VALUATION: CLOSING THOUGHTS

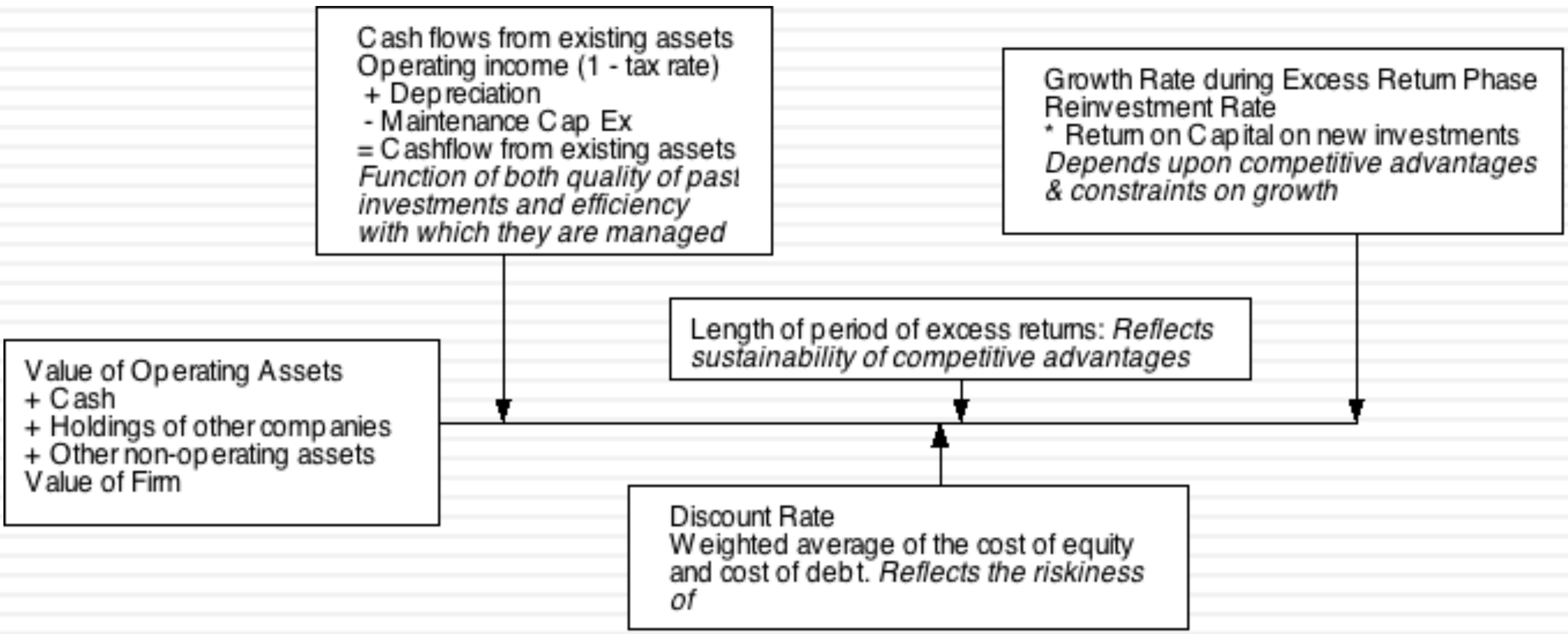
Spring 2020

"It ain't over till its over"

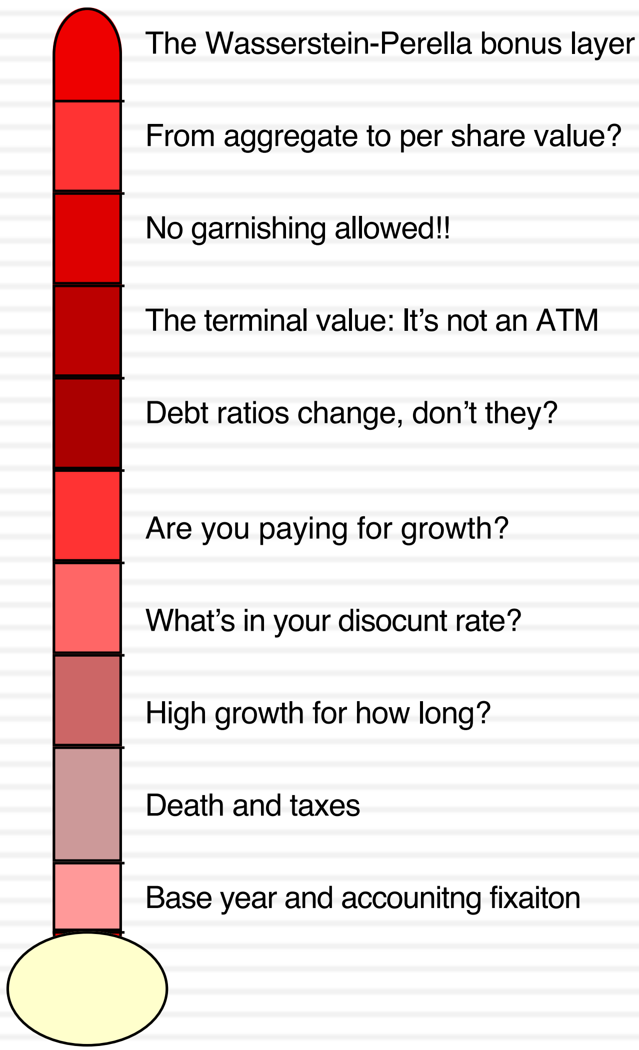
Back to the very beginning: Approaches to Valuation

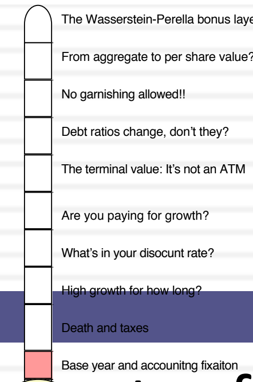
- **Discounted Cashflow Valuation**, where we try (sometimes desperately) to estimate the intrinsic value of an asset by using a mix of theory, guesswork and prayer.
- **Relative valuation**, where we pick a group of assets, attach the name "comparable" to them and tell a story.
- **Contingent claim 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



Dante meets DCF: Nine layers of valuation hell.. And a bonus layer..





Layer 1: Base Year fixation….

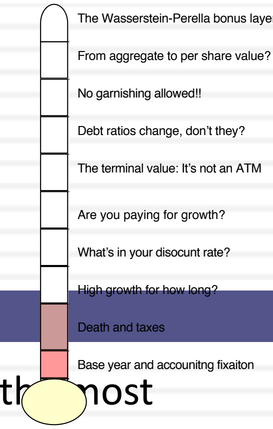
- You are valuing Exxon Mobil, using the financial statements of the firm from 2008. The following provides the key numbers:

Revenues	$477 billion
EBIT (1-t)	$ 58 billion
Net Cap Ex	$ 3 billion
Chg WC	$ 1 billion
FCFF	$ 54 billion

- The cost of capital for the firm is 8% and you use a very conservative stable growth rate of 2% to value the firm. The market cap for the firm is $373 billion and it has $ 10 billion in debt outstanding.

  a. How under or over valued is the equity in the firm?

  b. Would you buy the stock based on this valuation? Why or why not?

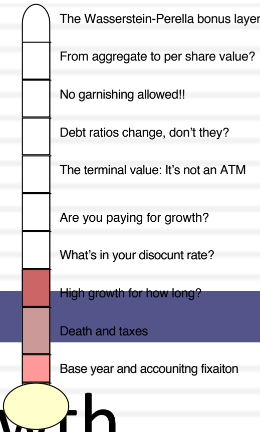


Layer 2: Taxes and Value

- Assume that you have been asked to value a company and have been provided with the most recent year's financial statements:
- EBITDA 140
- - DA 40
- EBIT 100
- Interest exp 20
- Taxable income 80
- Taxes 32
- Net Income 48

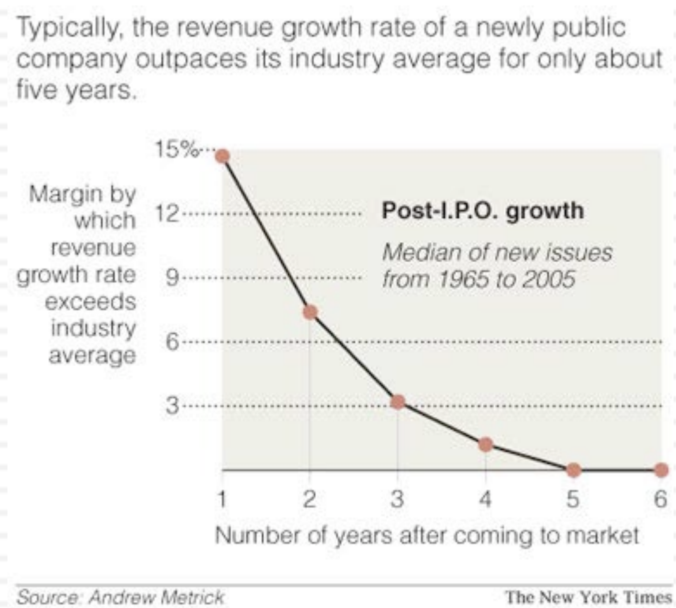
Free Cash flow to firm
EBIT (1- tax rate)
-(Cap Ex – Depreciation)
- Change in non-cash WC
=FCFF

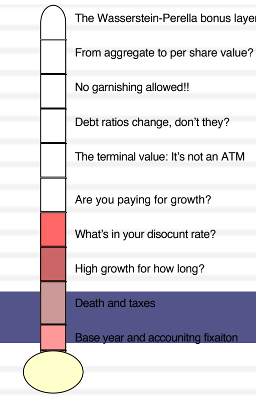
- Assume also that cash flows will be constant and that there is no growth in perpetuity. What is the free cash flow to the firm?
  a. 88 million (Net income + Depreciation)
  b. 108 million (EBIT – taxes + Depreciation)
  c. 100 million (EBIT (1-tax rate)+ Depreciation)
  d. 60 million (EBIT (1- tax rate))
  e. 48 million (Net Income)
  f. 68 million (EBIT – Taxes)



Layer 3: High Growth for how long…

- Assume that you are valuing a young, high growth firm with great potential, just after its initial public offering. How long would you set your high growth period?
- < 5 years
- 5 years
- 10 years
- >10 years





Layer 4: The Cost of Capital

- The cost of capital for Chippewa Technologies, a US technology firm with 20% of its revenues from Brazil, has been computed using the following inputs:

Cost of equity = Riskfree Rate + Beta (ERP) + Small firm premium
= 5% + 1.20 (5%) + 3% = **14%**

Replaced current T.Bond rate of 3% with normalized rate of 5%

"Adjusted" Beta from Bloomberg

Both from Ibbotson data base, derived from 1926-2008 data
ERP: Stocks - T.Bonds (Arithmetic average)
Small firm: Smal stocks - Overall market

Cost of capital = Cost of equity (Equity/ (Debt + Equity)) + Cost of debt (1- tax rate) (Debt/ (Debt + Equity)
= 14% (1000/2000) + 3% (1-.30) (1000/2000) = **8.05%**

From above

Used market value of equity

Company is not rated and has no bonds. Used book interest rate = Int exp/ BV of debt

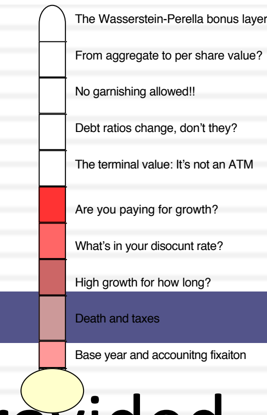
Used effective tax rate of 30%

To be conservative, counted all liabilities, other than equity, as debt and used book value.

The Correct Cost of Capital for Chippewa

Input	*What was used…*	*What should have been used…*
Riskfree Rate	Corrected treasury bond rate = 5%	Actual treasury bond rate = 3%
Beta	Bloomberg adjusted beta = 1.20	Sector average adjusted beta = 1.60 (Based on small cap companies in sector)
Equity Risk Premium	Ibbotson premium =5%	Updated implied ERP = 6.5%
Other adjustments to cost of equity	Small cap premium = 3%	No small cap premium Country risk adjustment = $\text{Lambda}_{\text{Brazil}}$ * Brazil CRP = 0.26*6.77% = 2.28%
Cost of equity	5%+ 1.2 (5%) + 3% = 14%	3% + 1.6 (6.5%) + 2.28% = 15.68%
Cost of debt (pre-tax)	3%	3%+6% (based on synthetic rating)=9%
Tax rate	Effective tax rate =30%	Marginal tax rate = 40%
Cost of debt (after-tax)	3% (1-.3) = 2.1%	9% (1-.4) = 5.4%
Debt ratio	Book ratio: Liabilities=50% Equity=50%	Market ratio: Interest bearing debt = 30%; Equity= 70%
Cost of capital	14% (.5) + 2.1% (.5) = 8.05%	15.68% (.7) + 5.4% (.3) = 12.60%

Layer 5: The price of growth..

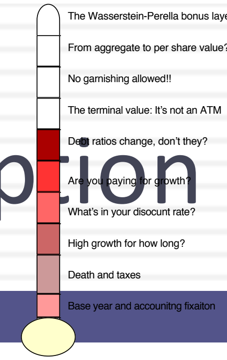


- You are looking at the projected cash flows provided by the management of the firm, for use in valuation

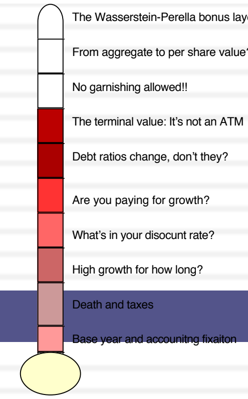
Year	Current	1	2	3	4
Growth rate		10%	10%	10%	10%
Revenues	$100.00	$110.00	$121.00	$133.10	$146.41
EBIT (1-t)	$30.00	$33.00	$36.30	$39.93	$43.92
+ Depreciation	$15.00	$16.50	$18.15	$19.97	$21.96
- Cap Ex	$18.00	$19.80	$21.78	$23.96	$26.35
- Chg in WC	$3.00	$3.30	$3.63	$3.99	$4.39
FCFF	$24.00	$26.40	$29.04	$31.94	$35.14

- What questions would you raise about the forecasts?

Layer 6: The "fixed debt ratio" assumption



- You have been asked to value Hormel Foods, a firm which currently has the following cost of capital:
  - Cost of capital = 7.31% (.9) + 2.36% (.1) = 6.8%
- You believe that the target debt ratio for this firm should be 30%. What will the cost of capital be at the target debt ratio?
- Which debt ratio (and cost of capital) should you use in valuing this company?



Layer 7: The Terminal Value

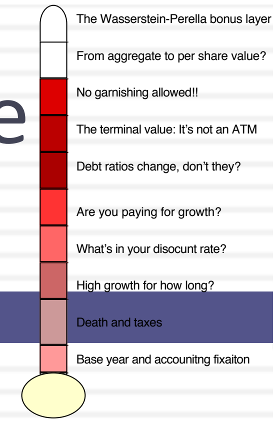
- The best way to compute terminal value is to

a. Use a stable growth model and assume cash flows grow at a fixed rate forever
b. Use a multiple of EBITDA or revenues in the terminal year
c. Use the estimated liquidation value of the assets

- You have been asked to value a business. The business expects to \$ 120 million in after-tax earnings (and cash flow) next year and to continue generating these earnings in perpetuity. The firm is all equity funded and the cost of equity is 10%; the riskfree rate is 3% and the ERP is 7%. What is the value of the business?

- Assume now that you were told that the firm can grow earnings at 2% a year forever. Estimate the value of the business.

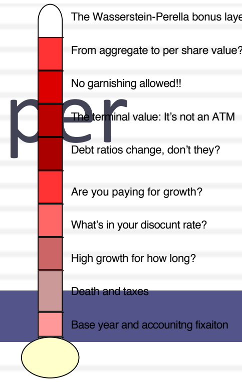
Layer 8. From firm value to equity value: The Garnishing Effect…



- For a firm with consolidated financial statements, you have discounted free cashflows to the firm at the cost of capital to arrive at a firm value of $ 100 million. The firm has
  - A cash balance of $ 15 million
  - Debt outstanding of $ 20 million
  - A 5% holding in another company: the book value of this holding is $ 5 million. (Market value of equity in this company is $ 200 million)
  - Minority interests of $ 10 million on the balance sheet
- What is the value of equity in this firm?

- How would your answer change if you knew that the firm was the target of a lawsuit it is likely to win but where the potential payout could be $ 100 million if it loses?

Layer 9. From equity value to equity value per share



- You have valued the equity in a firm at $ 200 million. Estimate the value of equity per share if there are 10 million shares outstanding..

- How would your answer change if you were told that there are 2 million employee options outstanding, with a strike price of $ 20 a share and 5 years left to expiration?

Layer 10. The final circle of hell…

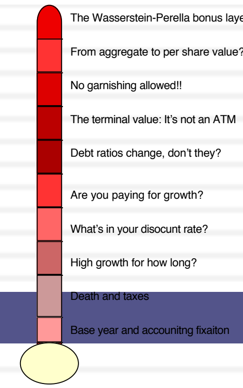


Exhibit 8

KENNECOTT COPPER CORPORATION

PROJECTED CARBORUNDUM COMPANY FINANCIAL DATA ADJUSTED TO REFLECT THE ACQUISITION OF CARBORUNDUM BY KENNECOTT AT A PRICE OF $66 PER SHARE, 1977–1987

($ millions except for per share and ratio data)

	1977 Unadjusted	Adjustments[1]	1977 Adjusted	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Income statement													
Sales	$717.6			$790.1	$885.9	$1,005.2	$1,129.9	$1,265.5	$1,392.1	$1,531.3	$1,684.4	$1,852.8	$2,038.1
Net income (before adjustments)	38.4			43.1	50.7	60.1	70.6	84.7	93.2	102.5	112.7	124.0	136.4
Interest adjustment[2]	0			6.5	7.8	8.5	9.2	9.8	10.7	11.7	12.8	14.0	15.4
Goodwill adjustment[3]	0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plant write-up adjustment[4]	0			2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Net income (after adjustments)	$38.4			$31.8	$38.1	$ 46.8	$ 56.6	$ 70.1	$ 77.7	$ 86.0	$ 95.1	$ 105.2	$ 116.2
Balance sheet													
Working capital	$198.8	+ 37.0 + 100.0 − 140.0	$195.8	$202.9	$223.0	$248.1	$274.2	$302.8	$329.3	$358.6	$390.7	$426.1	$465.0
Property, plant, and equipment	181.8	+ 124.0	305.8	334.2	367.4	384.6	400.1	411.6	437.5	466.6	499.1	535.6	576.1
Goodwill	0	+ 80.0	80.0	78.0	76.0	74.0	72.0	70.0	68.0	66.0	64.0	62.0	60.0
Total assets	584.3	+ 201.0	785.3	824.0	889.9	948.4	1,007.0	1,065.8	1,135.5	1,213.1	1,299.0	1,394.6	1,500.3
Long-term debt	86.2	+ 100.0	186.2	220.9	238.8	252.9	266.8	280.1	297.7	317.5	339.4	363.9	391.0
Shareholders' equity	309.0	+ 101.0	410.0	410.1	443.5	469.7	495.4	520.2	553.0	589.6	630.3	675.7	726.0
Total capital	395.2	+ 201.0	596.2	631.0	682.3	722.6	762.2	800.3	850.7	907.1	969.7	1,039.6	1,117.0
Capital sources													
Profit retentions				$ 0.1	$33.4	$26.2	$25.7	$24.8	$32.8	$36.6	$40.7	$45.4	$50.3
Capital contributed by Kennecott				—	—	—	—	—	—	—	—	—	—
Debt financing (net)				34.7	17.9	14.1	13.9	13.3	17.6	19.8	21.9	24.5	27.1
Total capital added				$34.8	$51.3	$40.3	$39.6	$38.1	$50.4	$56.4	$62.6	$69.9	$77.4
Key financial ratios													
Growth rate in sales (%)	16.9			10.1	12.1	13.5	12.4	12.0	10.0	10.0	10.0	10.0	10.0
Sales/assets	1.23			0.96	1.00	1.06	1.12	1.19	1.23	1.26	1.30	1.33	1.36
Profit/sales	.054			0.040	0.043	0.047	0.050	0.055	0.056	0.056	0.056	0.057	0.057
Assets/net worth	1.89			2.01	2.01	2.02	2.03	2.05	2.05	2.06	2.06	2.06	2.07
Profit/net worth	.124			0.078	0.086	0.100	0.114	0.135	0.141	0.146	0.151	0.156	0.160
Cash flow to Kennecott													
Acquisition of Carborundum			$(550.0)										
Dividends to Kennecott[5]			140.0	$31.7	$ 4.7	$20.6	$30.9	$45.3	$44.9	$49.4	$54.4	$59.8	$ 65.9
Utilization of Kennecott tax loss carryforwards[6]			—	20.0	20.0	—	—	—	—	—	—	—	—
Tax shelter from plant write-up adj.[4]				2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Terminal value at 10 times earnings[7]													1,044.9
Net cash flow			$(410.0)	$54.5	$27.5	$23.4	$33.7	$48.1	$47.7	$52.2	$57.2	$62.6	$1,113.6

Assumptions:

[1] Kennecott would pay $550 million to acquire Carborundum's equity which had a book value of $309 million. The $241 million in excess of purchase price over book value of assets acquired would be allocated as follows: (a) $37.0 million would be added to inventory to reflect the replacement cost of inventories; (b) $11.0 million would be added to land to reflect the market value of land; (c) $113 million would be added to net plant and equipment to reflect the depreciated replacement cost of plant and equipment; and (d) $80 million would be added to goodwill. Immediately following the acquisition of Carborundum, Carborundum borrows $100 million and then pays a $140 million dividend to Kennecott. This dividend is financed with the $100 million plus $40 million of Carborundum's excess cash.

[2] Interest at the rate of 10% (5% after taxes) is paid on the difference between the amount of Carborundum debt outstanding in Exhibit 8 and the amount of debt assumed to be outstanding in Exhibit 5. In Exhibit 8, it is assumed that Carborundum will have 35% debt in its total capital structure after 1977.

[3] The $80 million of goodwill created as a result of the acquisition is amortized over 40 years. This expense is not tax-deductible.

[4] The $113 million write-up of plant and equipment is depreciated over a 20-year life, providing a reduction in profit after taxes and an increase in cash flow equal to ($113/20) x .5. It is assumed that this added cash flow is paid to Kennecott as dividends.

[5] Dividends to Kennecott equal the difference between Carborundum's net profit (after adjustment) and the profit retention requirements needed to support Carborundum's growth.

[6] The utilization of $40 million of tax loss carry-forwards and investment tax credit carryforwards available to Kennecott are assumed to be utilized as a result of the Carborundum acquisition and that these would expire unutilized without the acquisition.

[7] Carborundum is assumed to be sold at the end of ten years at a price equal to ten times earnings. The proceeds from this sale, $1,162 million, are reduced by $117.1 million as a result of taxes on the capital gain of $1,162—$726. Carborundum's net worth at 12/31/87 is assumed to be $726 million.

Sources: Exhibit 5 and casewriter projections.

	Cost of Equity	Cost of Capital
Kennecott Corp (Acquirer)	13.0%	10.5%
Carborundum (Target)	16.5%	12.5%

YOUR NUMBERS/FINDINGS

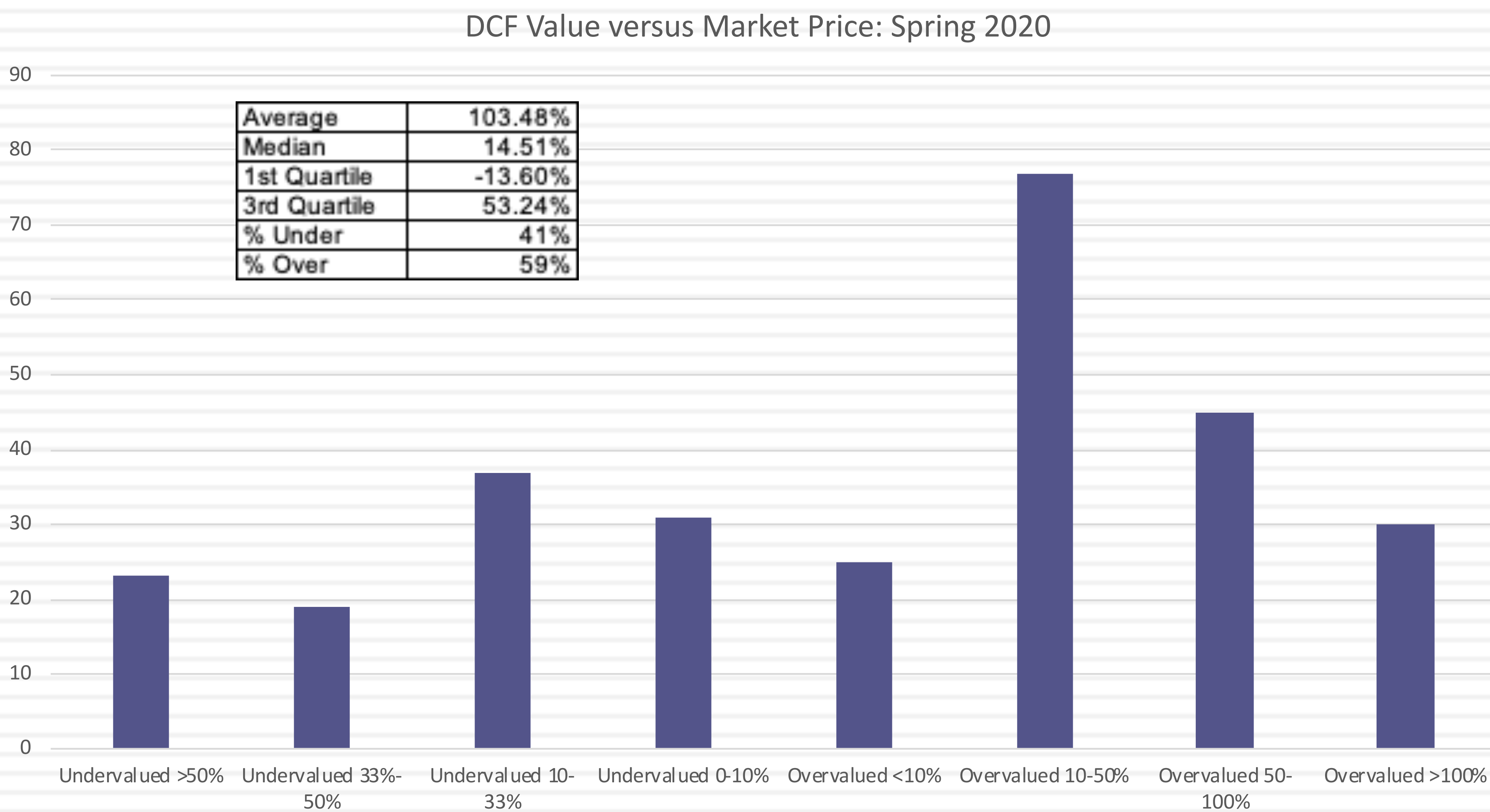
"The truth shall set you free".

The Most Valued Company (Companies)..

Company	*Number of analyses*
Netflix	12
Lululemon	9
Beyond Meat	8
Lyft	7
Uber	6

Company	Stock Price	DCF value	Pricing	Recommendation
Uber	$32.79	$15.69	26.72	Sell
Uber	$28.87	$34	-$16.30	Buy
Uber	32.79	21.27	18.67	Sell
Uber	$28.61	$35.69	?	Buy
Uber	$32.79	$15.83	$9.57	Sell

What you found…



Average	103.48%
Median	14.51%
1st Quartile	-13.60%
3rd Quartile	53.24%
% Under	41%
% Over	59%

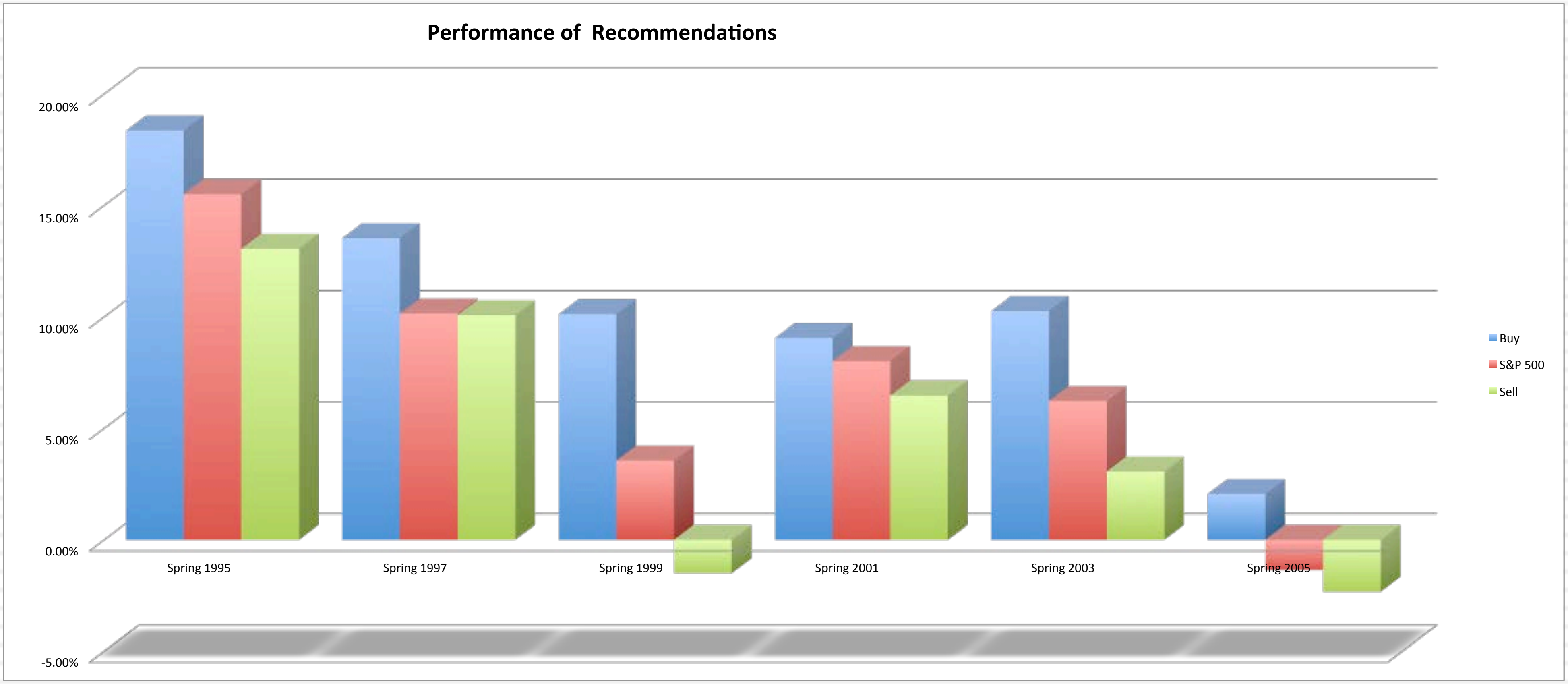
The most undervalued stocks…

Company	Price	DCF	Pricing (based on multiple)	Recommendation
Gamestop	4.98	22.13	15.62	Hold
Sonos, Inc.	10.48	43.55	23.85	Buy
American Eagel Outfitters	$8.09	$28.12	$26	Buy
Curaleaf	4.36	14.08	6.73	Buy
Lyft	$29.60	$82.34	$30.66	Buy
Cheescake Factory	22.4	57.99	35.93	Buy
Tecnoglass Inc.	$4.17	$10.38	$7.89	Buy
LYFT	$26.76	$51.92	$30.69	Buy
Cementos Pacasmayo	1.19	2.27	1.24	Hold
Lukoil	4,832.00 ₽	9,186.68 ₽	6,217.01 ₽	Buy

The Most Overvalued stocks are...

Company	Price	DCF	Pricing (based on multiple)	Recommendation
AMC	$4.10	$0.03	$4.01	Sell
Beyond Meat	$122.66	$2.29	?	Sell
Rolls Royce	287.1	16.64	26.23	Sell
Beyond Meat	133	8.79	4.65	Sell
lyft	32.73	$7.84	4.78	Sell
The Trade Desk	$315.50	$97.89	$97.06	Sell
Live Nation	$44.72	$14.47	$84.10	Sell
Chegg	$63.13	$21.35	$10.52	Sell
Twilio	179.69	62.47	$163.58	Sell
Zoom	$155.40	$54.46	$115.70	Hold
Vivint Solar	$6.61	2.33	$11.43	Sell

The ultimate test… Did undervalued stocks make money?

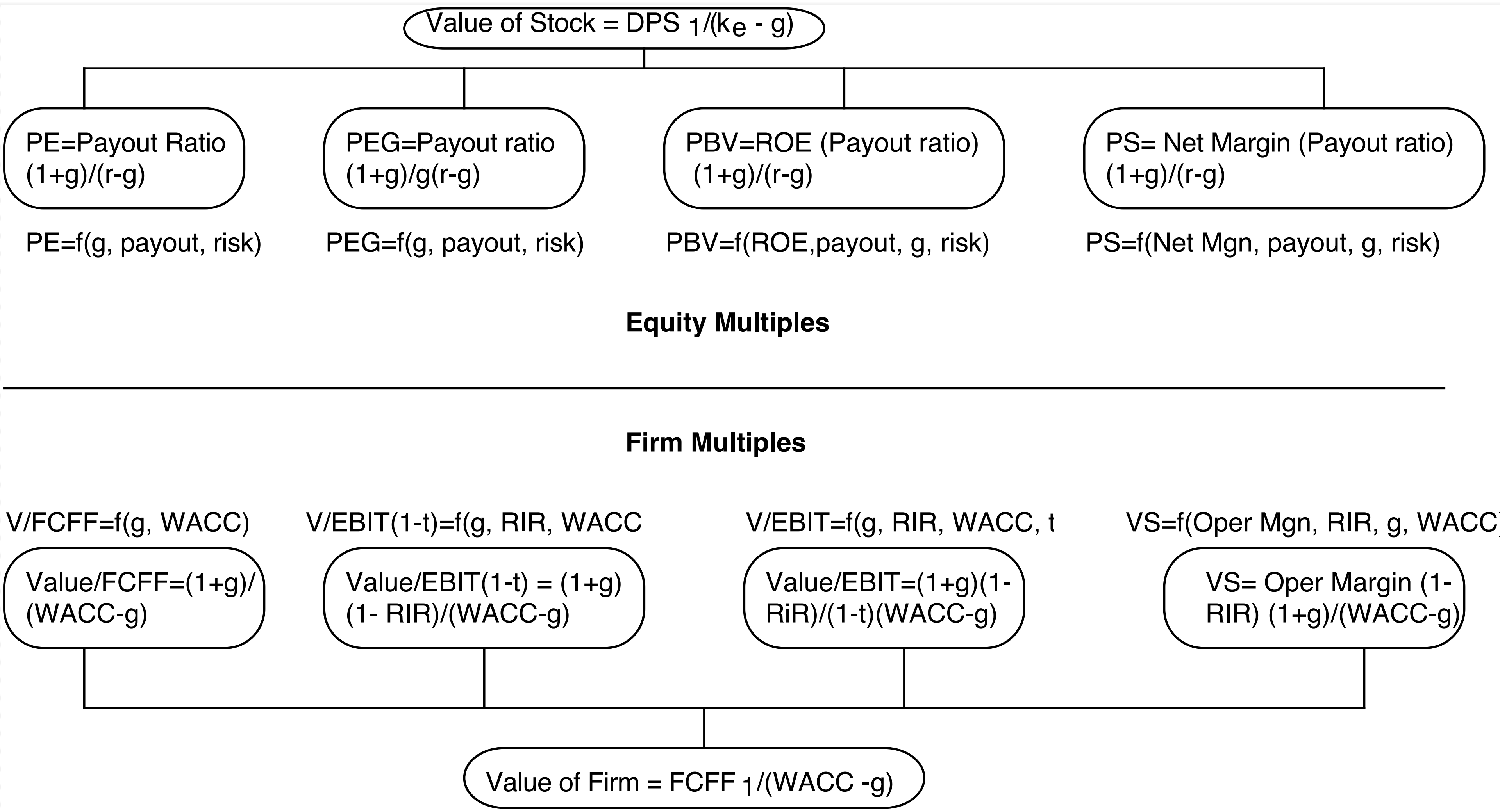


More on the winners…

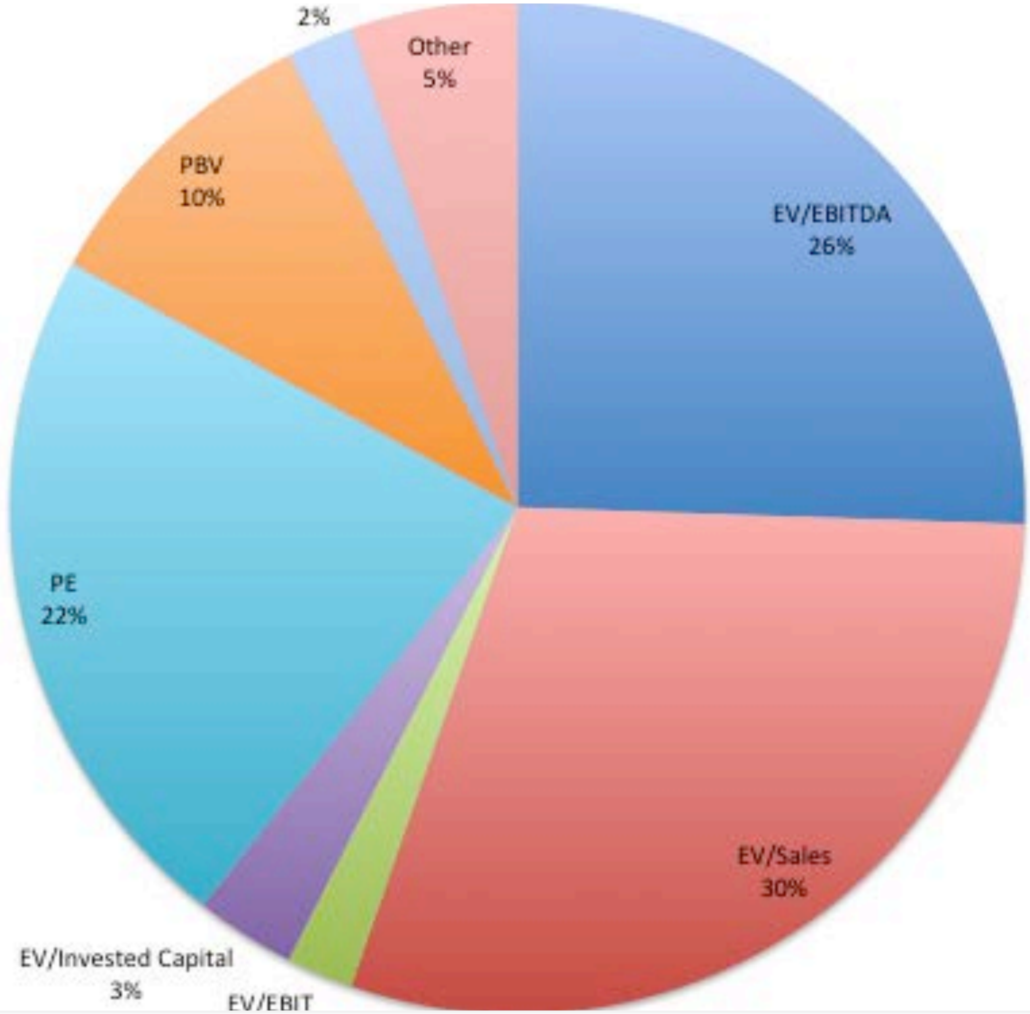
- On average, right: About 60% of all buy recommendations make money; about 45% of sell recommendations beat the market. The average return on buy recommendations was about 4% higher, on an annualized basis, than the average return on sell recommendations.
- More so on some: The excess returns on buy 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.
- Skewed payoffs: 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.
- Double whammy: 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.

Relative Valuation: The Four Steps to Understanding Multiples

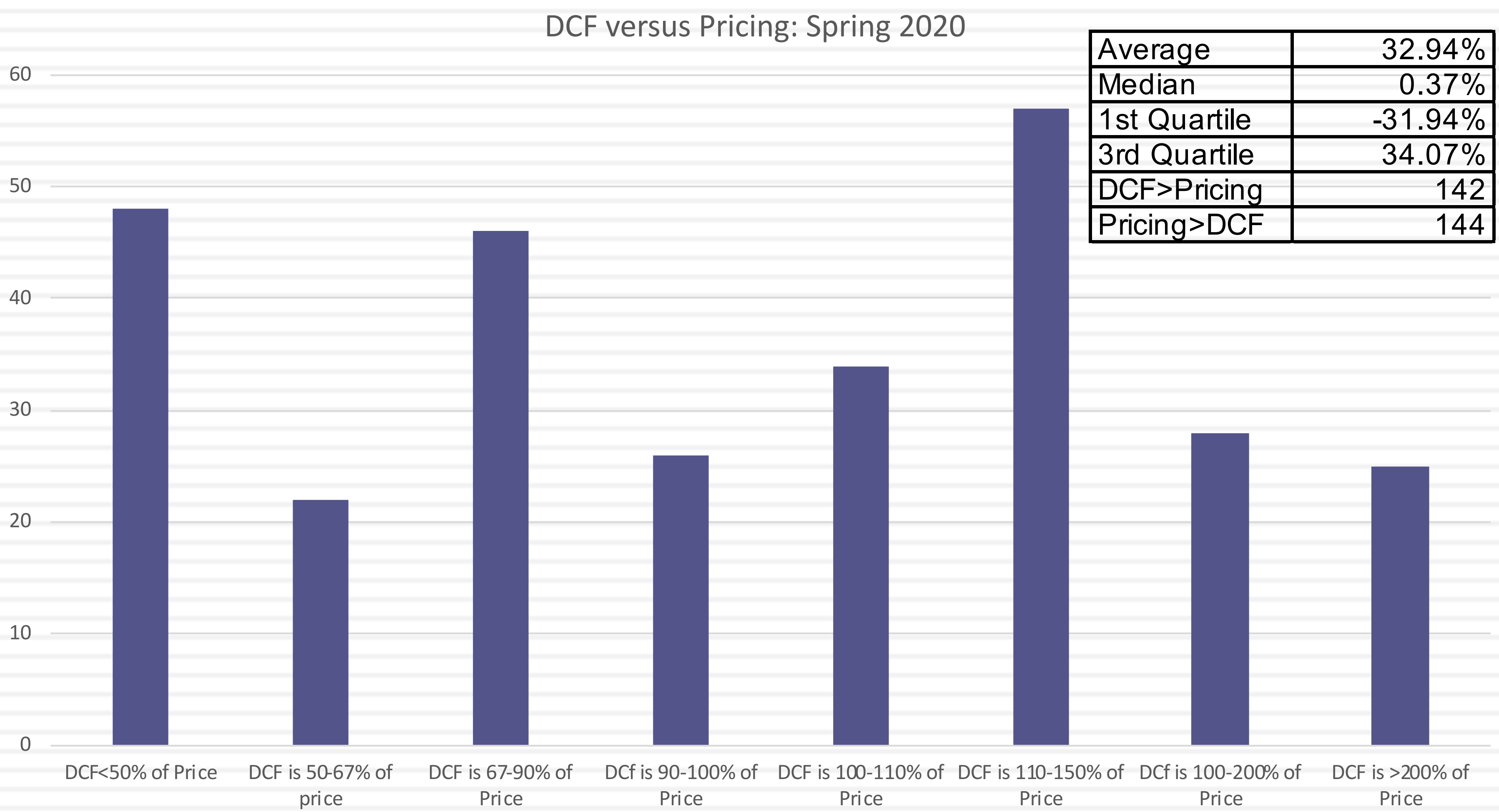
- Anna Kournikova knows PE…. Or does she?
  - In use, the same multiple can be defined in different ways by different users. When comparing and using multiples, estimated by someone else, it is critical that we understand how the multiples have been estimated
- 8 times EBITDA is not always cheap…
  - 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.


Value of Stock = DPS 1/(ke - g)
PE=Payout Ratio (1+g)/(r-g)
PEG=Payout ratio (1+g)/g(r-g)
PBV=ROE (Payout ratio) (1+g)/(r-g)
PS= Net Margin (Payout ratio) (1+g)/(r-g)
PE=f(g, payout, risk)
PEG=f(g, payout, risk)
PBV=f(ROE,payout, g, risk)
PS=f(Net Mgn, payout, g, risk)
Equity Multiples
Firm Multiples
V/FCFF=f(g, WACC)
V/EBIT(1-t)=f(g, RIR, WACC
V/EBIT=f(g, RIR, WACC, t
VS=f(Oper Mgn, RIR, g, WACC)
Value/FCFF=(1+g)/(WACC-g)
Value/EBIT(1-t) = (1+g)(1- RIR)/(WACC-g)
Value/EBIT=(1+g)(1-RiR)/(1-t)(WACC-g)
VS= Oper Margin (1-RIR) (1+g)/(WACC-g)
Value of Firm = FCFF 1/(WACC -g)

The Multiples you used were ...



DCF vs Relative Valuation



Average	32.94%
Median	0.37%
1st Quartile	-31.94%
3rd Quartile	34.07%
DCF>Pricing	142
Pricing>DCF	144

Most underpriced on a relative basis…

Company	Price	DCF Value	Multiple	Pricing	Recommendation
Falabella	$2,465	$2,497	EV to Sales	$10,698	Hold
L Brands Inc.	$12.22	$15.11	EV to Sales	$43.49	Buy
American Eagel Outfitters	$8.09	$28.12	EV to Sales	$26	Buy
Gamestop	4.98	22.13	EV to Sales	15.62	Hold
Electronic Arts	116.62	127.94	PE	350	Hold
Anglo American plc	$18.18	$19.39	Price to Book	$50.79	Buy
STOP LOOKIN	450,086	450,086	EV to EBITDA	1,247,583	Buy
Nordstrom	$18.03	$22.89	EV to Sales	$48.61	Buy
WWE	$43.98	$53.91	EV to EBITDA	$116.27	Buy
AB Inbev	$43.34	$65.54	EV to EBITDA	$103.12	Buy

Most overpriced on a relative basis…

Company	Price	DCF Value	Multiple	Pricing	Recommendation
Delta Airlines	22.72	36.41	EV to Sales	0.72	Buy
Beyond Meat	133	8.79	EV to Sales	4.65	Sell
Airgas	$135,110.00	$135,110.00	Price to Book	$8,515.00	Buy
Rolls Royce	287.1	16.64	PE	26.23	Sell
Beyond Meat	$89.00	$97.37	PE	9.07	Buy
lyft	32.73	$7.84	EV to Sales	4.78	Sell
Chegg	$63.13	$21.35	EV to EBITDA	$10.52	Sell
Chegg	42.36	65.47	EV to Sales	7.71	Buy
Shopify	$708.97	$419.43	EV to Sales	$133.41	Sell
Papa John's	71.57	43.38	EV to EBITDA	13.63	Sell

Contingent Claim (Option) Valuation

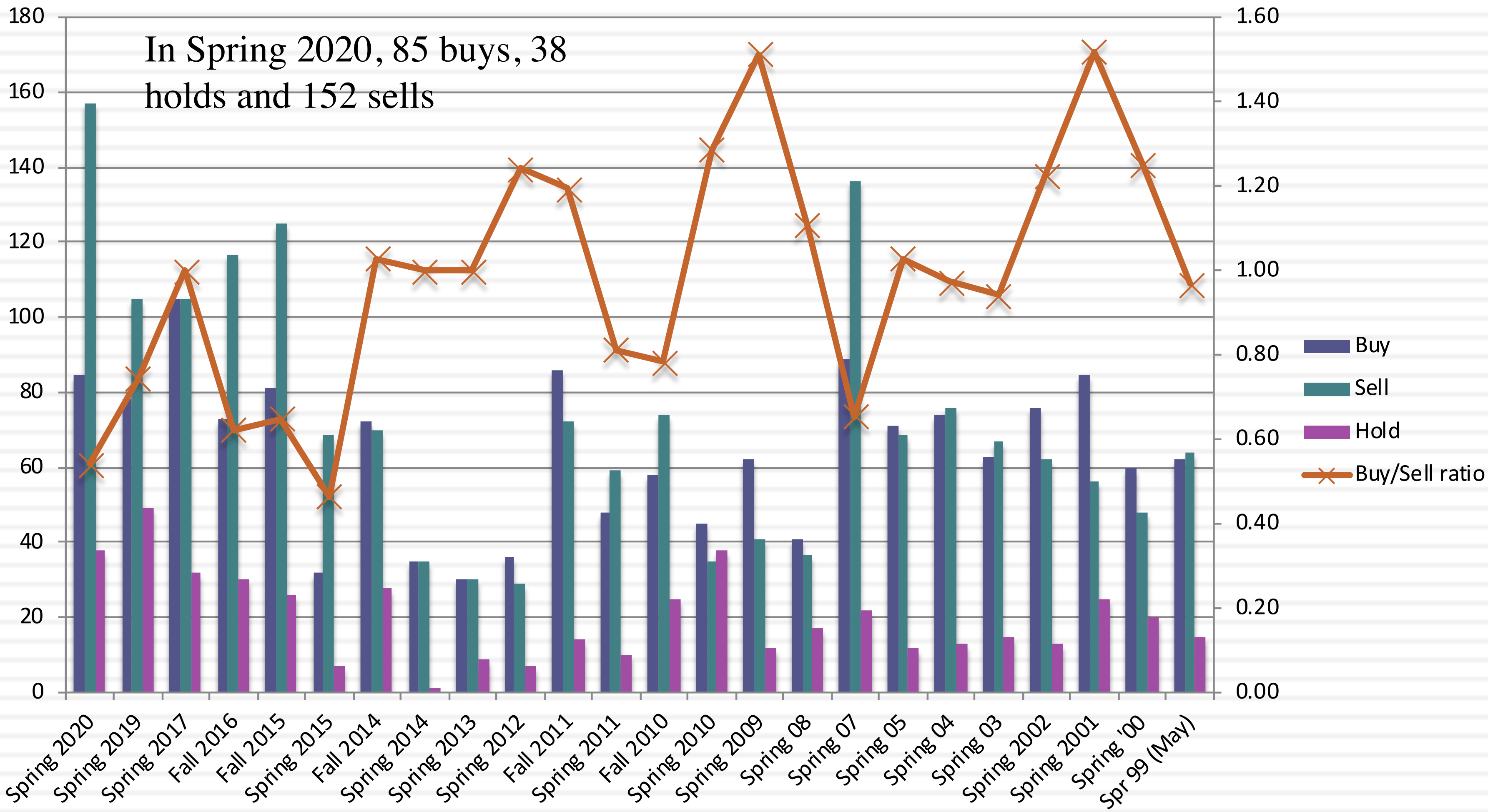
- Options have several features
  - They derive their value from an underlying asset, which has value
  - The payoff on a call (put) option occurs only if the value of the underlying asset is greater (lesser) than an exercise price that is specified at the time the option is created. If this contingency 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 = 61
- Median Percent increase in value over DCF value= 45.55%

Acting on valuation: It is not just an academic exercise

a. I am not sure yet: Uncertainty is not a shield against action. If you wait until you feel "certain" about your valuation, you will never act.
b. All believers now? Ultimately, you have to believe in some modicum of market efficiency. Markets have to correct their mistakes for your valuations to pay off.
c. The law of large numbers: 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..



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.

Keep your perspective!