MY VALUATION JOURNEY: HAVE FAITH, YOU MUST!

May 2016

Aswath Damodaran

I. Don't mistake accounting for finance

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

Assets are recorded at original cost, adjusted for depreciation.

The Balance Sheet

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

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

Equity reflects original capital invested and historical retained earnings.

The financial balance sheet

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

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

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

Intrinsic value of equity, reflecting intrinsic value of assets, net of true value of debt outstanding.
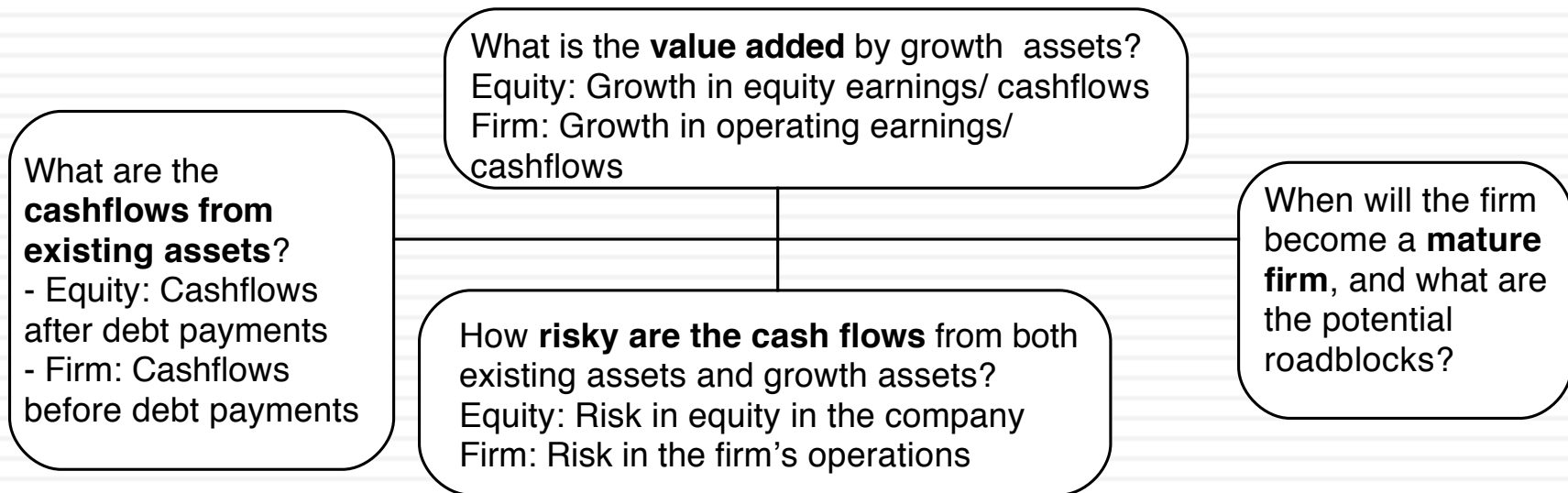
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II. Don't assume that D+CF = DCF

□ 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:

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

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..

What is the **value added** by growth assets?
Equity: Growth in equity earnings/ cashflows
Firm: Growth in operating earnings/ cashflows

What are the
cashflows from existing assets?
- Equity: Cashflows after debt payments
- Firm: Cashflows before debt payments

How **risky are the cash flows** from both existing assets and growth assets?
Equity: Risk in equity in the company
Firm: Risk in the firm's operations

When will the firm become a **mature firm**, and what are the potential roadblocks?

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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.

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.

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

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.

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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).

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2. Discount rates

Expected Return on a Risky Investment = Cost of Equity

=

Risk free Rate		**Beta**		**Equity Risk Premium**
Rate of return on a long term, default free bond.	**+**	Relative measure of risk added to a diversified portfolio.	**X**	Premium investors demand over and above the risk free rate for investing in equities as a class.

Will vary across currencies and across time.

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

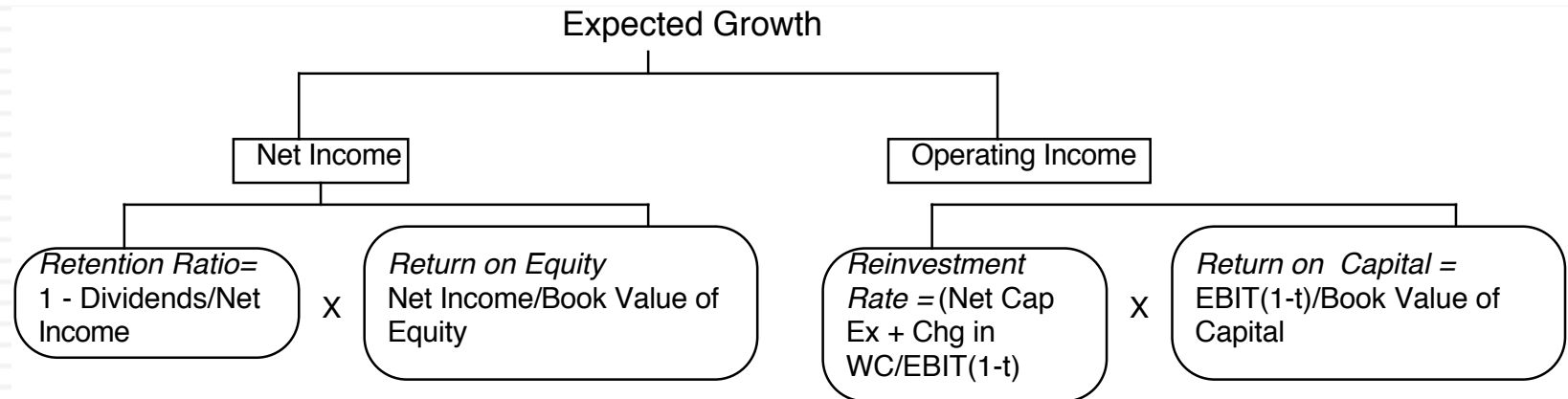*Function of the countries that you do business in and how much value you derive from each country.*

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3. Expected Growth

Expected Growth

Net Income   Operating Income

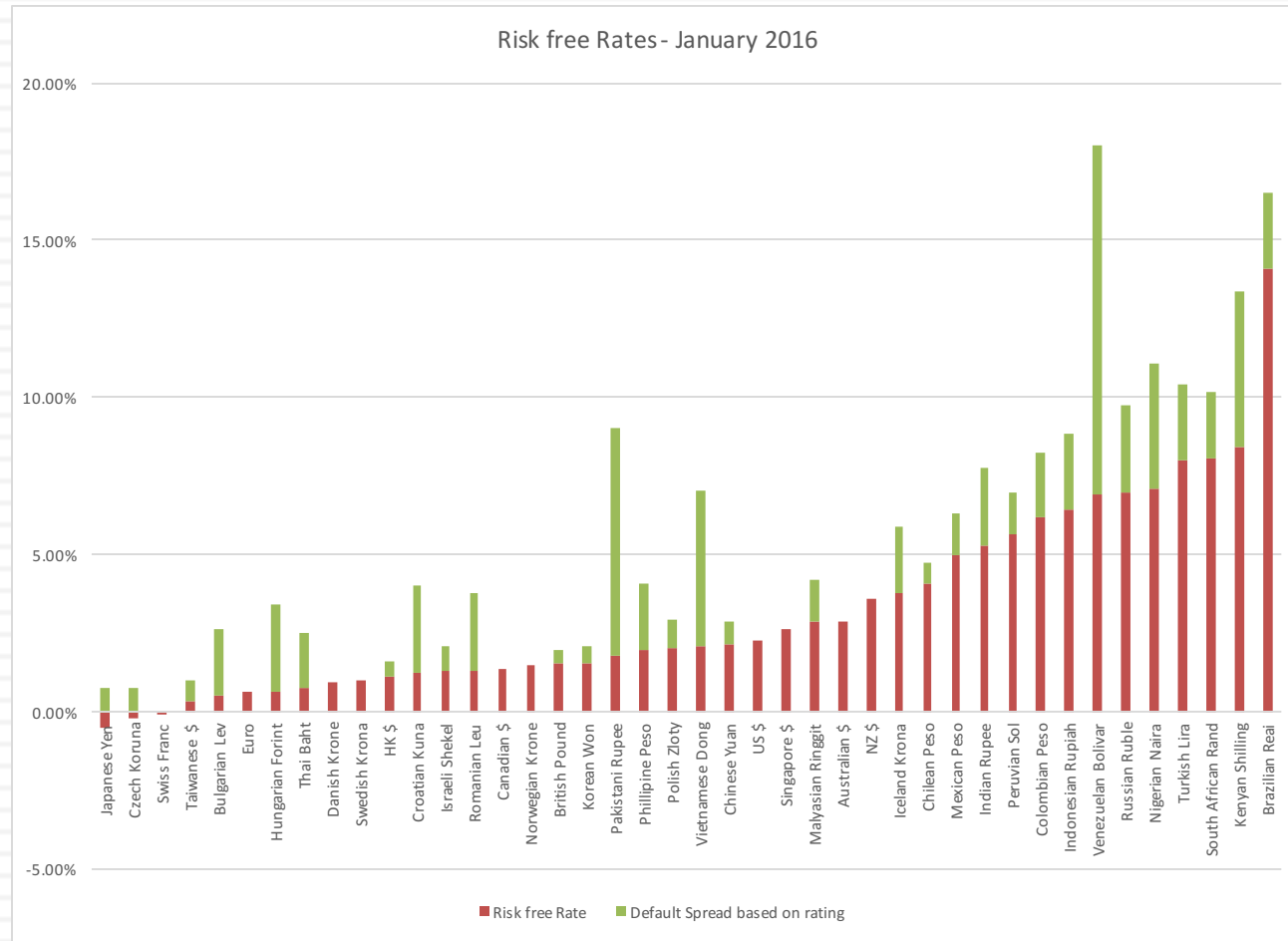| *Retention Ratio=* 1 - Dividends/Net Income | X | *Return on Equity* Net Income/Book Value of Equity | | *Reinvestment Rate =* (Net Cap Ex + Chg in WC/EBIT(1-t) | X | *Return on Capital =* EBIT(1-t)/Book Value of Capital |

- 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.
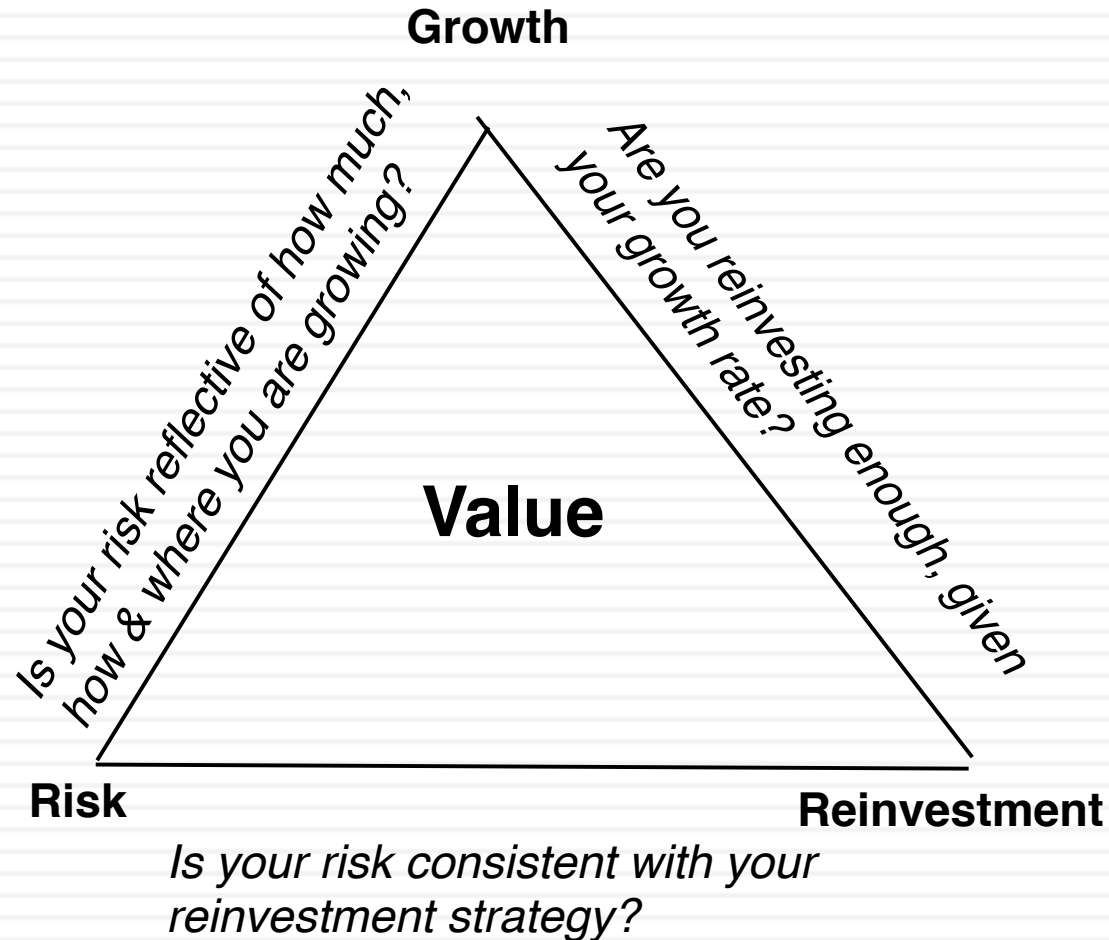
4. The Terminal Value

Move towards a marginal tax rate

Are you reinvesting enough to sustain your stable growth rate?
Reinv Rate = g/ ROC
Is the ROC that of a stable company?

$$\text{Terminal Value}_n = \frac{EBIT_{n+1} \ (1 - \text{tax rate}) \ (1 - \text{Reinvestment Rate})}{\text{Cost of capital - Expected growth rate}}$$

This is a mature company. Its cost of capital should reflect that.

This growth rate should be less than the nomInal growth rate of the economy

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

Risk free Rates - January 2016

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Caveat 2. Don't let your inputs be at war with each other..

Growth

Is your risk reflective of how much, how & where you are growing?

Are you reinvesting enough, given your growth rate?

Value

Risk

Reinvestment

Is your risk consistent with your reinvestment strategy?

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And consider the trade offs..

Excess Return Distribution - Global in January 2016

55% of 41,889 companies globally earned less than their cost of capiital

Region	Cost of capital	ROIC	ROIC - Cost of Capital
Africa and Middle East	9.16%	5.49%	-3.67%
Australia & NZ	7.89%	3.87%	-4.02%
Canada	8.38%	3.70%	-4.69%
China	8.66%	4.36%	-4.31%
Eastern Europe & Russia	11.12%	7.39%	-3.73%
EU & Environs	9.15%	4.38%	-4.77%
India	9.84%	9.40%	-0.44%
Japan	8.62%	4.52%	-4.10%
Latin America & Caribbean	10.38%	5.88%	-4.51%
Small Asia	10.13%	4.88%	-5.25%
UK	8.34%	4.36%	-3.98%
United States	7.57%	6.27%	-1.30%
Grand Total	8.94%	5.12%	-3.82%

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Caveat 3. Globalization is not a buzz word

□ As companies get globalized, the valuations that we do have to reflect that globalization. In particular, we need to be wary of

- ❑ Currency mismatches: Multinationals derive their revenues in many currencies but you have to be currency-consistent.

- ❑ Beta gaming: When a company is listed in many markets, you can get very different betas, depending on how you set up and run a beta regression

- ❑ Equity Risk Premiums: The standard practice of estimating equity risk premiums based on your country of incorporation will lead to skewed valuations.

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ERP : Jan 2016

Western Europe

Country	ERP	CRP	Country	ERP	CRP
Andorra	9.28%	3.28%	Jersey (States of)	6.59%	0.59%
Austria	6.00%	0.00%	Liechtenstein	6.00%	0.00%
Belgium	6.90%	0.90%	Luxembourg	6.00%	0.00%
Cyprus	12.71%	6.71%	Malta	7.79%	1.79%
Denmark	6.00%	0.00%	Netherlands	6.00%	0.00%
Finland	6.00%	0.00%	Norway	6.00%	0.00%
France	6.74%	0.74%	Portugal	9.72%	3.72%
Germany	6.00%	0.00%	Spain	8.84%	2.84%
Greece	20.90%	14.90%	Sweden	6.00%	0.00%
Guernsey	6.59%	0.59%	Switzerland	6.00%	0.00%
Iceland	8.84%	2.84%	Turkey	9.28%	3.28%
Ireland	8.38%	2.38%	United Kingdom	6.59%	0.59%
Isle of Man	6.59%	0.59%	**Western Europe**	**7.16%**	**1.16%**
Italy	8.84%	2.84%			

North America

Country	ERP	CRP
Canada	6.00%	0.00%
US	6.00%	0.00%
North America	**6.00%**	**0.00%**

Caribbean	**14.61%**	**8.61%**

Latin America

Country	ERP	CRP
Argentina	17.17%	11.17%
Belize	19.42%	13.42%
Bolivia	11.37%	5.37%
Brazil	9.28%	3.28%
Chile	6.90%	0.90%
Colombia	8.84%	2.84%
Costa Rica	9.72%	3.72%
Ecuador	15.70%	9.70%
El Salvador	11.37%	5.37%
Guatemala	9.72%	3.72%
Honduras	15.70%	9.70%
Mexico	7.79%	1.79%
Nicaragua	14.20%	8.20%
Panama	8.84%	2.84%
Paraguay	9.72%	3.72%
Peru	7.79%	1.79%
Suriname	11.37%	5.37%
Uruguay	8.84%	2.84%
Venezuela	20.90%	14.90%
Latin America	**10.42%**	**4.42%**

Africa

Country	ERP	CRP
Angola	10.48%	4.48%
Botswana	7.26%	1.26%
Burkina Faso	15.70%	9.70%
Cameroon	14.20%	8.20%
Cape Verde	14.20%	8.20%
Congo (DR	15.70%	9.70%
Congo (Republic)	11.37%	5.37%
Côte d'Ivoire	11.37%	5.37%
Egypt	15.70%	9.70%
Ethiopia	12.71%	6.71%
Gabon	11.37%	5.37%
Ghana	15.70%	9.70%
Kenya	12.71%	6.71%
Morocco	9.72%	3.72%
Mozambique	14.20%	8.20%
Namibia	9.28%	3.28%
Nigeria	11.37%	5.37%
Rwanda	12.71%	6.71%
Senegal	12.71%	6.71%
South Africa	8.84%	2.84%
Tunisia	11.37%	5.37%
Uganda	12.71%	6.71%
Zambia	14.20%	8.20%
Africa	**11.76%**	**5.76%**

Eastern Europe & Russia

Country	ERP	CRP
Albania	12.71%	6.71%
Armenia	11.37%	5.37%
Azerbaijan	9.28%	3.28%
Belarus	17.17%	11.17%
Bosnia	15.70%	9.70%
Bulgaria	8.84%	2.84%
Croatia	9.72%	3.72%
Czech Republic	7.05%	1.05%
Estonia	7.05%	1.05%
Georgia	11.37%	5.37%
Hungary	9.72%	3.72%
Kazakhstan	8.84%	2.84%
Latvia	7.79%	1.79%
Lithuania	7.79%	1.79%
Macedonia	11.37%	5.37%
Moldova	15.70%	9.70%
Montenegro	11.37%	5.37%
Poland	7.26%	1.26%
Romania	9.28%	3.28%
Russia	9.72%	3.72%
Serbia	12.71%	6.71%
Slovakia	7.26%	1.26%
Slovenia	9.28%	3.28%
Ukraine	20.90%	14.90%
Eastern Europe & Russia	**9.65%**	**3.65%**

Middle East

Country	ERP	CRP
Abu Dhabi	6.74%	0.74%
Bahrain	9.28%	3.28%
Israel	7.05%	1.05%
Jordan	12.71%	6.71%
Kuwait	6.74%	0.74%
Lebanon	14.20%	8.20%
Oman	7.05%	1.05%
Qatar	6.74%	0.74%
Ras Al Khaimah	7.26%	1.26%
Saudi Arabia	6.90%	0.90%
Sharjah	7.79%	1.79%
United Arab Emirates	6.74%	0.74%
Middle East	**7.11%**	**1.11%**

Frontier Markets (not rated)

Country				Country			
Algeria	63.0	12.71%	6.71%	Malawi	57.0	17.17%	11.17%
Brunei	72.8	8.84%	2.84%	Mali	62.5	12.71%	6.71%
Gambia	62.0	14.20%	8.20%	Myanmar	63.3	12.71%	6.71%
Guinea	53.8	17.17%	11.17%	Niger	51.0	17.17%	11.17%
Guinea-Bissau	62.3	12.71%	6.71%	Sierra Leone	56.5	17.17%	11.17%
Guyana	63.5	12.71%	6.71%	Somalia	42.5	20.90%	14.90%
Haiti	57.0	17.17%	11.17%	Sudan	48.3	20.90%	14.90%
Iran	67.8	10.48%	4.48%	Syria	35.8	25.00%	19.00%
Iraq	56.0	17.17%	11.17%	Tanzania	63.0	12.71%	6.71%
Korea, D.P.R.	56.0	17.17%	11.17%	Togo	63.8	12.71%	6.71%
Liberia	50.5	17.17%	11.17%	Yemen, Republic	50.3	17.17%	11.17%
Libya	52.8	17.17%	11.17%	Zimbabwe	54.5	17.17%	11.17%
Madagascar	61.3	14.20%	8.20%				

Asia

Country	ERP	CRP
Bangladesh	11.37%	5.37%
Cambodia	14.20%	8.20%
China	6.90%	0.90%
Fiji	12.71%	6.71%
Hong Kong	6.59%	0.59%
India	9.28%	3.28%
Indonesia	9.28%	3.28%
Japan	7.05%	1.05%
Korea	6.74%	0.74%
Macao	6.74%	0.74%
Malaysia	7.79%	1.79%
Mauritius	8.38%	2.38%
Mongolia	14.20%	8.20%
Pakistan	15.70%	9.70%
Papua New Guine	12.71%	6.71%
Philippines	8.84%	2.84%
Singapore	6.00%	0.00%
Sri Lanka	12.71%	6.71%
Taiwan	6.90%	0.90%
Thailand	8.38%	2.38%
Vietnam	12.71%	6.71%
Asia	**7.49%**	**1.49%**

Australia & NZ

Country	ERP	CRP
Australia	6.00%	0.00%
Cook Islands	12.71%	6.71%
New Zealand	6.00%	0.00%
Australia & NZ	**6.00%**	**0.00%**

Black #: Total ERP
Red #: Country risk premium
AVG: GDP weighted average

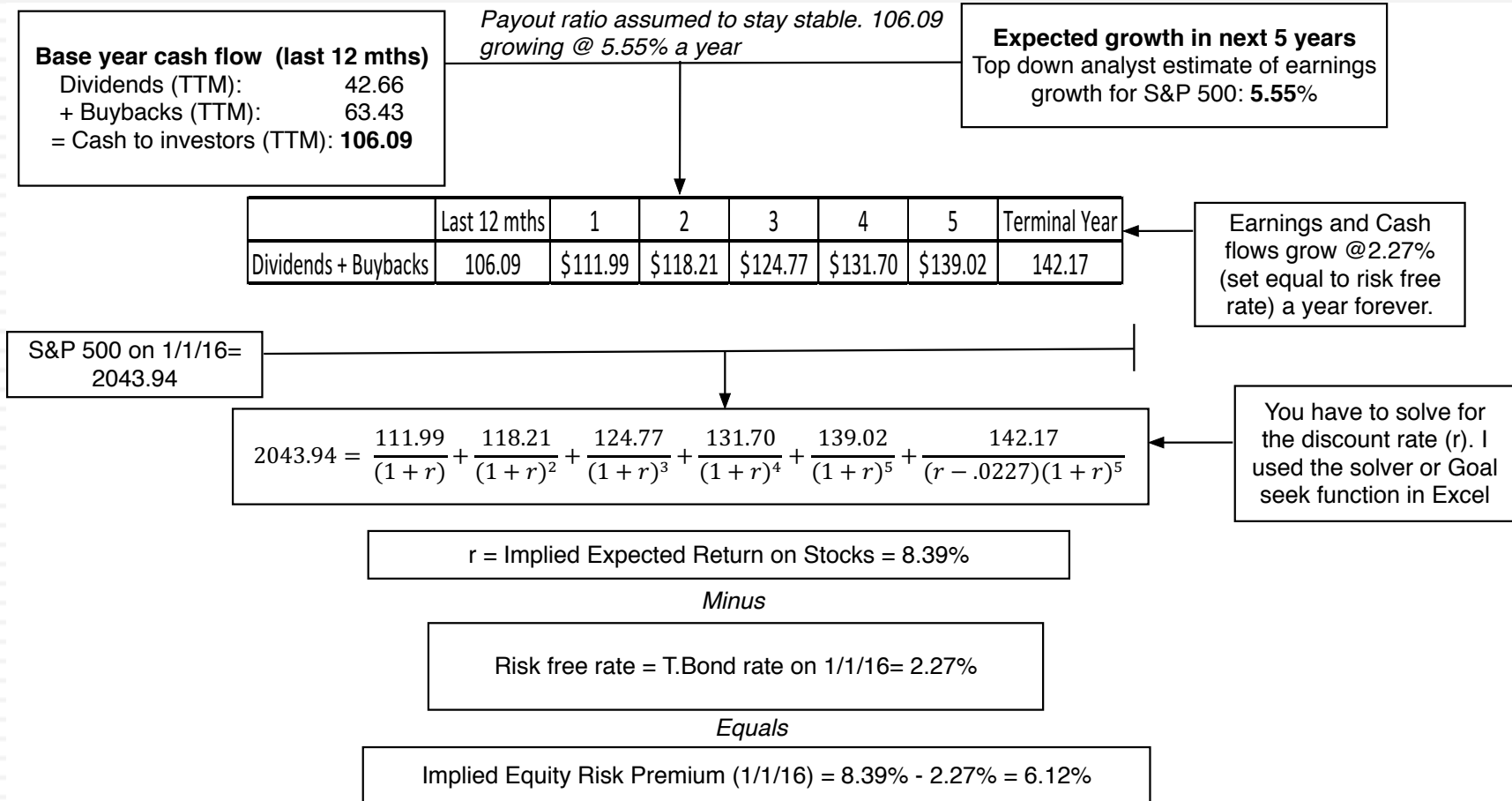# Caveat 4. Everyone may do it, but that does not make it right.. Small cap premium

Small Firm Premium over time- 1927 -2014

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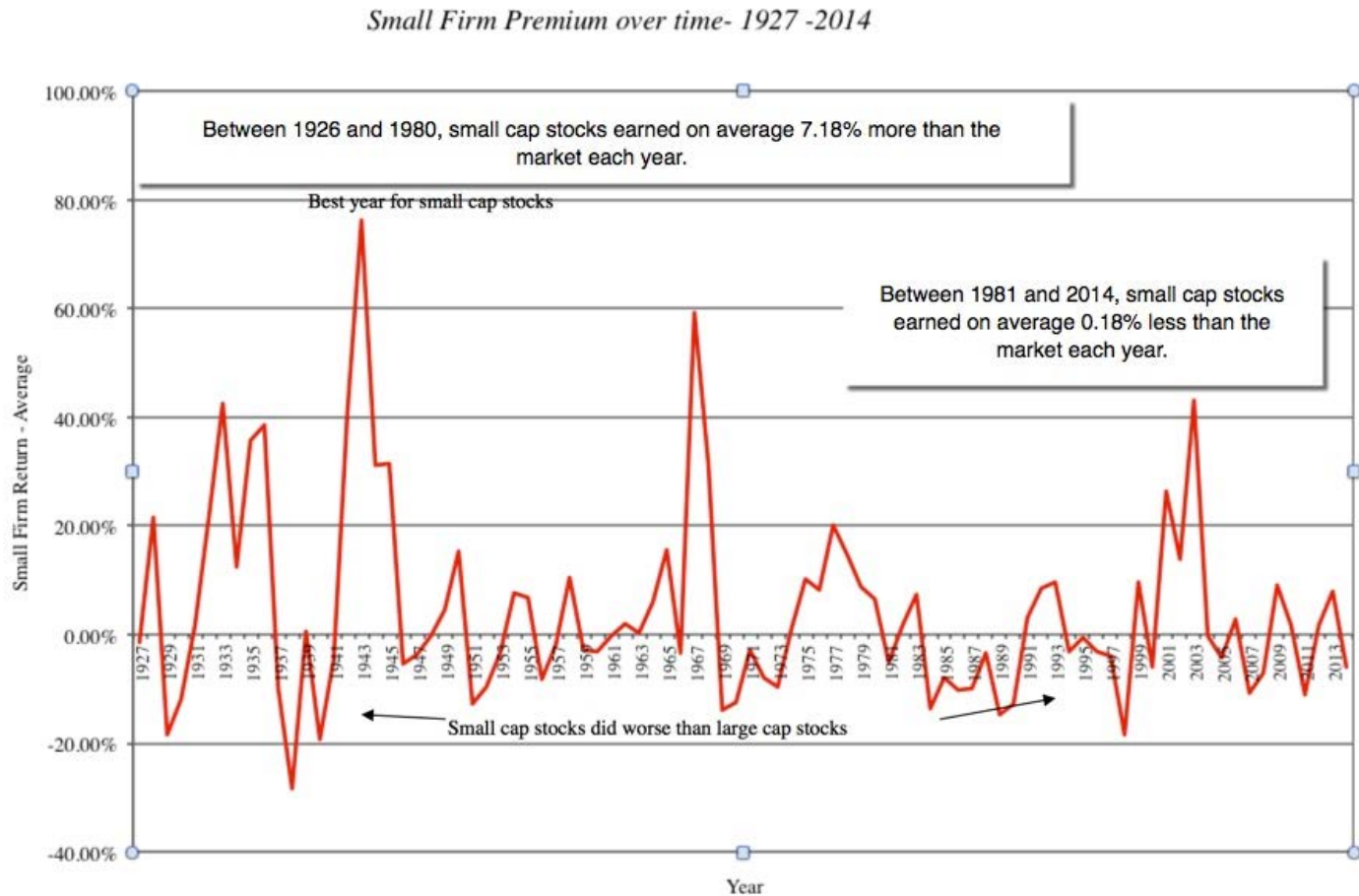
Caveat 5. Value is not about the past..

	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2015	7.92%	6.18%	6.05%	4.54%
Std Error	2.15%	2.29%		
1966-2015	6.05%	3.89%	4.69%	2.90%
Std Error	2.42%	2.74%		
2006-2015	7.87%	3.88%	6.11%	2.53%
Std Error	6.06%	8.66%		

☐ If you are going to use a historical risk premium, make it
- ◻ Long term (because of the standard error)
- ◻ Consistent with your risk free rate
- ◻ A "compounded" average

☐ No matter which estimate you use, recognize that it is backward looking, is noisy and may reflect selection bias.
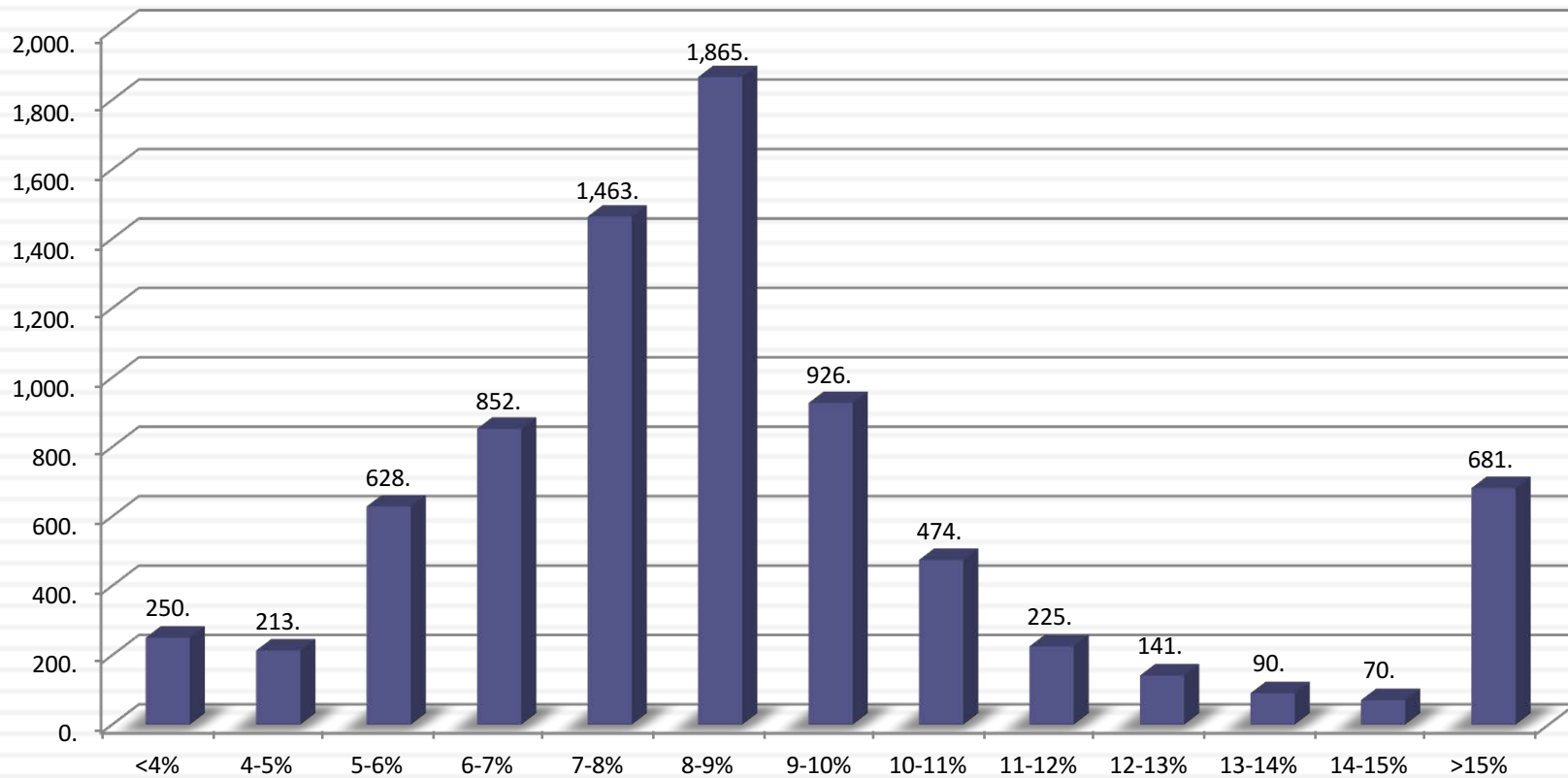
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But in the future..

Base year cash flow (last 12 mths)
Dividends (TTM):   42.66
+ Buybacks (TTM):   63.43
= Cash to investors (TTM): **106.09**

Payout ratio assumed to stay stable. 106.09 growing @ 5.55% a year

Expected growth in next 5 years
Top down analyst estimate of earnings growth for S&P 500: **5.55%**

	Last 12 mths	1	2	3	4	5	Terminal Year
Dividends + Buybacks	106.09	$111.99	$118.21	$124.77	$131.70	$139.02	142.17

Earnings and Cash flows grow @2.27% (set equal to risk free rate) a year forever.

S&P 500 on 1/1/16= 2043.94

$$2043.94 = \frac{111.99}{(1+r)} + \frac{118.21}{(1+r)^2} + \frac{124.77}{(1+r)^3} + \frac{131.70}{(1+r)^4} + \frac{139.02}{(1+r)^5} + \frac{142.17}{(r-.0227)(1+r)^5}$$

You have to solve for the discount rate (r). I used the solver or Goal seek function in Excel

r = Implied Expected Return on Stocks = 8.39%

Minus

Risk free rate = T.Bond rate on 1/1/16= 2.27%

Equals

Implied Equity Risk Premium (1/1/16) = 8.39% - 2.27% = 6.12%

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Caveat 6. Don't sweat the small stuff

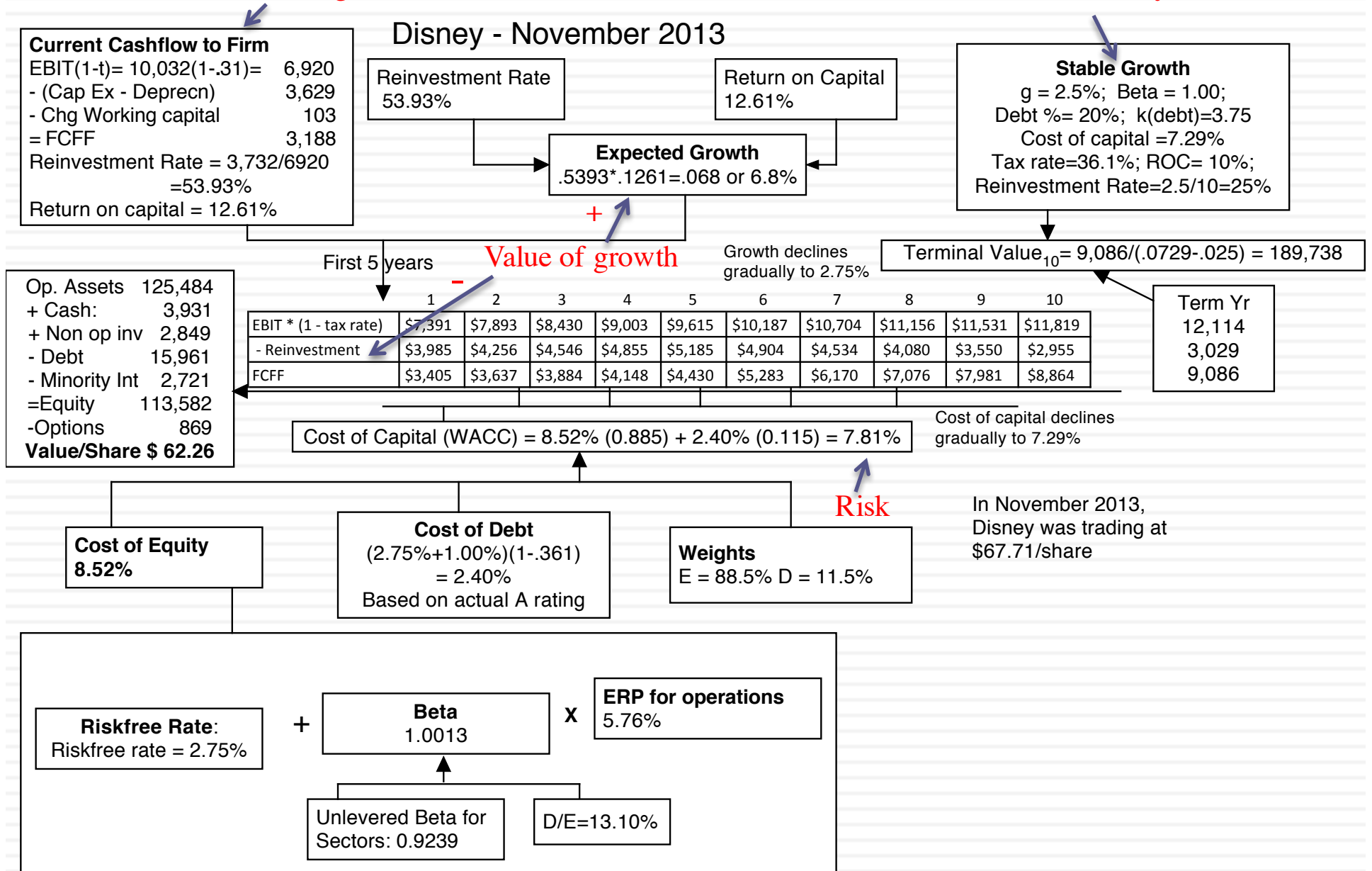*Cost of equity for Publicly traded US firms*

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Caveat 7. Don't let your macro views drown out your micro views..

- When you are asked to value a company, you should keep your focus on what drives that value. If you bring in your specific macro views into the valuation, the value that you obtain for a company will be a joint result of what you think about the company and your macro views.

- **Bottom line**: If you have macro views, provide them separately. You should be as macro-neutral as you can be, in your company valuations.

- **Follow up**: If you find macro risk dominating your thoughts, deal with it frontally.

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Disney - November 2013

Current Cashflow to Firm
EBIT(1-t)= 10,032(1-.31)= 6,920
- (Cap Ex - Deprecn)   3,629
- Chg Working capital   103
= FCFF   3,188
Reinvestment Rate = 3,732/6920
              =53.93%
Return on capital = 12.61%

Reinvestment Rate
53.93%

Return on Capital
12.61%

Stable Growth
g = 2.5%; Beta = 1.00;
Debt %= 20%; k(debt)=3.75
Cost of capital =7.29%
Tax rate=36.1%; ROC= 10%;
Reinvestment Rate=2.5/10=25%

Expected Growth
.5393*.1261=.068 or 6.8%

+

Value of growth

Growth declines
gradually to 2.75%

Terminal Value$_{10}$= 9,086/(.0729-.025) = 189,738

First 5 years

−

Op. Assets   125,484
+ Cash: 3,931
+ Non op inv   2,849
- Debt   15,961
- Minority Int 2,721
=Equity   113,582
-Options   869
Value/Share $ 62.26

	1	2	3	4	5	6	7	8	9	10		Term Yr
EBIT * (1 - tax rate)	$7,391	$7,893	$8,430	$9,003	$9,615	$10,187	$10,704	$11,156	$11,531	$11,819		12,114
- Reinvestment	$3,985	$4,256	$4,546	$4,855	$5,185	$4,904	$4,534	$4,080	$3,550	$2,955		3,029
FCFF	$3,405	$3,637	$3,884	$4,148	$4,430	$5,283	$6,170	$7,076	$7,981	$8,864		9,086

Cost of capital declines
gradually to 7.29%

Cost of Capital (WACC) = 8.52% (0.885) + 2.40% (0.115) = 7.81%

Risk

In November 2013,
Disney was trading at
$67.71/share

Cost of Equity
8.52%

Cost of Debt
(2.75%+1.00%)(1-.361)
= 2.40%
Based on actual A rating

Weights
E = 88.5% D = 11.5%

Riskfree Rate:
Riskfree rate = 2.75%

+

Beta
1.0013

X

ERP for operations
5.76%

Unlevered Beta for
Sectors: 0.9239

D/E=13.10%

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

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

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

D+CF ≠ DCF

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.

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

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

A **Mutant DCF** is a collection of numbers where items have familiar names (free cash flow, cost of capital) but the analyst putting it together has neither a narrative nor a sense of the basic principles of
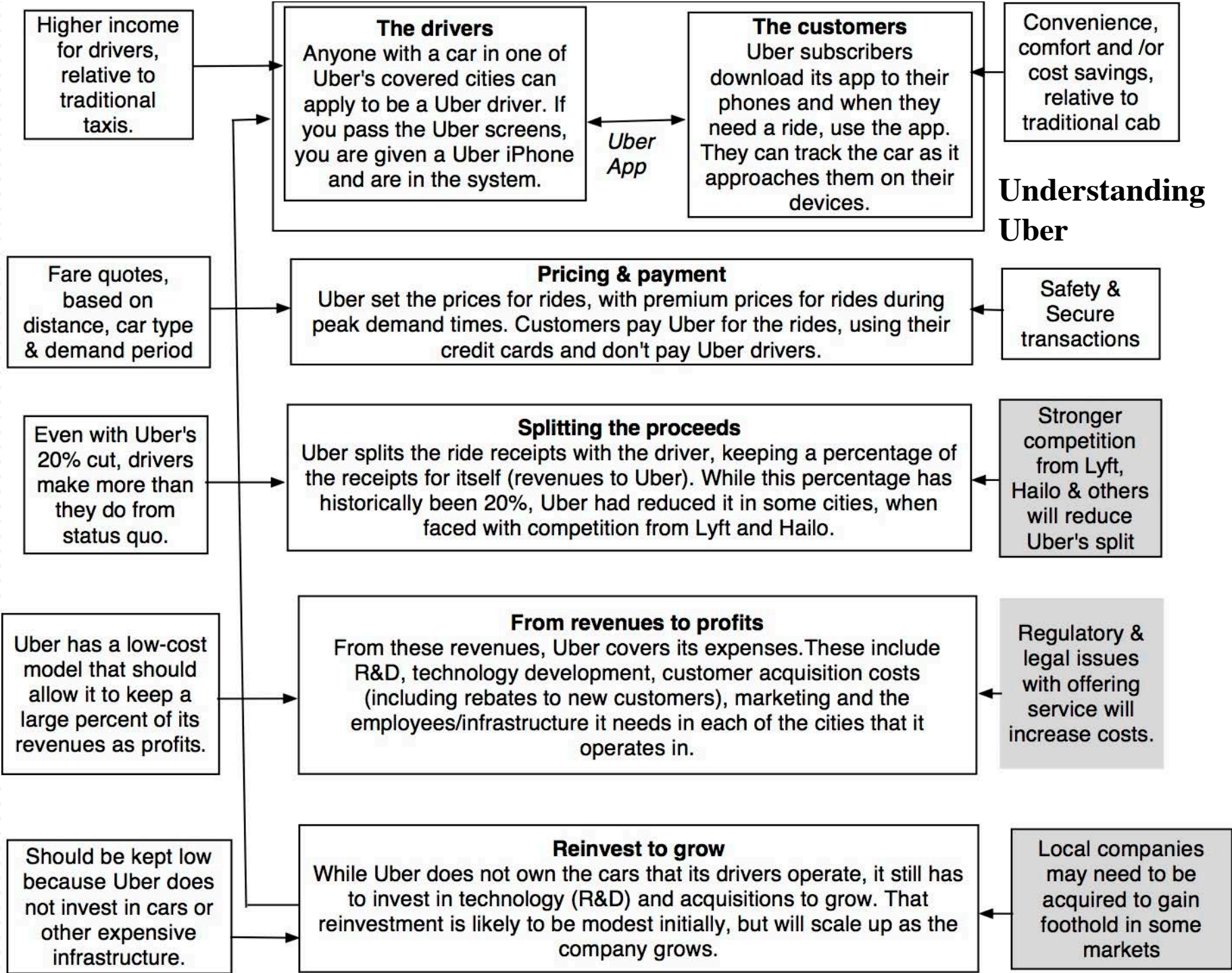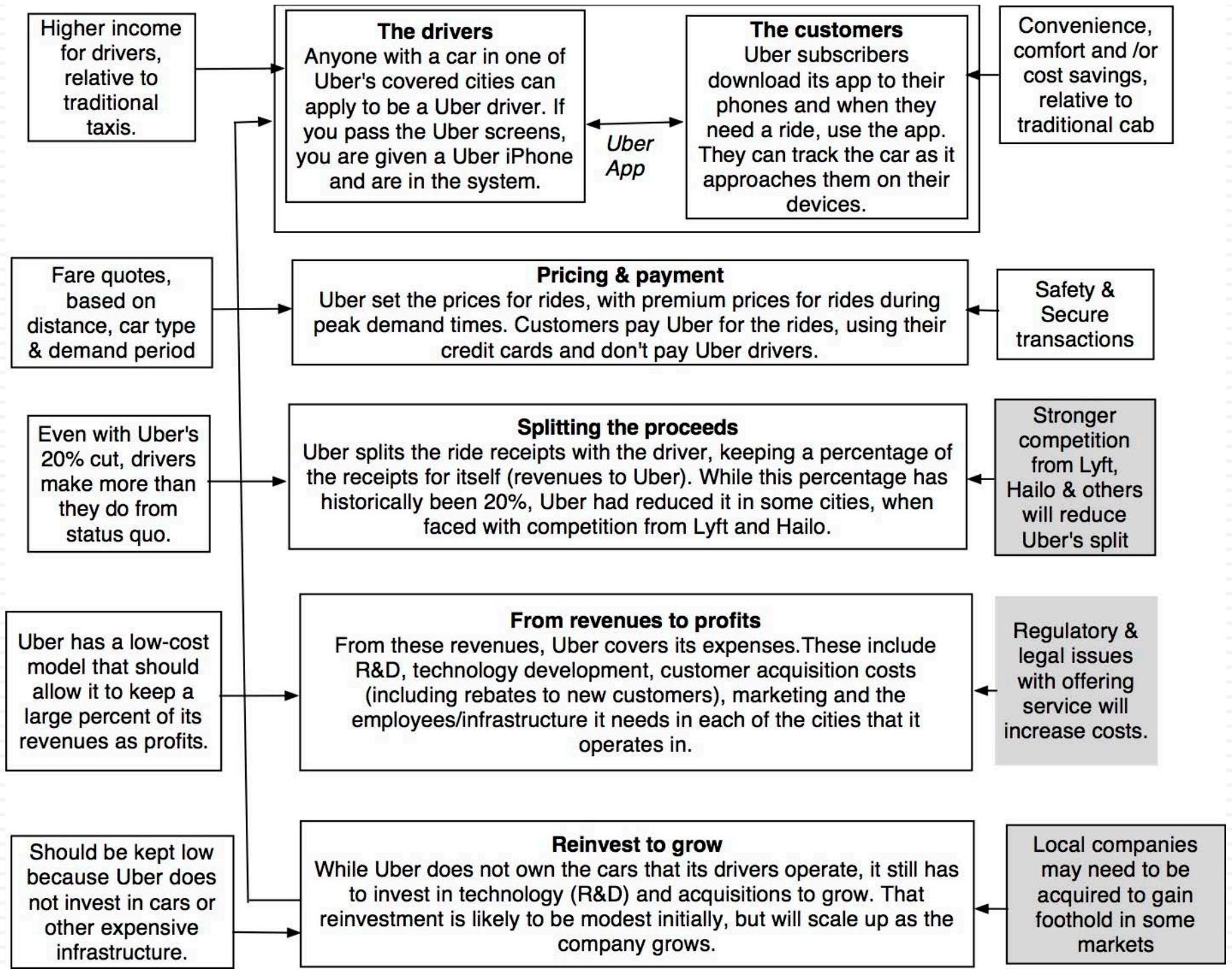
III. Don't mistake modeling for valuation

Favored Tools
- Accounting statements
- Excel spreadsheets
- Statistical Measures
- Pricing Data

A Good Valuation

Favored Tools
- Anecdotes
- Experience (own or others)
- Behavioral evidence

The Numbers People ←————————→ The Narrative People

Illusions/Delusions
1. Precision: Data is precise
2. Objectivity: Data has no bias
3. Control: Data can control reality

Illusions/Delusions
1. Creativity cannot be quantified
2. If the story is good, the investment will be.
3. Experience is the best teacher

From story to numbers and beyond..

Step 1: Develop a narrative for the business that you are valuing
In the narrative, you tell your story about how you see the business evolving over time. Keep it <u>simple</u> & <u>focused</u>.

Step 2: Test the narrative to see if it is possible, plausible and probable
There are lots of possible narratives, not all of them are plausible and only a few of them are probable. No <u>fairy tales</u> or <u>runaway stories</u>.

Step 3: Convert the narrative into drivers of value
Take the narrative apart and look at how you will bring it into valuaton inputs starting with potential market size down to cash flows and risk. By the time you are done, each part of the narrative should have a place in your numbers and each number should be backed up a portion of your story.

Step 4: Connect the drivers of value to a valuation
Create an intrinsic valuation model that connects the inputs to an end-value the business.

Step 5: Keep the feedback loop open
Listen to people who know the business better than you do and use their suggestions to fine tune your narrative and perhaps even alter it. Work out the effects on value of alternative narratives for the company.

Aswath Damodaran

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

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

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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

The Automobile Business: Pre-tax Operating Margins in 2015
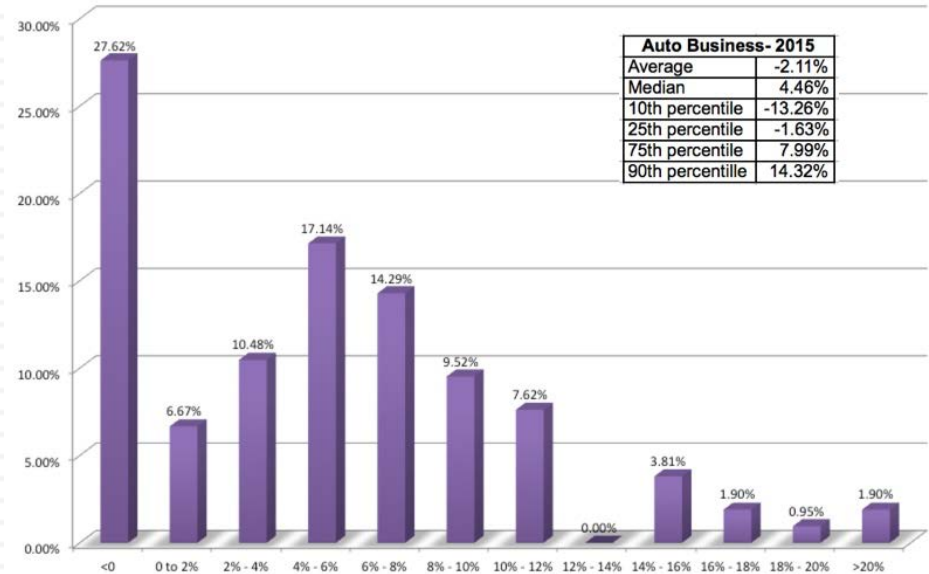
Auto Business- 2015	
Average	-2.11%
Median	4.46%
10th percentile	-13.26%
25th percentile	-1.63%
75th percentile	7.99%
90th percentille	14.32%

High & Increasing Reinvestment

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

In 2014, the auto business reinvested about 4.65% of sales back into the business, either in the form of additional plant and equipment (net capital expenditures) or

=
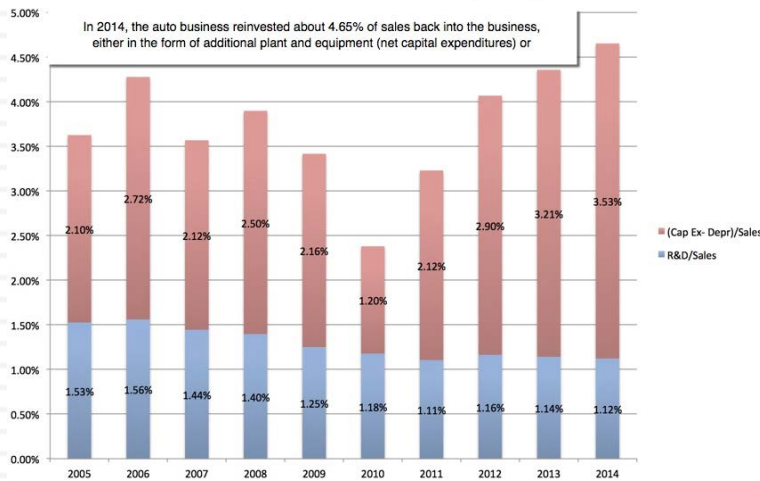
Bad Business

	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: Geographical Sales (2014)

- UK 10%
- Germany 9%
- Switzerland 5%
- France 3%
- Italy 3%
- Middle East 7%
- Rest of EMEA 8%
- Americas 34%
- China 9%
- Rest of Asia Pacific 12%

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. <u>An urban car service business</u>: I saw Uber primarily as a force in urban areas and only in the car service business.

2. Which <u>would expand the business moderately</u> (about 40% over ten years) by bringing in new users.

3. <u>With local networking benefits</u>: 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 <u>competitive advantages</u> (from being a first mover).

5. And <u>its existing low-capital business model</u>, 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

Probability of occurrence

Cannot assess   *Low*   *Increasing*

"IT" IS POSSIBLE
This could happen, but you are not sure what "this" is, when it will happen and what it will look like when it does.

Gauge market potential & test products

"IT" IS PLAUSIBLE
This is something that you can make a reasoned argument could happen, though you have no tangible evidence for it happening (yet).

Product success & Financial results

IT IS PROBABLE
This is something that you expect to happen, with some basis or evidence for that expectation. There can be substantial uncertainty in your expectations.

VALUATION RESPONSE
Value as an option, with the value increasing with the size of the possible market and the exclusivity of your firm's access to that market.

VALUATION RESPONSE
Show as expected growth, adjusting for risk in your expected return. Value will increase with size of the market and your firm's competitive advantages.

VALUATION RESPONSE
Show in base year numbers and expected cash flows, adjusting for risk in your expected return.

Aswath Damodaran

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

Growth

High Growth and Low Risk

High Growth & Low Reinvestment

Value Narrative

Low Risk and High Reinvestment

Risk

Reinvestment

Aswath Damodaran
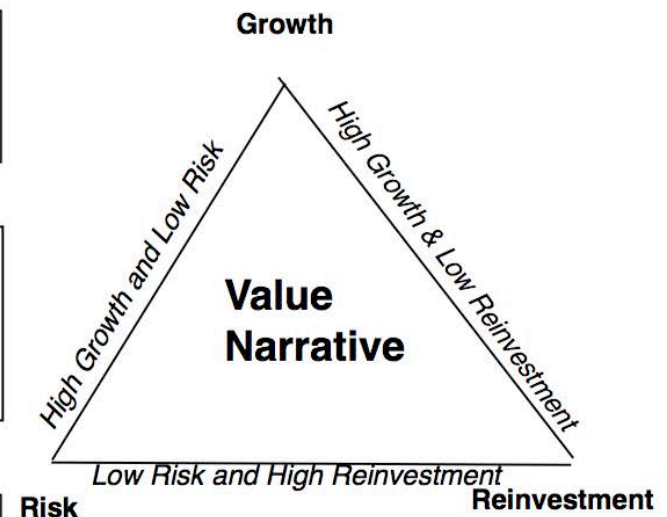
Uber: Possible, Plausible and Probable

Uber (My narrative))

Possible
Car ownership market
Option value

Plausible
Suburban car service & rental market
Higher growth rate

Probable
Urban taxi market
In Total Market size, Revenues & Earnings
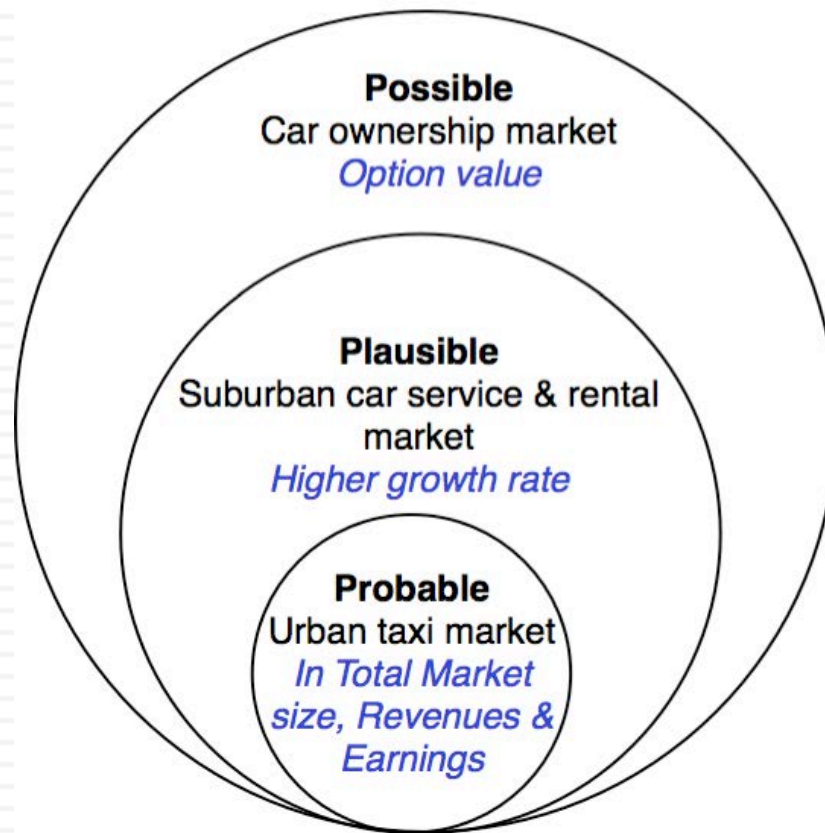
The Impossible: The Runaway Story

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

+

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

125 COMPANIES

Theranos valued at $9 billion

$1 billion $10 billion $40 billion
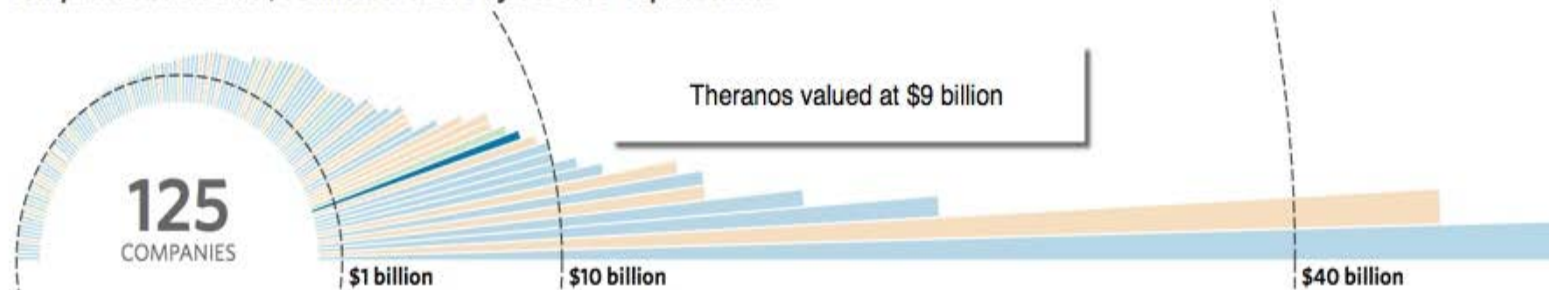
Valuations as of **October 2015**

Select companies from the chart or table for more detail.

The Implausible: The Big Market Delusion
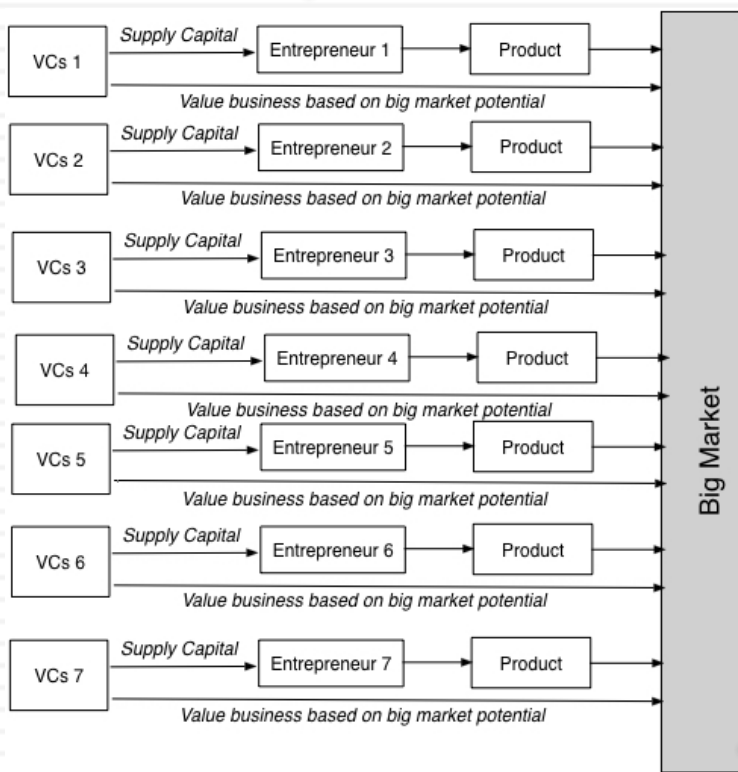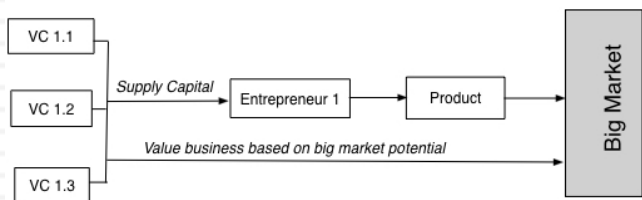
Company	Market Cap	Enterprise Value	Current Revenues	Breakeven Revenues (2025)	% from Online Advertising	Imputed Online Ad Revenue (2025)
Google	$441,572.00	$386,954.00	$69,611.00	$224,923.20	89.50%	$201,306.26
Facebook	$245,662.00	$234,696.00	$14,640.00	$129,375.54	92.20%	$119,284.25
Yahoo!	$30,614.00	$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**

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%

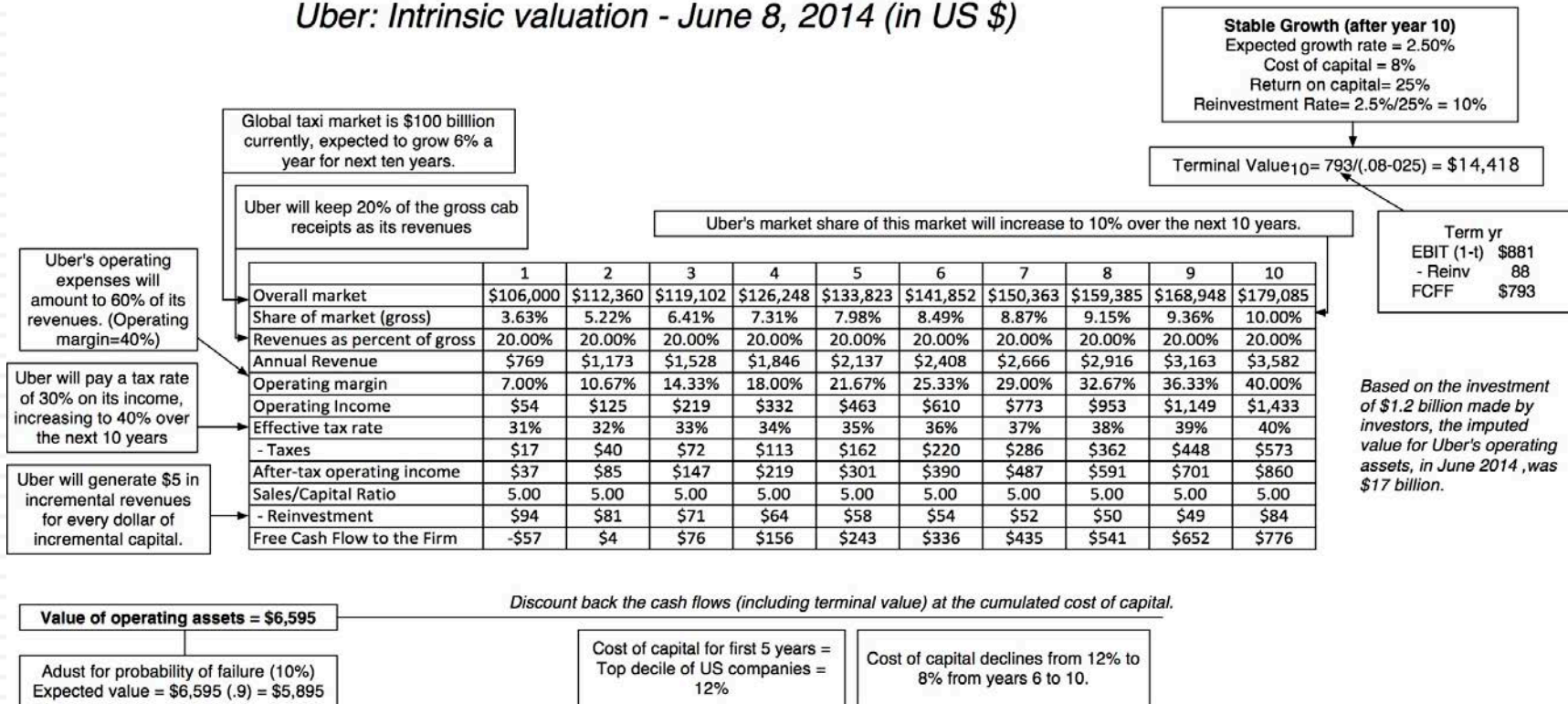|			
Discount Rate High	13.0%	FY Month of Valuation	1.0 (Beginning of this Month)
Discount Rage Low	9.0%	Month of FY End	12.0 (End of this Month)

Step 4: Connect your narrative to key drivers of value

The Uber narrative (June 2014)

Uber is an **urban car service company**, competing against taxis & limos in urban areas, but it may expand demand for car service. **The global taxi/limo business is $100 billion in 2013, growing at 6% a year.**

Total Market

X

Market Share

Uber will have competitive advantages against traditional car companies & against newcomers in this business, but no global networking benefits. **Target market share is 10%**

=

Revenues (Sales)

-

Operating Expenses

Uber will maintain its current model of keeping 20% of car service payments, even in the face of competition, because of its first mover advantages. It will maintain its current low-infrastructure cost model, allowing it to earn high margins. **Target pre-tax operating margin is 40%.**

=

Operating Income

-

Taxes

=

After-tax Operating Income

-

Reinvestment

Uber has a low capital intensity model, since it does not own cars or other infrastructure, allowing it to maintain a high **sales to capital ratio for the sector (5.00)**

=

After-tax Cash Flow

Adjust for time value & risk

Adjusted for operating risk with a discount rate and for failure with a probability of failure.

The company is young and still trying to establish a business model, leading to a **high cost of capital (12%)** up front. As it grows, it will become safer and its cost of capital will drop to 8%.

VALUE OF OPERATING ASSETS

Cash

Uber has cash & capital, but there is a chance of failure. **10% probability of failure.**

Ferrari: From story to numbers

Valuation Input	The Story	Valuation Inputs
Revenues	*Keep it scarce*	Revenue growth of 4% (in Euro terms) a year for next 5 years, scaling down to 0.7% in year 10. Translates into an increase in production of about 25% in next 10 years
Operating Margin & Taxes		
Operating Income	*And pricey*	Ferrari's pre-tax operating margin stays at 18.2%, in the 95th percentile of auto business.
Reinvestment	*Little need for capacity expansion*	Sales/Invested Capital stays at 1.42, i.e. every euro invested generates 1.42 euros in sales
Cash Flow		
Discount Rate (Risk)	*Super-rich clients are recession-proof*	Cost of capital of 6.96% in Euros and no chance of default.

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%

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

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

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.

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

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

	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

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.

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.

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

Value of operating assets = $6,595

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.

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Ferrari: The "Exclusive Club" Value

	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Stay Super Exclusive: Revenue growth is low												
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. <u>Not just car service company.</u>: 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. <u>Not just urban</u>: Uber can create new demands for car service in parts of the country where taxis are not used (suburbia, small towns).

3. <u>Global networking benefits</u>: By linking with technology and credit card companies, Uber can have global networking benefits.

Aswath Damodaran

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 Option

Valuation Input	The Story	Valuation Inputs
Revenues	Sales Push	Revenue growth of 12% (in Euro terms) a year for next 5 years, scaling down to 0.7% in year 10. Translates into an increase in production of about 100% in next 10 years
Operating Margin & Taxes		
Operating Income	With lower priced models & selling costs	Ferrari's pre-tax operating margin drops to 14.32%, in the 90th percentile of auto business.
Reinvestment	With investments in additional capacity	Sales/Invested Capital stays at 1.42, but higher sales create more reinvestment
Cash Flow		
Discount Rate (Risk)	Very rich are more sensitive to economic conditions	Cost of capital of 8% in Euros and no chance of default
Value		

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Ferrari: The "Rev-it-up" Alternative

	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Get less exclusive: Double number of cars sold over next decade												
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

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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

Aswath Damodaran

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

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%

Increases overall market to $618 billion in year 10

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

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

Better accurate than precise

It's all relative

High Accuracy High Precision | Low Accuracy High Precision | High Accuracy Low Precision | Low Accuracy Low Precision

Scenario 1 | Scenario 2

You

Rest of world
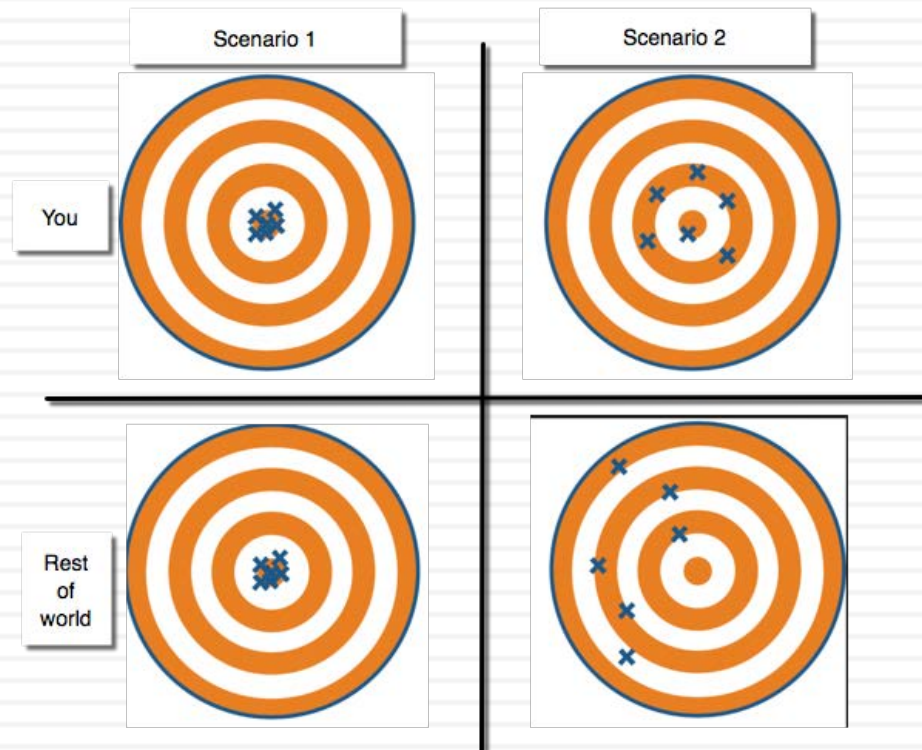
Introducing the corporate life cycle

	Stage 1 Start-up	Stage 2 Young Growth	Stage 3: High Growth	Stage 4 Mature Growth	Stage 5 Mature Stable	Stage 6 Decline
Growth stage	Stage 1 Start-up	Stage 2 Young Growth	Stage 3: High Growth	Stage 4 Mature Growth	Stage 5 Mature Stable	Stage 6 Decline
Description	Have an idea for a business that meets an unmet need in the market.	Create a business model that converts ideas into potential revenues & earnings	Build the business, converting potential into revenues.	Grow your business, shifting from losses to profits	Defend your business from new competitors & find new markets	Scale down your business as market shrinks.

The Investor Challenge

Growth stage	Stage 1 Start-up	Stage 2 Young Growth	Stage 3: High Growth	Stage 4 & 5 Mature Stable	Stage 6 Decline
Key Questions	Is there a market for the product or service? How big is that market? Will you survive?	Do people use your product or service? How much do they like it?	Will people pay for the product or service? Can you scale up, i.e., grow as you get bigger?	Can you make money of the product and service and sustain profitability in the face of competition?	What will you get if you sell your assets? How do you plan to return cash flows to your investors?
Pricing Metrics & Measures	Market size, Cash on hand, Access to capital	Number of users, User intensity (EV/User)	User engagement with model, Revenues (EV/Sales)	Earnings levels and growth (PE, EV/EBIT)	Cash flows, Payout & Debt servicing (PBV, EV/EBITDA)
Narrative vs Numbers	Mostly or all narrative	More narrative than numbers	Mix of narrative & numbers	More numbers than narrative	Mostly or all numbers
Value Drivers	Total market size, Market Share & Target Margin	Revenue Growth (and its drivers)	Revenue Growth & Reinvestment	Operating margins and Return on capital	Dividends/Cash Returns & Debt ratios
Dangers	Macro delusions, where companies are collectively overpriced, given market size.	Value distractions, with focus on wrong revenue drivers.	Growth illusions, with failure to factor in the cost of growth.	Disruption Denial, with failure to see threats to sustainable profits.	Liquidation leakage, with unrealistic assumptions about what others will pay for liquidated assets.
Transitions	Potential to Product	Product to Revenues	Revenues to Profits	Profits to Cash flows	

Valuing a start up is hard to do..

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

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

Cash flows from existing assets non-existent or negative.

What is the value added by growth assets?

What are the cashflows from existing assets?

When will the firm become a mature fiirm, and what are the potential roadblocks?

Different claims on cash flows can affect value of equity at each stage.

How risky are the cash flows from both existing assets and growth assets?

Limited historical data on earnings, and no market prices for securities makes it difficult to assess risk.

Will the firm make it through the gauntlet of market demand and competition? Even if it does, assessing when it will become mature is difficult because there is so little to go on.

What is the value of equity in the firm?

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And the dark side will beckon..

□ With young start up companies, you will be told that it is "too difficult" or even "impossible" to value these companies, because there is so little history and so much uncertainty in the future.

□ Instead, you will be asked to come over to the "dark side", where
  - ◘ You will see value metrics that you have never seen before
  - ◘ You will hear "macro" stories, justifying value
  - ◘ You will be asked to play the momentum game

□ While all of this behavior is understandable, none of it makes the uncertainty go away. You have a choice. You can either hide from uncertainty or face up to it.

Twitter: Setting the table in October 2013

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

Twitter: Priming the Pump for Valuation

1. Make small revenues into big revenues

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

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

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

Aswath Damodaran

2. Make losses into profits

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

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

3. Reinvest for growth

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

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

The Cost of Capital for Twitter

Risk in the discount rate

My estimate for Twitter

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

Cost of Capital: US - Nov '13

Cost of Equity 11.12%

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

Weights E = 98.11% D = 1.89%

Riskfree Rate: Riskfree rate = 2.5%

+

Beta 1.40

x

Risk Premium 6.15%

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

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

D/E=1.71%

2,500.

2,000.

1,500.

1,000.

500.

0.

<6% 6%-7% 7%-8% 8%-9% 9-10% 10-11% 11-12% >12%

0%

Survival Risk

100%
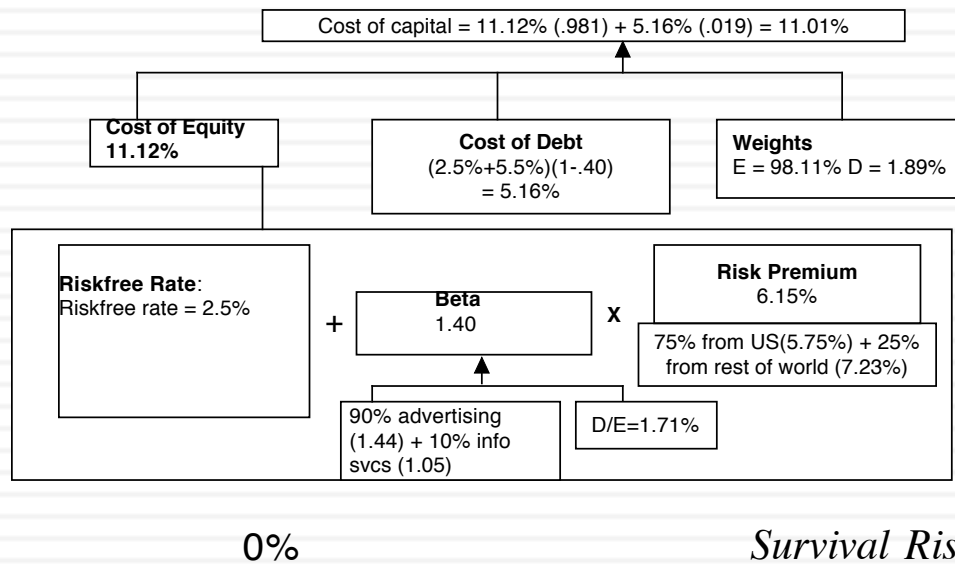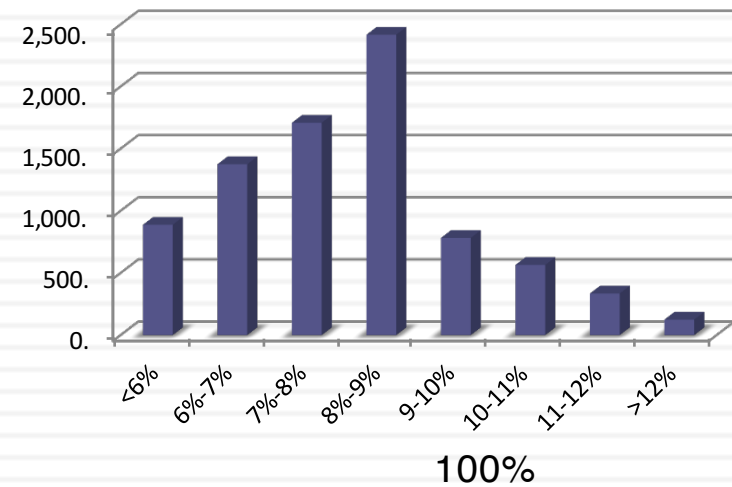
Probability that the firm will not make it as a going concern

Certain to make it as going concern → *Certain to fail*

My assumption for Twitter

Starting numbers

Twitter Pre-IPO Valuation: October 27, 2013

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

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

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

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

Stable Growth
g = 2.5%; Beta = 1.00;
Cost of capital = 8%
ROC= **12**%;
Reinvestment Rate=2.5%/12% = 20.83%

Terminal Value$_{10}$= 1466/(.08-.025) = $26,657

Operating assets	$9,705
+ Cash	321
+ IPO Proceeds	1295
- Debt	214
Value of equity	11,106
- Options	713
Value in stock	10,394
/ # of shares	582.46
Value/share	$17.84

	1	2	3	4	5	6	7	8	9	10
Revenues	$ 810	$1,227	$1,858	$2,816	$4,266	$6,044	$7,973	$9,734	$10,932	$11,205
Operating Income	$ 31	$ 75	$ 158	$ 306	$ 564	$ 941	$1,430	$1,975	$ 2,475	$ 2,801
Operating Income after tax	$ 31	$ 75	$ 158	$ 294	$ 395	$ 649	$ 969	$1,317	$ 1,624	$ 1,807
- Reinvestment	$ 183	$ 278	$ 421	$ 638	$ 967	$1,186	$1,285	$1,175	$ 798	$ 182
FCFF	$(153)	$ (203)	$ (263)	$ (344)	$ (572)	$ (537)	$ (316)	$ 143	$ 826	$ 1,625

Terminal year (11)

EBIT (1-t)	$ 1,852
- Reinvestment	$ 386
FCFF	$ 1,466

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

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

Cost of Equity
11.12%

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

Weights
E = 98.1% D = 1.9%

Riskfree Rate:
Riskfree rate = 2.5%

+

Beta
1.40

X

Risk Premium
6.15%

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

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

D/E=1.71%
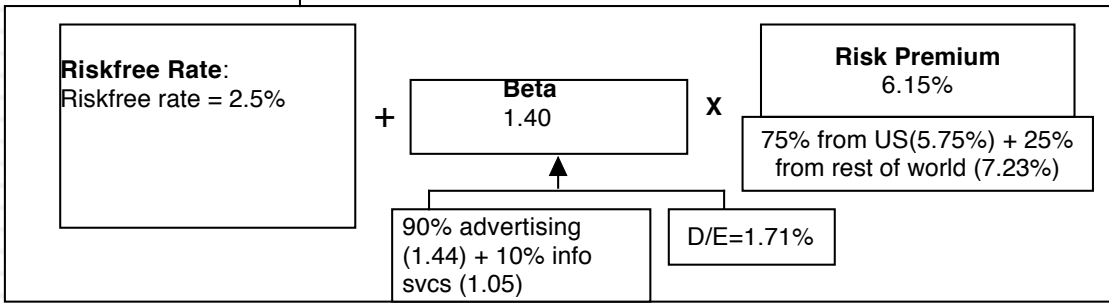
A sobering reminder: You will be "wrong" and it is okay

- No matter how careful you are in getting your inputs and how well structured your model is, your estimate of value will change both as new information comes out about the company, the business and the economy.

- As information comes out, you will have to adjust and adapt your model to reflect the information. Rather than be defensive about the resulting changes in value, recognize that this is the essence of risk.

- Remember that it is not just your value that is changing, but so is the price, and the price will change a great deal more than the value.

Aswath Damodaran

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

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%	

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

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Forecasting in the face of uncertainty. A test:

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

Weather changeability for Honolulu, Hawaii

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

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

Weather changeability for Epping, North Dakota

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

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

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

Weather changeability for Honolulu, Hawaii

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

Further changeability analysis »

Weather forecast accuracy for Honolulu, Hawaii

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

Weather changeability for Epping, North Dakota

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

Further changeability analysis »

Weather forecast accuracy for Epping, North Dakota

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

2004 Best Places Rank: 210, 280, 350, 420, 490, 560, 630, 700

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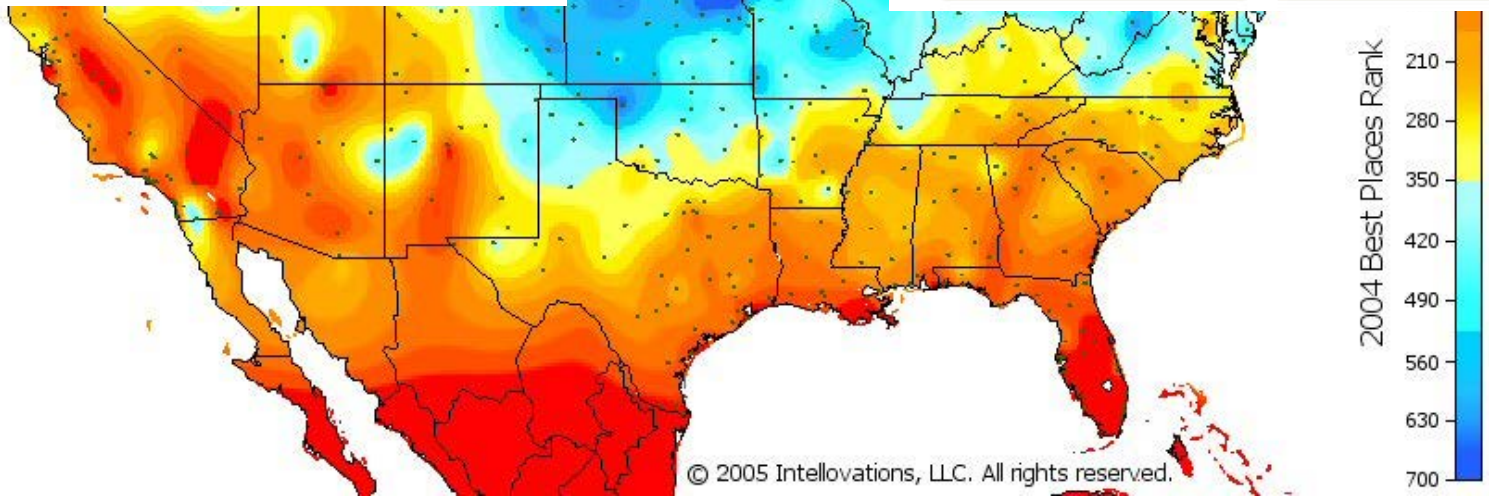
V. Don't mistake price for value!

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

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Test 1: Are you pricing or valuing?

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Test 2: Are you pricing or valuing?

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

BB BIOTECH
SPI Swiss Performanc (Rebased)
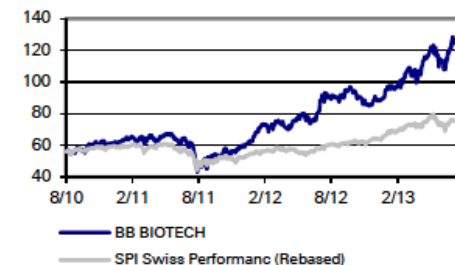
Performance (%)	1m	3m	12m
Absolute	-1.4	5.4	37.4

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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**

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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".

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Multiples and Comparable Transactions

Market value of equity	Market value for the firm Firm value = Market value of equity + Market value of debt	Market value of operating assets of firm Enterprise value (EV) = Market value of equity + Market value of debt - Cash

Step 1: Pick a multiple

Numerator = What you are paying for the asset

$$\text{Multiple} = \frac{\text{Numerator} = \text{What you are paying for the asset}}{\text{Denominator} = \text{What you are getting in return}}$$

→ **CHOOSE A MULTIPLE**

Revenues a. Accounting revenues b. Drivers - # Customers - # Subscribers = # units	**Earnings** a. To Equity investors - Net Income - Earnings per share b. To Firm - Operating income (EBIT)	**Cash flow** a. To Equity - Net Income + Depreciation - Free CF to Equity b. To Firm - EBIT + DA (EBITDA) - Free CF to Firm	**Book Value** a. Equity = BV of equity b. Firm = BV of debt + BV of equity c. Invested Capital = BV of equity + BV of debt - Cash

Step 2: Choose comparables

Narrow versus Broad sector/business	Similar market cap or all companies	Country, Region or Global	Other criteria, subjective & objective

→ **PICK COMPARABLE FIRMS**

Step 3: Tell a story

Risk - Lower risk for higher value - Higher risk for lower value	Growth - Higher growth for higher value - Lower growth for lower value	Quality of growth - Higher barriers to entry/moats for higher value - Lower barriers to entry for lower value

SPIN/TELL YOUR STORY

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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.

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1. 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.

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2. 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?

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Multiples have skewed distributions...

PE Ratios for US stocks: January 2015

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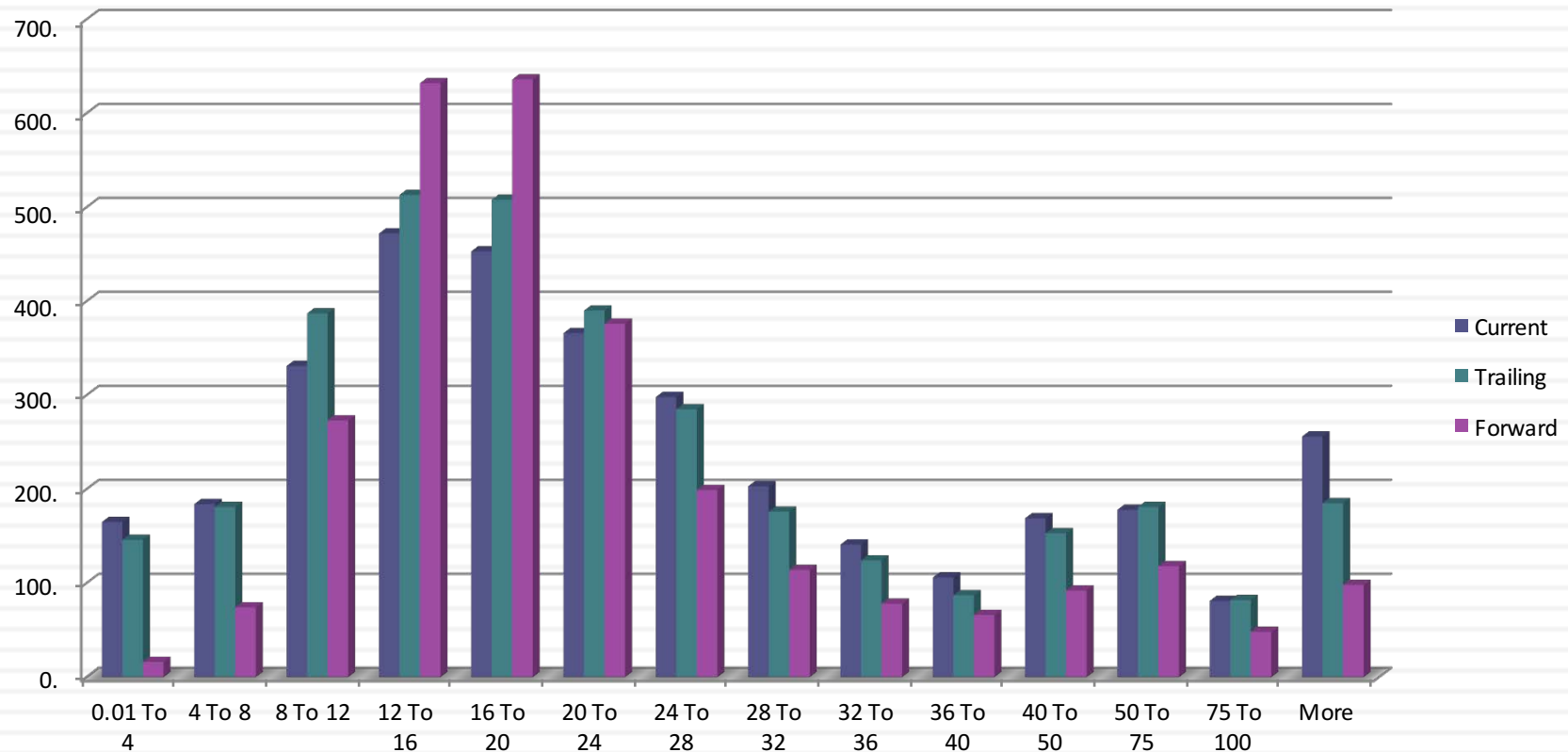
Making statistics "dicey"

	Current PE	Trailing PE	Forward PE
Number of firms	7887	7887	7887
Number with PE	3403	3398	2820
Average	72.13	60.49	35.25
Median	20.88	19.74	18.32
Minimum	0.25	0.4	1.15
Maximum	23,100.	23,100.	5,230.91
Standard deviation	509.6	510.41	139.75
Standard error	8.74	8.76	2.63
Skewness	31.	32.77	25.04
25th percentile	13.578	13.2	14.32
75th percentile	33.86	31.16	25.66

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3. 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.

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PE Ratio: Understanding the Fundamentals

Equity Multiple or Firm Multiple

Equity Multiple	Firm 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

1. Start with a firm DCF model (a FCFF model)
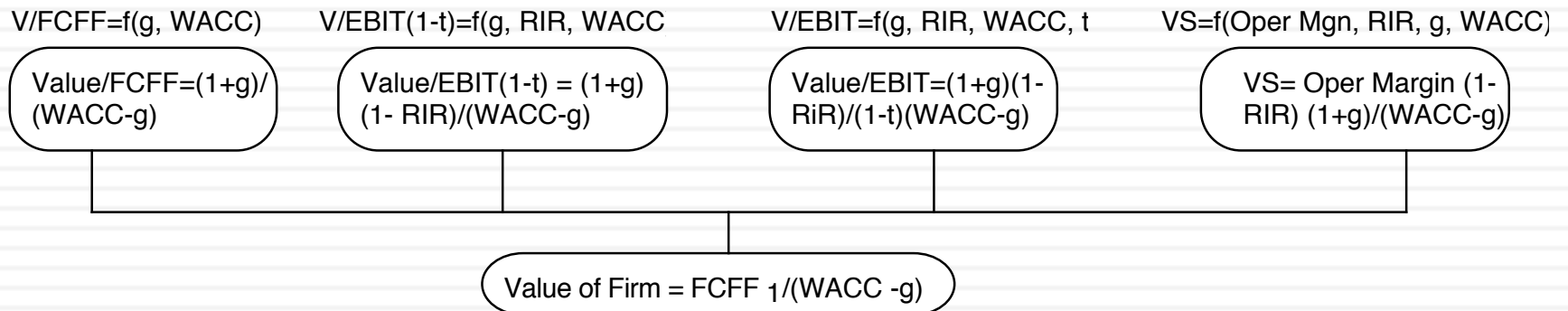
$$EV_0 = \frac{FCFF_1}{\text{Cost of capital} - g_n}$$

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

Aswath Damodaran

The Determinants of Multiples...

$$\text{Value of Stock} = DPS_1/(k_e - g)$$

PE=Payout Ratio $(1+g)/(r-g)$	PEG=Payout ratio $(1+g)/g(r-g)$	PBV=ROE (Payout ratio) $(1+g)/(r-g)$	PS= Net Margin (Payout ratio) $(1+g)/(r-g)$
PE=f(g, payout, risk)	PEG=f(g, payout, risk)	PBV=f(ROE,payout, g, risk)	PS=f(Net Mgn, payout, g, risk)
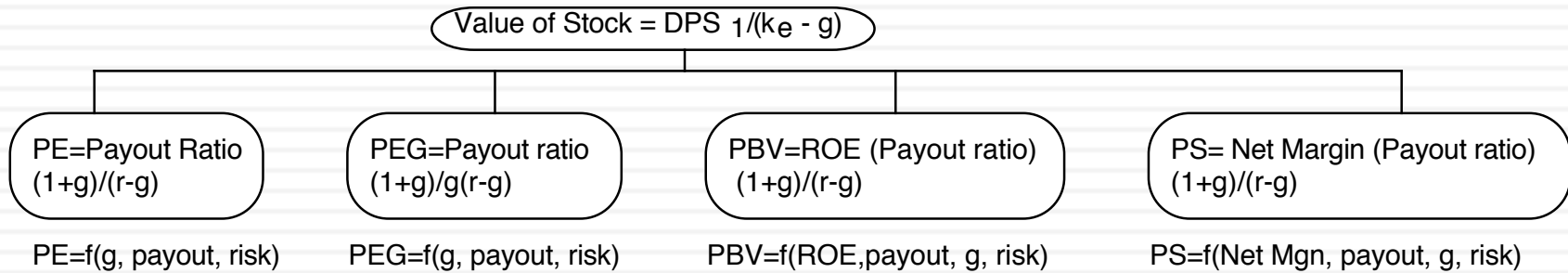
Equity Multiples

Firm Multiples

V/FCFF=f(g, WACC) V/EBIT(1-t)=f(g, RIR, WACC V/EBIT=f(g, RIR, WACC, t VS=f(Oper Mgn, RIR, g, WACC)

Value/FCFF=$(1+g)/$ $(WACC-g)$	Value/EBIT(1-t) = $(1+g)$ $(1-RIR)/(WACC-g)$	Value/EBIT=$(1+g)(1-RiR)/(1-t)(WACC-g)$	VS= Oper Margin $(1-RIR)$ $(1+g)/(WACC-g)$

$$\text{Value of Firm} = FCFF_1/(WACC - g)$$

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4. 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 4: 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 5: It is impossible to find an exactly identical firm to the one you are valuing.

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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

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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?

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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

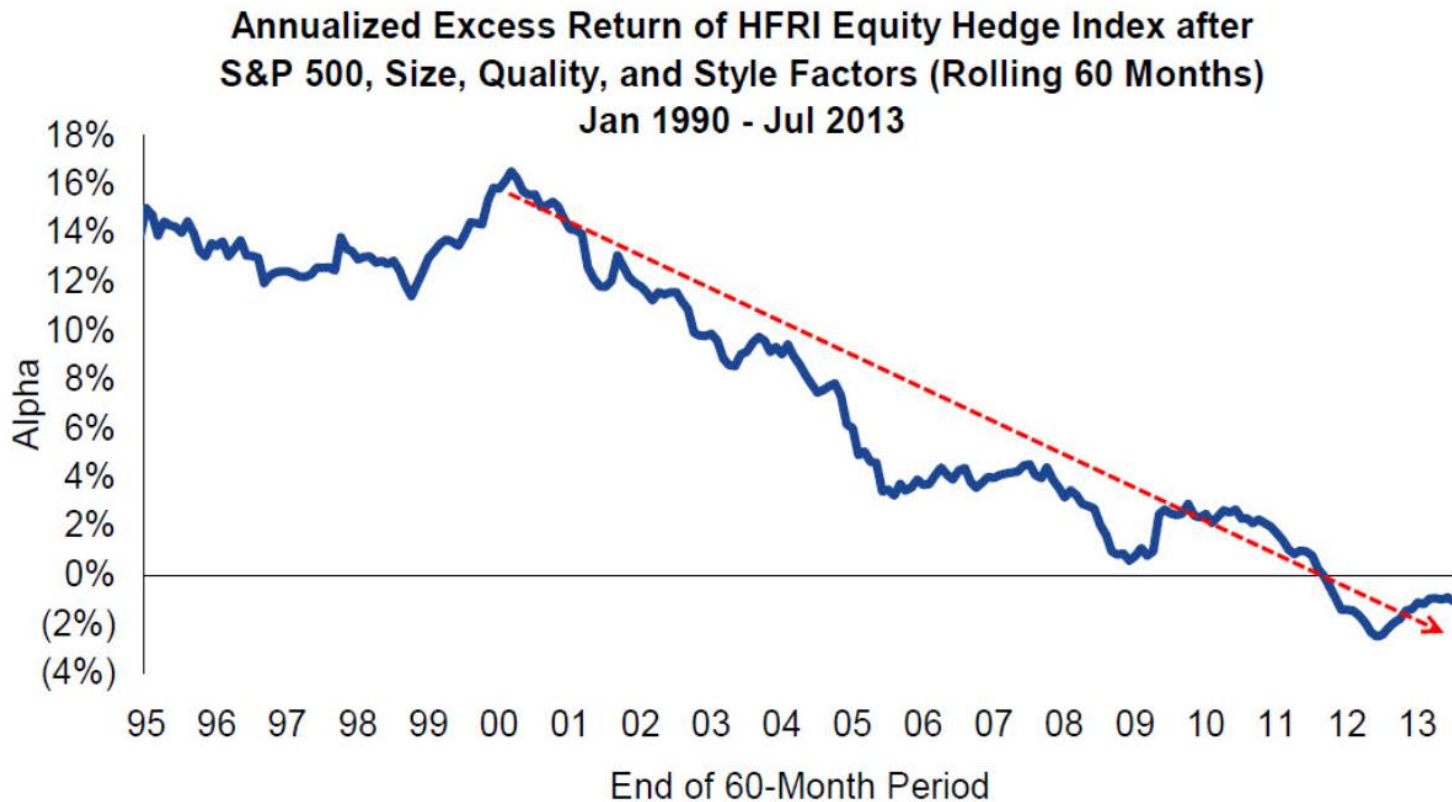Aswath Damodaran

VI. Investing is an act of faith..

- When investing, we are often told that if you are virtuous (careful in your research, good at valuation, have a long time horizon), you will be rewarded (with high returns).

- That pitch is amplified by anecdotal evidence of righteous ones, i.e., those who have followed the path to success.

- Those who chose not to be virtuous are labeled as "speculators", viewed as shallow and deserving of the fate that awaits them.

Aswath Damodaran

1. Investment Heaven is a promise, not a guarantee..

Apple: Price versus Value- December 2010 to April 2014

Aswath Damodaran

2. There is no "smart" money

Annualized Excess Return of HFRI Equity Hedge Index after S&P 500, Size, Quality, and Style Factors (Rolling 60 Months) Jan 1990 - Jul 2013

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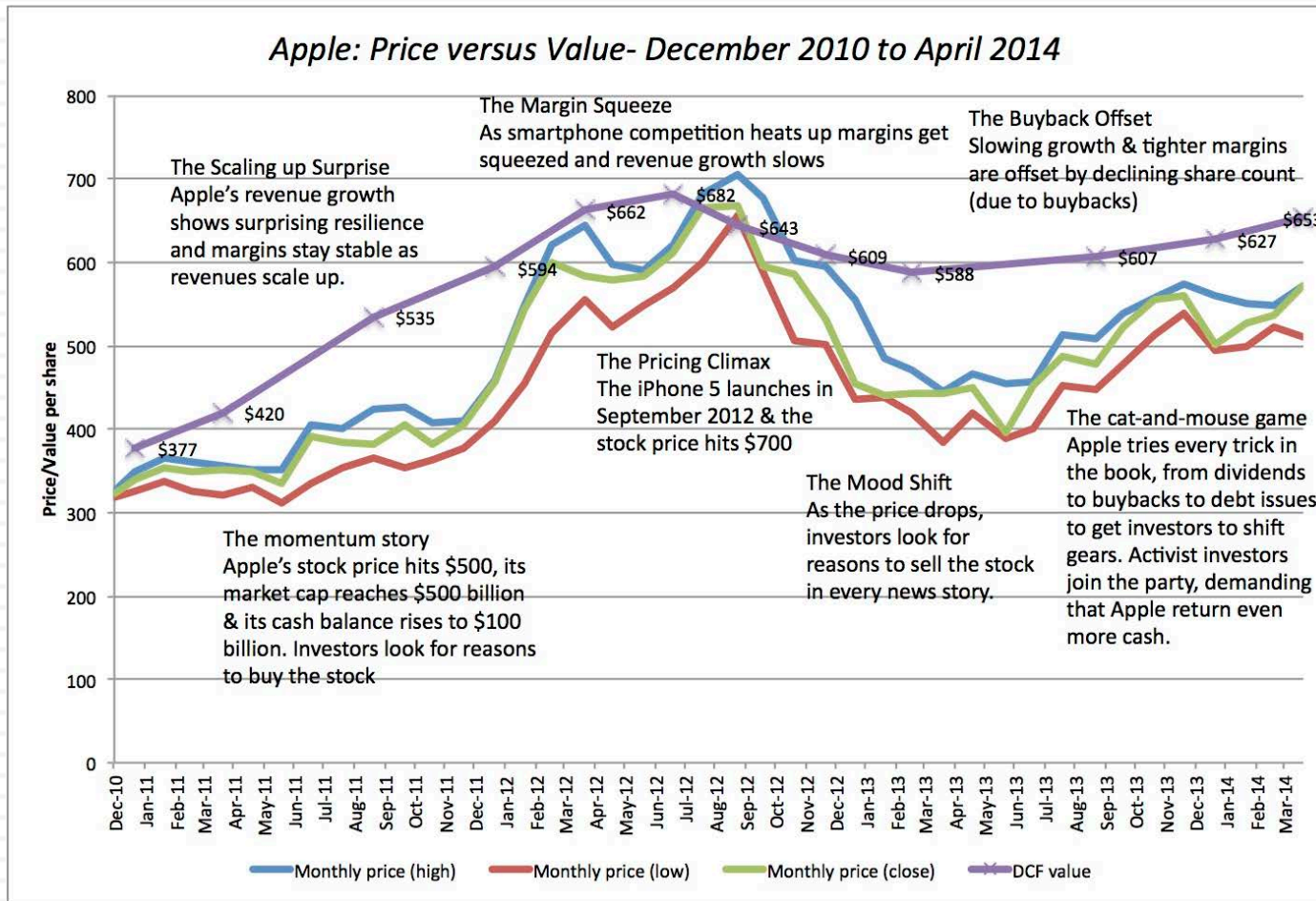
3. There is nothing more tiresome than a value investing scold

- <u>Rigid</u>: The strategies that have come to characterize a great deal of value investing reveal an astonishing faith in accounting numbers and an equally stunning lack of faith in markets getting anything right.

- <u>Righteous</u>: Value investors have convinced themselves that they are better people than other investors. Index fund investors are viewed as "academic stooges", growth investors are considered to be "dilettantes" and momentum investors are "lemmings". Value investors consider themselves to be the grown ups in the investing game.

- <u>Ritualistic</u>: Modern day value investing has a whole menu of rituals that investors have to perform to be "value investors". The rituals range from the benign (reading Security Analysis by Graham) to the not-so-benign..

Aswath Damodaran

Follow the yellow brick road..

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