VALUATION: CLOSING THOUGHTS

Spring 2023

"It ain't over till its over"

Back to the very beginning: Approaches to Valuation

- **Discounted Cashflow Valuation**, where we try (sometimes desperately) to estimate the intrinsic value of an asset by using a mix of theory, guesswork and prayer.
- **Relative valuation**, where we pick a group of assets, attach the name "comparable" to them and tell a story.
- **Contingent claim valuation**, where we take the valuation that we did in the DCF valuation and divvy it up between the potential thieves (equity) and the victims of this crime (lenders)

Intrinsic Valuation: The set up

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. The expected cash flow is computed as net of taxes and reinvestment:

Expected Cash Flow = $E(CF_n)$ = Expected After-tax Operating Income in year n - Reinvestment in year n

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.

$$Value\ of\ Business = \frac{E(CF_1)}{(1+r)} + \frac{E(CF_2)}{(1+r)^2} + \frac{E(CF_3)}{(1+r)^3} \dots + \frac{Terminal\ Value_n}{(1+r)^n}$$

Terminal Value

This is the value that you attach to the business at the end of high growth. It can be a liquidation or going concern value.

$$Going\ Concern\ Value_n = \frac{E(CF_{n+1})}{r-g}$$

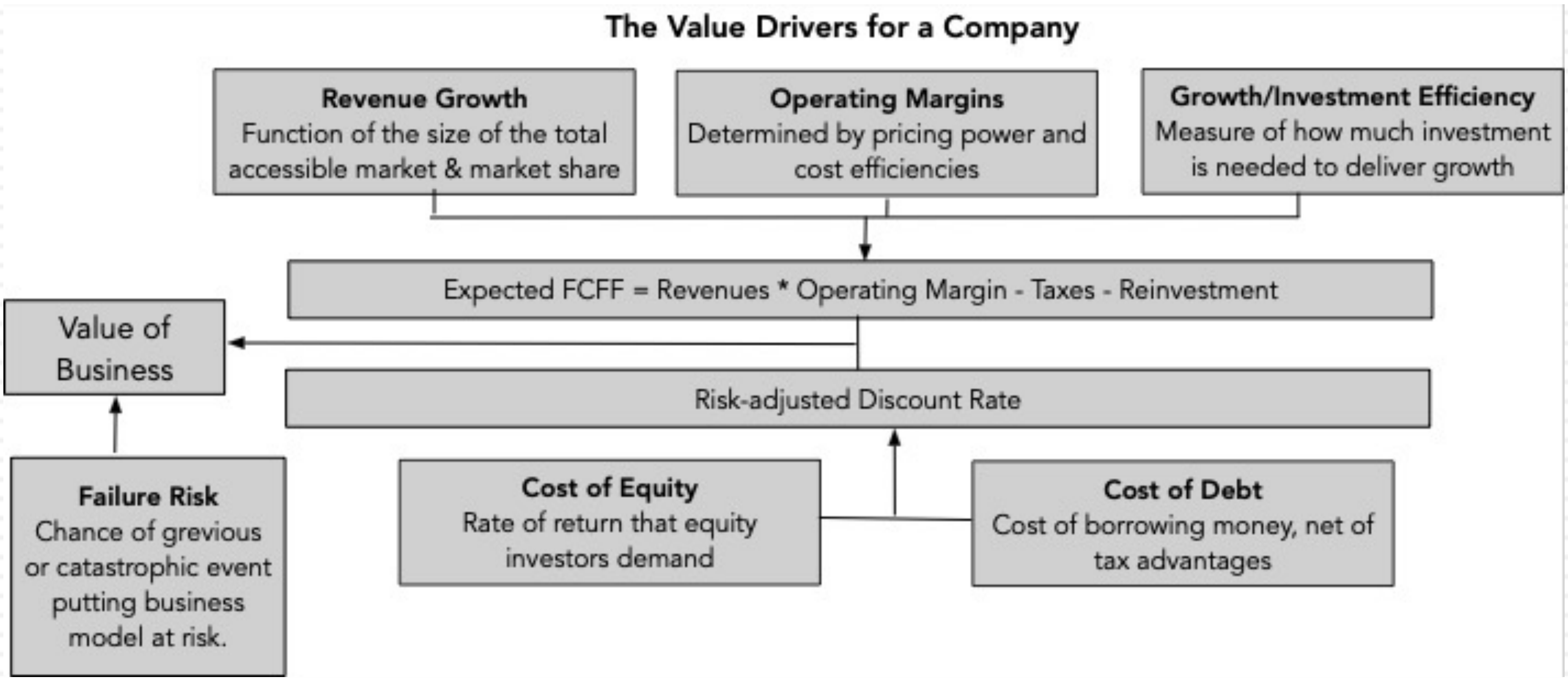
Cost of Capital

The cost of capital can be affected by the tax code, if it tilts towards debt over equity or vice versa. In much of the world, debt creates a tax benefit, because interest is tax deductible and the tax savings are at the margin (at the marginal tax rate).

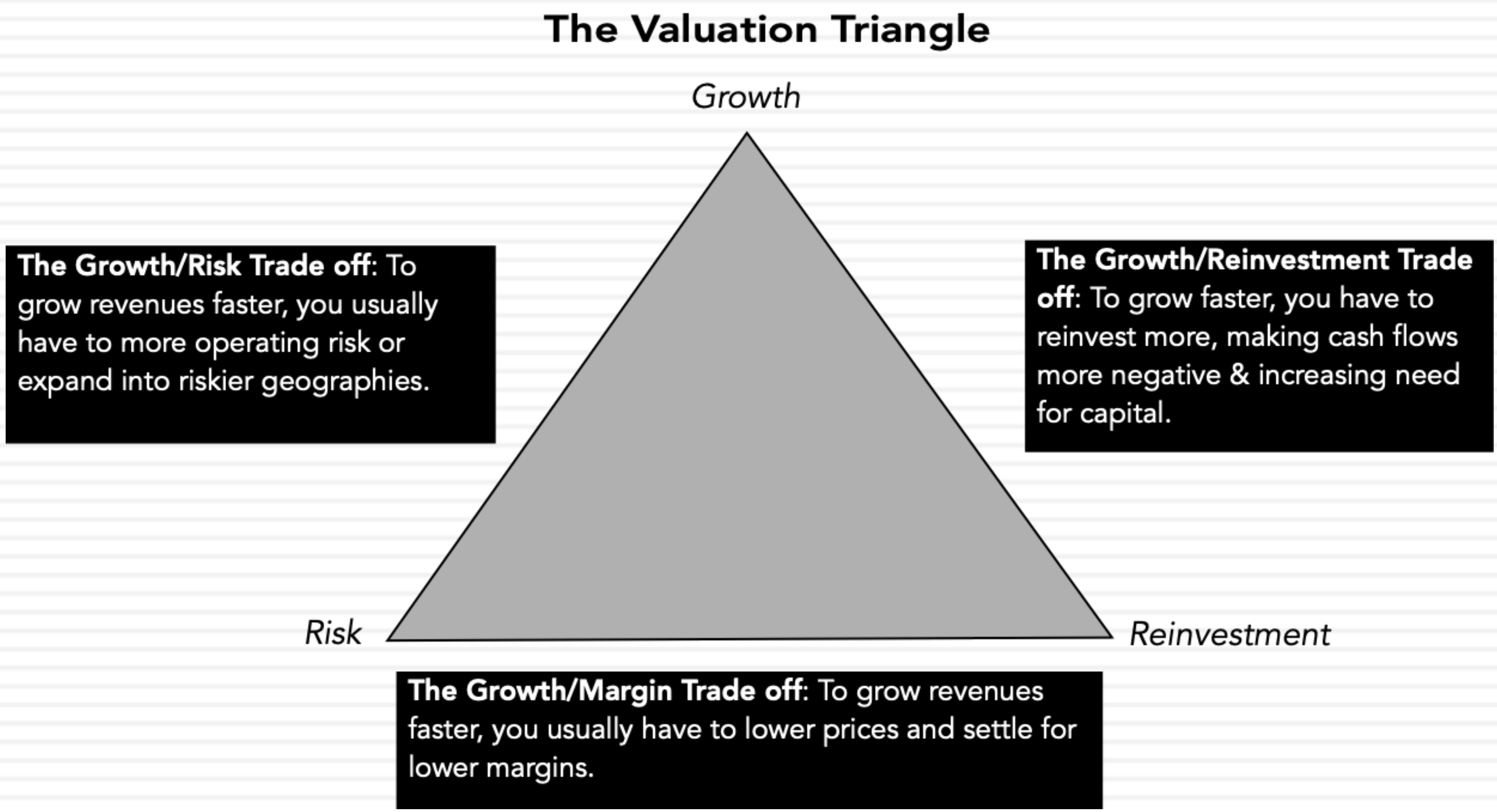
Risk adjusted Discount Rate = r = Cost of capital = Cost of Equity (Equity/(Debt+Equity) + Cost of Debt (1-t) (Debt/(Debt+Equity)

$Going\ Concern\ Val$

The Value Drivers..



The Valuation Triangle



Your intrinsic valuation findings

The Most Valued Company (Companies)..

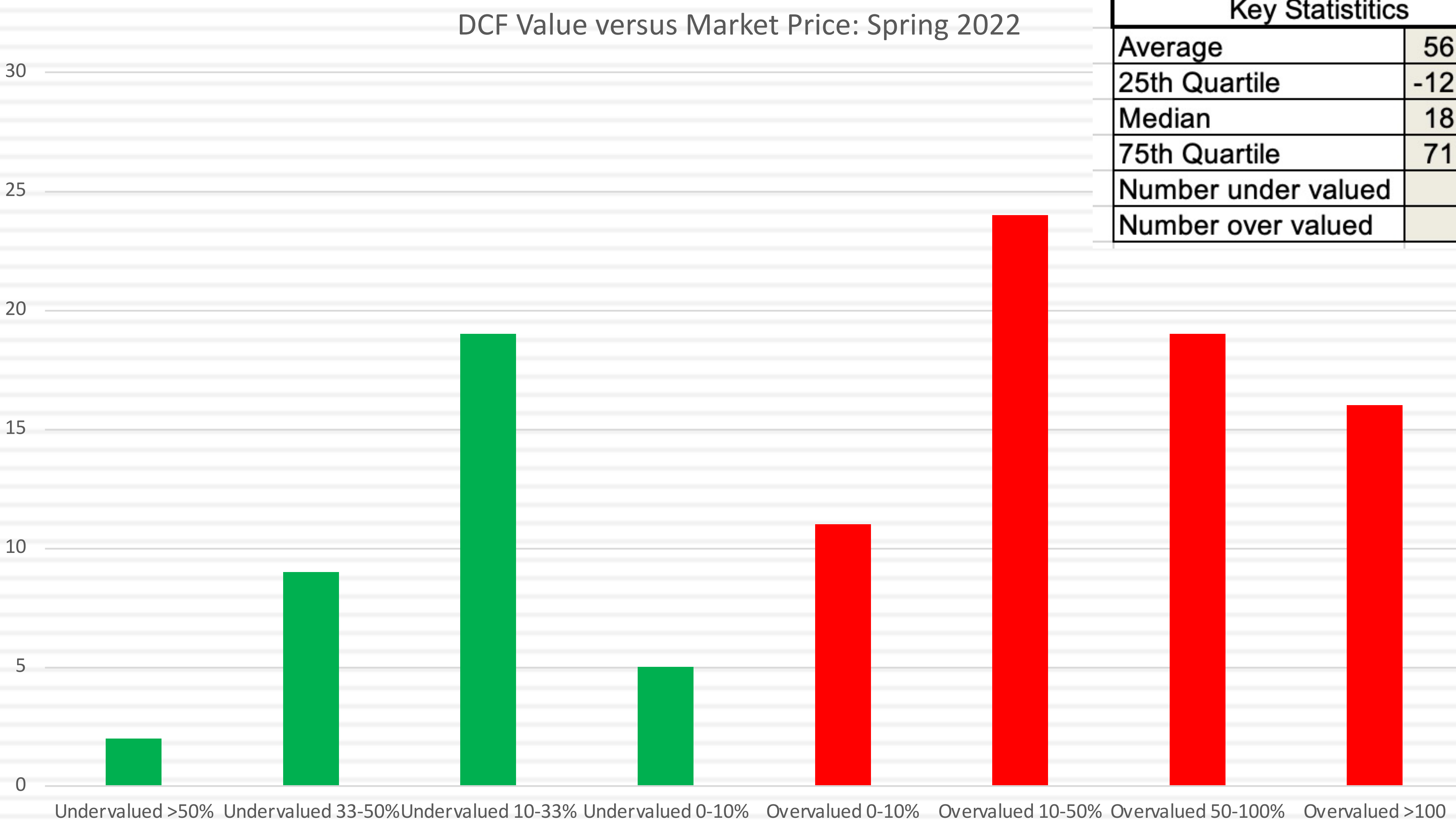
Company	*Number of analyses*
Lululemon	3
Nvidia	3
Apple, Amazon, Netflix, Uber	2

And here is why its not a problem..

Company	Date of Valuation	Price per share	DCF Value per share	Multiple you used in pricing	Pricing per Share	Recommendation
Lululemon	5/5/23	$386.71	$177.53	EV to EBITDA	$232.46	SELL
Lululemon	3/31/23	$364.19	$238.81	EV to EBITDA	$318.00	SELL
Lululemon	5/1/23	$384.64	$155.47	EV to Sales	$178.76	Sell

What you found…

Key Statistitics	
Average	56.65%
25th Quartile	-12.00%
Median	18.90%
75th Quartile	71.85%
Number under valued	36
Number over valued	71



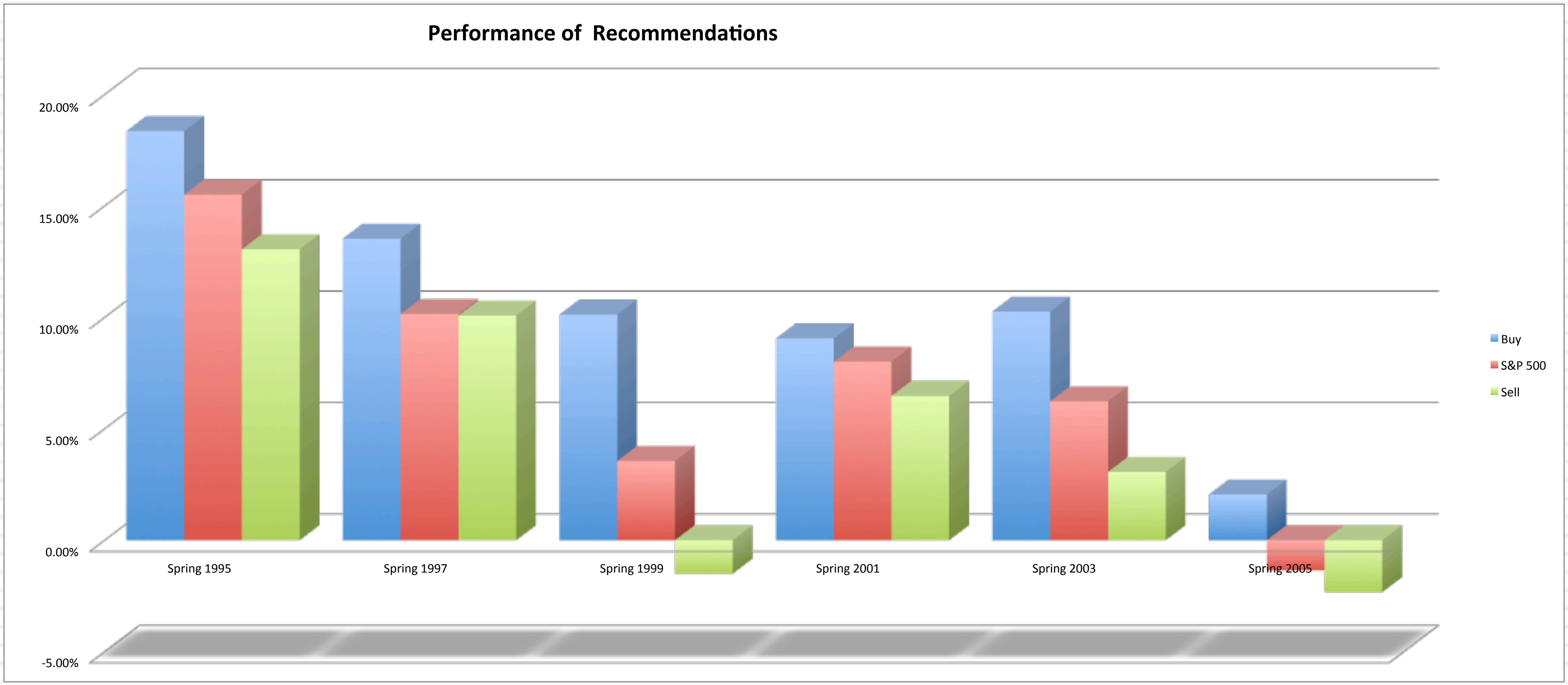
The most undervalued stocks…

Company	Date	Price	DCF Value	Multiple Used	Pricing	Option Value	Recommendation	% Under Valued
Upwork	5/7/23	$8.00	$31.75	EV to Sales	$17.17	$17.58	Buy	-74.80%
PNC Bank	5/5/23	$116.18	$287.70	PBV	$115.39		Hold	-59.62%
Weyerhaueser	5/8/23	$29.67	$56.79	PE	$54.28		BUY	-47.75%
Fidelity National Financial Inc (FNF)	4/26/23	$34.14	$59.83	PBV	$55.63		Buy	-42.94%
Progyny	3/25/23	$33.10	$55.89	EV to Sales	$15.02		BUY	-40.78%
Clearfield, Inc (CLFD)	4/28/23	$43.68	$71.28	EV to EBITDA	$86.42		BUY	-38.72%
Aveanna Healthcare (NASDAQ: AVAH)	4/20/23	$1.09	$1.75		$4.47			-37.71%
Digital Ocean	4/13/23	$35.30	$56.40	EV to Sales	$68.00		Buy	-37.41%
ZTO Express	4/29/23	190.99	290.99	PBV	200.31		Buy	-34.37%
MTN Nigeria	5/5/23	229	347.4	EV to Inv Capital	2,203.77		BUY	-34.08%
Genius Sports (NYSE: GENI)	4/5/23	$3.70	$5.56	EV to Sales	$4.66		BUY	-33.45%

The Most Overvalued stocks are...

Company	*Date*	*Price*	*DCF Value*	*Multiple Used*	*Pricing*	*Recommendation*	*% Over Valued*
New York Times	3/23/23	$39.19	$1.72	EV to EBITDA	$10.20	SELL	2178.49%
Godrej Properties	5/6/23	1,324.20	205.71	EV to Inv Capital	937.83	SELL	543.72%
Doordash	5/1/23	62.31	21.64	EV to Sales	$56.85	Sell	187.94%
Chipotle Mexican Grill, Inc	5/7/23	$2,028.21	$716.05	EV to Sales	$255.99	Sell	183.25%
Fleury	5/5/23	15.81	5.71	EV to EBITDA	22.14	Sell	176.88%
Bilibili	5/6/23	$20.25	$7.81	EV to Sales	6.91	Sell	159.28%
Genpact	5/3/23	$44.55	$17.87	PE	$37.86	SELL	149.30%
Lululemon	5/1/23	$384.64	$155.47	EV to Sales	$178.76	Sell	147.40%
Nvidia Corporation (NVDA)	5/5/23	286.8	118.54	PE	$232.88	SELL	141.94%
Netflix	4/28/23	329.93	143.18	PE	198.02	Sell	130.43%
Catalyst Pharmaceuticals	5/4/23	15.92	$7.08	EV to Sales	16.97	Sell	124.86%

The ultimate test… Did undervalued stocks make money?



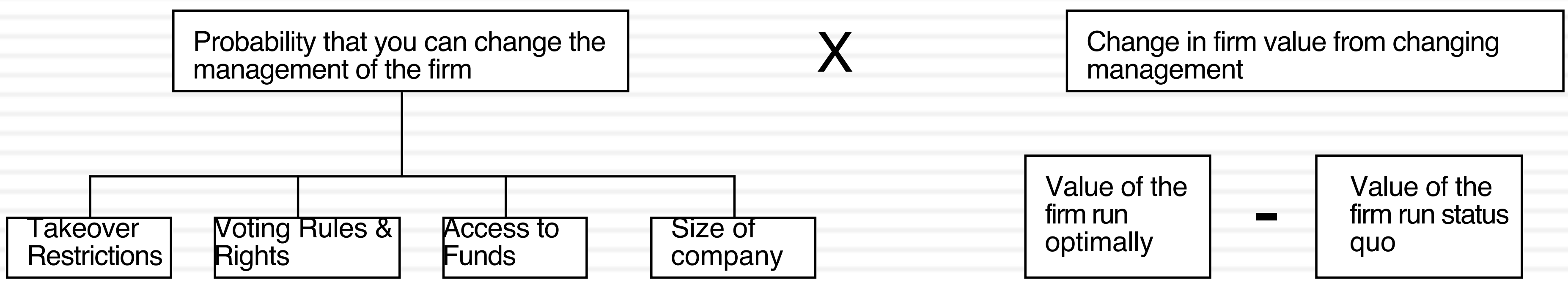
More on the winners...

- <u>On average, right</u>: About 60% of all buy recommendations make money; about 45% of sell recommendations beat the market. The average return on buy recommendations was about 4% higher, on an annualized basis, than the average return on sell recommendations.
- <u>More so on some</u>: The excess returns on buy recommendations on small cap and emerging market companies is higher than the excess returns on large market cap companies, with higher mistakes in both directions on the former.
- <u>Skewed payoffs</u>: There are two or three big winners in each period, but the payoff was not always immediate. Buying Apple in 1999 would have led to negative returns for a year or more, before the turnaround occurred.
- <u>Double whammy</u>: Stocks that are under valued on both a DCF and relative valuation basis do better than stocks that are under valued on only one approach.

The Value of Control

The Expected Value of Control

The Value of Control



Why the probability of management changing shifts over time….

- Corporate governance rules can change over time, as new laws are passed. If the change gives stockholders more power, the likelihood of management changing will increase.
- Activist investing ebbs and flows with market movements (activist investors are more visible in down markets) and often in response to scandals.
- Events such as hostile acquisitions can make investors reassess the likelihood of change by reminding them of the power that they do possess.

Estimating the Probability of Change

- You can estimate the probability of management changes by using historical data (on companies where change has occurred) and statistical techniques such as probits or logits.
- Empirically, the following seem to be related to the probability of management change:
  - Stock price and earnings performance, with forced turnover more likely in firms that have performed poorly relative to their peer group and to expectations.
  - Structure of the board, with forced CEO changes more likely to occur when the board is small, is composed of outsiders and when the CEO is not also the chairman of the board of directors.
  - Ownership structure, since forced CEO changes are more common in companies with high institutional and low insider holdings. They also seem to occur more frequently in firms that are more dependent upon equity markets for new capital.
  - Industry structure, with CEOs more likely to be replaced in competitive industries.

Manifestations of the Value of Control

- Hostile acquisitions: In hostile acquisitions which are motivated by control, the control premium should reflect the change in value that will come from changing management.
- Valuing publicly traded firms: The market price for every publicly traded firm should incorporate an expected value of control, as a function of the value of control and the probability of control changing.
  - Market value = Status quo value + (Optimal value – Status quo value)* Probability of management changing
- Voting and non-voting shares: The premium (if any) that you would pay for a voting share should increase with the expected value of control.
- Minority Discounts in private companies: The minority discount (attached to buying less than a controlling stake) in a private business should be increase with the expected value of control.

1. Hostile Acquisition: Example

- In a hostile acquisition, you can ensure management change after you take over the firm. Consequently, you would be willing to pay up to the optimal value.
- As an example, Blockbuster was trading at $9.50 per share in July 2005. The optimal value per share that we estimated as $ 12.47 per share. Assuming that this is a reasonable estimate, you would be willing to pay up to $2.97 as a premium in acquiring the shares.
- Issues to ponder:
  - Would you automatically pay $2.97 as a premium per share? Why or why not?
  - What would your premium per share be if change will take three years to implement?

2. Market prices of Publicly Traded Companies: An example

- The market price per share at the time of the valuation (May 2005) was roughly $9.50.
  - Expected value per share = Status Quo Value + Probability of control changing * (Optimal Value – Status Quo Value)
  - $ 9.50 = $ 5.13 + Probability of control changing ($12.47 - $5.13)
- The market is attaching a probability of 59.5% that management policies can be changed. This was after Icahn's successful challenge of management. Prior to his arriving, the market price per share was $8.20, yielding a probability of only 41.8% of management changing.

	Value of Equity	Value per share
Status Quo	$ 955 million	$ 5.13 per share
Optimally managed	$2,323 million	$12.47 per share

Value of stock in a publicly traded firm

- When a firm is badly managed, the market still assesses the probability that it will be run better in the future and attaches a value of control to the stock price today:

$$\text{Value per share} = \frac{\text{Status Quo Value} + \text{Probability of control change (Optimal} - \text{Status Quo Value)}}{\text{Number of shares outstanding}}$$

- With voting shares and non-voting shares, a disproportionate share of the value of control will go to the voting shares. In the extreme scenario where non-voting shares are completely unprotected:

$$\text{Value per non-voting share} = \frac{\text{Status Quo Value}}{\#\ \text{Voting Shares} + \#\ \text{Non-voting shares}}$$

$$\text{Value per voting share} = \text{Value of non-voting share} + \frac{\text{Probability of control change (Optimal} - \text{Status Quo Value)}}{\#\ \text{Voting Shares}}$$

3. Voting and Non-voting Shares: An Example

- To value voting and non-voting shares, we will consider Embraer, the Brazilian aerospace company. As is typical of most Brazilian companies, the company has common (voting) shares and preferred (non-voting shares).
  - Status Quo Value = 12.5 billion $R for the equity;
  - Optimal Value = 14.7 billion $R, assuming that the firm would be more aggressive both in its use of debt and in its reinvestment policy.
- There are 242.5 million voting shares and 476.7 non-voting shares in the company and the probability of management change is relatively low. Assuming a probability of 20% that management will change, we estimated the value per non-voting and voting share:
  - Value per non-voting share = Status Quo Value/ (# voting shares + # non-voting shares) = 12,500/(242.5+476.7) = 17.38 $R/ share
  - Value per voting share = Status Quo value/sh + Probability of management change * (Optimal value – Status Quo Value) = 17.38 + 0.2* (14,700-12,500)/242.5 = 19.19 $R/share
- With our assumptions, the voting shares should trade at a premium of 10.4% over the non-voting shares.

4. Minority Discount: An example

- Assume that you are valuing Kristin Kandy, a privately owned candy business for sale in a private transaction. You have estimated a value of $ 1.6 million for the equity in this firm, assuming that the existing management of the firm continues into the future and a value of $ 2 million for the equity with new and more creative management in place.
  - Value of 51% of the firm = 51% of optimal value = 0.51* $ 2 million = $1.02 million
  - Value of 49% of the firm = 49% of status quo value = 0.49 * $1.6 million = $784,000
- Note that a 2% difference in ownership translates into a large difference in value because one stake ensures control and the other does not.

Alternative Approaches to Value Enhancement

- Maximize a variable that is correlated with the value of the firm. There are several choices for such a variable. It could be
  - an accounting variable, such as earnings or return on investment
  - a marketing variable, such as market share
  - a cash flow variable, such as cash flow return on investment (CFROI)
  - a risk-adjusted cash flow variable, such as Economic Value Added (EVA)
- The advantages of using these variables are that they
  - Are often simpler and easier to use than DCF value.
- The disadvantage is that the
  - Simplicity comes at a cost; these variables are not perfectly correlated with DCF value.

Economic Value Added (EVA) and CFROI

- The Economic Value Added (EVA) is a measure of surplus value created on an investment.
  - Define the return on capital (ROC) to be the "true" cash flow return on capital earned on an investment.
  - Define the cost of capital as the weighted average of the costs of the different financing instruments used to finance the investment.
  - EVA = (Return on Capital - Cost of Capital) (Capital Invested in Project)
- The CFROI is a measure of the cash flow return made on capital
  - It is computed as an IRR, based upon a base value of capital invested and the cash flow on that capital.

The bottom line...

- The value of a firm is not going to change just because you use a different metric for value. All approaches that are discounted cash flow approaches should yield the same value for a business, if they make consistent assumptions.
- If there are differences in value from using different approaches, they must be attributable to differences in assumptions, either explicit or implicit, behind the valuation.
- When you use a shortcut (as you are with EVA or CFROI), you are making assumptions that firms can exploit to game the system.

Your Pricing

Relative Valuation: The Four Steps to Understanding Multiples

- Anna Kournikova knows PE…. Or does she?
  - In use, the same multiple can be defined in different ways by different users. When comparing and using multiples, estimated by someone else, it is critical that we understand how the multiples have been estimated
- 8 times EBITDA is not always cheap…
  - Too many people who use a multiple have no idea what its cross sectional distribution is. If you do not know what the cross sectional distribution of a multiple is, it is difficult to look at a number and pass judgment on whether it is too high or low.
- You cannot get away without making assumptions
  - It is critical that we understand the fundamentals that drive each multiple, and the nature of the relationship between the multiple and each variable.
- There are no perfect comparables
  - Defining the comparable universe and controlling for differences is far more difficult in practice than it is in theory.

The Determinants of Multiples…

Cheat Box
ROE = Net Income$_1$/ Book Equity$_0$
Net Margin= Net Income/ Sales
Payout = Dividends/Net Income

Equity Multiples

Variants of Net Income (E)
1. Net Income$_1$= Net Margin (Sales)
2. Net Income$_1$= ROE(Book Equity)
3. Net Income$_1$ = Net Income$_0$ (1+g)

P = Dividends$_1$ / (k_e -g) = Net Income$_1$(Payout) / (k_e-g)

P/ Div$_1$ =1/ (k_e -g) or **Div$_1$/ P** =1/ (k_e -g)
Div Yield = f(k_e, g)

P/ E$_1$ = Payout / (k_e -g)
PE = f (k_e, *g*, Payout)

P/ Book Equity = ROE*Payout/ (k_e -g)
PBV= f (ROE, k_e, *g*, *Payout*)

P/ Sales$_1$ = Net Margin*Payout/ (k_e -g)
PS= f (ROE, k_e, *g*, Payout, *Net Margin*)

EV/ FCFF$_1$ = f(WACC.g)
EV/ FCFF$_1$ =1 / (WACC -g)

EV/ EBIT$_1$ (1-t)= f(RIR,WACC.g)
EV/ EBIT$_1$(1-t) =(1-RIR) / (WACC -g)

EV/ EBIT$_1$ = f(t,RIR,WACC.g)
EV/ EBIT$_1$ =(1-t) (1-RIR)/ (WACC -g)

EV/ Sales$_1$ = f(*ATOM*,RIR,WACC.g)
EV/ Sales$_1$ = (ATOM) (1- RIR)/ (WACC -g)

EV/ IC = f(*ROIC*,RIR,WACC.g)
EV/ IC = (ROIC)(1-RIR)/ (WACC -g)

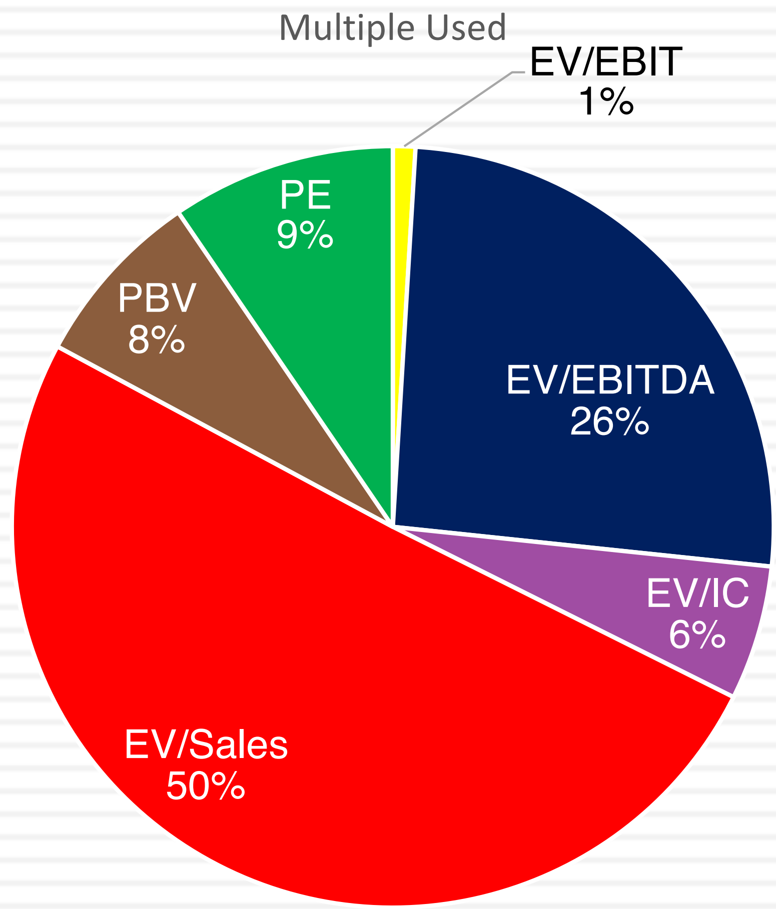
EV = FCFF$_1$ / (WACC -g) = EBIT$_1$(1-t)(1- RIR) / (WACC -g)

Variants of EBIT (*1-t)
1. EBIT$_1$(1-t) = ATOM (Sales)
2. EBIT$_1$(1-t) = ROIC (IC)
3. EBIT$_1$(1-t) = EBITDA$_1$(1-t) + t DA

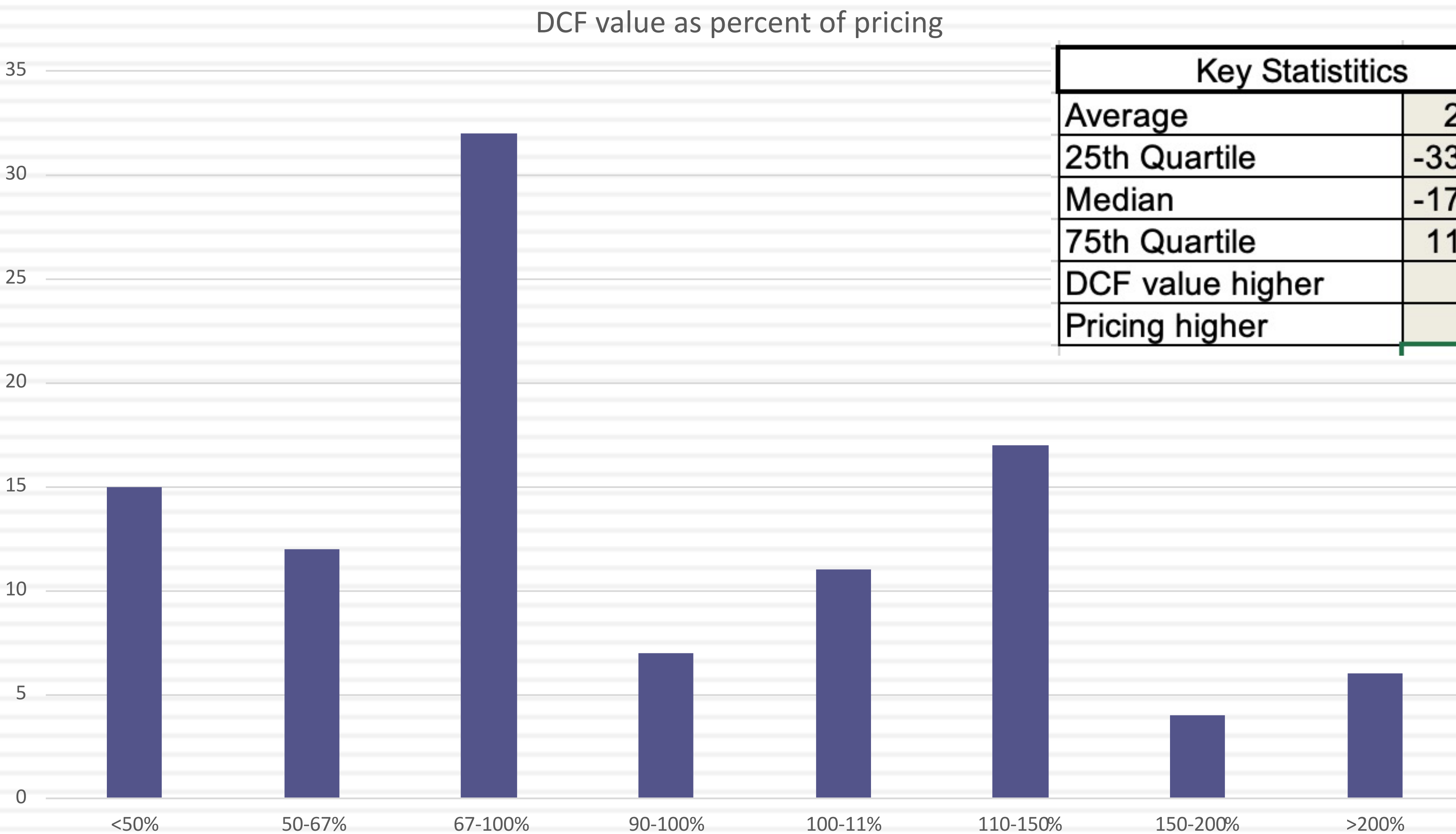
Cheat Box
IC = Book Equity + Debt - Cash
ATOM = EBIT (1-t)/ Sales
RIR = (Cap Ex - DA + Chg WC)/EBIT (1-t)
ROIC = EBIT$_1$ (1-t)/ IC

Enterprise Value Multiples

The Multiples you used were …

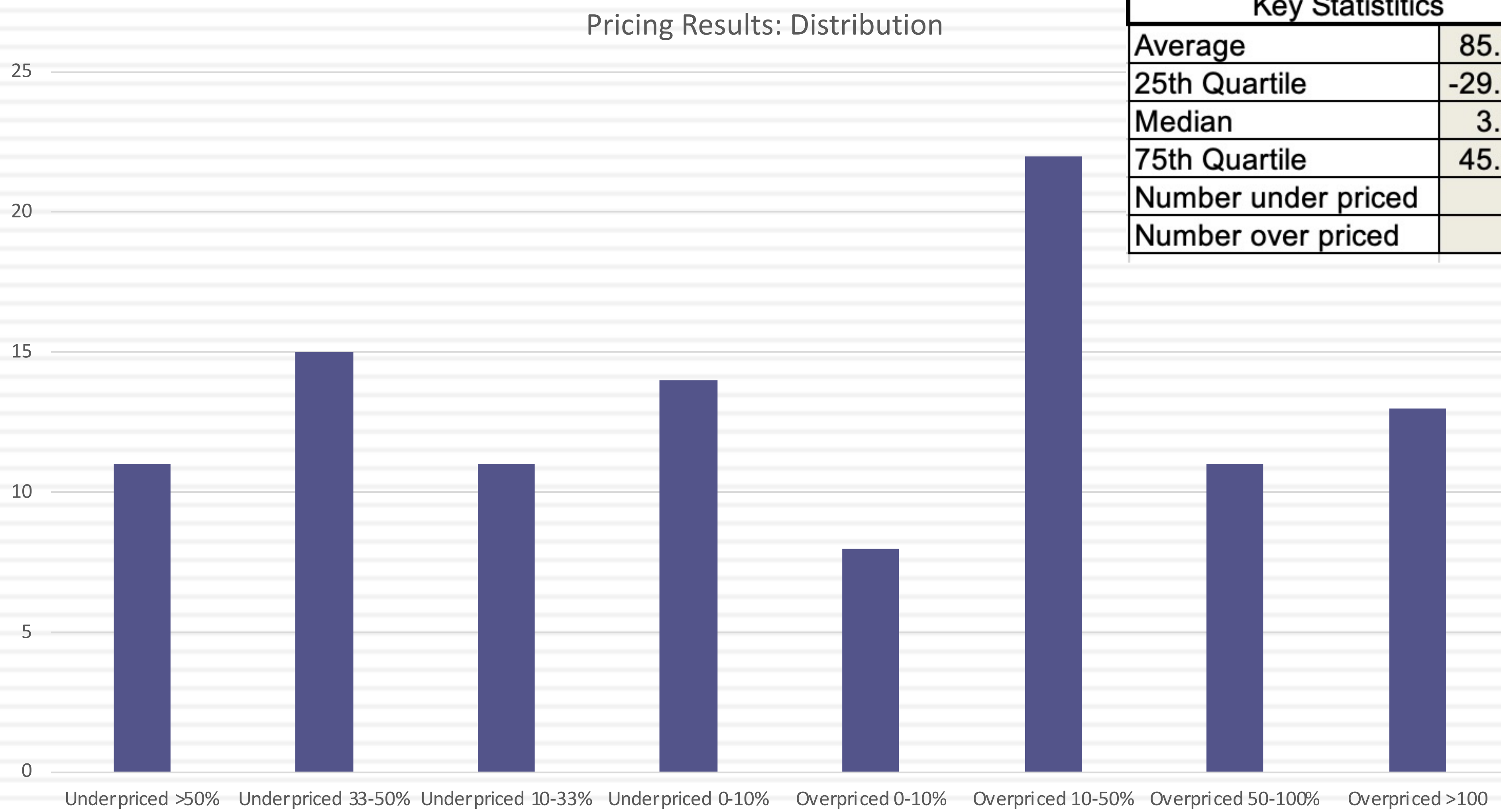


DCF vs Relative Valuation



Key Statistitics	
Average	2.91%
25th Quartile	-33.74%
Median	-17.56%
75th Quartile	11.30%
DCF value higher	67
Pricing higher	40

Pricing Results



Key Statistitics	
Average	85.23%
25th Quartile	-29.73%
Median	3.00%
75th Quartile	45.19%
Number under priced	52
Number over priced	55

Most underpriced on a relative basis…

Company	Date	Price	DCF Value	Multiple Used	Pricing	Option Value	Recommendation	% Under Priced
MTN Nigeria	5/5/23	229	347.4	EV to Inv Capital	2,203.77		BUY	-89.61%
Academy Sports + Outdoors	3/30/23	$63.85	$73.45	EV to Inv Capital	$295.09		Buy	-78.36%
Aveanna Healthcare (NASDAQ: AVAH)	4/20/23	$1.09	$1.75		$4.47			-75.62%
Under Armour	4/15/23	$8.93	5.87	EV to Sales	$34.36		Sell	-74.01%
Qualcomm	4/23/23	$116.80	$118.76	PE	$320.41		Buy	-63.55%
Zillow	5/5/23	$47.86	$39.59	EV to Sales	$106.17		Sell	-54.92%
Alibaba	Apr-23	585.04	652.93	PBV	1,264.93		BUY	-53.75%
Upwork	5/7/23	$8.00	$31.75	EV to Sales	$17.17	$17.58	Buy	-53.41%
GameStop	5/3/23	$18.90	$26.93	EV to Sales	$39.67		BUY	-52.36%
Uber	5/2/23	$37.75	$52.18	EV to Sales	$78.41		BUY	-51.86%
Clearfield, Inc (CLFD)	4/28/23	$43.68	$71.28	EV to EBITDA	$86.42		BUY	-49.46%

Most overpriced on a relative basis…

Company	Date	Price	DCF Value	Multiple Used	Pricing	Option Value	Recommendation	% Over Priced
Jumia Technologies	5/6/23	$2.85	$0	EV to Sales	$0.05		Sell	5600.00%
Block Inc.	5/5/23	$60.50	$38.68	EV to EBITDA	$5.87		Sell	930.66%
Chipotle Mexican Grill, Inc	5/7/23	$2,028.21	$716.05	EV to Sales	$255.99		Sell	692.30%
D.Local Go	5/6/23	$13.82	$14.28	EV to Sales	$2.99		Hold	362.21%
New York Times	3/23/23	$39.19	$1.72	EV to EBITDA	$10.20		SELL	284.22%
Wingstop (WING)	5/1/23	$198.68	$91.67	EV to Sales	$52.55		SELL	278.08%
Bilibili	5/6/23	$20.25	$7.81	EV to Sales	6.91		Sell	193.05%
Snowflake	5/5/23	$154.17	$82.29	EV to Sales	$54.61		Sell	182.31%
Medtronic	4/1/23	$80.00	$41.30	EV to Sales	$28.96		SELL	176.24%
Philip Morris International	5/7/23	95.56	95.08	EV to EBITDA	34.97		Sell	173.26%
Chapel Down	May-23	0.37	0.23	EV to Sales	0.16		Sell	131.25%

Contingent Claim (Option) Valuation

- Options have several features
  - They derive their value from an underlying asset, which has value
  - The payoff on a call (put) option occurs only if the value of the underlying asset is greater (lesser) than an exercise price that is specified at the time the option is created. If this contingency does not occur, the option is worthless.
  - They have a fixed life
- Any security that shares these features can be valued as an option.

- Number of firms valued using option models = 8
- Median Percent increase in value over DCF value= 41.25%

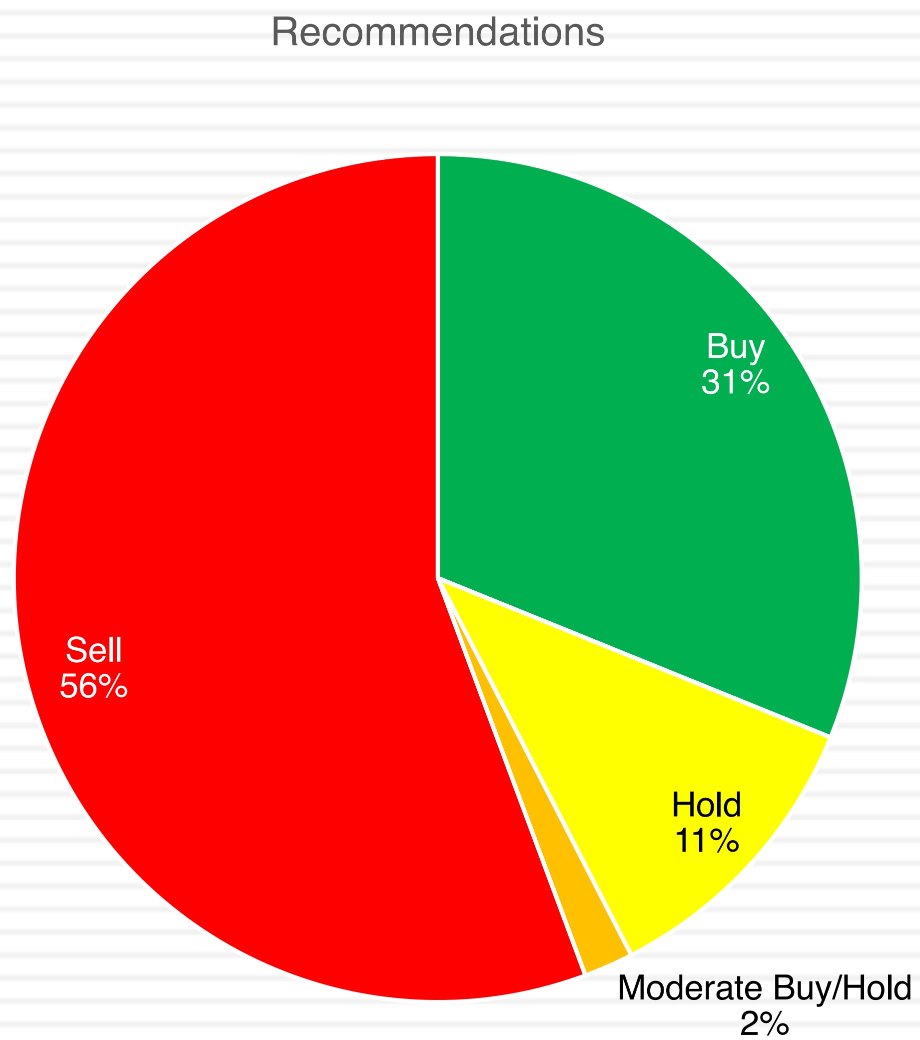
Acting on valuation: It is not just an academic exercise

a. <u>I am not sure yet</u>: Uncertainty is not a shield against action. If you wait until you feel "certain" about your valuation, you will never act.

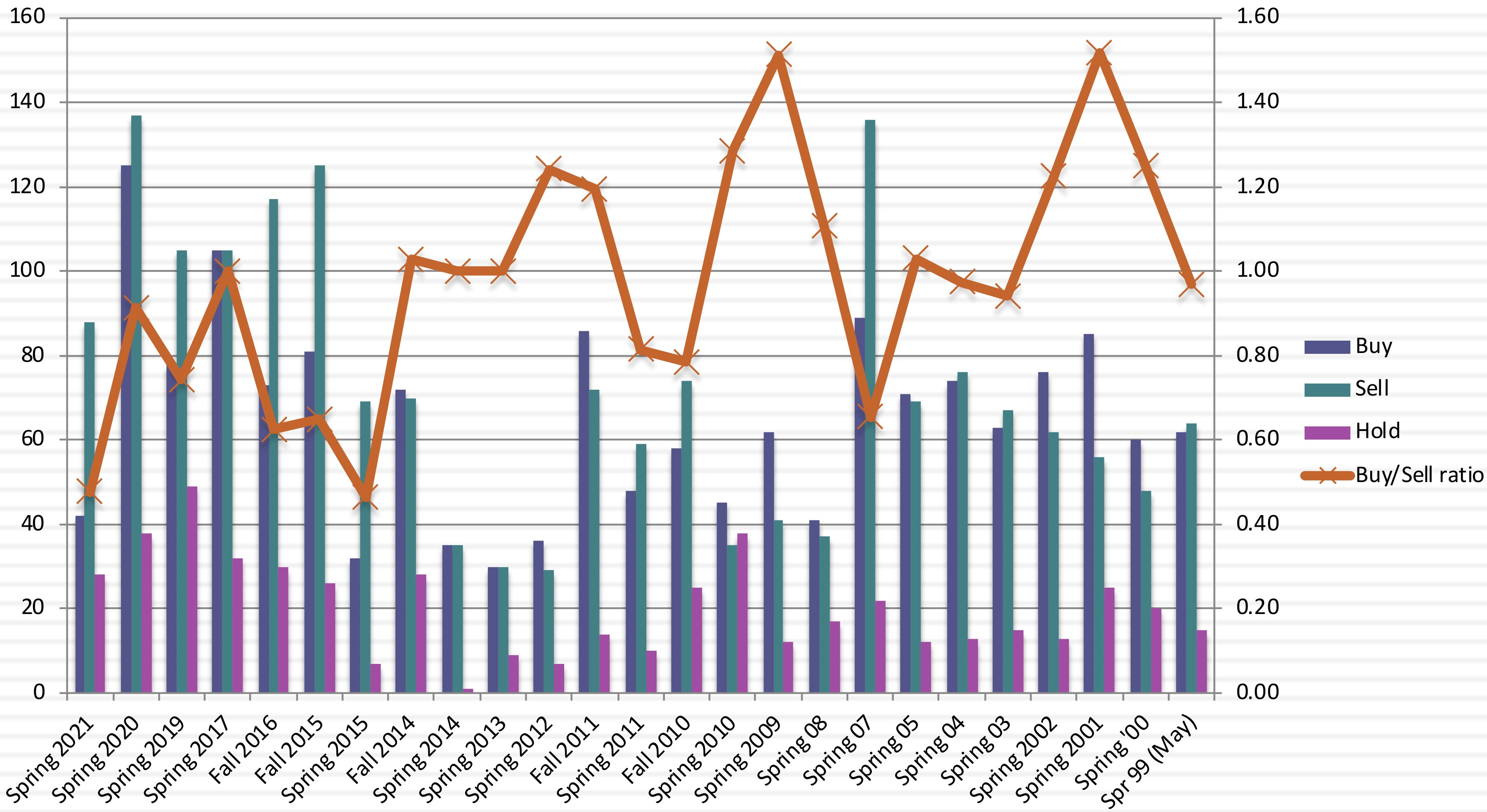
b. <u>All believers now</u>? Ultimately, you have to believe in some modicum of market efficiency. Markets have to correct their mistakes for your valuations to pay off.

c. <u>The law of large numbers</u>: Assuming your valuations carry heft, you are far more likely to be right across many companies than on any individual one.

Your recommendations were to…



Prior semesters



Picking your valuation approach

- Asset characteristics
  - Marketability
  - Cash flow generating capacity
  - Uniqueness
- Your characteristics
  - Time horizon
  - Reasons for doing the valuation
  - Beliefs about markets

What approach would work for you?

- As an investor, given your investment philosophy, time horizon and beliefs about markets (that you will be investing in), which of the the approaches to valuation would you choose?

a. Discounted Cash Flow Valuation
b. Relative Valuation
c. Neither. I believe that markets are efficient.

Story Tellers? Number Crunchers?

- If you are a story teller, I hope that you have
  - More confidence in your number crunching
  - More discipline in your stories
  - Less intimidation, when confronted with number crunchers
- If you are a number cruncher, I hope that you have
  - More willingness to put stories behind your numbers
  - More imagination in your number crunching
  - More understanding, when confronted with story telling

Some Not Very Profound Advice

1. Its all in the fundamentals.
2. Focus on the big picture. Don’t sweat the small stuff and don’t get distracted.
3. Anecdotes mean little and experience does not equal knowledge.
4. Keep your perspective. It is only a valuation.
5. In investing, luck dominates skill and knowledge.

Do not forget to do your CFEs. Your ability to check your grade rests on it.