




PRICE AND VALUE: WHAT'S YOUR GAME?

February 2014

Aswath Damodaran

Test 1: Are you pricing or valuing?

2

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





\$995,000
Price

3
Beds

2.5
Baths


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

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

Favorite X-Out Share... Tour Home


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



Lisa Padilla
REDFIN Real Estate Agent

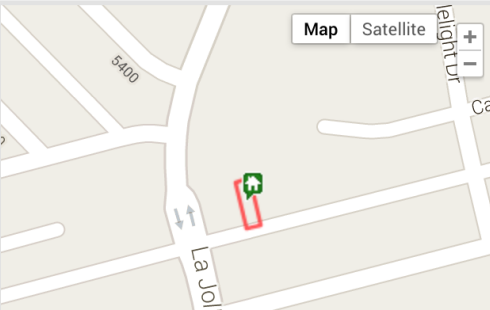
★★★★★
47 client reviews



\$8,726 commission refund

 Go Tour This Home

[Ask Lisa a Question](#) or [Start an Offer](#)

1 of 4 Redfin Agents in this area



1 of 25  

Test 2: Are you pricing or valuing?

3

The image shows a Ticketmaster interface for purchasing NFL tickets. On the left is a stadium seating chart with colored dots indicating deal quality. On the right is a search results table for 4 tickets.

Stadium Seating Chart Legend:

- Awful Deals: Red dot
- Bad Deals: Orange dot
- Good Deals: Yellow dot
- Best Deals: Green dot

Search Results Table:

Deal Score	Section	Market	Price per ticket
82	117	7 tix PRINESPORT	\$2,413
82	117	6 tix PRINESPORT	\$2,413
82	117	8 tix PRINESPORT	\$2,413
82	139	4 tix TN Direct	\$3,486
81	224 A	14 tix PRINESPORT	\$1,760
81	126	12 tix TN Direct	\$1,849

Search Parameters:

- # Tickets: 4
- Price per ticket: \$717 (range \$717 - \$7349)

Test 3: Are you pricing or valuing?

4

Rating
Buy

Europe
Switzerland

Biotechnology
Biotechnology

Company
BB BIOTECH

Reuters BION.S Bloomberg BION SW Exchange SWX Ticker BION

Date
13 August 2013

Forecast Change

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.

BB Biotech shares remain attractive

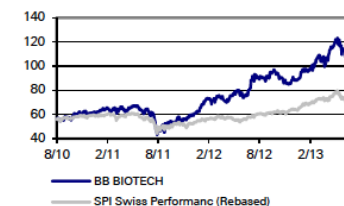
In the first 6M of 2013, BB Biotech increased its NAV by 36%, which marks good outperformance against the Nasdaq Biotech Index (NBI)'s 27%. This is a remarkable performance after 2012 when BRR's NAV increase of 45% also

Key changes

Target Price 106.50 to 164.50 ↑ 54.5%

Source: Deutsche Bank

Price/price relative



Performance (%)	1m	3m	12m
Absolute	-1.4	5.4	37.4
SPI Swiss Performance IX	0.5	-1.4	26.4

Source: Deutsche Bank

Test 4: Are you pricing or valuing?

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A Venture Capital “Valuation”

Today

Young software company
Revenues = \$2 m
Earnings (Loss) = -\$1 m

Exit Year (Year 3)

Estimated revenues = \$50 m
Estimated earnings = \$10 million
Exit Earnings Multiple = 20
Estimated Exit Value = \$10 * 20 = \$200 m

Value today
= $200/1.5^3$
= \$59.26 m

Discount back at target rate of return on 50%

Test 5: Are you pricing or valuing?

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	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				

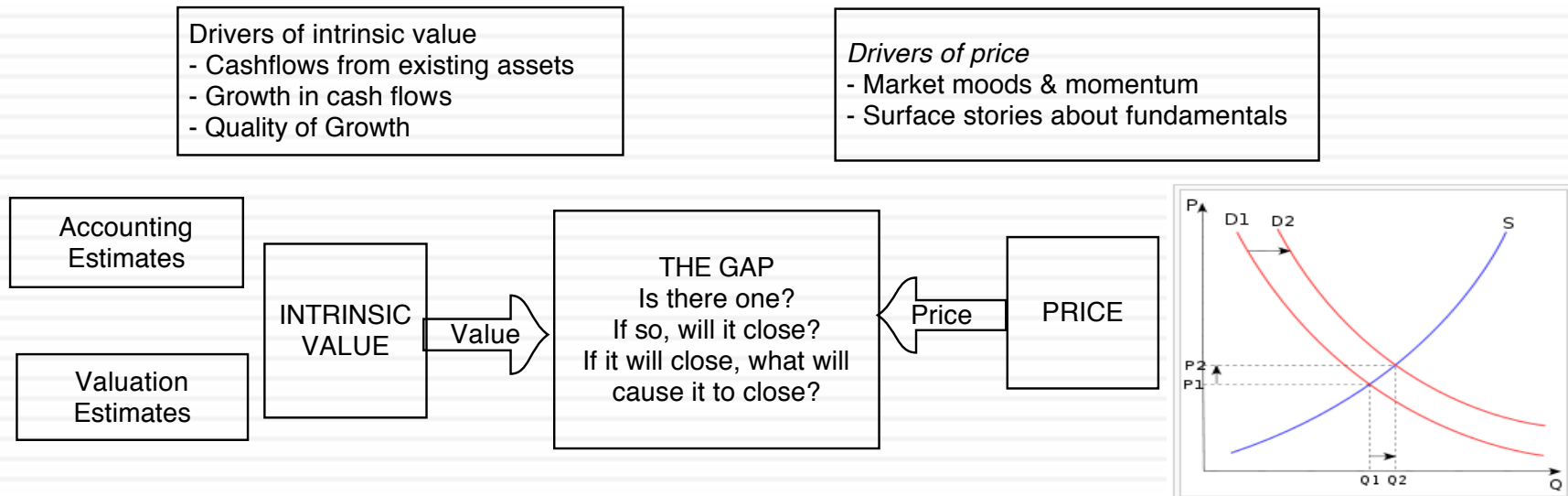
Test 6: Are you pricing or valuing?

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- You are an accountant, given the onerous and massive responsibility of restating the assets on a balance sheet to “fair value”.
- In FAS 157, here is what it says: “The exchange price is the price in an orderly transaction between market participants to sell the asset or transfer ... The transaction to sell the asset or transfer the liability is a hypothetical transaction at the measurement date, considered from the perspective of a market participant that holds the asset or owes the liability. Therefore, the definition focuses on the price that would be received to sell the asset or paid to transfer the liability (an exit price), not the price that would be paid to acquire the asset or received to assume the liability (an entry price).”

Price versus Value: The Set up

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INTRINSIC VALUATION
CASH FLOWS, GROWTH & RISK

Intrinsic value is simple: We choose to make it complex

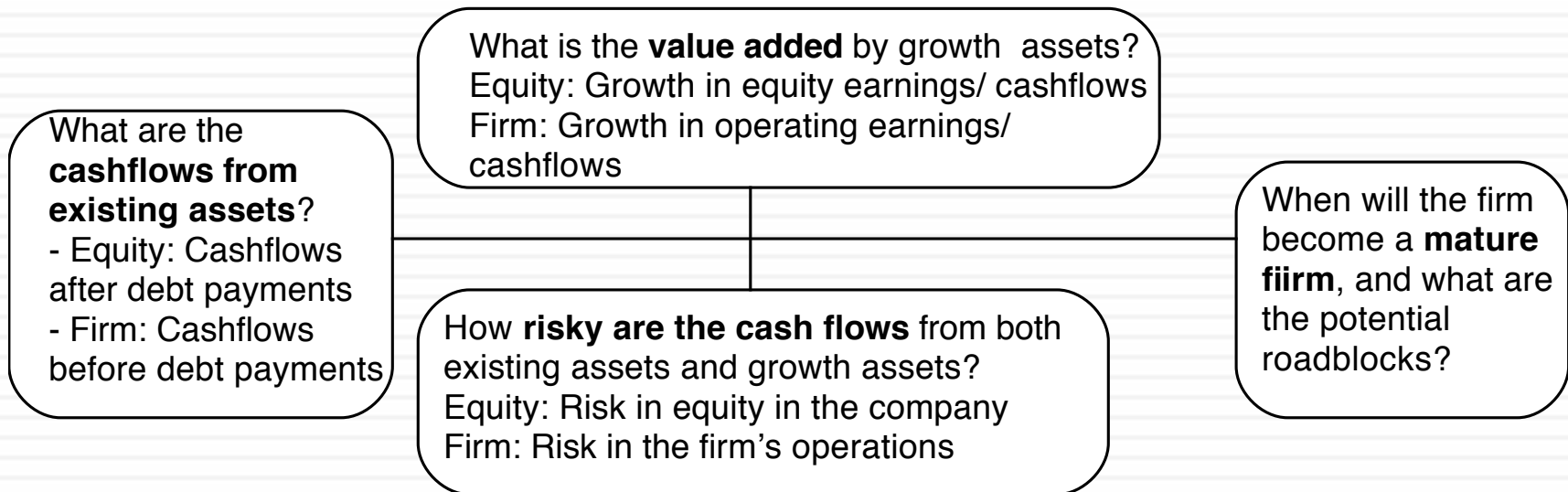
10

For cash flow generating assets, the intrinsic value will be a function of the magnitude of the expected cash flows on the asset over its lifetime and the uncertainty about receiving those cash flows.

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.
4. *The VALUE IS NOT PRICE Proposition:* The value of an asset may be very different from its price.

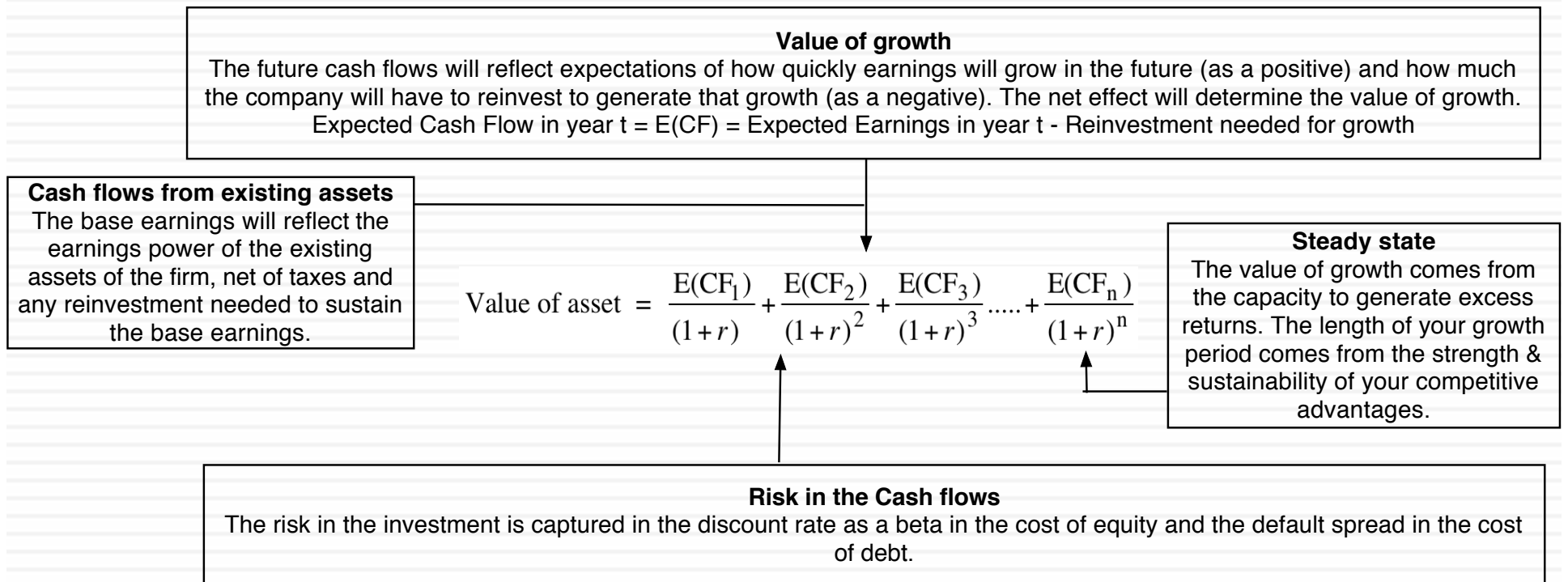
The determinants of value

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DCF as a tool for intrinsic valuation

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1. Cash Flows

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To get to cash flow	Here is why
Operating Earnings	<p>This is the earnings before interest & taxes you generate from your existing assets.</p> <p>Operating Earnings = Revenues * Operating Margin</p> <p>Measures the operating efficiency of your assets & can be grown either by growing revenues and/or improving margins.</p>
(minus) Taxes	<p>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.</p>
(minus) Reinvestment	<p>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.</p>
Free Cash Flow to the Firm	<p>This is a pre-debt cash flow that will be shared by lenders (as interest & principal payments) and by equity investors (as dividends & buybacks).</p>

2. Discount Rates

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Expected Return on a Risky Investment = Cost of Equity

Risk free Rate

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

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.

=

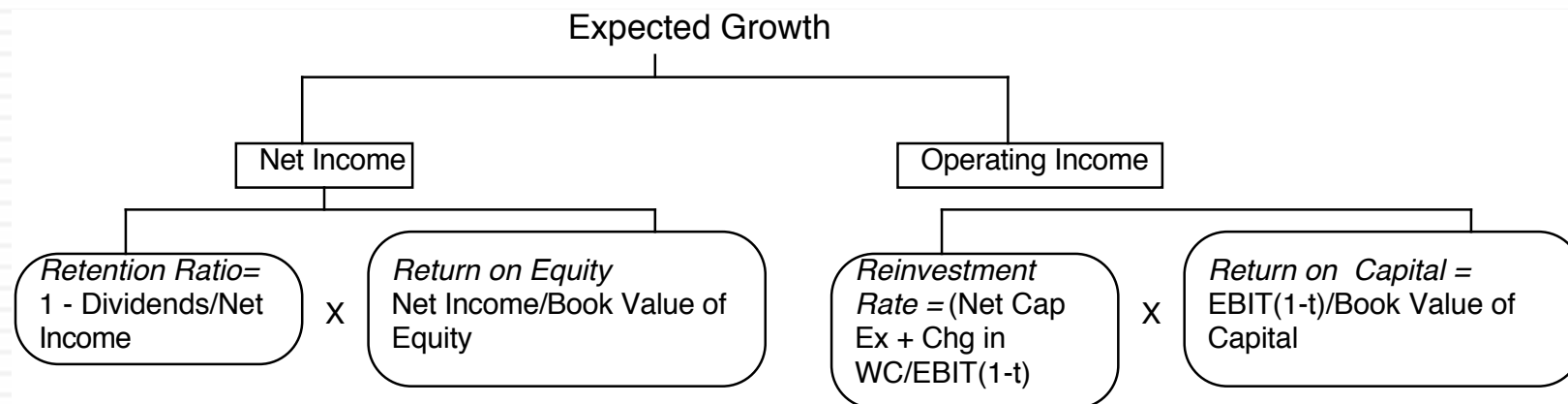
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Equity Risk Premium

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

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

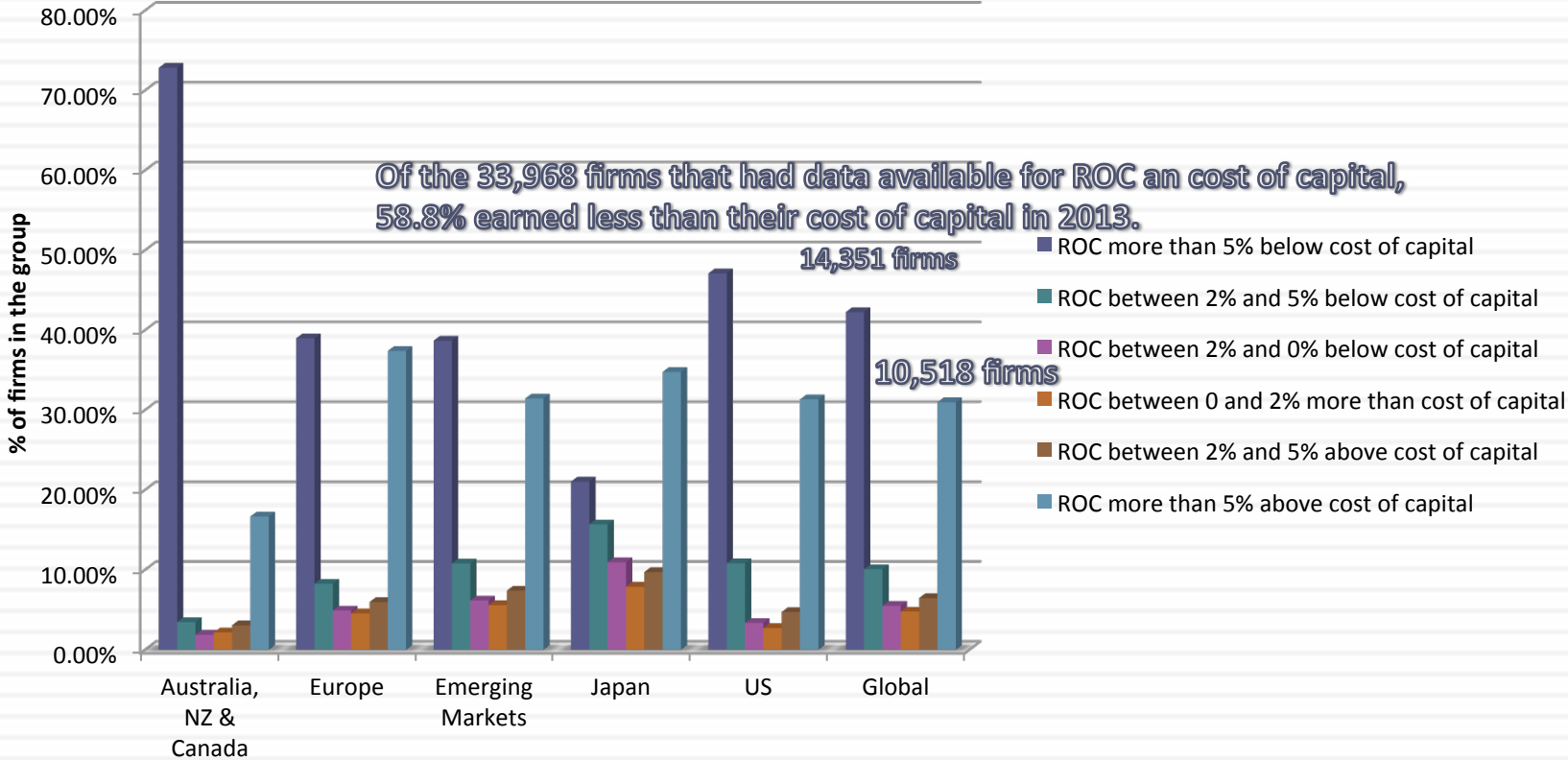
3. Growth



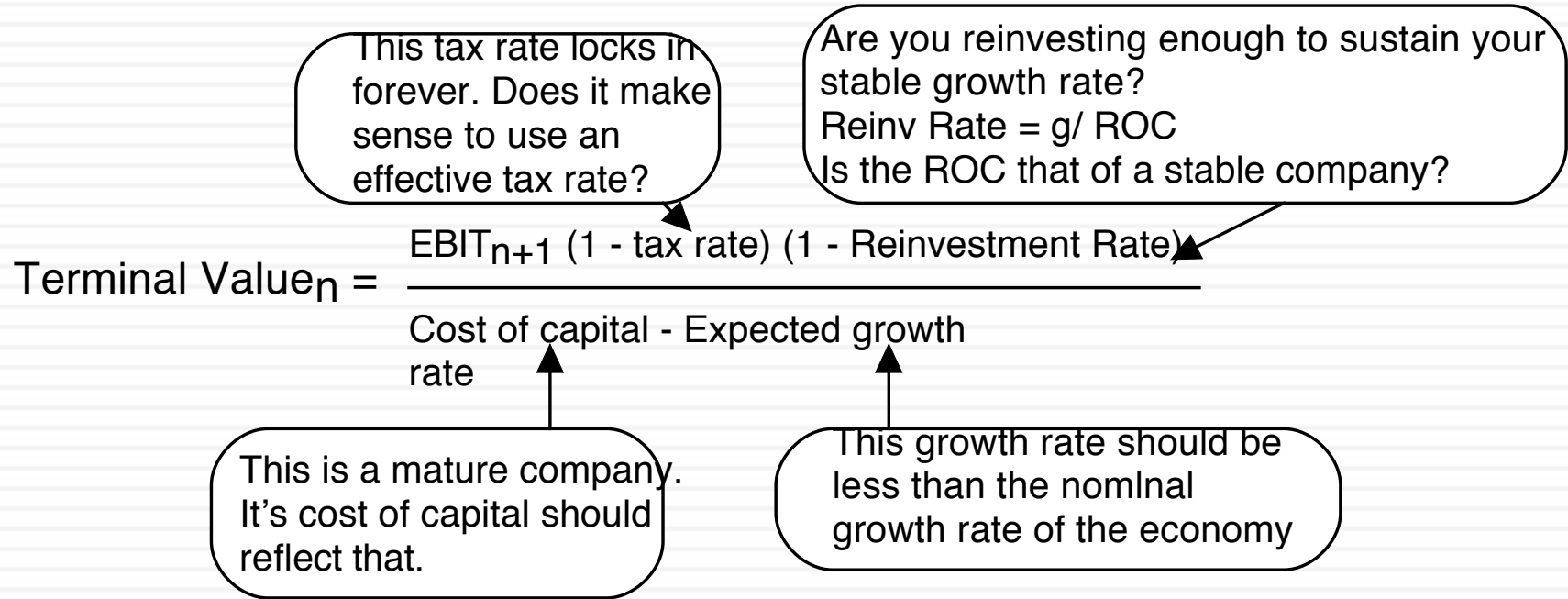
- ❑ Quality growth is rare requires that a firm be able to reinvest a lot and reinvest well (earnings more than your cost of capital) at the same time.
- ❑ The larger you get, the more difficult it becomes to maintain quality growth.
- ❑ You can grow while destroying value at the same time.

And its value

ROIC versus Cost of Capital: A Global Assessment for 2013

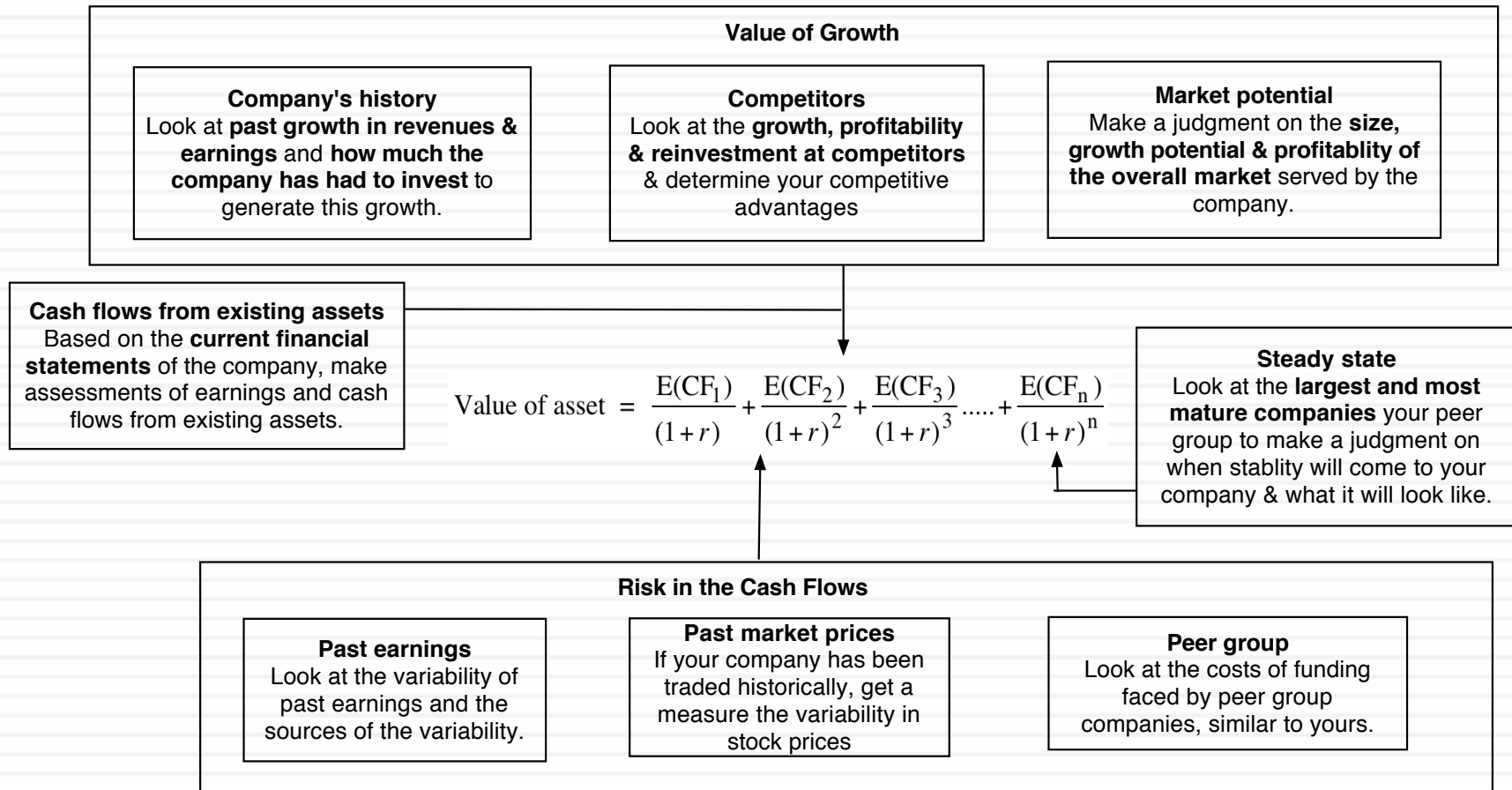


4. The Terminal Value



If your job is assessing value, here are your challenges...

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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		\$7.67
Invested Capital		\$955.00
Adjusted Operatng Margin		1.44%
Sales/ Invested Capital		0.56
Interest expenses	\$2.49	\$5.30

Twitter: Priming the Pump for Valuation

1. Make small revenues into big revenues

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

2. Make losses into profits

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

		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 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

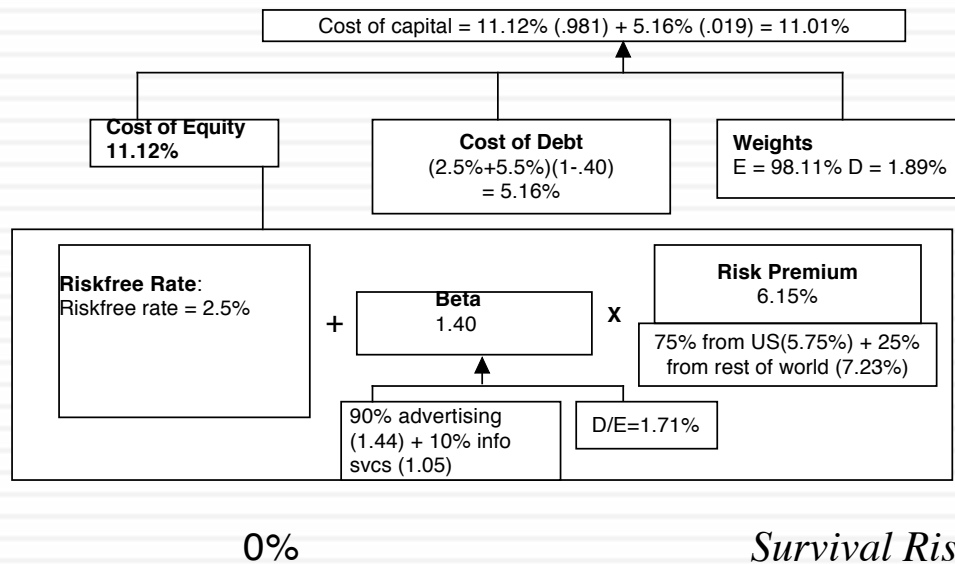
My estimate for 2023: Overall online advertising market will be close to \$200 billion and Twitter will have about 5.7% (\$11.5 billion)

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

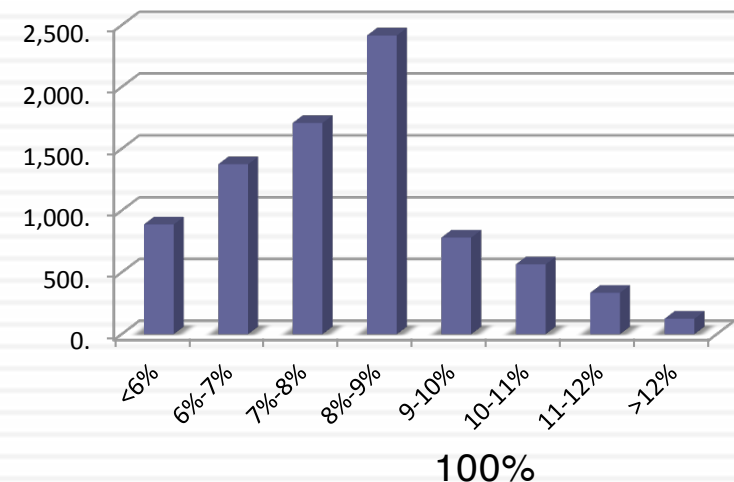
Sweating the small stuff: Risk and Required Return

Risk in the discount rate

My estimate for Twitter



Cost of Capital: US - Nov '13



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

Certain to make it as going concern

Certain to fail

My assumption for Twitter

Starting numbers

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

Twitter Pre-IPO Valuation: October 27, 2013

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

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

Sales to capital ratio of 1.50 for incremental sales

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

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

	1	2	3	4	5	6	7	8	9	10
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

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

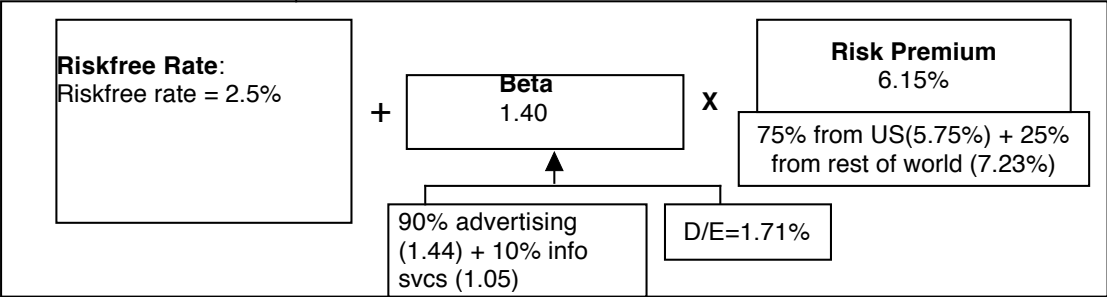
Cost of capital = 11.12% (.981) + 5.16% (.019) = 11.01%

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%



Starting numbers

Twitter Valuation after first earnings report: February 8, 2014

	2013	2012
Revenues	\$664.9	\$316.9
Operating Income	-\$635.8	-\$77.1
Adjusted Operating Income	-\$147.0	-\$7.7
Invested Capital	\$1,816.0	
Adjusted Operating Margin	-\$0.2	
Sales/Invested Capital	\$0.8	

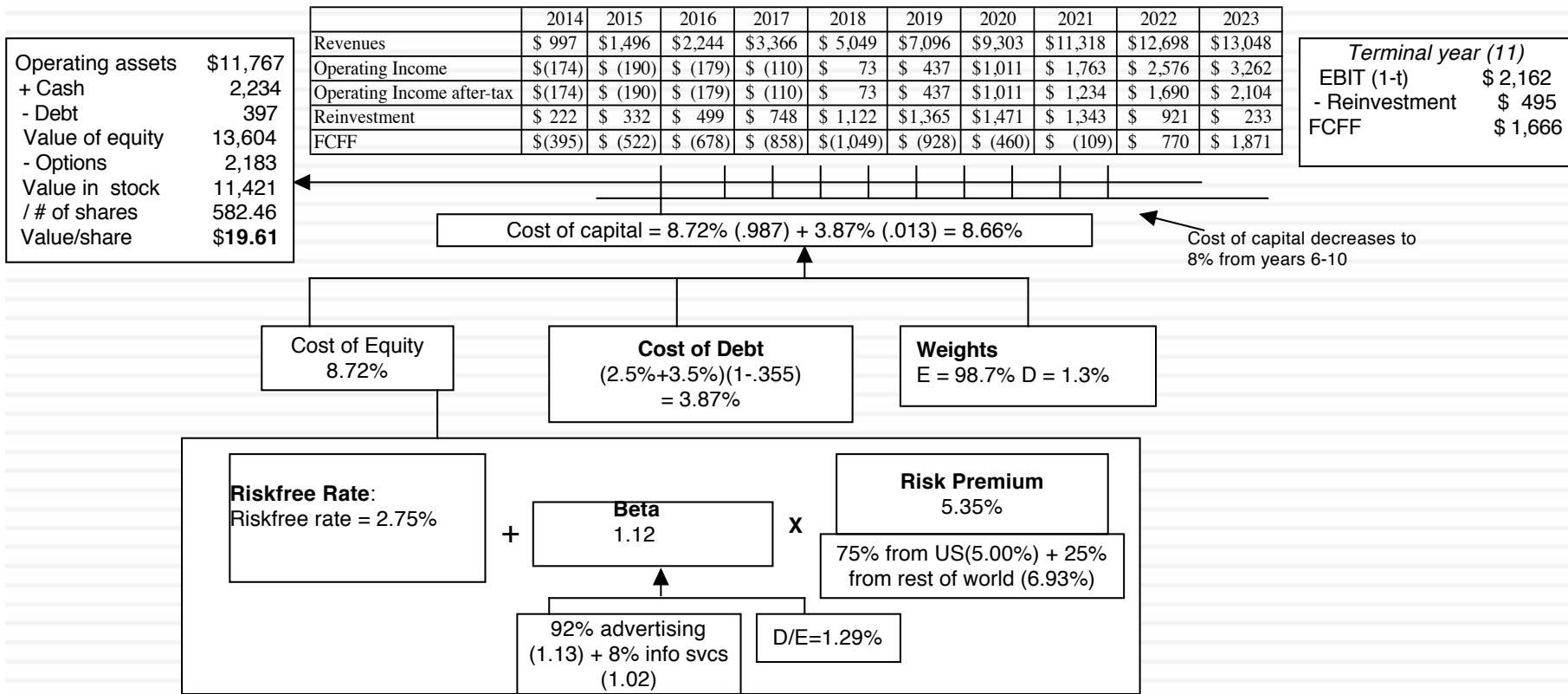
Revenue growth of 50% a year for 5 years, tapering down to 2.75% in year 10

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

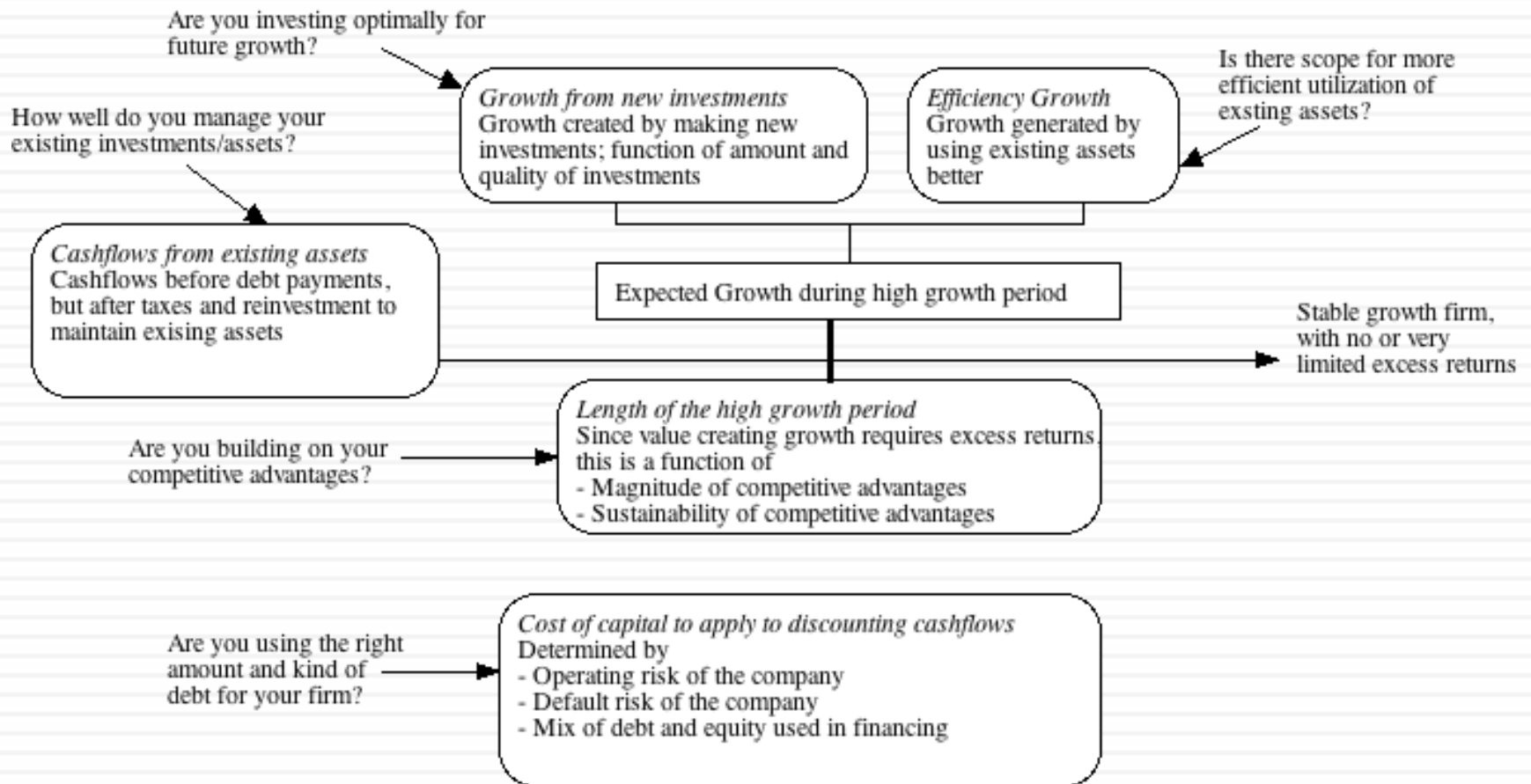
Sales to capital ratio of 1.50 for incremental sales

Stable Growth
 $g = 2.75\%$;
 Cost of capital = 8%
 $ROC = 12\%$;
 Reinvestment Rate = $2.75\%/12\% = 22.92\%$

Terminal Value₁₀ = $1666 / (.08 - .025) = \$31,741$



If your job is enhancing value, its got to come from changing the fundamentals



Three simple suggestions to make you better at intrinsic valuation

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1. Be honest about your biases/preconceptions: The biggest bogeyman in most valuations is that your preconceptions and biases will lead your choices. While you can never be unbiased, being aware of your biases can help.
2. Keep it simple: Less is more in valuation. While it is easy to build bigger models and you have more access to data, parsimonious valuations often do a better job than complex ones.
3. Face up to uncertainty: Uncertainty is a feature, not a bug. Make the best estimates you can, with the information you have, recognize that everyone else faces the same uncertainty and understand that you don't have to be right, just less wrong than everyone else.



PRICING
IT'S DEMAND AND SUPPLY



The determinants of price

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Mood and Momentum

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

Liquidity & Trading Ease

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

The Market Price

Incremental information

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

Group Think

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

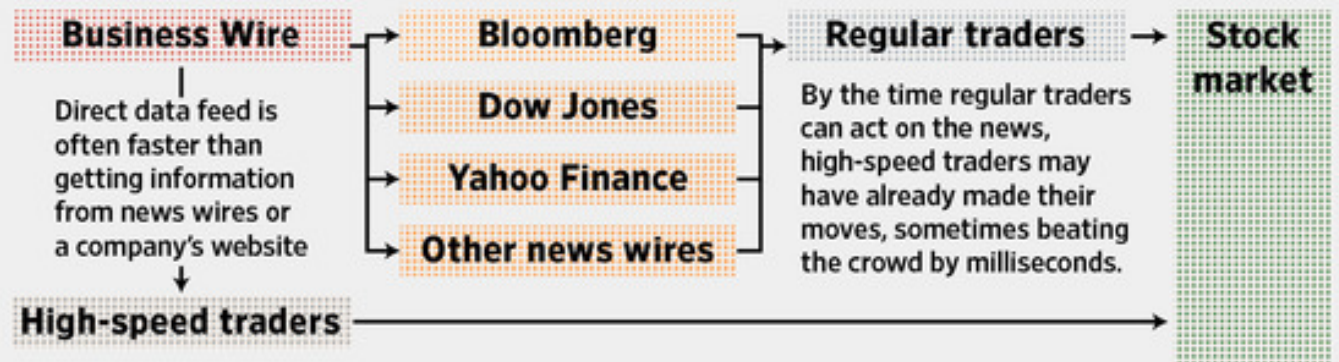
Tools for Pricing: Technical Analysis & Charting



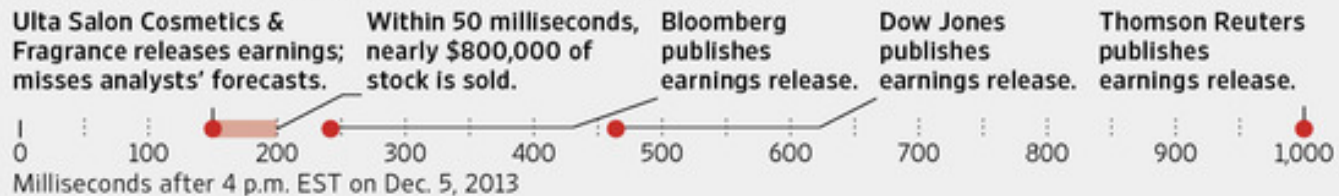
Timing and Incremental Information

Time = Money | Superfast traders can act on market-moving news before other investors

High-speed traders pay to get news releases directly from companies, like Business Wire, that distribute them on behalf of public companies and government entities.



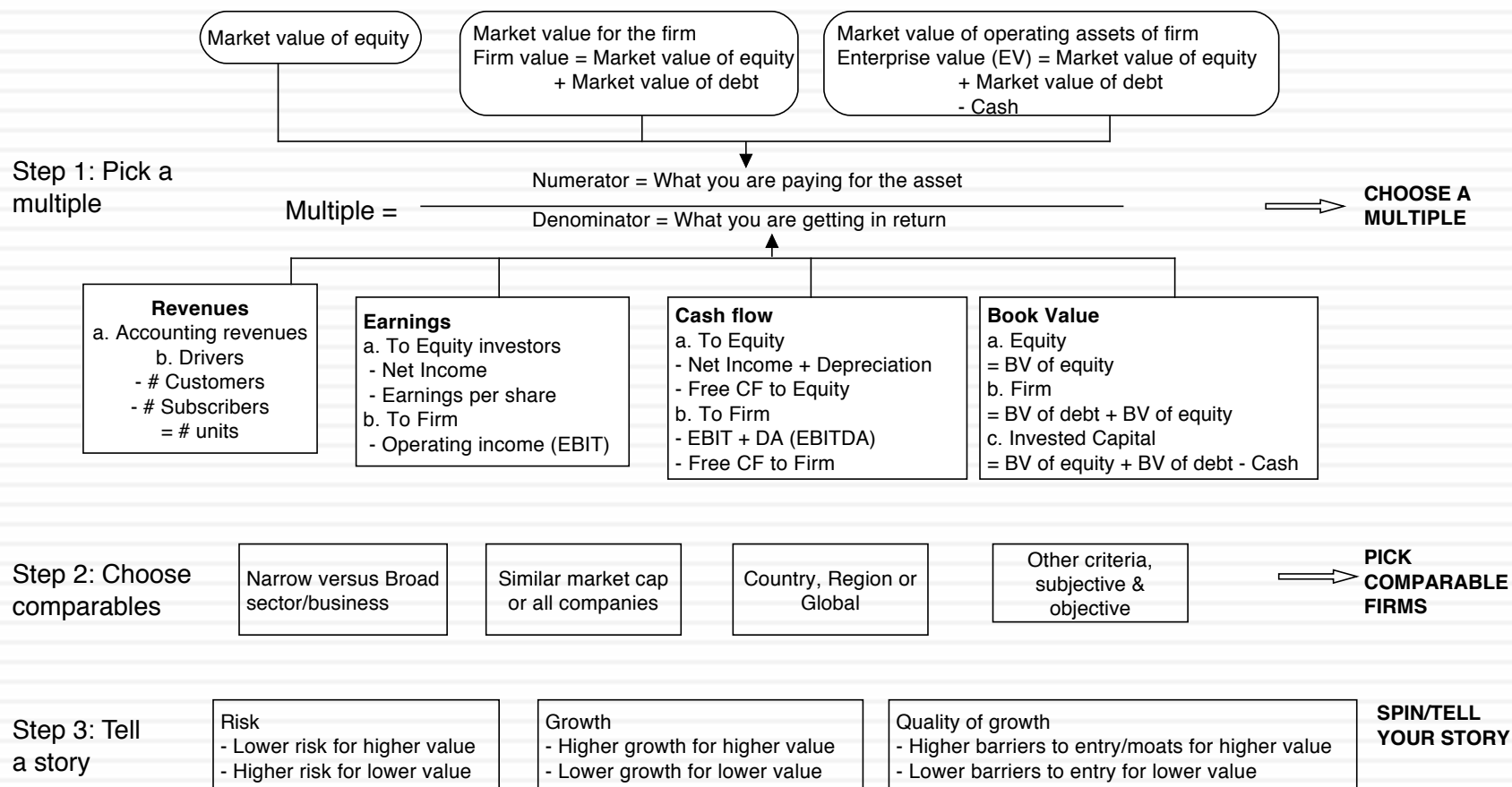
Last December, high-speed traders acted within 50 milliseconds to sell the stock of a company with disappointing earnings news.



Sources: Bloomberg, Dow Jones and Thomson Reuters (publication times)

The Wall Street Journal

A more general tool: Multiples and Comparable Transactions



The market price of Twitter



Pricing Twitter- October 2013

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
Netflix	\$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 = 237 million * ?*

Rules for the road: Relative valuation

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1. Be consistent: 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.
2. Play Moneyball: Look at the cross sectional distribution of a multiple and form judgments, based on the data, of what is cheap and what is expensive.
3. Make your implicit assumptions explicit: Multiples are standardized values, and as a consequence are driven by exactly the same variables that determine value – cash flows, growth and risk.
4. Control for differences (and go past story telling): No matter how carefully you control for differences across companies, there will still be residual differences on the fundamentals across the firms. You have to go beyond story telling and use the data to analyze how the market treats these differences.



PRICE OR VALUE?
PICK YOUR POISON!

What's your game?

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- The transactors
 - ▣ Traders: Oscar Wilde's definition of a cynic: "knows the price of everything, the value of nothing".
 - ▣ Salespeople: Caveat emptor!
 - ▣ Deal intermediaries: Get the deal done (even if it is not a good deal)!
- The muddled middle
 - ▣ Academic value: The cognitive dissonance of the "efficient market"
 - ▣ Accounting value: Rule maker, rule maker, make up your mind!
 - ▣ Legal value: The bane of the expert witness!
- The investors
 - ▣ Owners of businesses: Except if you want to run it for the long term.
 - ▣ Investors in companies: With faith and patience, you can take advantage of Mr. Market.
 - ▣ Long term consultants: You have to live with the consequences of the advice that you mete out to your clients.

Sometimes, you don't have a choice..

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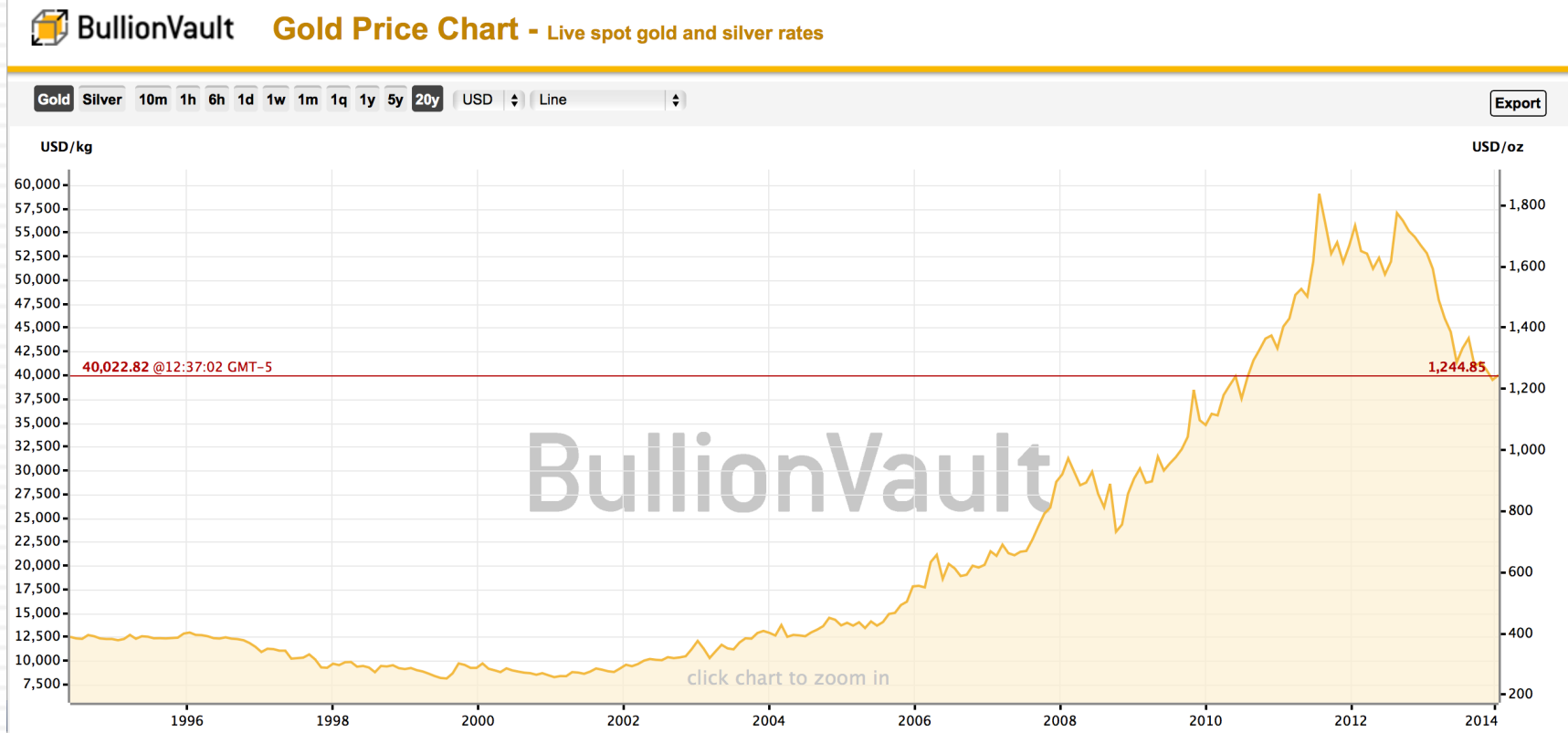
At \$142.4 Million, Triptych Is the Most Expensive Artwork Ever Sold at an Auction



2013 Estate of Francis Bacon/Artists Rights Society (ARS), New York/DACS, London

A fair price for gold? How about value?

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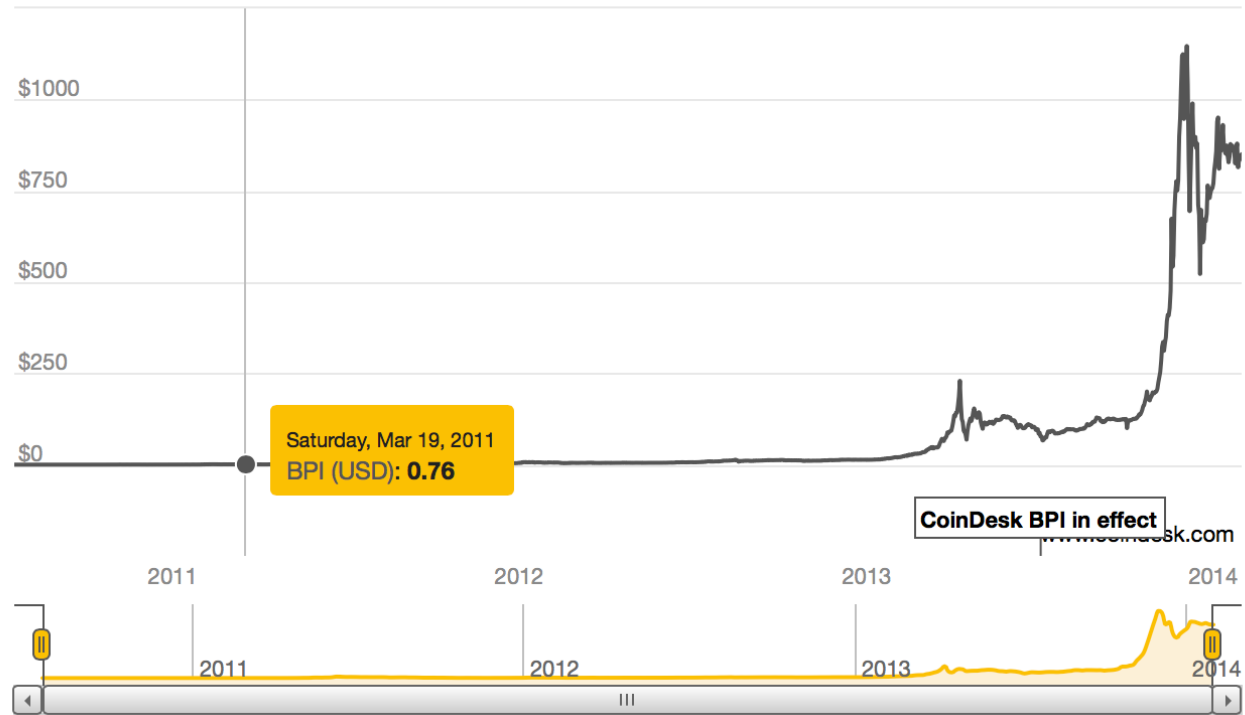


And for Bitcoins?

Bitcoin Price Index Chart

Closing Price ▼

Zoom 1h 12h 1d 1w 1m 3m 1y All From Jul 18, 2010 To Jan 30, 2014



In the muddled middle, what you get is neither price nor value, but mush..

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- The “fair value accounting” oxymoron: Fair value accounting requires accountants to value assets based upon what “market participants” will pay for those assets in arms length transactions today.
- Legal Valuation: In courts, experts witnesses are generally asked to opine on the values of assets, often in the abstract. It is unclear whether they are being asked to price assets or value assets, and that allows them to stake extreme positions (depending on which side is paying them).
- Academic valuation: Much of what passes for valuation in financial theory is just pricing.

In the investing world, there are three views of “the gap”

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	View of the gap	Investment Strategies
The Efficient Marketer	The gaps between price and value, if they do occur, are random.	Index funds
The “value” extremist	You view pricers as dilettantes who will move on to fad and fad. Eventually, the price will converge on value.	Buy and hold stocks where value > price
The pricing extremist	Value is only in the heads of the “eggheads”. Even if it exists (and it is questionable), price may never converge on value.	(1) Look for mispriced securities. (2) Get ahead of shifts in demand/momentum.

The pricer's dilemma..

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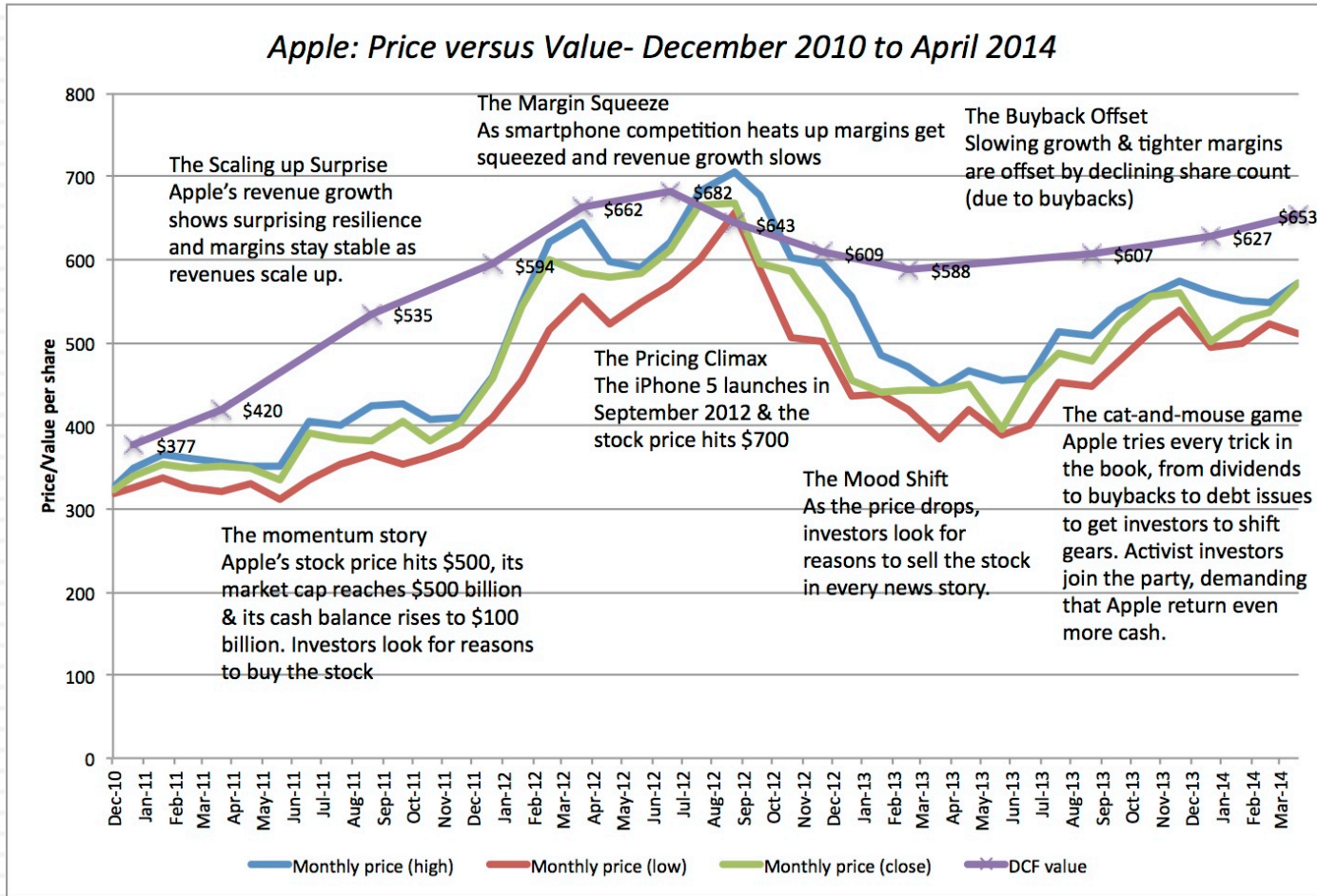
- No anchor: If you do not believe in intrinsic value and make no attempt to estimate it, you have no moorings when you invest. You will therefore be pushed back and forth as the price moves from high to low. In other words, everything becomes relative and you can lose perspective.
- Reactive: Without a core measure of value, your investment strategy will often be reactive rather than proactive.
- Crowds are fickle and tough to get a read on: The key to being successful as a pricer is to be able to read the crowd mood and to detect shifts in that mood early in the process. By their nature, crowds are tough to read and almost impossible to model systematically.

The valuer's dilemma

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- Uncertainty about the magnitude of the gap:
 - ▣ Margin of safety: Many value investors swear by the notion of the “margin of safety” as protection against risk/uncertainty.
 - ▣ Collect more information: Collecting more information about the company is viewed as one way to make your investment less risky.
 - ▣ Ask what if questions: Doing scenario analysis or what if analysis gives you a sense of whether you should invest.
 - ▣ Confront uncertainty: Face up to the uncertainty, bring it into the analysis and deal with the consequences.
- Uncertainty about gap closing: This is tougher and you can reduce your exposure to it by
 - ▣ Lengthening your time horizon
 - ▣ Providing or looking for a catalyst that will cause the gap to close.

An example: Apple – Price versus Value (my estimates) from 2011 to 2014



And the uncertainty is greater in some assets (stocks) than others

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- 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...

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Weather changeability for Honolulu, Hawaii

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[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%

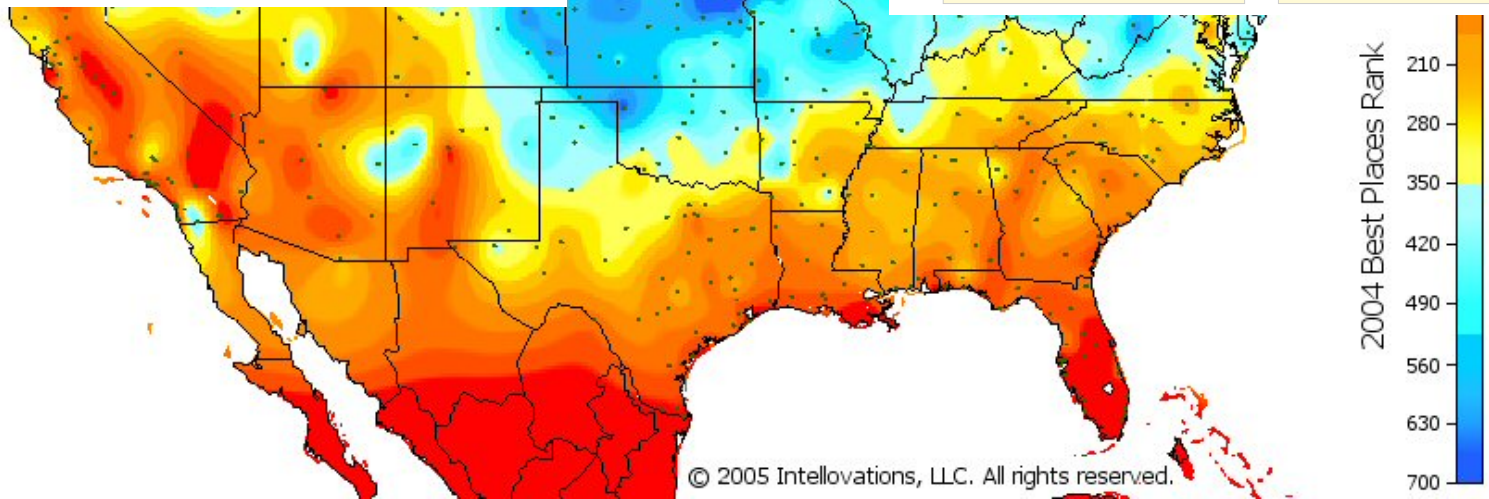
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[Further changeability analysis >](#)

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%



The choice is yours (and there is no right one)

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1. Do your job: There is no right or wrong way to put a number on an asset. If your job is to price it, that is exactly what you should do. If it is to value it, go for an intrinsic value approach.
2. Don't be delusional: If you are pricing an asset, don't get distracted too much by fundamentals and intrinsic value concerns. If you are valuing an asset, don't let the pricing process (mood & momentum) feed back into your valuation.
3. Play to your strengths: To be a successful investor, you have to know what makes you tick and pick the approach that best fits you.