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LIVING WITH NOISE: INVESTING IN THE FACE OF UNCERTAINTY

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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.

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%

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

5

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%

Further changeability analysis »

Weather forecast accuracy for Honolulu, Hawaii

Last Month	
MeteoGroup	**88.44%**
Persistence	**81.80%**
CustomWeather	**78.23%**
The Weather Channel	73.12%
AccuWeather	69.89%
Weather Underground	62.10%
National Weather Service	48.39%
Foreca	44.35%
WeatherBug	32.26%

Last Year	
MeteoGroup	**88.50%**
CustomWeather	**85.87%**
AccuWeather	**81.82%**
The Weather Channel	81.56%
Persistence	80.44%
Weather Underground	67.07%
National Weather Service	59.90%
Foreca	57.52%
WeatherBug	37.09%

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°

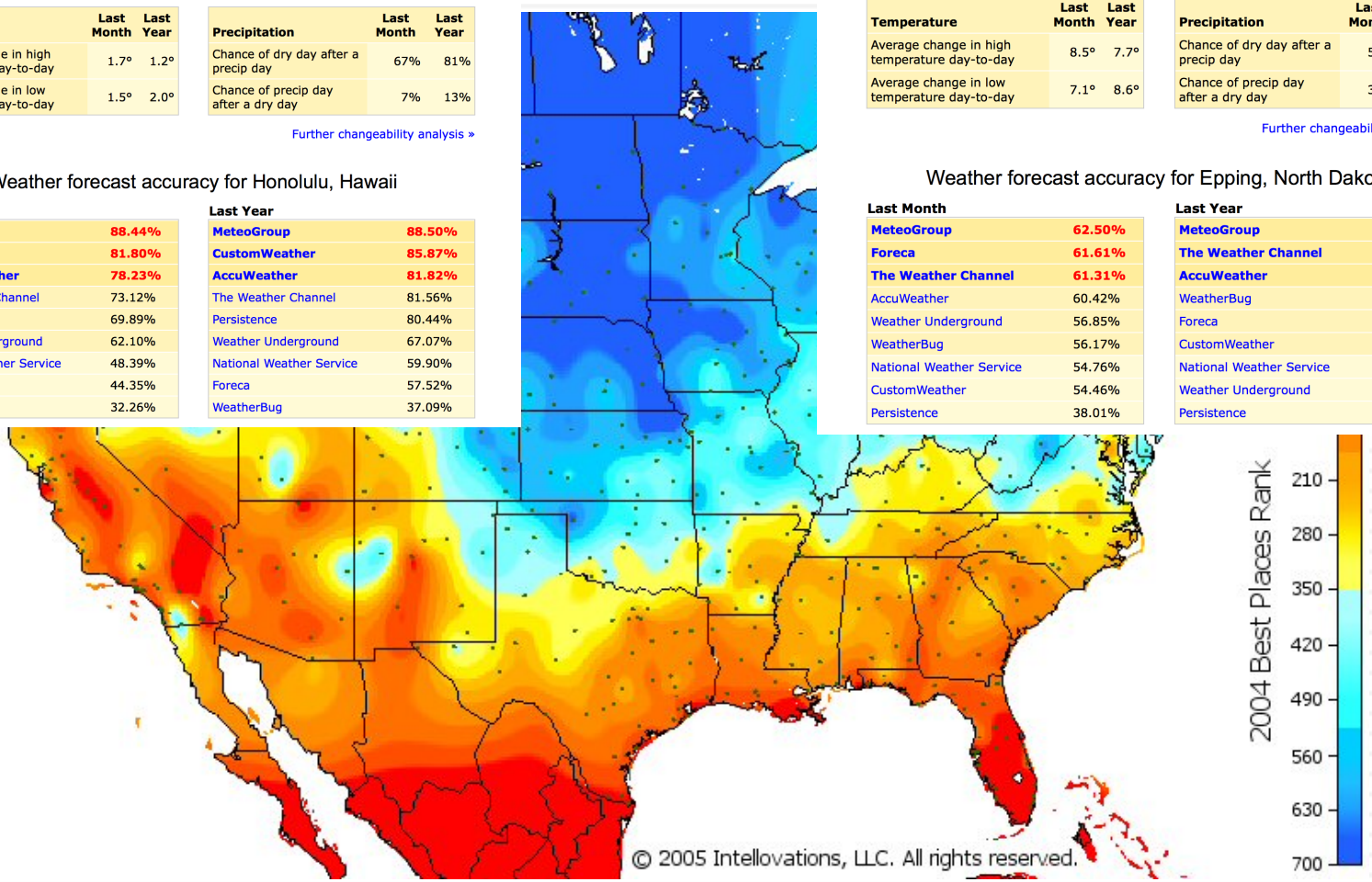
Precipitation	Last Month	Last Year
Chance of dry day after a precip day	50%	65%
Chance of precip day after a dry day	38%	20%

Further changeability analysis »

Weather forecast accuracy for Epping, North Dakota

Last Month	
MeteoGroup	**62.50%**
Foreca	**61.61%**
The Weather Channel	**61.31%**
AccuWeather	60.42%
Weather Underground	56.85%
WeatherBug	56.17%
National Weather Service	54.76%
CustomWeather	54.46%
Persistence	38.01%

Last Year	
MeteoGroup	**66.97%**
The Weather Channel	**66.73%**
AccuWeather	**64.86%**
WeatherBug	64.80%
Foreca	62.75%
CustomWeather	62.70%
National Weather Service	62.64%
Weather Underground	61.38%
Persistence	44.09%



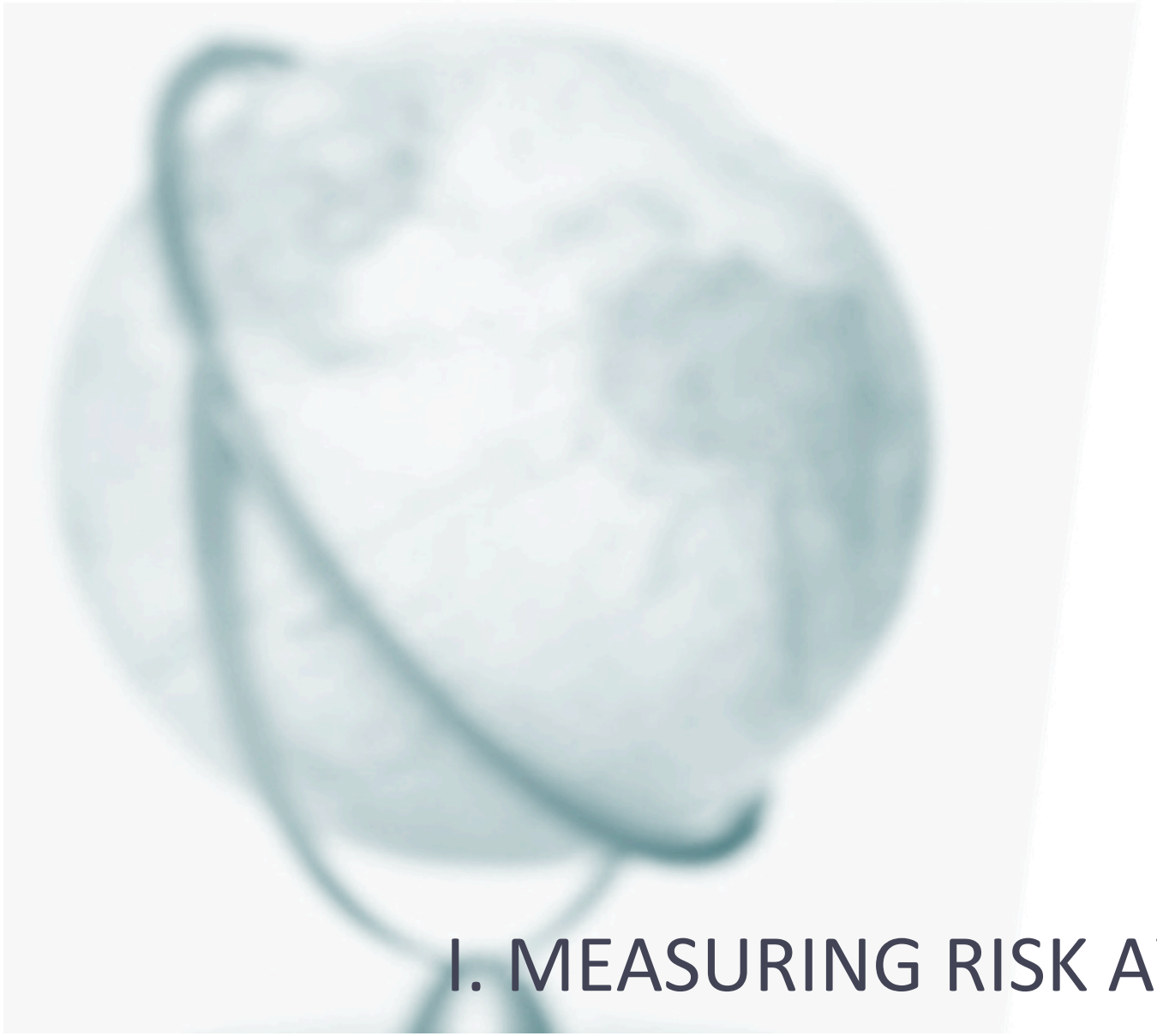
Uncertainty in investing and business

- Risk, in traditional terms, is viewed as a 'negative'. Webster's dictionary, for instance, defines risk as "exposing to danger or hazard". The Chinese symbols for crisis, reproduced below, give a much better description of risk:

- The first symbol is the symbol for "danger", while the second is the symbol for "opportunity", making risk a mix of danger and opportunity.
- The essence of dealing with risk and uncertainty well is not in avoiding danger, but in seeking out the "right" danger, where you are compensated best for taking that danger.

An Uncertainty Checklist

1. Risk Appetite: Not all of us are equally willing or comfortable taking risk. Become aware of how averse you are to taking risk and stay within your bounds.
2. Big picture of value: Understand how risk plays into your assessments of value and decision making.
3. Analytical tools: If you are an investor/analyst, develop tools for dealing with risk in healthier ways,
4. Risk-taking structure: If you are a business, develop a a better risk-taking organization.



I. MEASURING RISK AVERSION

I. Measuring your risk aversion
An experiemnt

- I will flip a coin once and will pay you a dollar if the coin came up tails on the first flip; the experiment will stop if it came up heads. If you win the dollar on the first flip, though, you will be offered a second flip where you could double your winnings if the coin came up tails again.
- The game will thus continue, with the prize doubling at each stage, until you come up heads. How much would you be willing to pay to partake in this gamble?
  a. Nothing
  b. <$2
  c. $2-$4
  d. $4-$6
  e. >$6

Measuring Risk Aversion

1. Risk aversion coefficients: Economists have long favored measuring risk with what "risk aversion" coefficients, mathematical constructs for measuring risk. Unfortunately, they are difficult to put into practice.
2. Certainty Equivalents: In technical terms, the price that an individual is willing to pay for a bet where there is uncertainty and an expected value is called the certainty equivalent value. The difference between the expected value and your certainty equivalent is a measure of risk aversion.
3. The sleep test: If you make an investment decision and then lose sleep over the consequences of that decision, you have taken on too much uncertainty.

Findings on risk aversion

- Individuals are generally risk averse, and are more so when the stakes are large than when they are small. There are big differences in risk aversion across the population and significant differences across sub-groups.
  - Young people tend to be less risk averse than older people.
  - Young women tend to be more risk averse than young men, especially on small bets. As the bets get larger and people get older, risk aversion converges.
- There are quirks in risk taking behavior
  - Individuals are far more affected by losses than equivalent gains (loss aversion), and this behavior is made worse by frequent monitoring.
  - The choices that people when presented with risky choices or gambles can depend upon how the choice is presented (framing).
  - Individuals tend to be much more willing to take risks with what they consider "found money" than with earned money (house money effect).
  - There are two scenarios where risk aversion seems to be replaced by risk seeking. One is when you have the chance of making an large sum with a very small probability of success (long shot bias). The other is when you have lost money are presented with choices that allow them to make their money back (break even effect).

How risk averse are you?

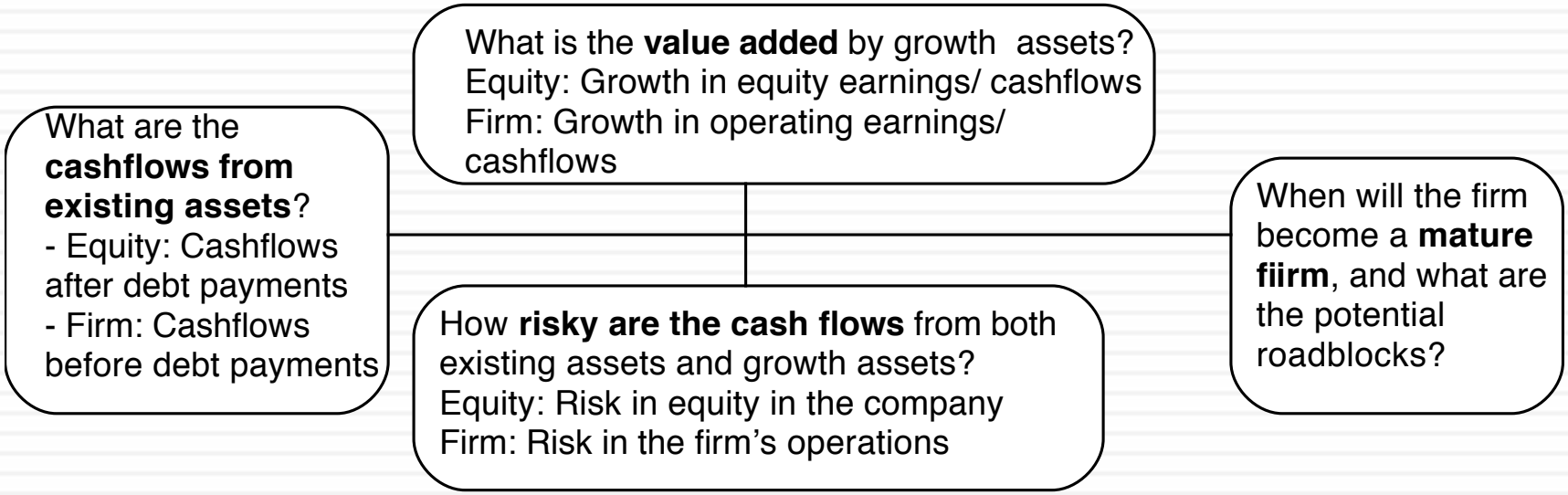
- If you are an investor, how risk averse are you? Is your investment portfolio consistent with your risk aversion?
- If you work in a business, how risk averse are you?

a. More risk averse than my colleagues
b. About as risk averse as my colleagues
c. Less risk averse than my colleagues

- If you are more or less risk averse than your colleagues, how does this difference affect your decisions and discussions?

II. VALUE AND RISK
THE BIG PICTURE

The determinants of value



And convert them into numbers…

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.

Measuring 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)

And 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 it, with more exposure to macro economic risk translating into a higher beta.

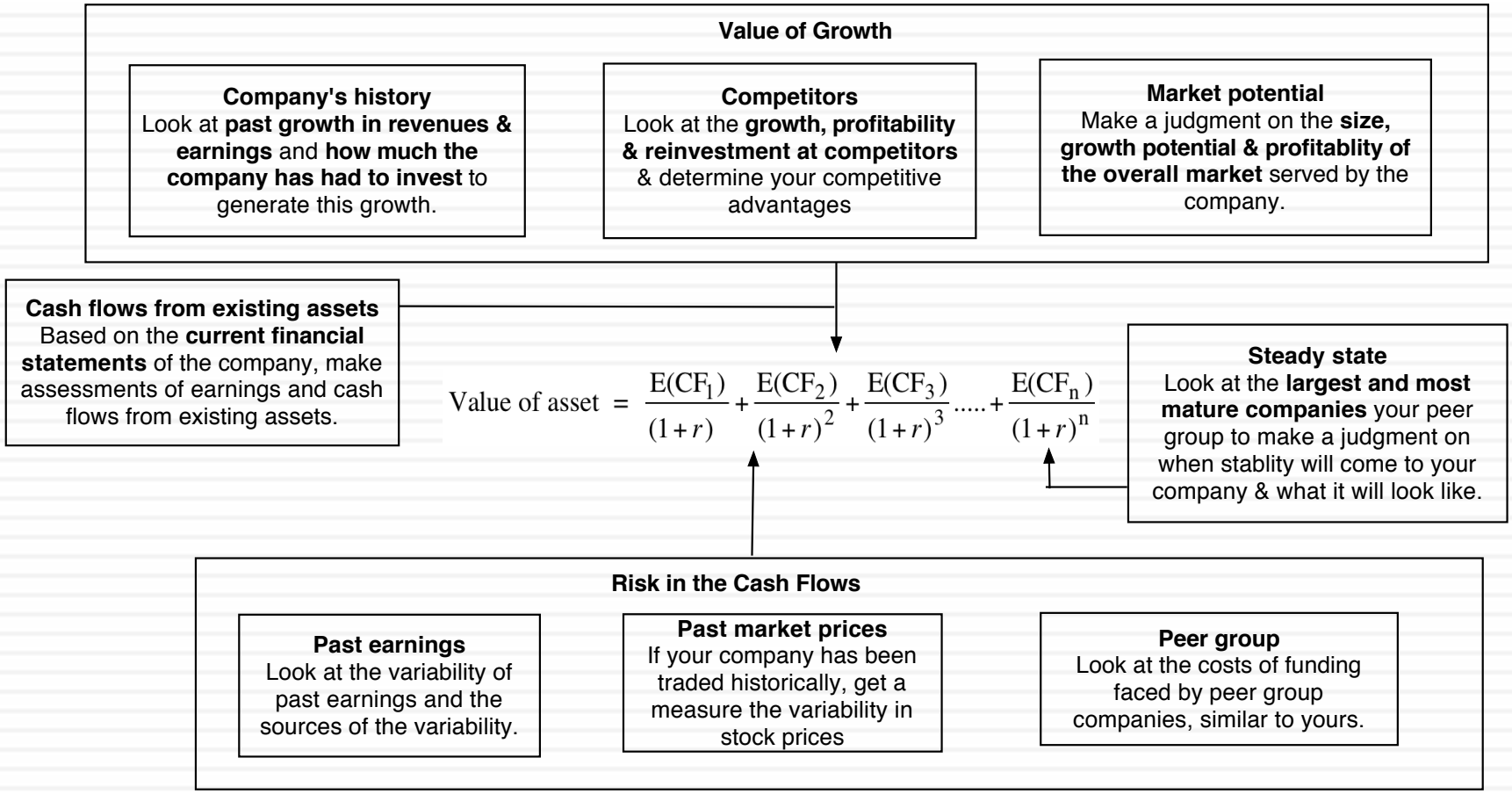
X

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

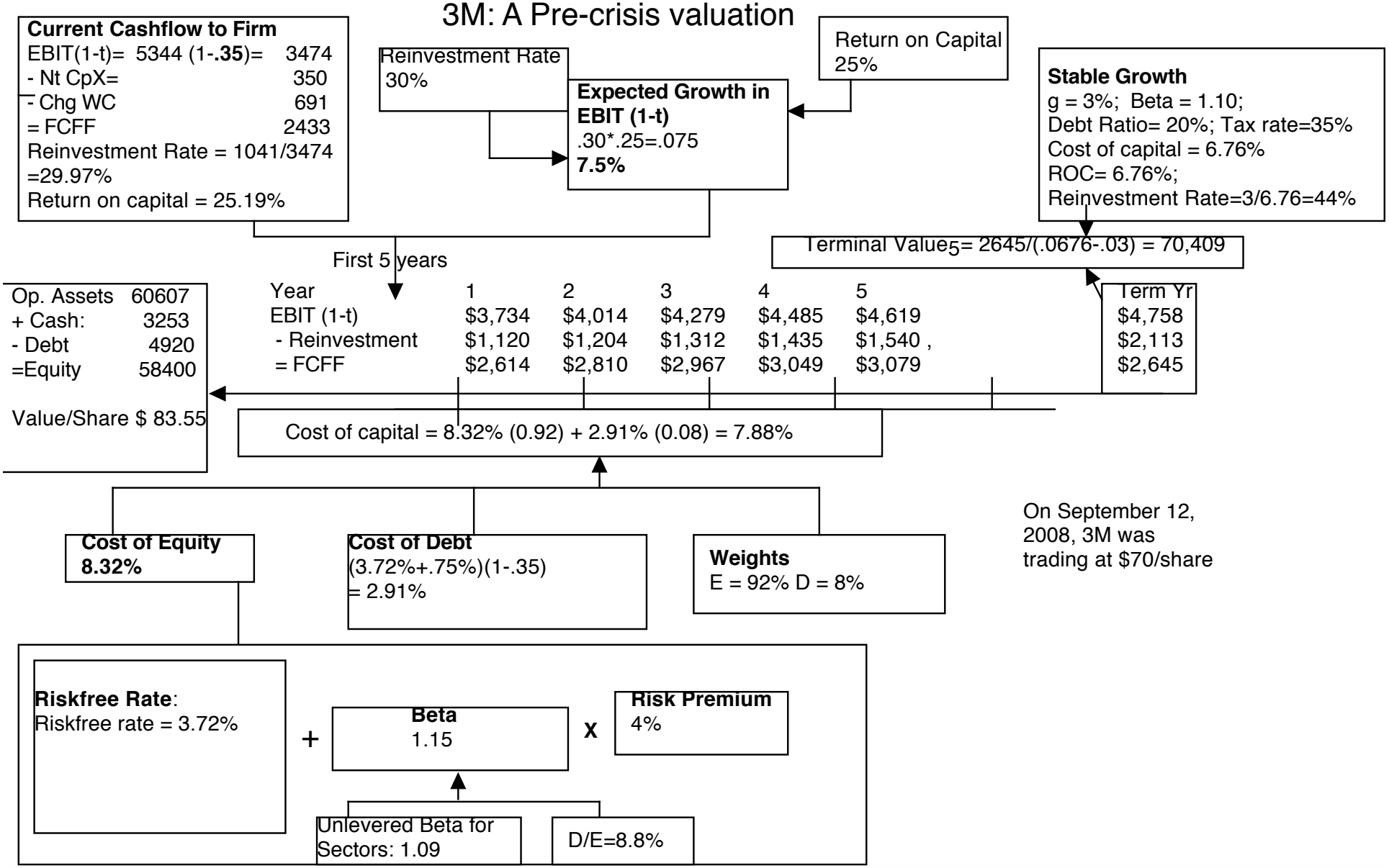
Function of the countries that you do business in and how much value you derive from each country.

III. THE ANALYST'S JOB COPING TOOLS FOR UNCERTAINTY

If your job is assessing value, here are you challenges…



3M: A Pre-crisis valuation



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

Tata Motors: April 2010

Average reinvestment rate from 2005-09: 179.59%; without acquisitions: 70%

Current Cashflow to Firm
EBIT(1-t) : Rs 20,116
- Nt CpX Rs 31,590
- Chg WC Rs 2,732
= FCFF - Rs 14,205
Reinv Rate = (31590+2732)/20116 = 170.61%; Tax rate = 21.00%
Return on capital = 17.16%

Reinvestment Rate 70%

Return on Capital 17.16%

Expected Growth from new inv. .70*.1716=0.1201

Stable Growth
g = 5%; Beta = 1.00
Country Premium= 3%
Cost of capital = 10.39%
Tax rate = 33.99%
ROC= 10.39%;
Reinvestment Rate=g/ROC =5/ 10.39= 48.11%

Terminal Value5= 23493/(.1039-.05) = Rs 435,686

Rs Cashflows

Year	1	2	3	4	5	6	7	8	9	10
EBIT (1-t)	22533	25240	28272	31668	35472	39236	42848	46192	49150	51607
- Reinvestment	15773	17668	19790	22168	24830	25242	25138	24482	23264	21503
FCFF	6760	7572	8482	9500	10642	13994	17711	21710	25886	30104

45278
21785
23493

Op. Assets Rs210,813
+ Cash: 11418
+ Other NO 140576
- Debt 109198
=Equity 253,628

Value/Share Rs 614

Discount at Cost of Capital (WACC) = 14.00% (.747) + 8.09% (0.253) = 12.50%

Growth declines to 5% and cost of capital moves to stable period level.

Cost of Equity 14.00%

Cost of Debt
(5%+ 4.25%+3)(1-.3399)
= 8.09%

Weights
E = 74.7% D = 25.3%

On April 1, 2010
Tata Motors price = Rs 781

Riskfree Rate:
Rs Riskfree Rate= 5%

+ **Beta** 1.20 X **Mature market premium** 4.5% + **Lambda** 0.80 X Country Equity Risk Premium 4.50%

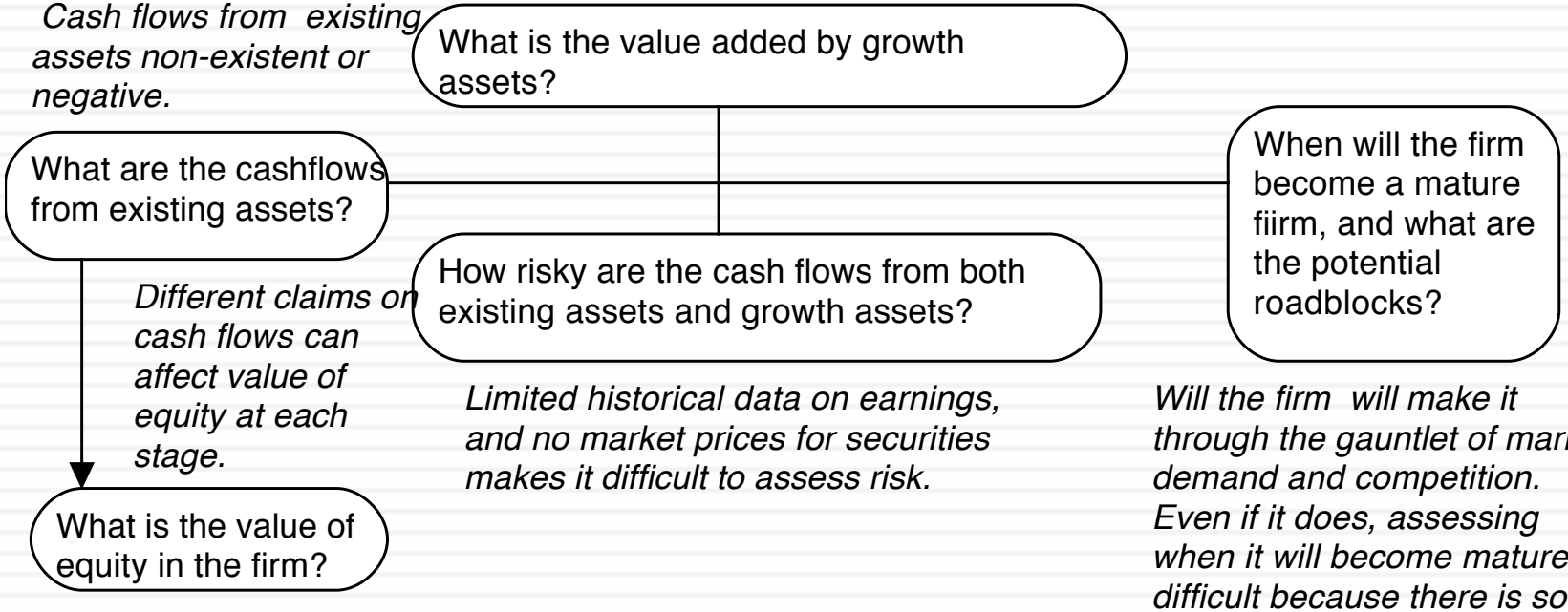
Unlevered Beta for Sectors: 1.04

Firm's D/E Ratio: 33%

Country Default Spread 3% X Rel Equity Mkt Vol 1.50

So, how about a young start-up company?

Making judgments on revenues/ profits difficult becaue 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.



9a. Amazon in January 2000

Current Revenue $ 1,117

Current Margin: -36.71%

EBIT -410m

From previous years

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

	1	2	3	4	5	6	7	8	9	10	Term. Year
Revenue Growth	150.00%	100.00%	75.00%	50.00%	30.00%	25.20%	20.40%	15.60%	10.80%	6.00%	6%
Revenues	$ 2,793	$ 5,585	$ 9,774	$ 14,661	$ 19,059	$ 23,862	$ 28,729	$ 33,211	$ 36,798	$ 39,006	$ 41,346
Operating Margin	-13.35%	-1.68%	4.16%	7.08%	8.54%	9.27%	9.64%	9.82%	9.91%	9.95%	10.00%
EBIT	-$373	-$94	$407	$1,038	$1,628	$2,212	$2,768	$3,261	$3,646	$3,883	$4,135
EBIT(1-t)	-$373	-$94	$407	$871	$1,058	$1,438	$1,799	$2,119	$2,370	$2,524	$2,688
- Reinvestment	$600	$967	$1,420	$1,663	$1,543	$1,688	$1,721	$1,619	$1,363	$961	$155
FCFF	-$931	-$1,024	-$989	-$758	-$408	-$163	$177	$625	$1,174	$1,788	$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

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

Terminal year (11)

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

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.

Perception versus Reality

Company	*Market Capitalization*	*Enterprise Value*	*Current Revenues*	*Breakeven Revenues (2023)*	*% from Online Ads (2012)*	*Imputed Online Ad Revenue (2023)*	*Cost of capital*	*Target margin*
Google	$291,586.00	$240,579.00	$56,594.00	$168,336.00	87.07%	$146,570.16	10%	22.49%
Facebook	$119,769.00	$111,684.00	$6,118.00	$90,959.00	84.08%	$76,478.33	10%	29.99%
Yahoo!	$34,688.00	$29,955.00	$4,823.00	$17,695.00	100%	$17,695.00	10%	25.00%
Linkedin	$27,044.00	$26,171.00	$1,244.00	$32,110.00	80.41%	$25,819.65	10%	25.00%
Twitter (Est)	$12,000.00	$11,000.00	$448.00	$7,846.00	90.00%	$7,061.40	10%	25.00%
Pandora	$4,833.00	$4,774.00	$528.00	$3,085.00	87.84%	$2,709.86	10%	25.00%
Yelp	$4,422.00	$4,325.00	$179.00	$2,825.00	94.31%	$2,664.26	10%	25.00%
Zillow	$3,192.00	$3,060.00	$152.00	$1,984.00	25.83%	$512.47	10%	25.00%
AOL	$2,586.00	$2,208.00	$2,211.00	$10,055.00	64.72%	$6,507.60	10%	9.32%
Retailmenot	$1,718.00	$1,644.00	$169.00	$1,605.00	100%	$1,605.00	10%	25.00%
OpenTable	$1,597.00	$1,505.00	$173.77	$1,361.38	74.22%	$1,010.42	10%	25.00%
US based	**$503,435.00**	**$436,905.00**	**$72,639.77**	**$337,861.38**	**$8.88**	**$288,634.13**		
Baidu	$53,589.00	$49,961.00	$4,182.00	$15,526.00	99.73%	$15,484.08	10%	25.00%
Sohu.com	$3,166.00	$2,540.00	$1,231.00	$1,338.00	36.33%	$486.10	10%	21.45%
Naver	$17,843.00	$17,595.00	$133.00	$11,227.00	62.94%	$7,066.27	10%	25.00%
Yandex	$12,654.00	$11,872.00	$1,065.00	$7,684.00	98%	$7,505.73	10%	25.00%
Global	**$590,687.00**	**$518,873.00**	**$79,250.77**	**$373,636.38**	**$11.85**	**$319,176.31**		

Tools 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 kill you…

1. Less is more

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

Use “auto pilot” approaches to estimate future years

Principle of parsimony: Estimate fewer inputs when faced with uncertainty.

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

		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 market will be close to $200 billion and Twitter will about 5.7% ($11.5 billion)

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

Aswath Damodaran

2. Build in "internal" checks for reasonableness…

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%

Check total revenues, relative to the market that it serves… Your market share obviously cannot exceed 100% but there may be tighter constraints.

Are the margins and imputed returns on capital 'reasonable' in the outer years?

3. Stay consistent

(1.125)*(1.01/1.04)-1 = .0925

	In Indian Rupees	In US $
Risk free Rate	5.00%	2.00%
Expected inflation rate	4.00%	1.00%
Cost of capital - High Growth - Stable Growth	 12.50% 10.39%	 9.25% 7.21%
Expected growth rate - High Growth - Stable Growth	 12.01% 5.00%	 8.78% 2.00%
Return on Capital - High Growth - Stable Growth	 17.16% 10.39%	 13.78% 7.21%
Value per share	Rs 614	$12.79/share (roughly Rs 614 at current exchange rate)

4. Draw on economic first principles and mathematical limits…

Stable growth rate	*3M*	*Tata Motors*	*Amazon*	*Twitter*
0%	$70,409	435,686₹	$26,390	$23,111
1%	$70,409	435,686₹	$28,263	$24,212
2%	$70,409	435,686₹	$30,595	$25,679
3%	$70,409	435,686₹	$33,594	
4%		435,686₹	$37,618	
5%		435,686₹	$43,334	
			$52,148	
Riskfree rate	3.72%	5%	6.60%	2.70%
ROIC	6.76%	10.39%	20%	12.00%
Cost of capital	6.76%	10.39%	9.61%	8.00%

Perception versus Reality

Company	*Market Capitalization*	*Enterprise Value*	*Current Revenues*	*Breakeven Revenues (2023)*	*% from Online Ads (2012)*	*Imputed Online Ad Revenue (2023)*	*Cost of capital*	*Target margin*
Google	$291,586.00	$240,579.00	$56,594.00	$168,336.00	87.07%	$146,570.16	10%	22.49%
Facebook	$119,769.00	$111,684.00	$6,118.00	$90,959.00	84.08%	$76,478.33	10%	29.99%
Yahoo!	$34,688.00	$29,955.00	$4,823.00	$17,695.00	100%	$17,695.00	10%	25.00%
Linkedin	$27,044.00	$26,171.00	$1,244.00	$32,110.00	80.41%	$25,819.65	10%	25.00%
Twitter (Est)	$12,000.00	$11,000.00	$448.00	$7,846.00	90.00%	$7,061.40	10%	25.00%
Pandora	$4,833.00	$4,774.00	$528.00	$3,085.00	87.84%	$2,709.86	10%	25.00%
Yelp	$4,422.00	$4,325.00	$179.00	$2,825.00	94.31%	$2,664.26	10%	25.00%
Zillow	$3,192.00	$3,060.00	$152.00	$1,984.00	25.83%	$512.47	10%	25.00%
AOL	$2,586.00	$2,208.00	$2,211.00	$10,055.00	64.72%	$6,507.60	10%	9.32%
Retailmenot	$1,718.00	$1,644.00	$169.00	$1,605.00	100%	$1,605.00	10%	25.00%
OpenTable	$1,597.00	$1,505.00	$173.77	$1,361.38	74.22%	$1,010.42	10%	25.00%
US based	**$503,435.00**	**$436,905.00**	**$72,639.77**	**$337,861.38**	**$8.88**	**$288,634.13**		
Baidu	$53,589.00	$49,961.00	$4,182.00	$15,526.00	99.73%	$15,484.08	10%	25.00%
Sohu.com	$3,166.00	$2,540.00	$1,231.00	$1,338.00	36.33%	$486.10	10%	21.45%
Naver	$17,843.00	$17,595.00	$133.00	$11,227.00	62.94%	$7,066.27	10%	25.00%
Yandex	$12,654.00	$11,872.00	$1,065.00	$7,684.00	98%	$7,505.73	10%	25.00%
Global	**$590,687.00**	**$518,873.00**	**$79,250.77**	**$373,636.38**	**$11.85**	**$319,176.31**		

5. Use the market as a crutch… ERP as an illustration

	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2013	7.93%	6.29%	6.02%	4.62%
Std Error	*2.19%*	*2.34%*		
1964-2013	6.18%	4.32%	4.83%	3.33%
Std Error	*2.42%*	*2.75%*		
2004-2013	7.55%	4.41%	5.80%	3.07%
Std Error	*6.02%*	*8.66%*		

← *Historical premium*

Base year cash flow
Dividends (TTM): 34.32
+ Buybacks (TTM): 49.85
= Cash to investors (TTM): 84.16
Earnings in TTM:

Expected growth in next 5 years
Top down analyst estimate of earnings growth for S&P 500 with stable payout: 4.28%

E(Cash to investors) 87.77 91.53 95.45 99.54 103.80

S&P 500 on 1/1/14 = 1848.36

Beyond year 5
Expected growth rate = Riskfree rate = 3.04%
Terminal value = 103.8(1.0304)/(,08 - .0304)

$$\frac{87.77}{(1+r)^1}+\frac{91.53}{(1+r)^2}+\frac{95.45}{(1+r)^3}+\frac{99.54}{(1+r)^4}+\frac{103.80}{(1+r)^5}+\frac{103.80(1.0304)}{(r-.0304)(1+r)^5}=1848.36$$

r = Implied Expected Return on Stocks = 8.00%

Minus

Risk free rate = T.Bond rate on 1/1/14=3.04%

Equals

Implied Equity Risk Premium (1/1/14) = 8% - 3.04% = 4.96%

ERP : Jan 2014

Andorra	6.80%	1.80%
Austria	5.00%	0.00%
Belgium	5.90%	0.90%
Cyprus	20.00%	15.00%
Denmark	5.00%	0.00%
Finland	5.00%	0.00%
France	5.60%	0.60%
Germany	5.00%	0.00%
Greece	20.00%	15.00%
Iceland	8.30%	3.30%
Ireland	8.75%	3.75%
Italy	7.85%	2.85%
Liechtenstein	5.00%	0.00%
Luxembourg	5.00%	0.00%
Malta	6.80%	1.80%
Netherlands	5.00%	0.00%
Norway	5.00%	0.00%
Portugal	10.40%	5.40%
Spain	8.30%	3.30%
Sweden	5.00%	0.00%
Switzerland	5.00%	0.00%
Turkey	8.30%	3.30%
United Kingdom	5.60%	0.60%
Western Europe	**6.29%**	**1.29%**

Canada	5.00%	0.00%
United States of America	5.00%	0.00%
North America	**5.00%**	**0.00%**

Argentina	14.75%	9.75%
Belize	18.50%	13.50%
Bolivia	10.40%	5.40%
Brazil	7.85%	2.85%
Chile	5.90%	0.90%
Colombia	8.30%	3.30%
Costa Rica	8.30%	3.30%
Ecuador	16.25%	11.25%
El Salvador	10.40%	5.40%
Guatemala	8.75%	3.75%
Honduras	13.25%	8.25%
Mexico	7.40%	2.40%
Nicaragua	14.75%	9.75%
Panama	7.85%	2.85%
Paraguay	10.40%	5.40%
Peru	7.85%	2.85%
Suriname	10.40%	5.40%
Uruguay	8.30%	3.30%
Venezuela	16.25%	11.25%
Latin America	**8.62%**	**3.62%**

Angola	10.40%	5.40%
Benin	13.25%	8.25%
Botswana	6.28%	1.28%
Burkina Faso	13.25%	8.25%
Cameroon	13.25%	8.25%
Cape Verde	13.25%	8.25%
DR Congo	14.75%	9.75%
Egypt	16.25%	11.25%
Gabon	10.40%	5.40%
Ghana	11.75%	6.75%
Kenya	11.75%	6.75%
Morocco	8.75%	3.75%
Mozambique	11.75%	6.75%
Namibia	8.30%	3.30%
Nigeria	10.40%	5.40%
Rep Congo	10.40%	5.40%
Rwanda	13.25%	8.25%
Senegal	11.75%	6.75%
South Africa	7.40%	2.40%
Tunisia	10.40%	5.40%
Uganda	11.75%	6.75%
Zambia	11.75%	6.75%
Africa	**10.04%**	**5.04%**

Albania	11.75%	6.75%
Armenia	9.50%	4.50%
Azerbaijan	8.30%	3.30%
Belarus	14.75%	9.75%
Bosnia and Herzegovina	14.75%	9.75%
Bulgaria	7.85%	2.85%
Croatia	8.75%	3.75%
Czech Republic	6.05%	1.05%
Estonia	6.05%	1.05%
Georgia	10.40%	5.40%
Hungary	8.75%	3.75%
Kazakhstan	7.85%	2.85%
Latvia	7.85%	2.85%
Lithuania	7.40%	2.40%
Macedonia	10.40%	5.40%
Moldova	14.75%	9.75%
Montenegro	10.40%	5.40%
Poland	6.28%	1.28%
Romania	8.30%	3.30%
Russia	7.40%	2.40%
Serbia	11.75%	6.75%
Slovakia	6.28%	1.28%
Slovenia	8.75%	3.75%
Ukraine	16.25%	11.25%
E. Europe & Russia	**7.96%**	**2.96%**

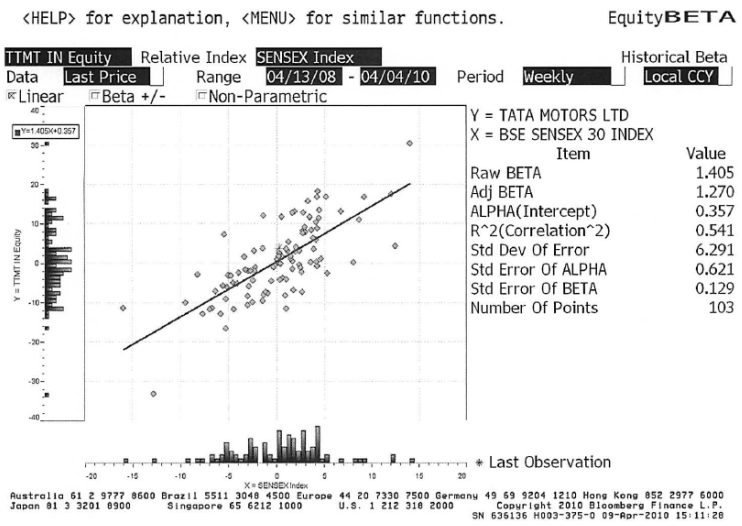
Abu Dhabi	5.75%	0.75%
Bahrain	7.85%	2.85%
Israel	6.05%	1.05%
Jordan	11.75%	6.75%
Kuwait	5.75%	0.75%
Lebanon	11.75%	6.75%
Oman	6.05%	1.05%
Qatar	5.75%	0.75%
Saudi Arabia	5.90%	0.90%
United Arab Emirates	5.75%	0.75%
Middle East	**6.14%**	**1.14%**

Bangladesh	10.40%	5.40%
Cambodia	13.25%	8.25%
China	5.90%	0.90%
Fiji	11.75%	6.75%
Hong Kong	5.60%	0.60%
India	8.30%	3.30%
Indonesia	8.30%	3.30%
Japan	5.90%	0.90%
Korea	5.90%	0.90%
Macao	5.90%	0.90%
Malaysia	6.80%	1.80%
Mauritius	7.40%	2.40%
Mongolia	11.75%	6.75%
Pakistan	16.25%	11.25%
Papua New Guinea	11.75%	6.75%
Philippines	8.30%	3.30%
Singapore	5.00%	0.00%
Sri Lanka	11.75%	6.75%
Taiwan	5.90%	0.90%
Thailand	7.40%	2.40%
Vietnam	13.25%	8.25%
Asia	**6.51%**	**1.51%**

Australia	5.00%	0.00%
Cook Islands	11.75%	6.75%
New Zealand	5.00%	0.00%
Australia & New Zealand	**5.00%**	**0.00%**

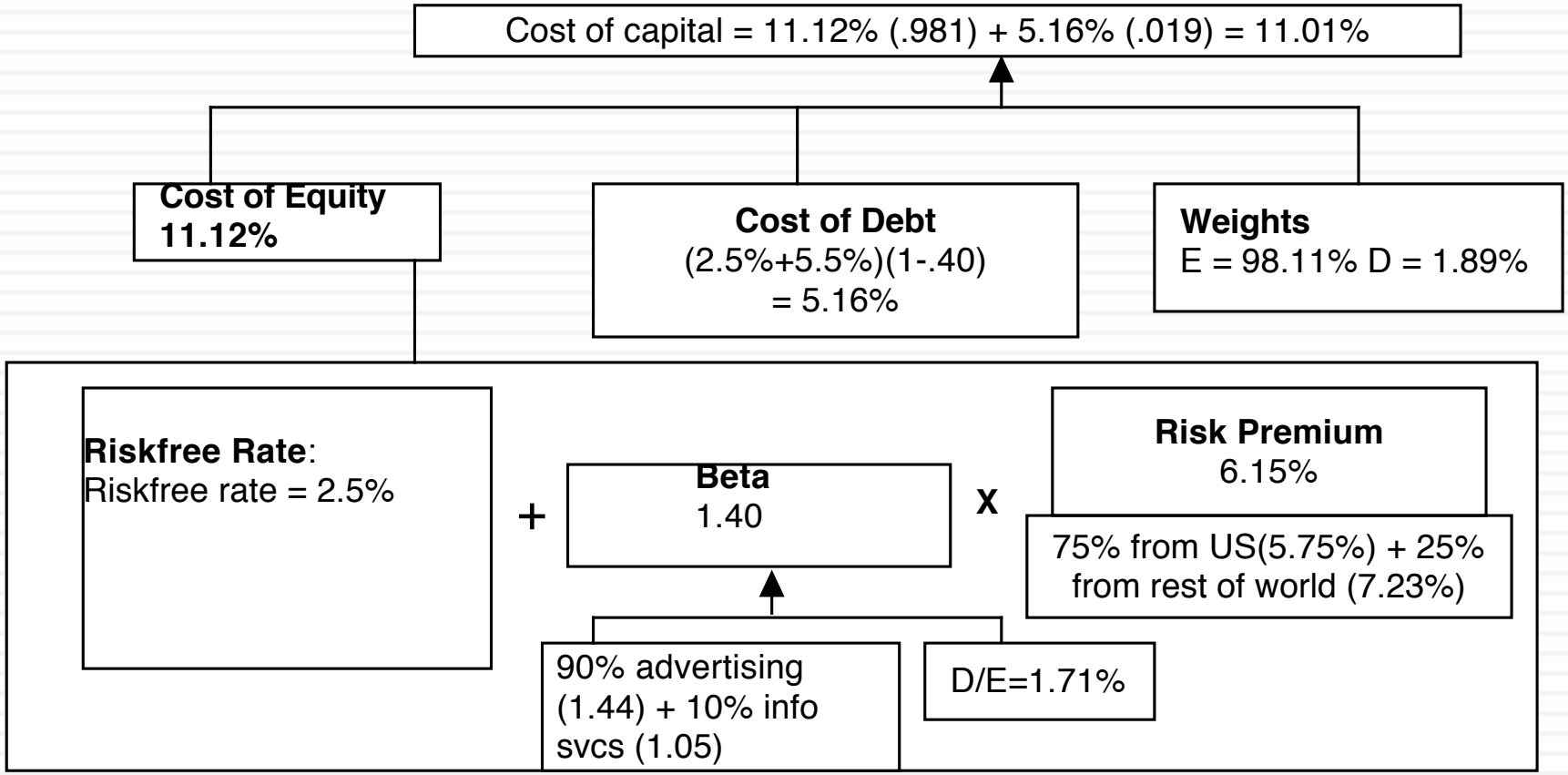
Black #: Total ERP
Red #: Country risk premium
AVG: GDP weighted average

6. Draw on the law of large numbers…

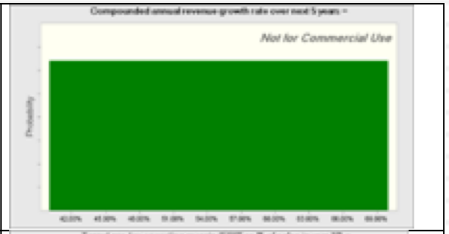
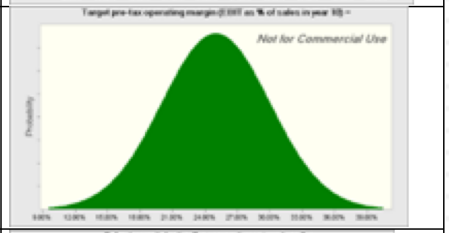
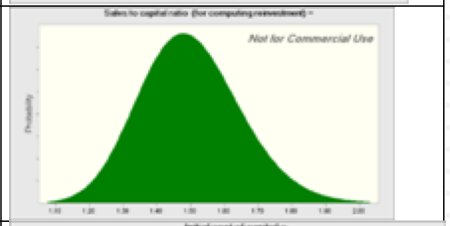
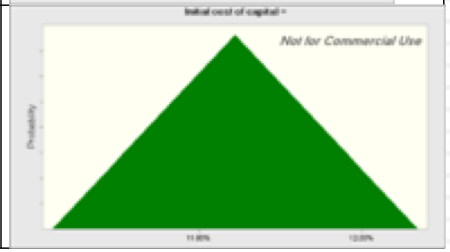


- To estimate the beta for Tata Motors
  - Unlevered beta for automobile company = 0.98
  - D/E ratio for Tata Motors = 33.87%
  - Marginal tax rate in India = 33.99%
  - Levered beta = 0.98 (1+ (1-.3399)(.3387)) = 1.20

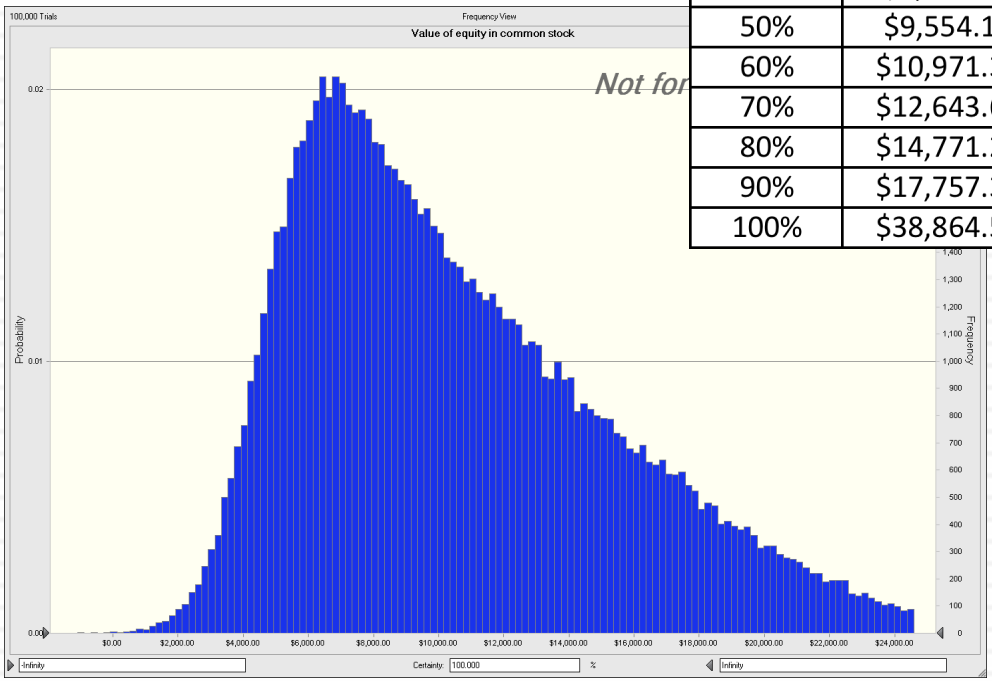
7. And don't sweat the small stuff



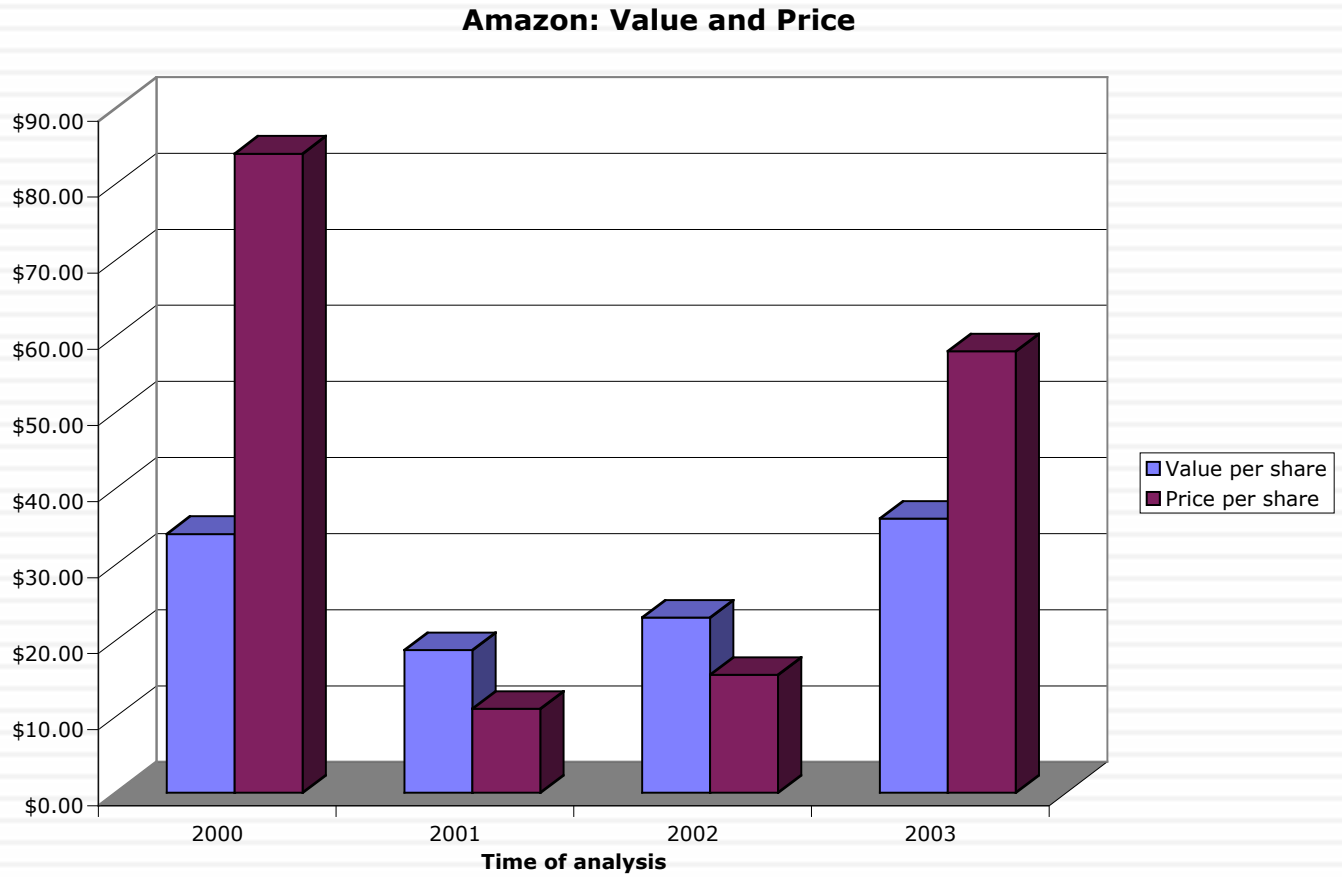
8. Confront uncertainty, if you can…

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



9. Don’t look for precision..



10. And don't expect market vindication: Price ≠ Value

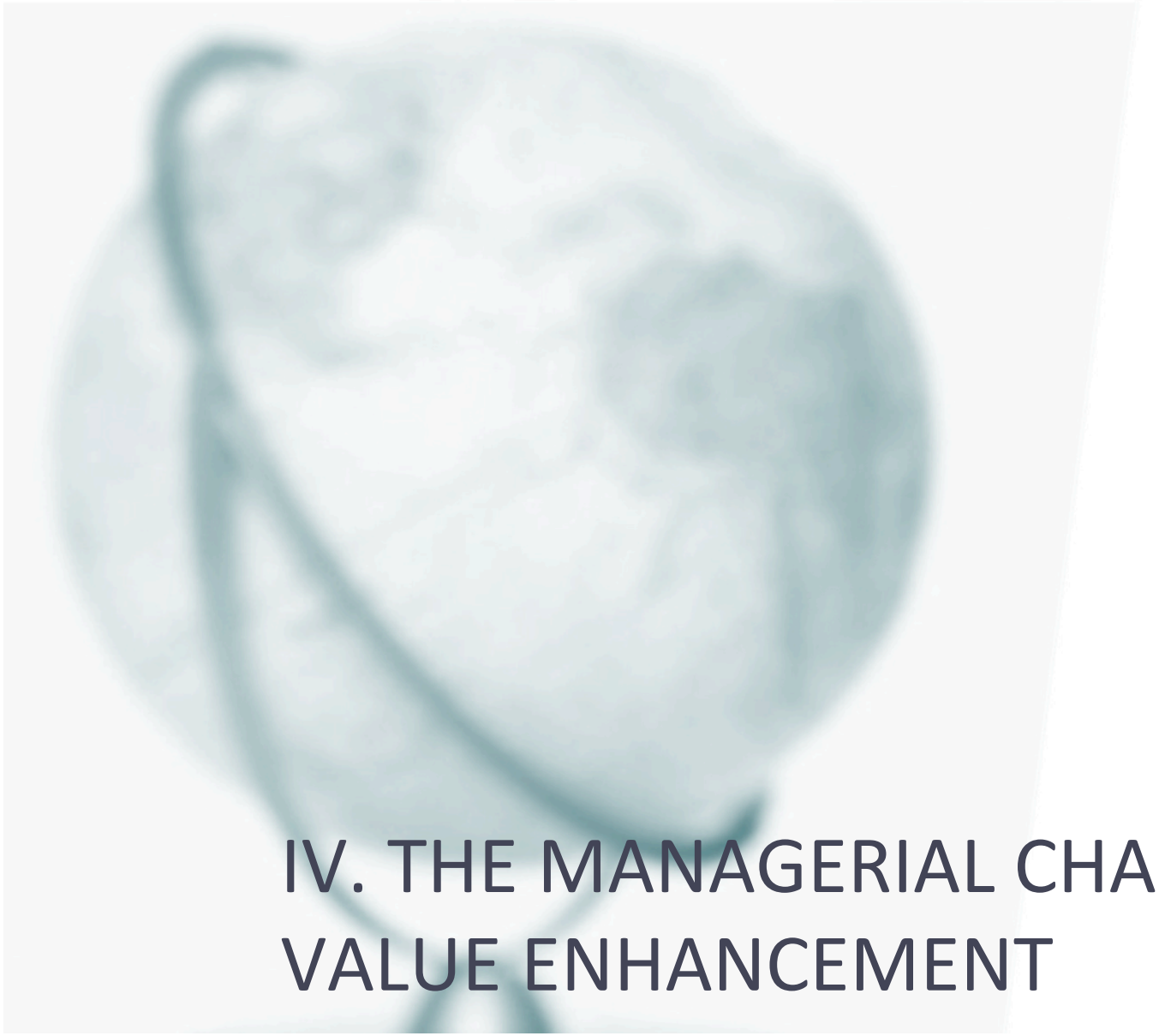
How is the price set?

Just Facebook and Linkedin							
Company	*EV*	*Market Cap*	*EV/Sales*	*EV/EBITDA*	*PE*	*Market Cap/User*	*Market Cap/Employee*
Facebook, Inc. (NasdaqGS:FB)	$100,017.00	$107,909.00	16.35	36.20	193.73	$97.22	$20.36
LinkedIn Corporation (NYSE:LNKD)	$28,448.50	$29,321.90	22.87	179.26	729.40	$130.32	$6.91
Facebook + Linkedin	$128,465.50	$137,230.90	17.45	43.97	229.79	$102.79	$14.38
Social Media/Internet Medley							
Facebook, Inc. (NasdaqGS:FB)	$100,017.00	$107,909.00	16.35	36.20	193.73	$97.22	$20.36
Google Inc. (NasdaqGS:GOOG)	$248,856.30	$296,078.30	4.46	14.64	25.45	$270.89	$6.61
LinkedIn Corporation (NYSE:LNKD)	$28,448.50	$29,321.90	22.87	179.26	729.40	$130.32	$6.91
Netlfix	$13,959.00	$14,539.00	3.54	81.20	304.80	$403.86	$7.11
OpenTable, Inc. (NasdaqGS:OPEN)	$1,641.70	$1,733.70	9.45	30.35	59.99	$15.34	$3.02
Pandora Media, Inc. (NYSE:P)	$4,163.40	$4,232.30	7.89	NA	NA	$21.16	$5.72
RetailMeNot	$1,723.60	$1,715.00	10.20	34.20	64.96	$147.84	$4.60
Trulia, Inc. (NYSE:TRLA)	$1,647.39	$1,853.10	17.75	NA	NA	$59.02	$3.57
Yelp, Inc. (NYSE:YELP)	$4,006.10	$4,102.90	22.42	NA	NA	$41.03	$2.67
Zillow, Inc. (NasdaqGS:Z)	$3,419.80	$3,589.50	22.48	NA	NA	$78.20	$5.22
Yahoo! Inc. (NasdaqGS:YHOO)	$27,262.80	$29,854.60	5.65	21.24	7.19	$106.24	$2.55
Groupon	$5,857.00	$7,039.00	2.42	44.04	NA	$168.80	$0.62
Travelzoo Inc. (NasdaqGS:TZOO)	$347.20	$421.10	2.23	12.81	23.39	$16.20	$0.95
Aggregate	*$441,349.79*	*$502,389.40*	*5.82*	*20.43*	*30.76*	*$151.57*	*$5.96*
Median			*8.67*	*32.27*	*59.99*	*101.73*	*4.91*
Average			*10.97*	*47.44*	*159.96*	*121.98*	*5.42*

*Twitter's value based on revenues = $543 million * ?*
*Twitter's value based on # users = 250 million * ?*

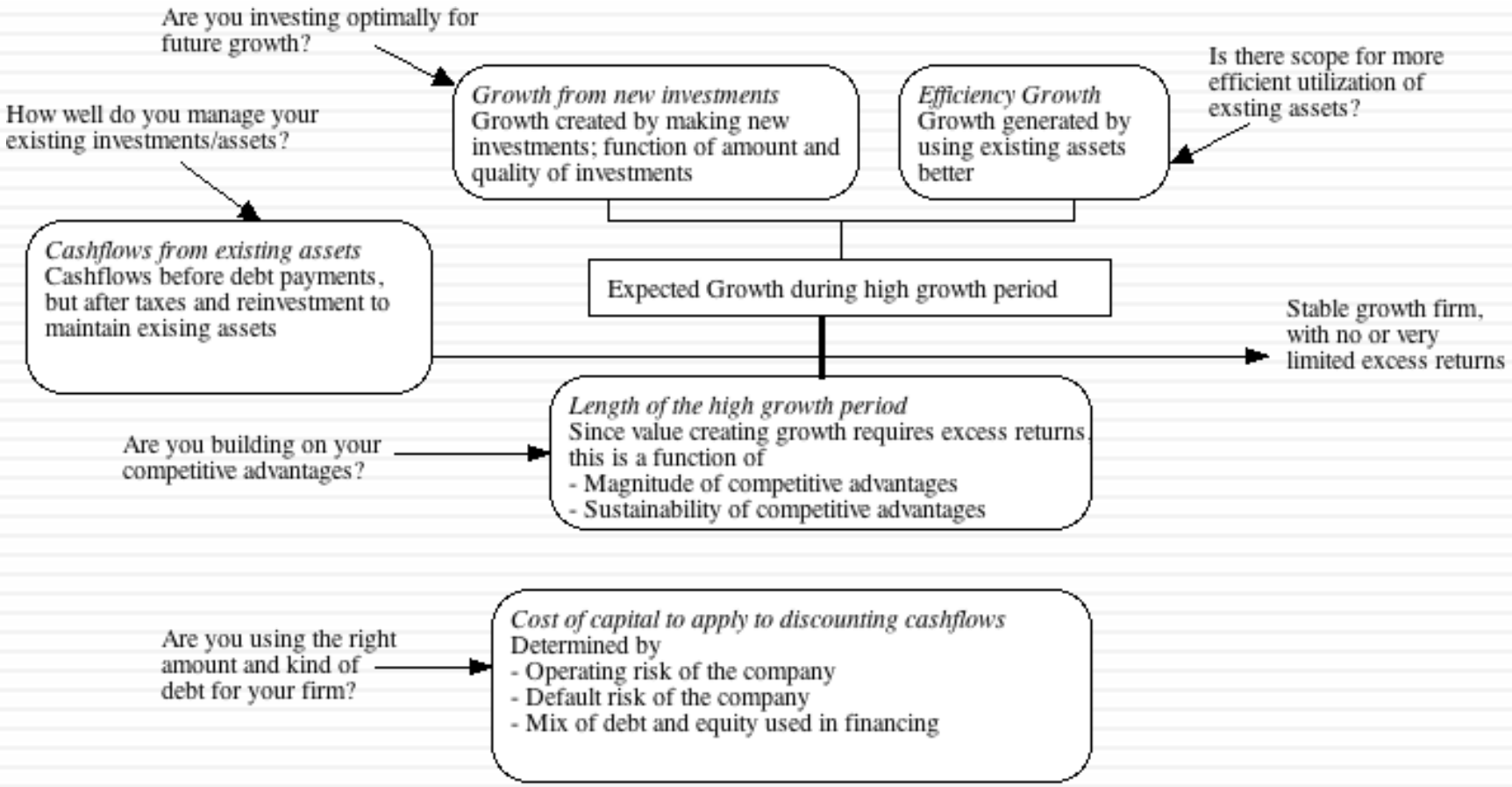
Canards about young, growth companies

1. **They cannot be valued**: That is absolute nonsense. The fact that you are uncertain about the future does not mean that you cannot make estimates. It is just that you will have more uncertainty around those estimates.
2. **Even if they can be valued, there is no point to it because there is too much uncertainty**: The payoff to valuation is not in how precise your valuation is but in how precise it is, relative to other people valuing the same company. You don't have to be right. You just have to be less wrong than everyone else and your odds are better with young, growth companies and when there is a lot of uncertainty than with mature companies in stable environments.
3. **They are always over priced**: Not true. They are always mispriced but they can be under priced as well as over priced.
4. **Bubbles are bad**: Even if you accept the proposition that there is a bubble in the social media portion of the market, is it a bad thing? I am not sure.



IV. THE MANAGERIAL CHALLENGE: VALUE ENHANCEMENT

If your job is creating or enhancing value, here are your pathways..



Step 1. Develop a risk profile

- List the risks you are exposed to as a business, from the risk of a supplier failing to deliver supplies to environmental/social risk.
- Categorize the risk into groups: Not all risks are made equal and it makes sense to break risks down into:
  - Economic versus non-Economic risks
  - Market versus Firm-specific risks
  - Operating versus Financial risk
  - Continuous versus Discrete risk
  - Catastrophic versus smaller risks
- Measure exposure to each risk (if possible): Use historical data and subjective judgments to make your best estimates.

Task 1: Risk in your organization

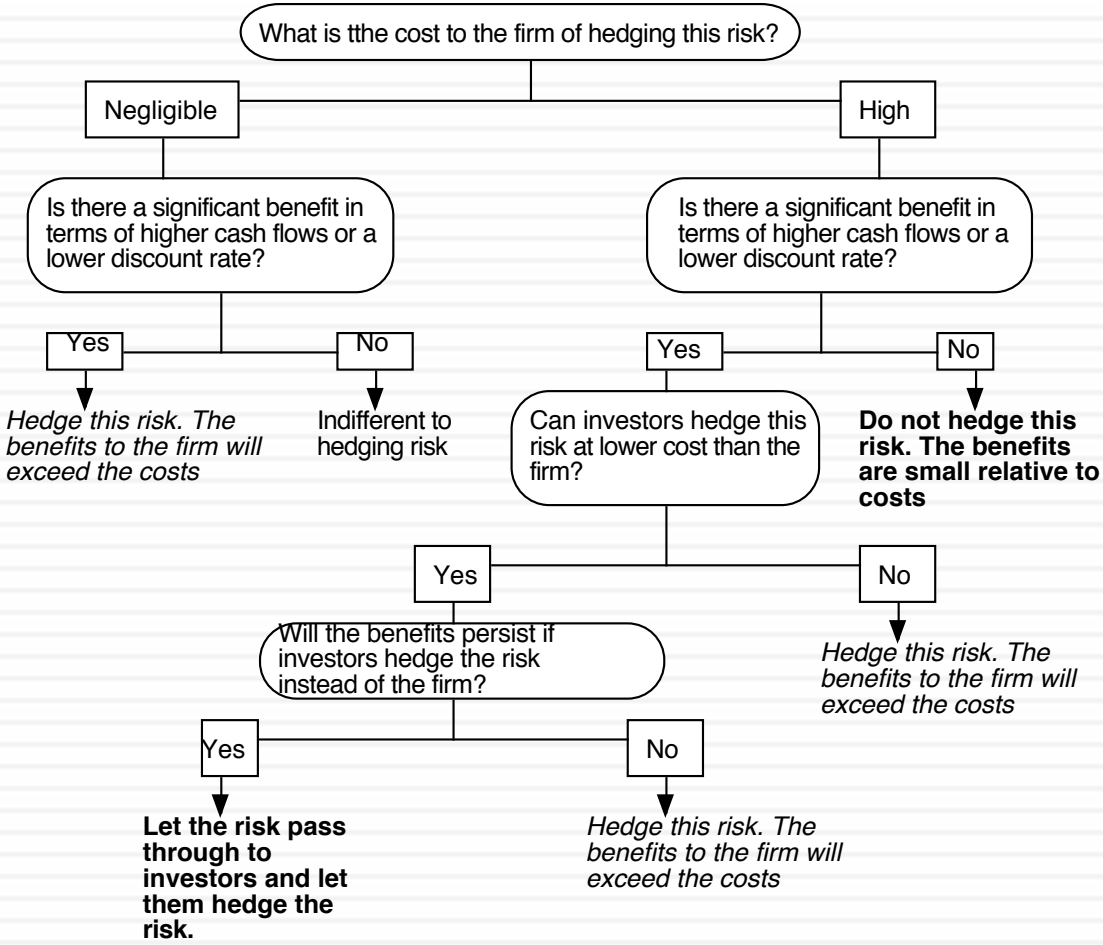
- List the five biggest risks that you see your firm (organization) facing, and then categorize them.

Risk	Micro or Macro	Discrete or Continuous	Catastrophic or Small
1.			
2.			
3.			
4.			
5.			

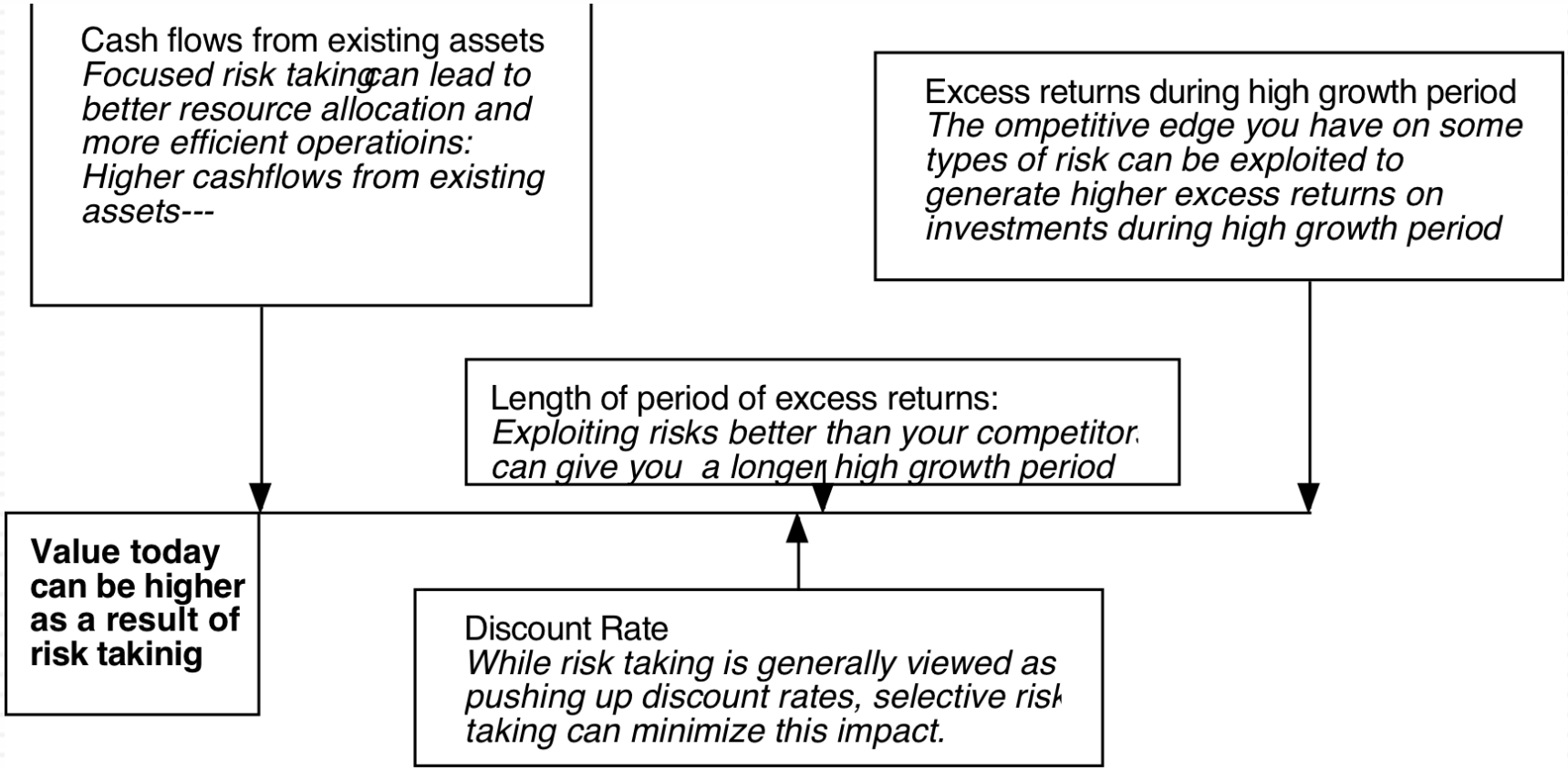
Step 2: Decide on what risks to take, which ones to avoid and which ones to pass through

- Every business (individual) is faced with a laundry list of risks. The key to success is to not avoid every risk, or take every one but to classify these risks into
  - Risks to pass through to the investors in the business.
  - Risks to avoid or hedge.
  - Risks to seek out
- In practice, firms often hedge risk that they should be passing through, seek out some risks that they should not be seeking out and avoid risks that they should be taking.

A framework for risk hedging..

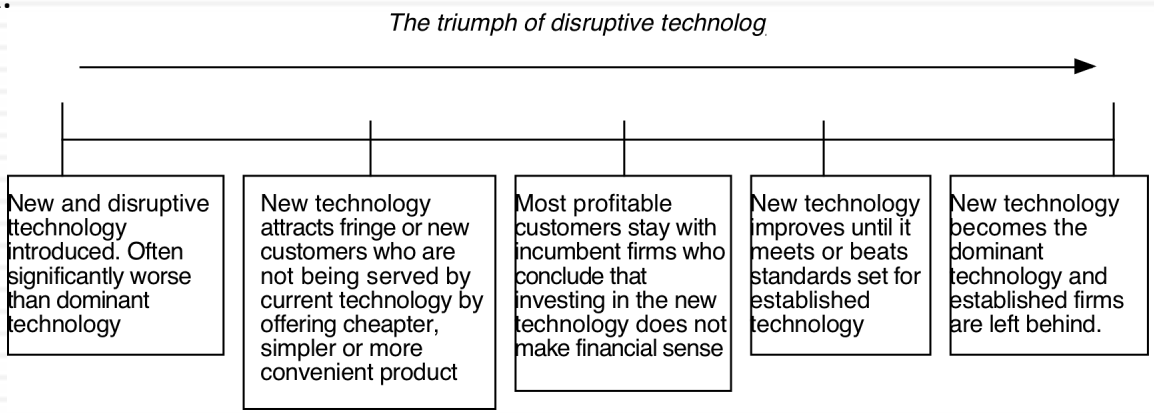


A framework for risk taking



How do you exploit risk?

1. Information Advantage: In a crisis, getting better information (and getting it early) can allow be a huge benefit.
2. Speed Advantage: Being able to act quickly (and appropriately) can allow a firm to exploit opportunities that open up in the midst of risk.
3. Experience/Knowledge Advantage: Firms (and managers) who have been through similar crises in the past can use what they have learned.
4. Resource Advantage: Having superior resources can allow a firm to withstand a crisis that devastates its competition. The resource advantage can come from either improved access to capital or having debt capacity.
5. Flexibility: Building in the capacity to change course quickly can be an advantage when faced with risk.



Task 2: Risk actions

- Take the five risks that you listed in task 1 and consider for each one, whether you will pass the risk through to your investors, hedge the risk or seek out and exploit the risk.

Risk	Action (Hedge, Pass through or exploit)	Why?

Step 3: Build a successful risk taking organization..

1. Align interests: If the decision makers at every level of the organization are aligned in their interests, risk taking will be more focused and improved.
2. Pick the right people: Good risk takers are both realistic & optimistic and are willing to make decisions with limited or incomplete information. You need a hiring process that looks for these risk takers and an organization that keeps them interested and involved.
3. Set up incentives to reward good risk taking: You should reward good risk taking behavior, not good outcomes and punish bad risk taking behavior, even if it makes money.
4. Make sure that the organizational culture is attuned to risk taking: Some firms are clearly much more open to risk taking and its consequences, positive as well as negative. One key factor in risk taking is how the firm deals with failure.
5. Preserve your options: Be flexible. With mistakes, cut your losses quickly. With good bets, be quick to build on success.

Task 3: Assess the "risk taking" capacity of your organization

Dimension	Your organization's standing
1. Are the interests of managers aligned with the interests of capital providers?	❑Aligned with stockholders ❑Aligned with bondholders ❑Aligned with their own interests
2. Do you have the right people in place to deal with risk?	❑Too many risk takers ❑Too many risk avoiders ❑Right balance
3. Is the incentive process designed to encourage good risk taking?	❑Discourages all risk taking ❑Encourages too much risk taking ❑Right balance
4. What is the risk culture in your organization?	❑Risk seeking ❑Risk avoiding ❑No risk culture
5. Have much flexibility is there in terms of exploiting upside risk and protecting against downside risk?	❑Good on exploiting upside risk ❑Good in protecting against downside ❑Good on both

And here is the most important ingredient in risk management: Be lucky…

- Proposition 1: Today's hero will be tomorrow's goat (and vice verse). There are no experts. Let your common sense guide you.
- Proposition 2: Don't mistake luck for skill. Do not over react either to success or to failure. Chill!
- Proposition 3: Life is not fair. You can do everything right and go bankrupt. You can do everything wrong and make millions.