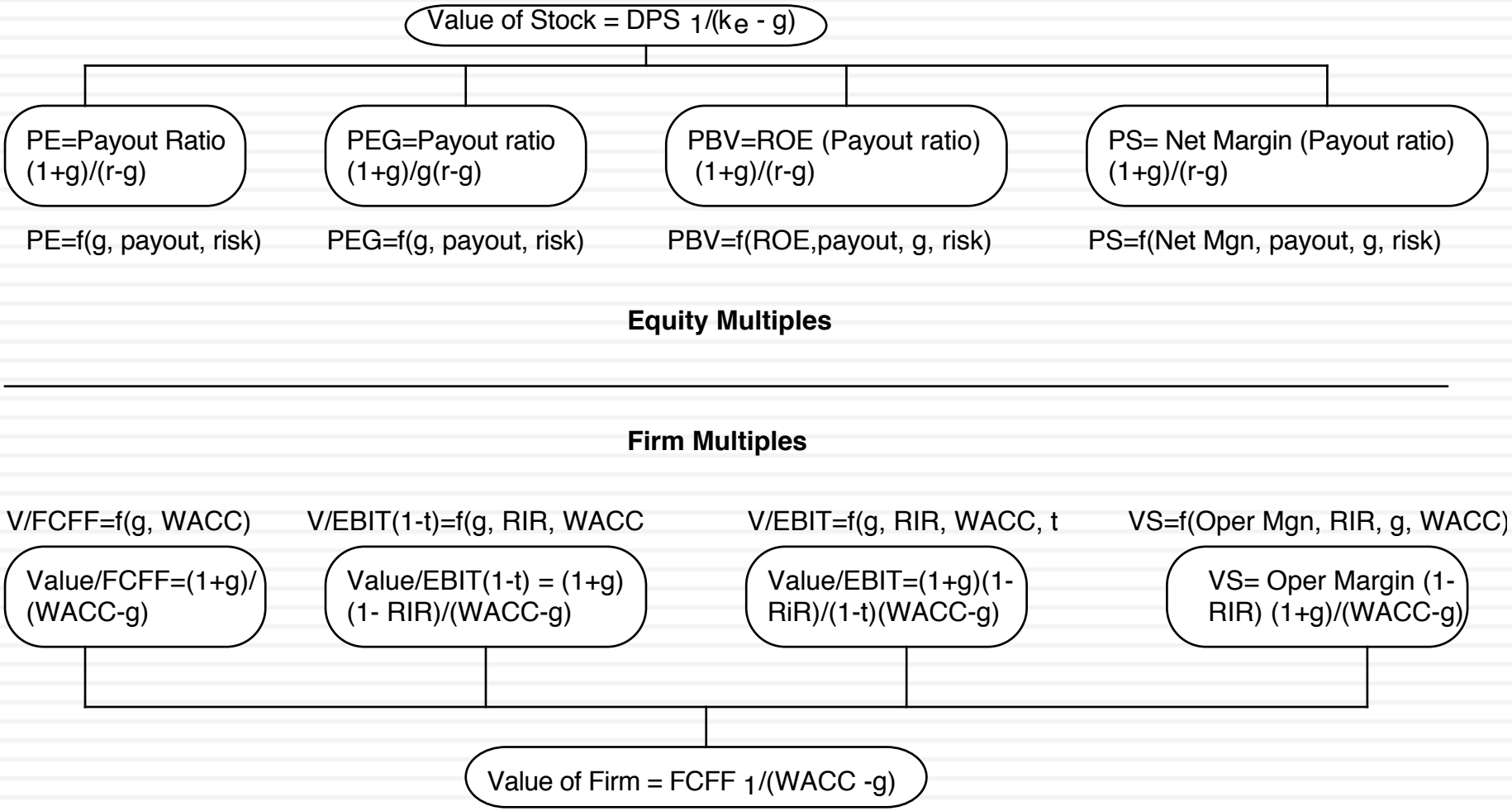
Firm Multiple

1. Start with a firm DCF model (a FCFF model)

$$EV_0 = \frac{FCFF_1}{\text{Cost of capital} - g_n}$$

2. Isolate the denominator of the multiple in the model
3. Do the algebra to arrive at the equation for the multiple

The Determinants of Multiples…



IV. Define "comparable" broadly & control for differences

- Given the firm that we are valuing, what is a "comparable" firm?
  - While traditional analysis is built on the premise that firms in the same sector are comparable firms, valuation theory would suggest that a comparable firm is one which is similar to the one being analyzed in terms of fundamentals.
  - **Proposition: There is no reason why a firm cannot be compared with another firm in a very different business, if the two firms have the same risk, growth and cash flow characteristics.**
- Given the comparable firms, how do we adjust for differences across firms on the fundamentals?
  - **Proposition: It is impossible to find an exactly identical firm to the one you are valuing.**

Pricing Twitter: Start with the "comparables"

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

	Market Cap	Enterprise value	Revenues	EBITDA	Net Income	Number of users (millions)
Market Cap	1.					
Enterprise value	0.9998	1.				
Revenues	0.8933	0.8966	1.			
EBITDA	0.9709	0.9701	0.8869	1.		
Net Income	0.8978	0.8971	0.8466	0.9716	1.	
Number of users (millions)	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?

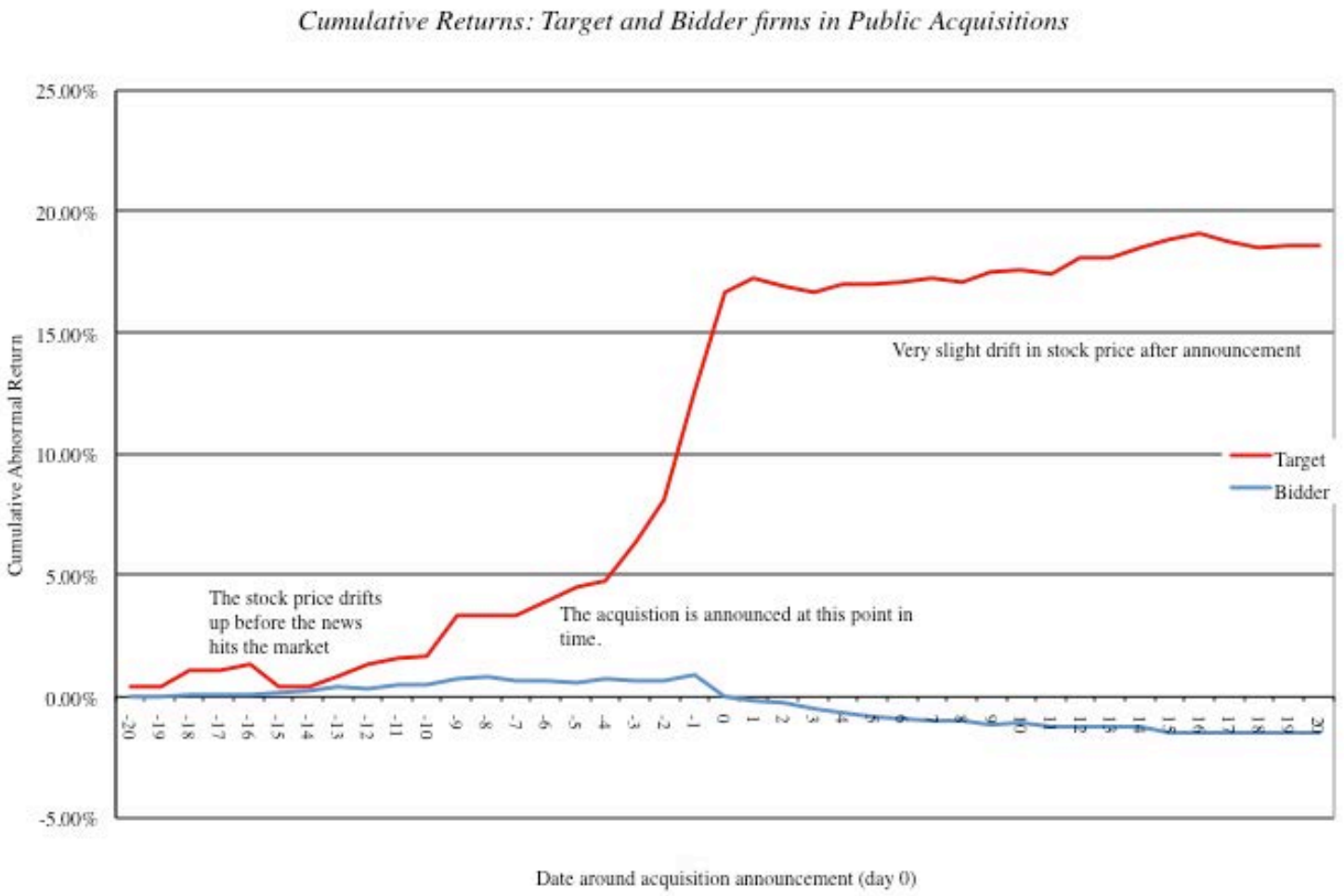
Use the “market metric” and “market price”

- 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

ACQUIRERS' ANONYMOUS: SEVEN STEPS TO SOBRIETY

Aswath Damodaran

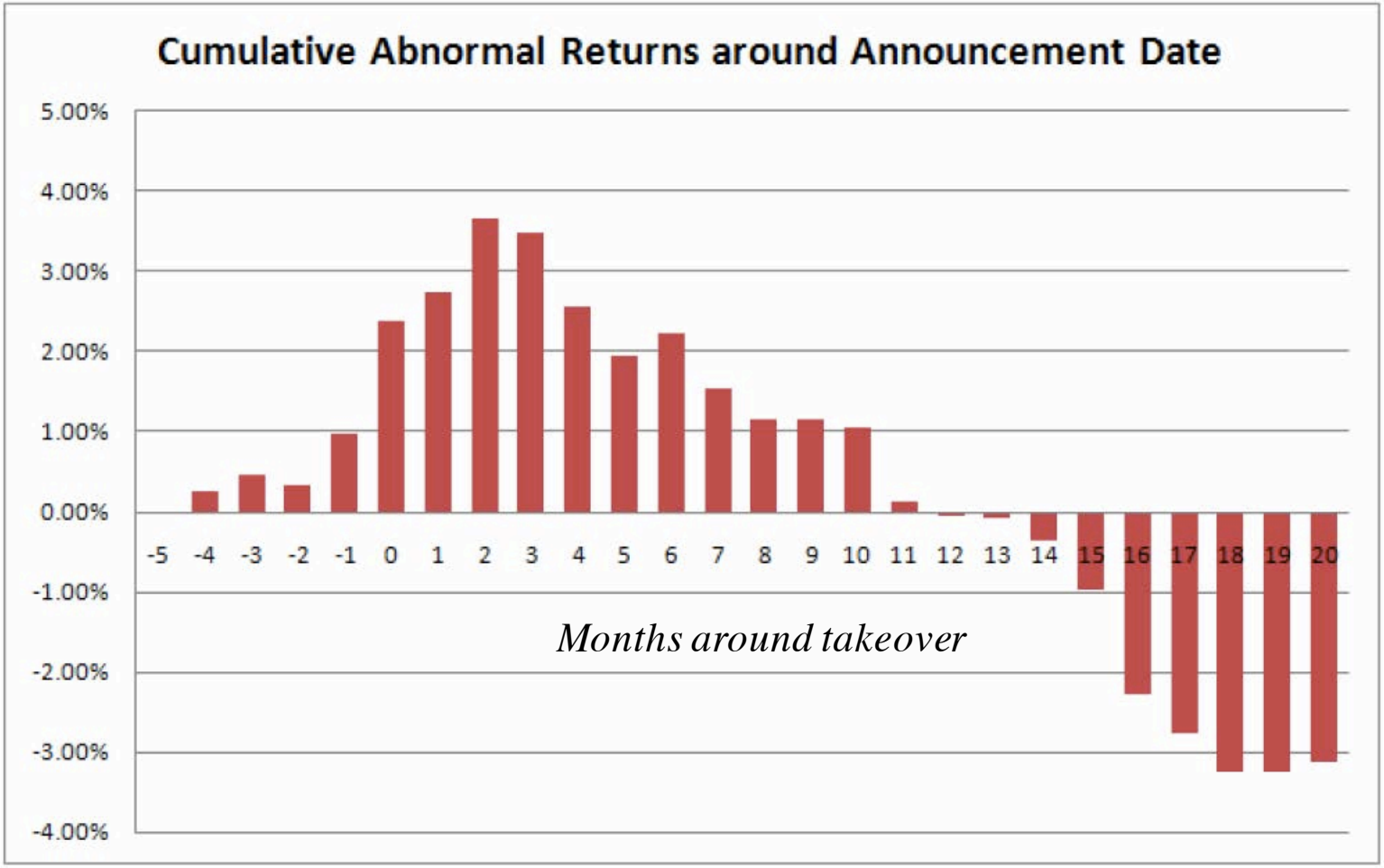
Acquisitions are great for target companies but not always for acquiring company stockholders…



And the long-term follow up is not positive either..

- Managers often argue that the market is unable to see the long term benefits of mergers that they can see at the time of the deal. If they are right, mergers should create long term benefits to acquiring firms.
- The evidence does not support this hypothesis:
  - McKinsey and Co. has examined acquisition programs at companies on
    - Did the return on capital invested in acquisitions exceed the cost of capital?
    - Did the acquisitions help the parent companies outperform the competition?
    - Half of all programs failed one test, and a quarter failed both.
  - Synergy is elusive. KPMG in a more recent study of global acquisitions concludes that most mergers (>80%) fail - the merged companies do worse than their peer group.
  - A large number of acquisitions that are reversed within fairly short time periods. About 20% of the acquisitions made between 1982 and 1986 were divested by 1988. In studies that have tracked acquisitions for longer time periods (ten years or more) the divestiture rate of acquisitions rises to almost 50%.

A scary thought… The disease is spreading… Indian firms acquiring US targets – 1999 - 2005



Growing through acquisitions seems to be a "loser's game"

- Firms that grow through acquisitions have generally had far more trouble creating value than firms that grow through internal investments.
- In general, acquiring firms tend to
  - Pay too much for target firms
  - Over estimate the value of "synergy" and "control"
  - Have a difficult time delivering the promised benefits
- Worse still, there seems to be very little learning built into the process. The same mistakes are made over and over again, often by the same firms with the same advisors.
- Conclusion: There is something structurally wrong with the process for acquisitions which is feeding into the mistakes.

The seven sins in acquisitions…

1. Risk Transference: Attributing acquiring company risk characteristics to the target firm.
2. Debt subsidies: Subsiding target firm stockholders for the strengths of the acquiring firm.
3. Auto-pilot Control: The "20% control premium" and other myth…
4. Elusive Synergy: Misidentifying and mis-valuing synergy.
5. Its all relative: Transaction multiples, exit multiples…
6. Verdict first, trial afterwards: Price first, valuation to follow
7. It's not my fault: Holding no one responsible for delivering results.

Testing sheet

Test	Passed/Failed	Rationalization
Risk transference		
Debt subsidies		
Control premium		
The value of synergy		
Comparables and Exit Multiples		
Bias		
A successful acquisition strategy		

Lets start with a target firm

- The target firm has the following income statement:

Revenues	100
Operating Expenses	80
= Operating Income	20
Taxes	8
= After-tax OI	12

- Assume that this firm will generate this operating income forever (with no growth) and that the cost of equity for this firm is 20%. The firm has no debt outstanding. What is the value of this firm?

Test 1: Risk Transference…

- Assume that as an acquiring firm, you are in a much safer business and have a cost of equity of 10%. What is the value of the target firm to you?

Lesson 1: Don't transfer your risk characteristics to the target firm

- The cost of equity used for an investment should reflect the risk of the investment and not the risk characteristics of the investor who raised the funds.
- Risky businesses cannot become safe just because the buyer of these businesses is in a safe business.

Test 2: Cheap debt?

- Assume as an acquirer that you have access to cheap debt (at 4%) and that you plan to fund half the acquisition with debt. How much would you be willing to pay for the target firm?

Lesson 2: Render unto the target firm..

- As an acquiring firm, it is entirely possible that you can borrow much more than the target firm can on its own and at a much lower rate. If you build these characteristics into the valuation of the target firm, you are essentially transferring wealth from your firm's stockholder to the target firm's stockholders.
- When valuing a target firm, use a cost of capital that reflects the debt capacity and the cost of debt that would apply to the firm.

Test 3: Control Premiums

- Assume that you are now told that it is conventional to pay a 20% premium for control in acquisitions (backed up by Mergerstat). How much would you be willing to pay for the target firm?

- Would your answer change if I told you that you can run the target firm better and that if you do, you will be able to generate a 30% pre-tax operating margin (rather than the 20% margin that is currently being earned).

- What if the target firm were perfectly run?

Lesson 3: Beware of rules of thumb…

- Valuation is cluttered with rules of thumb. After painstakingly valuing a target firm, using your best estimates, you will be often be told that
  - It is common practice to add arbitrary premiums for brand name, quality of management, control etc…
  - These premiums will be often be backed up by data, studies and services. What they will not reveal is the enormous sampling bias in the studies and the standard errors in the estimates.
  - If you have done your valuation right, those premiums should already be incorporated in your estimated value. Paying a premium will be double counting.

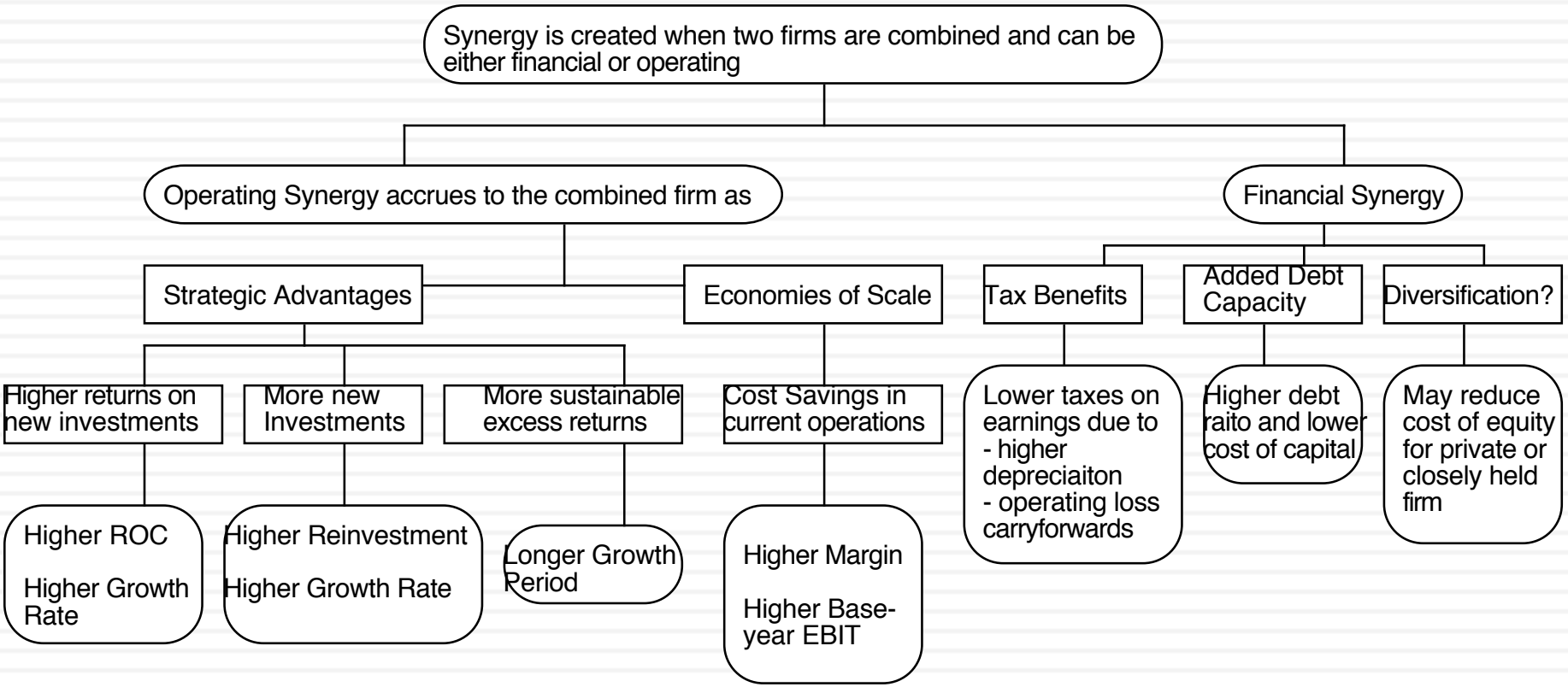
Test 4: Synergy….

- Assume that you are told that the combined firm will be less risky than the two individual firms and that it should have a lower cost of capital (and a higher value). Is this likely?

- Assume now that you are told that there are potential growth and cost savings synergies in the acquisition. Would that increase the value of the target firm?

- Should you pay this as a premium?

The Value of Synergy



Valuing Synergy

(1) the firms involved in the merger are valued independently, by discounting expected cash flows to each firm at the weighted average cost of capital for that firm.

(2) the value of the combined firm, with no synergy, is obtained by adding the values obtained for each firm in the first step.

(3) The effects of synergy are built into expected growth rates and cashflows, and the combined firm is re-valued with synergy.

Value of Synergy = Value of the combined firm, with synergy - Value of the combined firm, without synergy

Lesson 4: Don't pay for buzz words

- Through time, acquirers have always found ways of justifying paying for premiums over estimated value by using buzz words - synergy in the 1980s, strategic considerations in the 1990s and real options in this decade.
- While all of these can have value, the onus should be on those pushing for the acquisitions to show that they do and not on those pushing against them to show that they do not.

Test 5: Comparables and Exit Multiples

- Now assume that you are told that an analysis of other acquisitions reveals that acquirers have been willing to pay 5 times EBIT.. Given that your target firm has EBIT of $ 20 million, would you be willing to pay $ 100 million for the acquisition?

- What if I estimate the terminal value using an exit multiple of 5 times EBIT?

- As an additional input, your investment banker tells you that the acquisition is accretive. (Your PE ratio is 20 whereas the PE ratio of the target is only 10… Therefore, you will get a jump in earnings per share after the acquisition…)

Biased samples = Poor results

- Biased samples yield biased results. Basing what you pay on what other acquirers have paid is a recipe for disaster. After all, we know that acquirer, on average, pay too much for acquisitions. By matching their prices, we risk replicating their mistakes.
- Even when we use the pricing metrics of other firms in the sector, we may be basing the prices we pay on firms that are not truly comparable.
- When we use exit multiples, we are assuming that what the market is paying for comparable companies today is what it will continue to pay in the future.

Lesson 5: Don't be a lemming…

- All too often, acquisitions are justified by using one of the following two arguments:
  - Every one else in your sector is doing acquisitions. You have to do the same to survive.
  - The value of a target firm is based upon what others have paid on acquisitions, which may be much higher than what your estimate of value for the firm is.
- With the right set of comparable firms, you can justify almost any price.
- EPS accretion is a meaningless measure. After all, buying an company with a PE lower than yours will lead mathematically to EPS accretion.

Test 6: The CEO really wants to do this… & everyone else is doing it..

- Now assume that you know that the CEO of the acquiring firm really, really wants to do this acquisition and that the investment bankers on both sides have produced fairness opinions that indicate that the firm is worth $ 100 million. Would you be willing to go along?

- Now assume that you are told that your competitors are all doing acquisitions and that if you don't do them, you will be at a disadvantage? Would you be willing to go along?

Lesson 6: Don't let egos or investment bankers get the better of common sense…

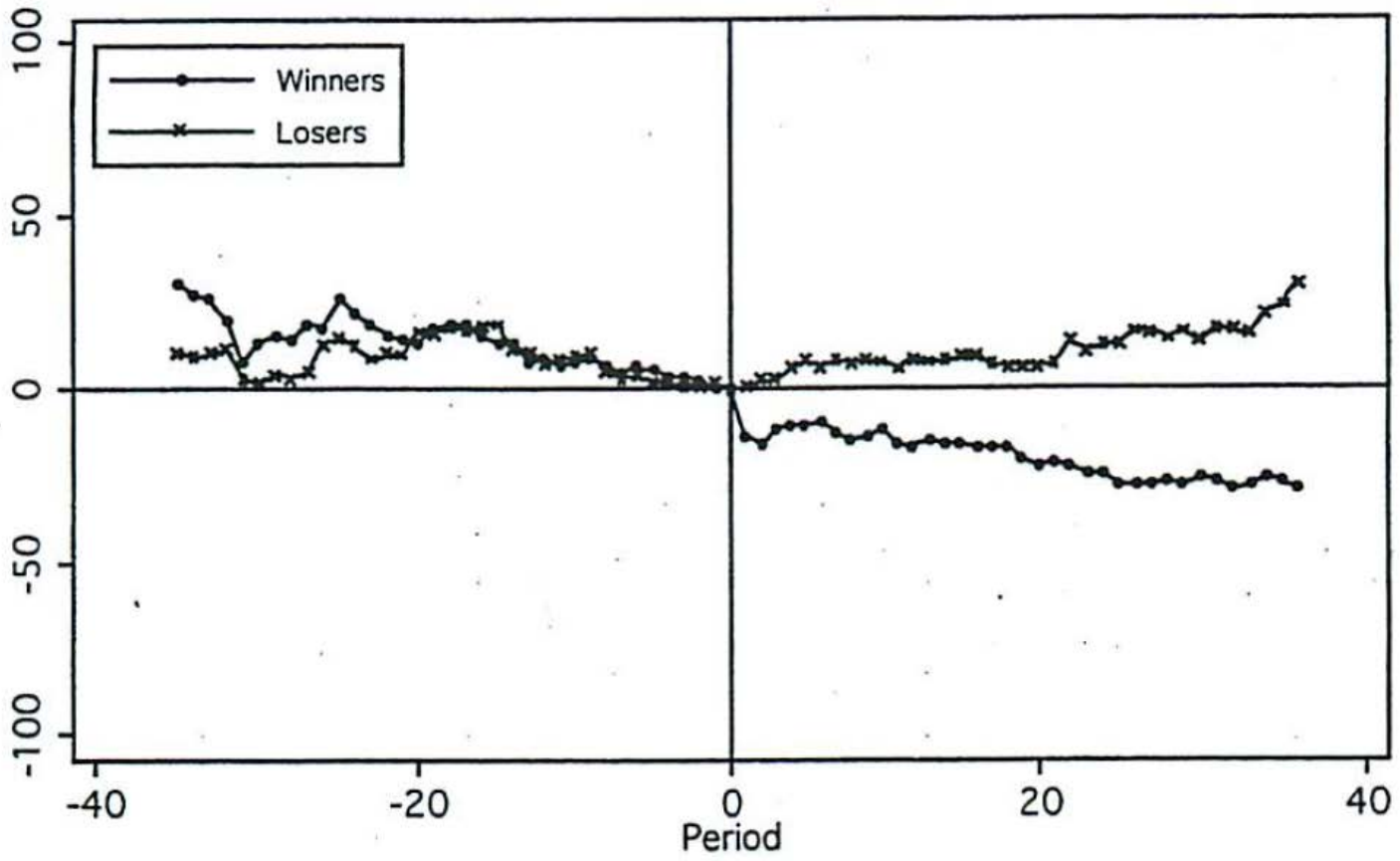
- If you define your objective in a bidding war as winning the auction at any cost, you will win. But beware the winner's curse!
- The premiums paid on acquisitions often have nothing to do with synergy, control or strategic considerations (though they may be provided as the reasons). They may just reflect the egos of the CEOs of the acquiring firms. There is evidence that "over confident" CEOs are more likely to make acquisitions and that they leave a trail across the firms that they run.
- Pre-emptive or defensive acquisitions, where you over pay, either because everyone else is overpaying or because you are afraid that you will be left behind if you don't acquire are dangerous. If the only way you can stay competitive in a business is by making bad investments, it may be best to think about getting out of the business.

Test 7: Is it hopeless?

- The odds seem to be clearly weighted against success in acquisitions. If you were to create a strategy to grow, based upon acquisitions, which of the following offers your best chance of success?

This	Or this
Sole Bidder	Bidding War
Public target	Private target
Pay with cash	Pay with stock
Small target	Large target
Cost synergies	Growth synergies

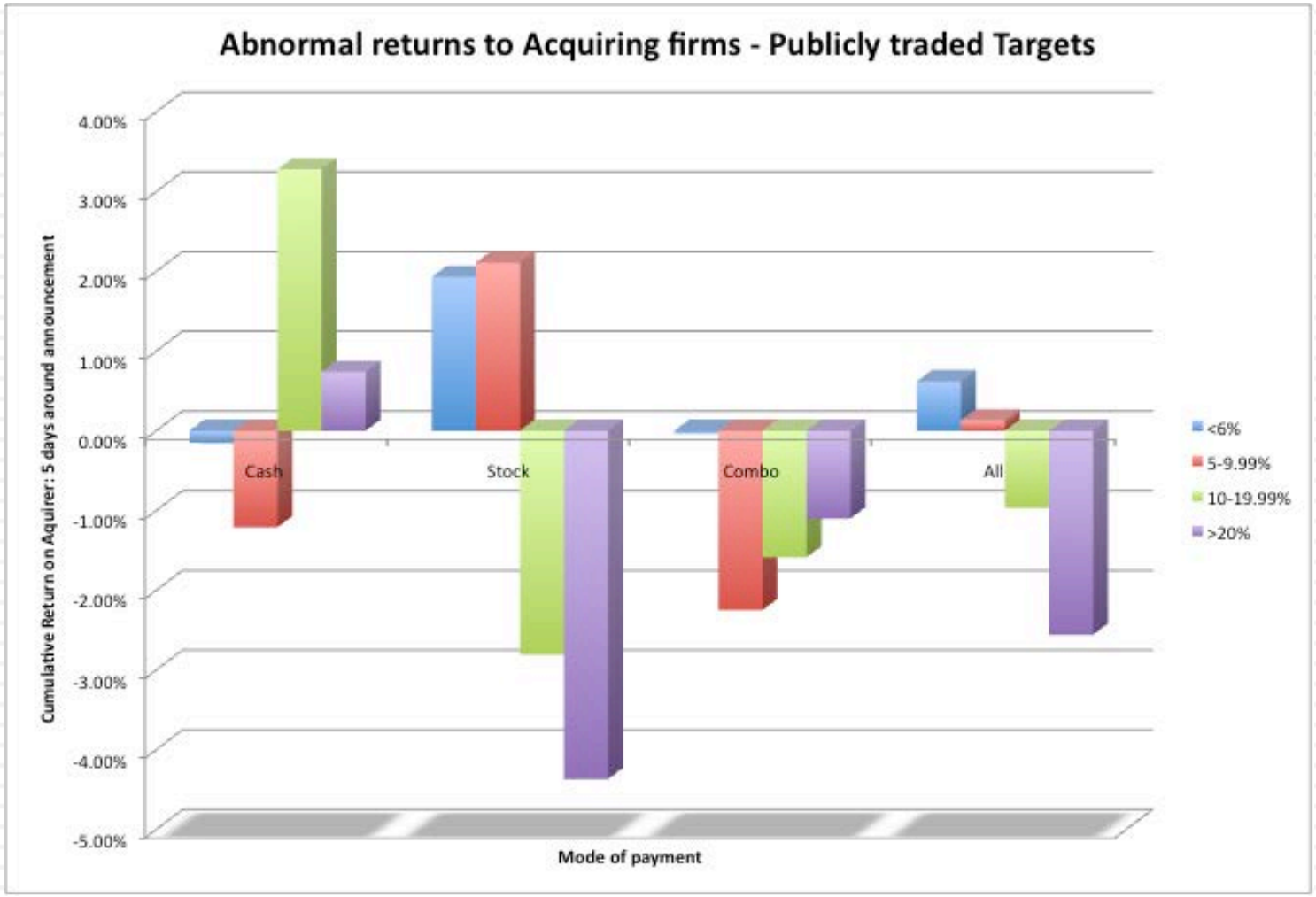
Better to lose a bidding war than to win one…



(a) Market-adjusted CARs

Returns in the 40 months before & after bidding war
Source: Malmendier, Moretti & Peters (2011)

Better off buying small rather than large targets… with cash rather than stock..

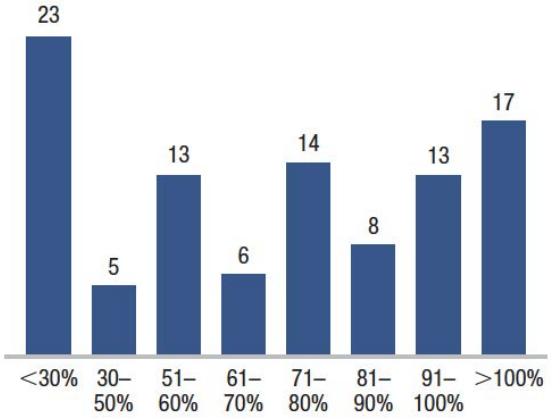


And focusing on private firms and subsidiaries, rather than public firms…

Growth vs Cost Synergies

Top-line trouble: 70 percent of mergers failed to achieve expected revenue synergies

Mergers achieving stated percentage of expected revenue synergies, percent $N = 77$



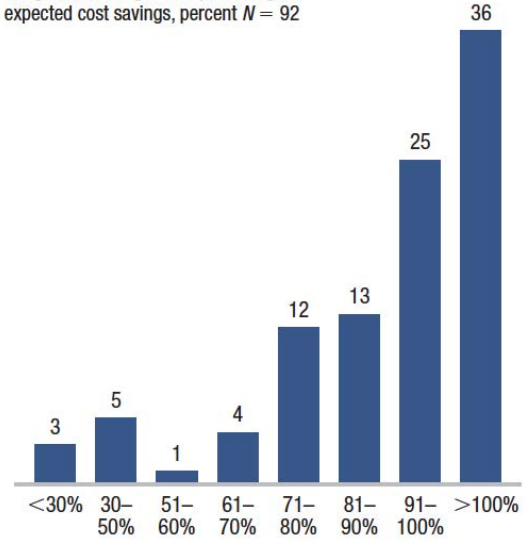
Typical sources of estimation error

- Ignoring or underestimating customer losses (typically 2% to 5%) that result from the integration
- Assuming growth or share targets out of line with overall market growth and competitive dynamics (no "outside view" calibration)

Source: McKinsey (2002) Postmerger Management Practice client survey; client case studies

Cost-synergy estimation is better, but there are patterns emerging in the errors

Mergers achieving stated percentage of expected cost savings, percent $N = 92$



Typical sources of estimation error

- Underestimating one-time costs
- Using benchmarks from noncomparable situations
- Not sanity-checking management estimates against precedent transactions
- Failing to ground estimates in bottom-up analysis (e.g., location-by-location review of overlaps

Source: McKinsey (2002) Postmerger Management Practice client survey; client case studies

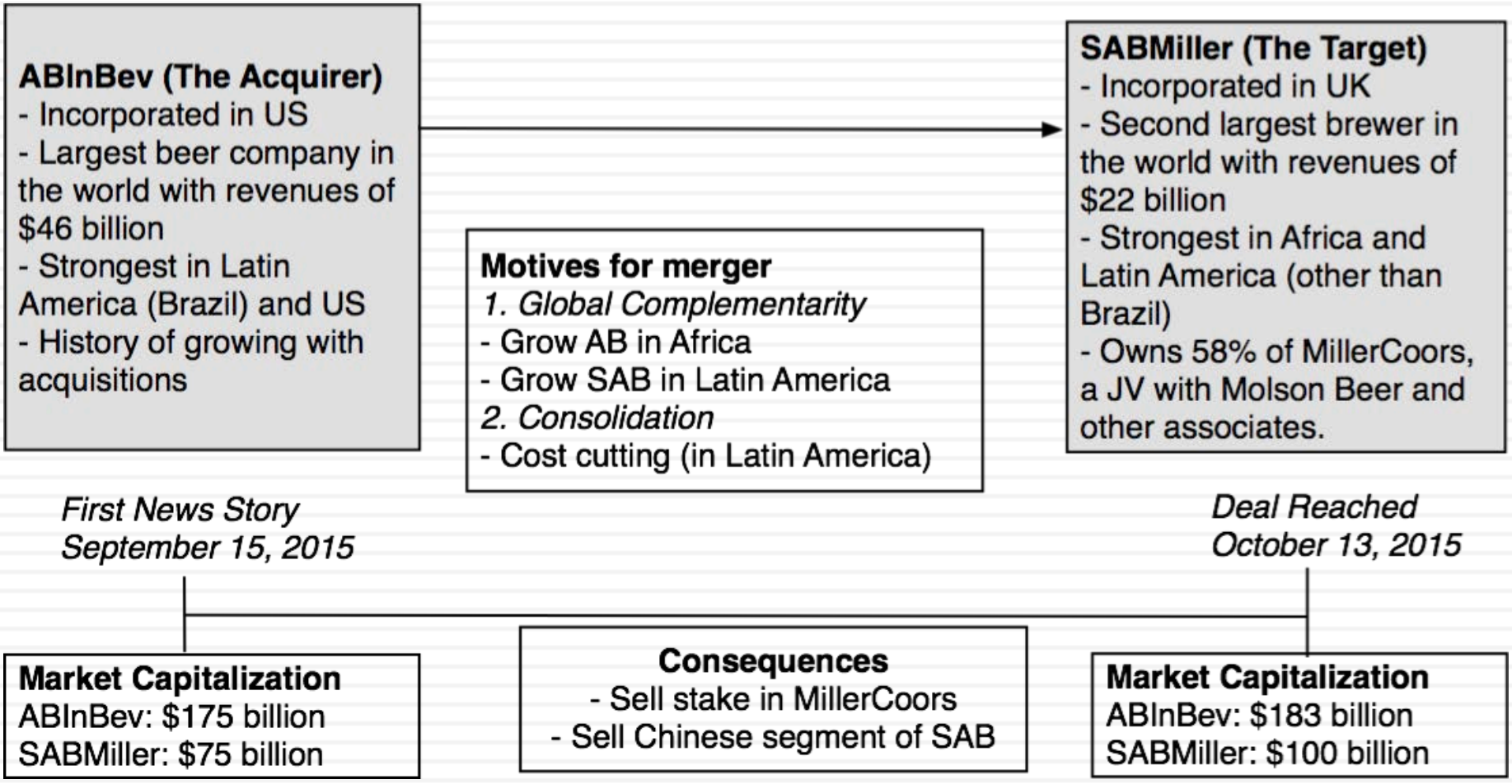
Synergy: Odds of success

- Studies that have focused on synergies have concluded that you are far more likely to deliver cost synergies than growth synergies.
- Synergies that are concrete and planned for at the time of the merger are more likely to be delivered than fuzzy synergies.
- Synergy is much more likely to show up when someone is held responsible for delivering the synergy.
- You are more likely to get a share of the synergy gains in an acquisition when you are a single bidder than if you are one of multiple bidders.

Lesson 7: For acquisitions to create value, you have to stay disciplined..

1. If you have a successful acquisition strategy, stay focused on that strategy. Don't let size or hubris drive you to "expand" the strategy.
2. Realistic plans for delivering synergy and control have to be put in place before the merger is completed. By realistic, we have to mean that the magnitude of the benefits have to be reachable and not pipe dreams and that the time frame should reflect the reality that it takes a while for two organizations to work as one.
3. The best thing to do in a bidding war is to drop out.
4. Someone (preferably the person pushing hardest for the merger) should be held to account for delivering the benefits.
5. The compensation for investment bankers and others involved in the deal should be tied to how well the deal works rather than for getting the deal done.

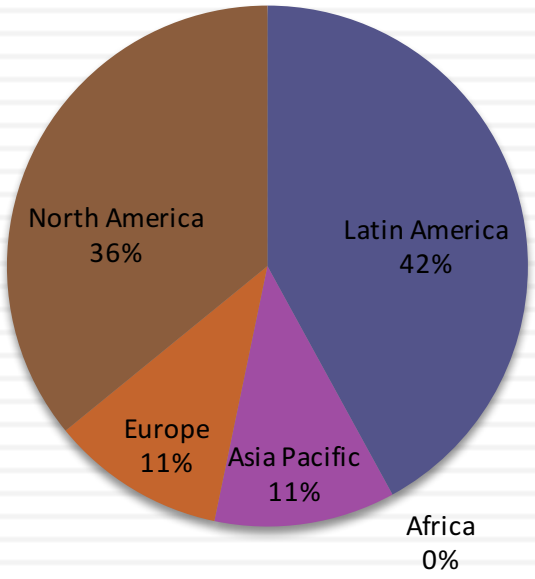
A Really Big Deal!



The Acquirer (ABInBev)

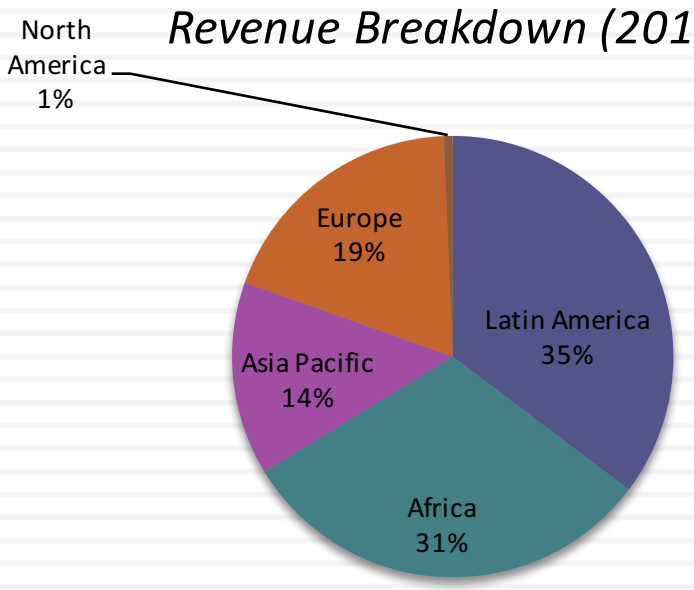
Capital Mix		*Operating Metrics*	
Interest-bearing Debt	$51,504	Revenues	$45,762.00
Lease Debt	$1,511	Operating Income (EBIT)	$14,772.00
Market Capitalization	$173,760	Operating Margin	32.28%
Debt to Equity ratio	30.51%	Effective tax rate	18.00%
Debt to Capital ratio	23.38%	After-tax return on capital	12.10%
Bond Rating	A2	Reinvestment Rate =	50.99%

Revenue Breakdown (2014)



The Target (SABMiller)

Capital Mix		*Operating Metrics*	
Interest-bearing Debt	$12,550	Revenues	$22,130.00
Lease Debt	$368	Operating Income (EBIT)	$4,420.00
Market Capitalization	$75,116	Operating Margin	19.97%
Debt to Equity ratio	17.20%	Effective tax rate	26.40%
Debt to Capital ratio	14.67%	After-tax return on capital	10.32%
Bond Rating	A3	Reinvestment Rate =	16.02%



Setting up the challenge

- SAB Miller's market capitalization was $75 billion on September 15, 2015, the day ABInBev announced its intent to acquire SABMiller.
- The deal was completed (pending regulatory approval) a month later, with ABInBev agreeing to pay $104 billion for SABMiller.
- Can ABInBev create $29 billion in additional value from this acquisition and if so where will it find the value?
  - The market seems to think so, adding $33 billion in market value to the combined company.

The Three (Value) Reasons for Acquisitions

- Undervaluation: You buy a target company because you believe that the market is mispricing the company and that you can buy it for less than its "fair" value.
- Control: You buy a company that you believe is badly managed, with the intent of changing the way it is run. If you are right on the first count and can make the necessary changes, the value of the firm should increase under your management
- Synergy: You buy a company that you believe, when combined with a business (or resource) that you already own, will be able to do things that you could not have done as separate entities. This synergy can be
  - Offensive synergy: Higher growth and increased pricing power
  - Defensive synergy: Cost cutting, consolidation & preempting competitors.
  - Tax synergy: Directly from tax clauses or indirectly through dent

Four numbers to watch

1. Acquisition Price: This is the price at which you can acquire the target company. If it is a private business, it will be negotiated and probably based on what others are paying for similar businesses. If it is a public company, it will be at a premium over the market price.
2. Status Quo Value: Value of the target company, run by existing management.
3. Restructured Value: Value of the target company, with changes to investing, financing and dividend policies.
4. Synergy value: Value of the combined company (with the synergy benefits built in) – (Value of the acquiring company, as a stand alone entity, and the restructured value of the target company)

- The Acid Test
  - Undervaluation: Price for target company < Status Quo Value
  - Control: Price for target company < Restructured Value
  - Synergy: Price for target company < Restructured Value + Value of Synergy

SAB Miller Status Quo Value

	SAB Miller	*+ Coors JV*	*+ Share of Associates*	*SAB Miller Consolidated*
Revenues	$22,130.00	$5,201.00	$6,099.00	
Operating Margin	19.97%	15.38%	10.72%	
Operating Income (EBIT)	$4,420.00	$800.00	$654.00	
Invested Capital	$31,526.00	$5,428.00	$4,459.00	
Beta	0.7977	0.6872	0.6872	
ERP	8.90%	6.00%	7.90%	
Cost of Equity =	9.10%	6.12%	7.43%	
After-tax cost of debt =	2.24%	2.08%	2.24%	
Debt to Capital Ratio	14.67%	0.00%	0.00%	
Cost of capital =	8.09%	6.12%	7.43%	
After-tax return on capital =	10.33%	11.05%	11.00%	
Reinvestment Rate =	16.02%	40.00%	40.00%	
Expected growth rate=	1.65%	4.42%	4.40%	
Number of years of growth	5	5	5	
Value of firm				
PV of FCFF in high growth =	$11,411.72	$1,715.25	$1,351.68	
Terminal value =	$47,711.04	$15,094.36	$9,354.28	
Value of operating assets today =	**$43,747.24**	**$12,929.46**	**$7,889.56**	**$64,566.26**
+ Cash				$1,027.00
- Debt				$12,918.00
- Minority Interests				$1,183.00
Value of equity				**$51,492.26**

Price on September 15, 2015: $75 billion > $51.5 billion

SABMiller: Potential for Control

	SABMiller	*ABInBev*	*Global Alcoholic Beverage Sector*
Pre-tax Operating Margin	19.97%	32.28%	19.23%
Effective Tax Rate	26.36%	18.00%	22.00%
Pre-tax ROIC	14.02%	14.76%	17.16%
ROIC	10.33%	12.10%	13.38%
Reinvestment Rate	16.02%	50.99%	33.29%
Debt to Capital	14.67%	23.38%	18.82%

SABMiller: Value of Control

	Status Quo Value	Optimal value	
Cost of Equity =	9.10%	9.37%	
After-tax cost of debt =	2.24%	2.24%	
Cost of capital =	8.09%	8.03%	
After-tax return on capital =	10.33%	12.64%	
Reinvestment Rate =	16.02%	33.29%	
Expected growth rate=	1.65%	4.21%	
Value of firm			
PV of FCFF in high growth =	$11,411.72	$9,757.08	
Terminal value =	$47,711.04	$56,935.06	
Value of operating assets today =	**$43,747.24**	**$48,449.42**	
+ Cash	$1,027.00	$1,027.00	
+ Minority Holdings	$20,819.02	$20,819.02	
- Debt	$12,918.00	$12,918.00	
- Minority Interests	$1,183.00	$1,183.00	*Value of Control*
Value of equity	**$51,492.26**	**$56,194.44**	**$4,702.17**

Price on September 15, 2015: $75 billion > $51.5 + $4.7 billion

The Synergies?

	Inbev	*SABMiller*	*Combined firm (status quo)*	*Combined firm (synergy)*
Levered Beta	0.85	0.8289	0.84641	0.84641
Pre-tax cost of debt	3.0000%	3.2000%	3.00%	3.00%
Effective tax rate	18.00%	26.36%	19.92%	19.92%
Debt to Equity Ratio	30.51%	23.18%	29.71%	29.71%
Revenues	$45,762.00	$22,130.00	$67,892.00	$67,892.00
Operating Margin	32.28%	19.97%	28.27%	30.00%
Operating Income (EBIT)	$14,771.97	$4,419.36	$19,191.33	$20.368
After-tax return on capital	12.10%	12.64%	11.68%	12.00%
Reinvestment Rate =	50.99%	33.29%	43.58%	50.00%
Expected Growth Rate	6.17%	4.21%	5.09%	6.00%

The value of synergy

	Inbev	*SABMiller*	*Combined firm (status quo)*	*Combined firm (synergy)*
Cost of Equity =	8.93%	9.37%	9.12%	9.12%
After-tax cost of debt =	2.10%	2.24%	2.10%	2.10%
Cost of capital =	7.33%	8.03%	7.51%	7.51%
After-tax return on capital =	12.10%	12.64%	11.68%	12.00%
Reinvestment Rate =	50.99%	33.29%	43.58%	50.00%
Expected growth rate=	6.17%	4.21%	5.09%	6.00%
Value of firm				
PV of FCFF in high growth =	$28,733	$9,806	$38,539	$39,151
Terminal value =	$260,982	$58,736	$319,717	$340,175
Value of operating assets =	$211,953	$50,065	$262,018	$276,610

Value of synergy = 276,610 – 262,018 = 14,592 million

Passing Judgment

- If you add up the restructured firm value of $56.2 billion to the synergy value of $14.6 billion, you get a value of about $70.8 billion.
- That is well below the $104 billion that ABInBev is planning to pay for SABMiller.
- One of the following has to be true:
  - I have massively under estimated the potential for synergy in this merger (either in terms of higher margins or higher growth).
  - ABInBev has over paid significantly on this deal. That would go against their history as a good acquirer and against the history of 3G Capital as a good steward of capital.

Follow the yellow brick road..