Price or Value? What’s your game?

March 2016
Aswath Damodaran
Test 1: Are you pricing or valuing?

Aswath Damodaran
Test 2: Are you pricing or valuing?

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 BB’s NAV increase of 68% also

Aswath Damodaran
Test 3: Are you pricing or valuing?
Price versus Value: The Set up

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

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

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

- **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?**
# DCF as a tool for intrinsic valuation

## 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.

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

## Value of growth
The future cash flows will reflect expectations of how quickly earnings will grow in the future (as a positive) and how much the company will have to reinvest to generate that growth (as a negative). The net effect will determine the value of growth.

Expected Cash Flow in year \( t \) = \( E(CF) = \text{Expected Earnings in year } t - \text{Reinvestment needed for growth} \)

## 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.

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

**Value of Growth**

- **Company's history**
  - Look at past growth in revenues & earnings and how much the company has had to invest to generate this growth.

- **Competitors**
  - Look at the growth, profitability & reinvestment at competitors & determine your competitive advantages.

- **Market potential**
  - Make a judgment on the size, growth potential & profitability of the overall market served by the company.

- **Cash flows from existing assets**
  - Based on the current financial statements of the company, make assessments of earnings and cash flows from existing assets.

- **Steady state**
  - Look at the largest and most mature companies your peer group to make a judgment on when stability will come to your company & what it will look like.

**Risk in the Cash Flows**

- **Past earnings**
  - Look at the variability of past earnings and the sources of the variability.

- **Past market prices**
  - If your company has been traded historically, get a measure the variability in stock prices.

- **Peer group**
  - Look at the costs of funding faced by peer group companies, similar to yours.

\[
\text{Value of asset} = \frac{E(CF_1)}{(1+r)} + \frac{E(CF_2)}{(1+r)^2} + \frac{E(CF_3)}{(1+r)^3} + \ldots + \frac{E(CF_n)}{(1+r)^n}
\]
### Twitter: Setting the table in October 2013

<table>
<thead>
<tr>
<th></th>
<th>Last 10K</th>
<th>Trailing 12 month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>$316.93</td>
<td>$534.46</td>
</tr>
<tr>
<td>Operating income</td>
<td>-$77.06</td>
<td>-$134.91</td>
</tr>
<tr>
<td>Adjusted Operating Income</td>
<td></td>
<td>$7.67</td>
</tr>
<tr>
<td>Invested Capital</td>
<td></td>
<td>$955.00</td>
</tr>
<tr>
<td>Adjusted Operating Margin</td>
<td></td>
<td>1.44%</td>
</tr>
<tr>
<td>Sales/ Invested Capital</td>
<td></td>
<td>0.56</td>
</tr>
<tr>
<td>Interest expenses</td>
<td>$2.49</td>
<td>$5.30</td>
</tr>
</tbody>
</table>
Twitter: Priming the Pump for Valuation

1. Make small revenues into big revenues

<table>
<thead>
<tr>
<th>Company</th>
<th>2011%</th>
<th>2012%</th>
<th>2013%</th>
<th>2013 $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google</td>
<td>32.09</td>
<td>31.46</td>
<td>33.24</td>
<td>$38.83</td>
</tr>
<tr>
<td>Facebook</td>
<td>3.65</td>
<td>4.11</td>
<td>5.04</td>
<td>$5.89</td>
</tr>
<tr>
<td>Yahoo!</td>
<td>3.95</td>
<td>3.37</td>
<td>3.10</td>
<td>$3.62</td>
</tr>
<tr>
<td>Microsoft</td>
<td>1.27</td>
<td>1.63</td>
<td>1.78</td>
<td>$2.08</td>
</tr>
<tr>
<td>IAC</td>
<td>1.15</td>
<td>1.39</td>
<td>1.47</td>
<td>$1.72</td>
</tr>
<tr>
<td>AOL</td>
<td>1.17</td>
<td>1.02</td>
<td>0.95</td>
<td>$1.11</td>
</tr>
<tr>
<td>Amazon</td>
<td>0.48</td>
<td>0.59</td>
<td>0.71</td>
<td>$0.83</td>
</tr>
<tr>
<td>Pandora</td>
<td>0.28</td>
<td>0.36</td>
<td>0.50</td>
<td>$0.58</td>
</tr>
<tr>
<td>Twitter</td>
<td>0.16</td>
<td>0.28</td>
<td>0.50</td>
<td>$0.58</td>
</tr>
<tr>
<td>LinkedIn</td>
<td>0.18</td>
<td>0.25</td>
<td>0.32</td>
<td>$0.37</td>
</tr>
<tr>
<td>Millennial Media</td>
<td>0.05</td>
<td>0.07</td>
<td>0.10</td>
<td>$0.12</td>
</tr>
<tr>
<td>Other</td>
<td>55.59</td>
<td>55.47</td>
<td>52.29</td>
<td>$61.09</td>
</tr>
<tr>
<td>Total Market</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>$116.82</td>
</tr>
</tbody>
</table>

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

2. Make losses into profits

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

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

3. Reinvest for growth

<table>
<thead>
<tr>
<th>Sales/ Invested Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twitter (2013)</td>
</tr>
<tr>
<td>Advertising Companies</td>
</tr>
<tr>
<td>Social Media Companies</td>
</tr>
</tbody>
</table>

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

Aswath Damodaran
Sweating the small stuff: Risk and Required Return

**Risk in the discount rate**

**My estimate for Twitter**

- **Cost of capital** = 11.12% (.981) + 5.16% (.019) = 11.01%
- **Cost of Equity** 11.12%
- **Cost of Debt** (2.5%+5.5%)(1-.40) = 5.16%
- **Risk Premium** 6.15%
- **Riskfree Rate**: Riskfree rate = 2.5%
- **Beta** 1.40
- **Risk Premium** 6.15%
- **Weights** E = 98.11% D = 1.89%
- **90% advertising** (1.44) + **10% info svcs (1.05)**

**Survival Risk**

0%  |  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*
Twitter Pre-IPO Valuation: October 27, 2013

1. Revenues:
   - Pre-tax operating margin increases to 25% over the next 10 years

2. Sales to capital ratio of 1.50 for incremental sales

3. 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

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

Risk Premium: 6.15%
- 75% from US(5.75%) + 25% from rest of world (7.23%)

D/E = 1.71%

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

Operating assets: $9,705
- Cash: 321
- IPO Proceeds: 1,295
- Debt: 214
- Value of equity: 11,106
- Options: 713
- Value in stock: 10,394
- # of shares: 582.46
- Value/share: $17.84

Revenue:
- Pre-tax operating margin:
  - 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

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

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

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

Operating Income:
- 8.12%
- 7.93%
- 8.25%
- 8.05%
- 8.01%
- 8.15%
- 8.23%
- 8.17%
- 8.08%
- 8.05%

Pre-ta Operating margin:
- 75%
- 60%
- 50%
- 40%
- 30%
- 25%
- 20%
- 15%
- 10%
- 5%

Sales to capital ratio:
- 1.50

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

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

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Cost of capital:
- 11.12% (.981) + 5.16% (.019) = 11.01%
Four simple suggestions for better intrinsic valuation

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 is a start.

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. **Be flexible**: For every rule in valuation, there are a hundred exceptions. You need to be pragmatic and flexible.

4. **Have a narrative**: A valuation without a story is just a collection of numbers. A good intrinsic valuation connects a story to numbers.

5. **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. You don’t have to be right, just less wrong than everyone else.

Aswath Damodaran
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".
Tools for Pricing: Technical Analysis & Charting
A more general tool: Multiples and Comparable Transactions

**Market value of equity**

**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**
- **Denominator = What you are getting in return**

### Step 2: Choose comparables

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

### 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

**Revenues**
- a. Accounting revenues
  - b. Drivers
    - # Customers
    - # Subscribers = # units

**Earnings**
- a. To Equity investors
  - Net Income
  - Earnings per share
  - Operating income (EBIT)
  - 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
The market price of Twitter

Twitter Inc
NYSE: TWTR - Apr 13, 7:21 PM EDT

17.37 USD  $0.80 (4.83%)
After-hours: 17.35  $0.02 (0.12%)

<table>
<thead>
<tr>
<th></th>
<th>1 day</th>
<th>5 day</th>
<th>1 month</th>
<th>3 month</th>
<th>1 year</th>
<th>5 year</th>
<th>max</th>
</tr>
</thead>
</table>

- Open: 16.68
- High: 17.40
- Low: 16.68

Mkt cap: 12.16B
P/E ratio: -
Div yield: -

Google Finance - Yahoo Finance - MSN Money
Disclaimer
Twitter’s value based on revenues = $543 million * ?
Twitter’s value based on # users = 237 million * ?
Rules for the road: Relative valuation

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.
What’s your game?

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

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

- **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

- **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.
The Righteous Win: Apple – Price versus Value (my estimates) from 2011 to 2016

Apple: Stock Price versus DCF Value (My Estimates)

Aswath Damodaran
Where is the convergence? Amazon – Price versus Value

Amazon: Price versus DCF value - 1999 to 2015

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

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

### Weather changeability for Honolulu, Hawaii

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Last Month</th>
<th>Last Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average change in high temperature day-to-day</td>
<td>1.7°</td>
<td>1.2°</td>
</tr>
<tr>
<td>Average change in low temperature day-to-day</td>
<td>1.5°</td>
<td>2.0°</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Precipitation</th>
<th>Last Month</th>
<th>Last Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chance of dry day after a precip day</td>
<td>67%</td>
<td>81%</td>
</tr>
<tr>
<td>Chance of precip day after a dry day</td>
<td>7%</td>
<td>13%</td>
</tr>
</tbody>
</table>

### Weather changeability for Epping, North Dakota

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Last Month</th>
<th>Last Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average change in high temperature day-to-day</td>
<td>8.5°</td>
<td>7.7°</td>
</tr>
<tr>
<td>Average change in low temperature day-to-day</td>
<td>7.1°</td>
<td>8.6°</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Precipitation</th>
<th>Last Month</th>
<th>Last Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chance of dry day after a precip day</td>
<td>50%</td>
<td>65%</td>
</tr>
<tr>
<td>Chance of precip day after a dry day</td>
<td>38%</td>
<td>20%</td>
</tr>
</tbody>
</table>
But the payoff is greatest where there is the most uncertainty...

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

1. **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.

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. **Stop being righteous**: Stop labeling investors as good or bad, based on how they pick stocks, how long they hold them and which direction they bet (long or short).

4. **Don’t expect to be rewarded**: The notion that if you do all the “right things”, you will be rewarded is not only wrong but dangerous.