Valuation: Closing Thoughts
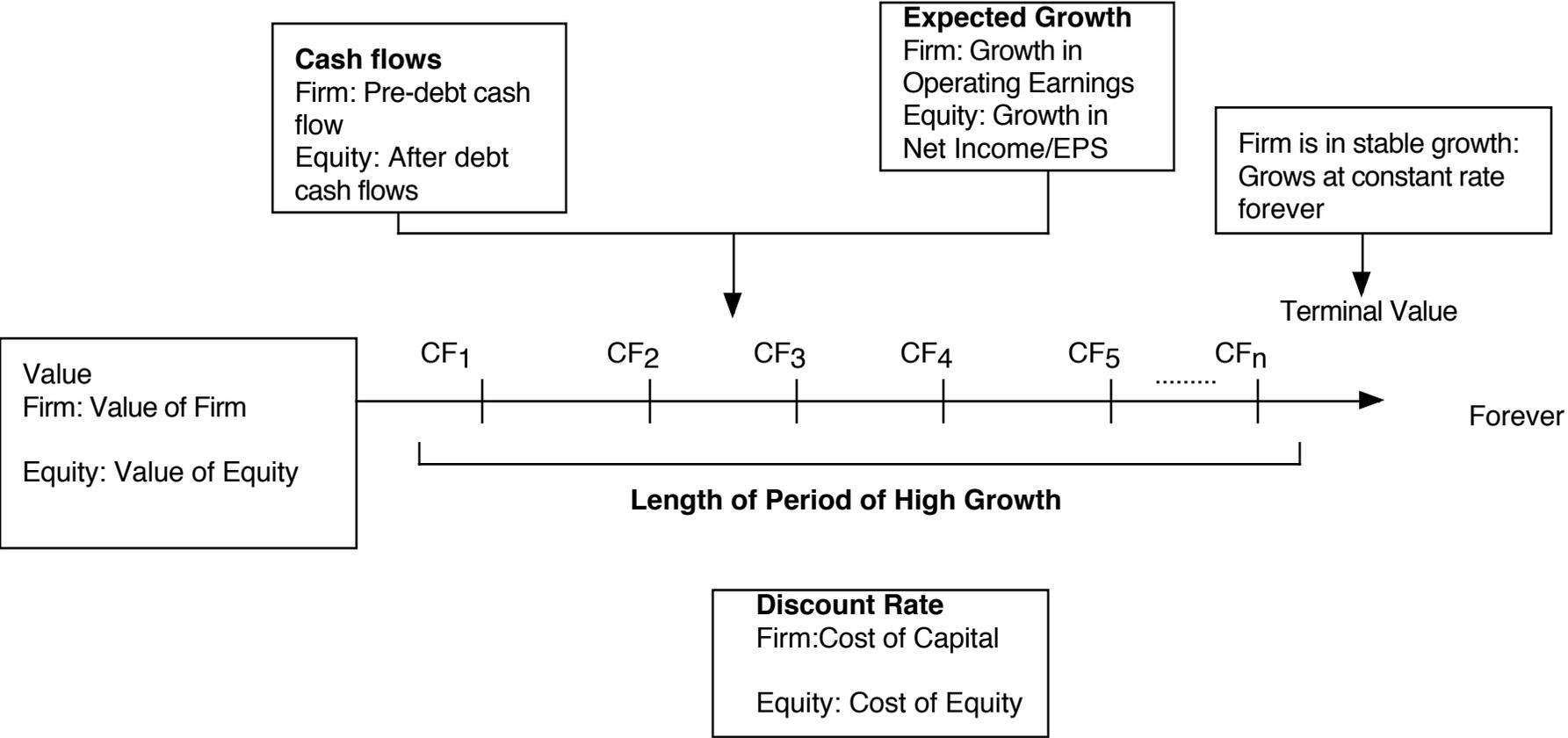
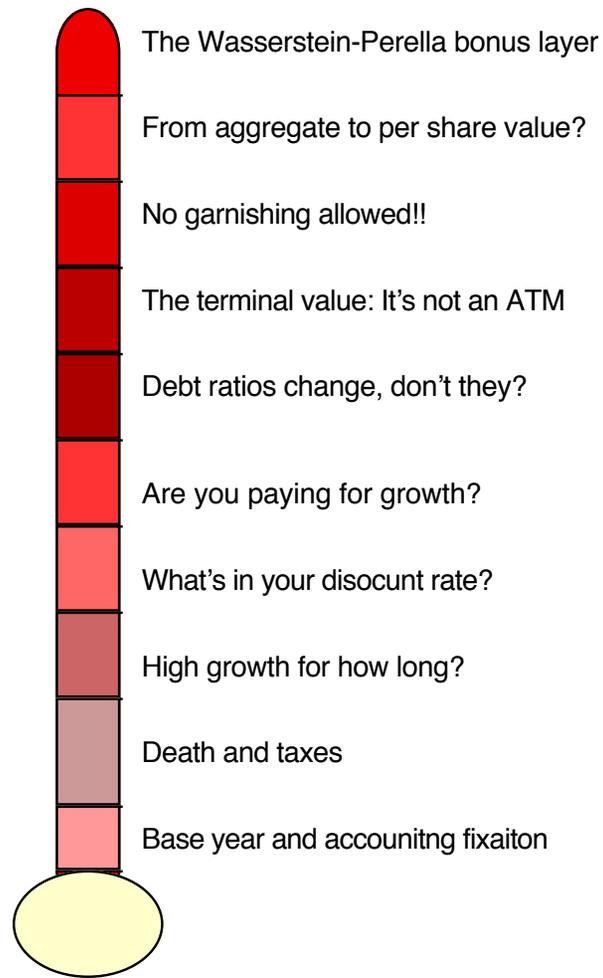*Spring 2011*

Aswath Damodaran

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 of value (equity) and the potential victims of this crime (lenders)

DISCOUNTED CASHFLOW VALUATION

Cash flows
Firm: Pre-debt cash flow
Equity: After debt cash flows

Expected Growth
Firm: Growth in Operating Earnings
Equity: Growth in Net Income/EPS

Firm is in stable growth: Grows at constant rate forever

Terminal Value

Value
Firm: Value of Firm

Equity: Value of Equity

CF_1 CF_2 CF_3 CF_4 CF_5 .... CF_n

Forever

Length of Period of High Growth

Discount Rate
Firm:Cost of Capital

Equity: Cost of Equity

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

The Wasserstein-Perella bonus layer

From aggregate to per share value?

No garnishing allowed!!

The terminal value: It's not an ATM

Debt ratios change, don't they?

Are you paying for growth?

What's in your disocunt rate?

High growth for how long?

Death and taxes

Base year and accounitng fixaiton

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

The Wasserstein-Perella bonus layer

From aggregate to per share value?

No garnishing allowed!!

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The terminal value: It's not an ATM

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What's in your disocunt rate?

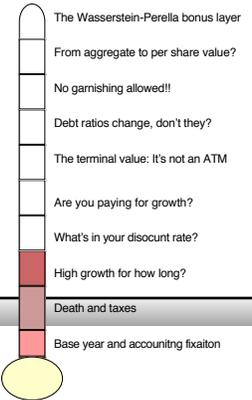High growth for how long?

Death and taxes

Base year and accounitng fixaiton

■ 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 <u>no growth in perpetuity</u>. 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)
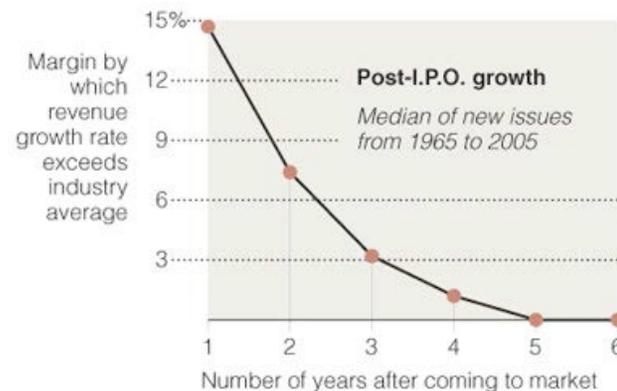
f) 68 million (EBIT – Taxes)

Layer 3: High Growth for how long…

The Wasserstein-Perella bonus layer

From aggregate to per share value?

No garnishing allowed!!

Debt ratios change, don't they?

The terminal value: It's not an ATM

Are you paying for growth?

What's in your disocunt rate?

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Base year and accounitng fixaiton

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

Typically, the revenue growth rate of a newly public company outpaces its industry average for only about five years.

Margin by which revenue growth rate exceeds industry average

Post-I.P.O. growth

Median of new issues from 1965 to 2005

Number of years after coming to market

Source: Andrew Metrick

The New York Times

Aswath Damodaran

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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 = Lambda$_{Brazil}$ * 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..
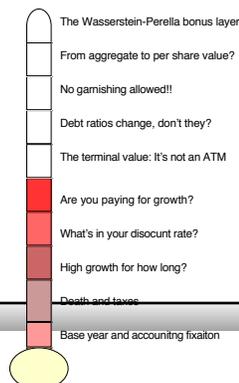
■ You are looking at the projected cash flows provided by the management of the firm, for use in valuation

| 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
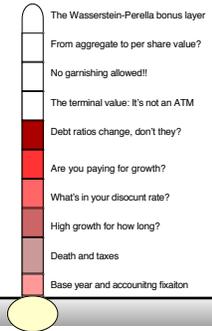
■ You have been asked to value Hormel Foods, a firm which currently has the following cost of capital:

  Cost of capital = 7.31% (.9) + 2.36% (.1) = 6.8%

a. 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?

b. Which debt ratio (and cost of capital) should you use in valuing this company?

Layer 7: The Terminal Value
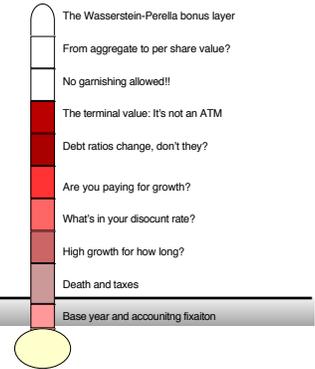
■ The best way to compute terminal value is to

❏ Use a stable growth model and assume cash flows grow at a fixed rate forever

❏ Use a multiple of EBITDA or revenues in the terminal year

❏ 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 <u>earnings</u> at 2% a year forever. Estimate the value of the business.

Layer 8. From firm value to equity value: The Garnishing Effect…
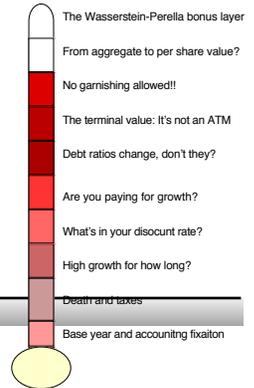
■ For a firm with consolidated financial statements, you have discounted free cashflows to the firm at the cost of capital to arrive at a firm value of $ 100 million. The firm has
- A cash balance of $ 15 million
- Debt outstanding of $ 20 million
- A 5% holding in another company: the book value of this holding is $ 5 million. (Market value of equity in this company is $ 200 million)
- Minority interests of $ 10 million on the balance sheet
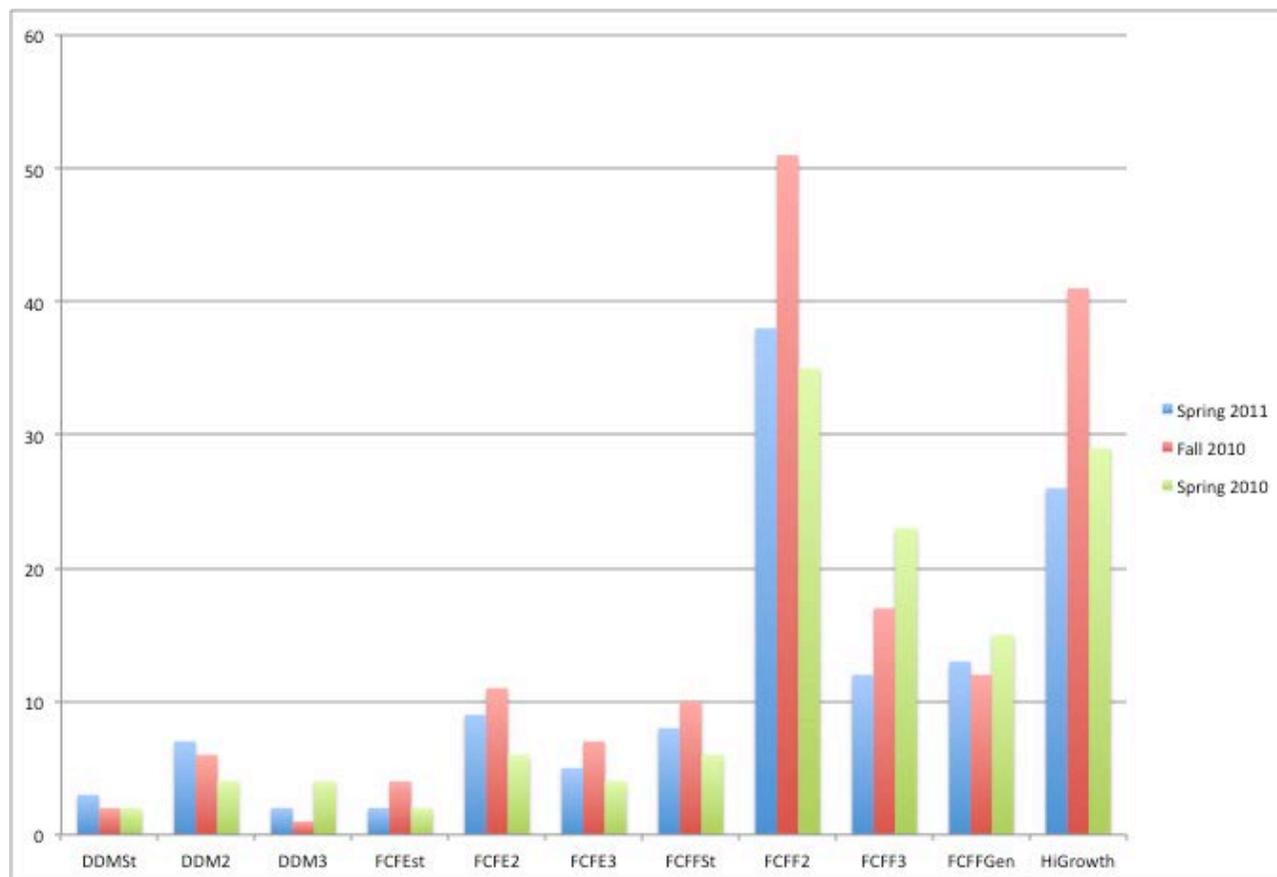
■ What is the value of equity in this firm?

■ 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?
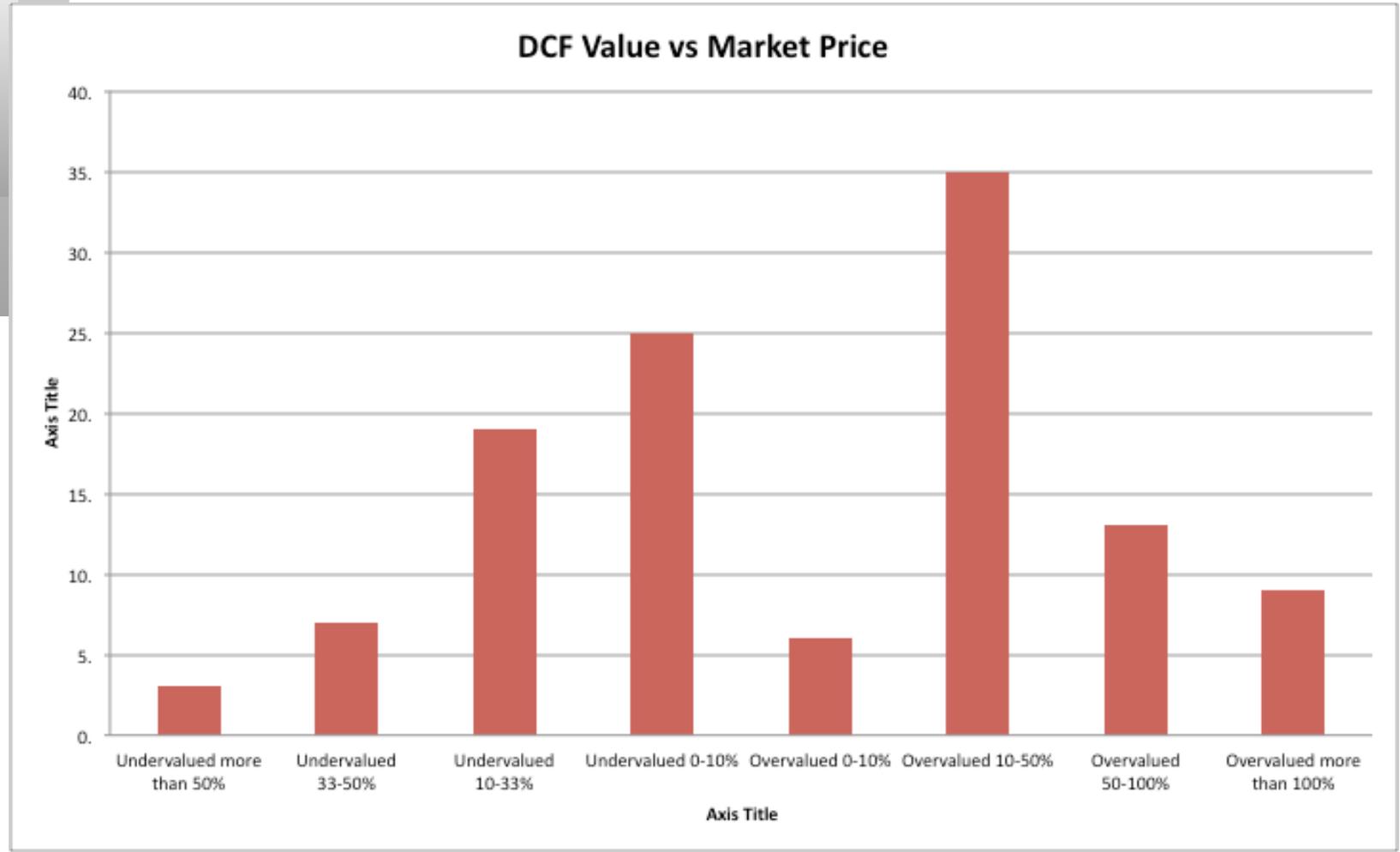
Layer 9. From equity value to equity value per share

■ 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…

The Wasserstein-Perella bonus layer

From aggregate to per share value?

No garnishing allowed!!

The terminal value: It's not an ATM

Debt ratios change, don't they?

Are you paying for growth?

What's in your disocunt rate?

High growth for how long?

Death and taxes

Base year and accounitng fixaiton

Exhibit 8
KENNECOTT COPPER CORPORATION
PROJECTED CARBORUNDUM COMPANY FINANCIAL DATA ADJUSTED TO REFLECT THE ACQUISITION OF CARBORUNDUM BY KENNNECOTT
AT A PRICE OF $66 PER SHARE, 1977–1987
($ millions except for per share and ratio data)

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

The Models You Used in DCF Valuation

What you found ...

The most undervalued stocks…

Company Name	Price	DCf Value	Price as % of value	Recommendation
Kodak	$ 2.88	$ 13.47	21.38%	Buy
Nabi Biopharmaceuticals	5.8	24.11	24.06%	Buy
E.ON	22.88	55.95	40.89%	BUY
Audiovox	$7.08	$13.68	51.75%	Buy
Netflix (NFLX)	$ 230.31	$ 385.87	59.69%	Buy
Grand Canyon	13.60	21.23	64.06%	Buy
Valiant Petroleum	5.17	8.05	64.22%	BUY
Woongjin Thinkbig Co. (KSE: 095720.KS)	17,100	25,880.00	66.07%	Buy
Banco Compartamos	$ 80.00	$ 119.97	66.68%	Buy
Goldman Sachs, & Co.	$150.10	$224.54	66.85%	Buy
Paddy Power PLC	32.98	48.35	68.21%	Buy
Urban Outfitters	$31.73	$45.82	69.25%	BUY
Molycorp	$ 70.14	$ 98.88	70.93%	Buy
Apple	346.66	459.8278739	75.39%	Buy
American Airlines	6.51	8.1	80.37%	BUY

The Most Overvalued stocks are…

Company	Price	DCF value	Price as % of value	Recommendation
OpenTable, Inc.	$90.70	$50.10	181.04%	Sell
CEMEX	9.39	5.11	183.76%	Sell
Amazon.com,Inc. (NASDAQ: AMZN)	$197.60	$106.51	185.52%	Sell
Lions Gate Entertainment	$6.27	3.20	195.94%	Sell
NFLX	$ 229.47	$ 117.09	195.98%	Sell
Tencent	185.53	86.71	213.97%	Sell
Lululemon Athletica	$ 91.28	$ 42.16	216.51%	Sell
OpenTable	$90.70	41.74	217.30%	Sell
Human Genome Sciences	$28.11	$12.09	232.51%	Sell
Starwood Hotels & Resorts	$ 58.71	$ 19.41	302.47%	Sell
Geeknet	$24	$5	480.00%	BUY
NetFlix Inc	$231.05	$43.13	535.71%	Buy
Baidu	$ 148.52	$ 21.17	701.56%	Hold
Vertex Pharmaceuticals	$ 55.54	$ 7.34	756.68%	Sell

The ultimate test… Did undervalued stocks make money?
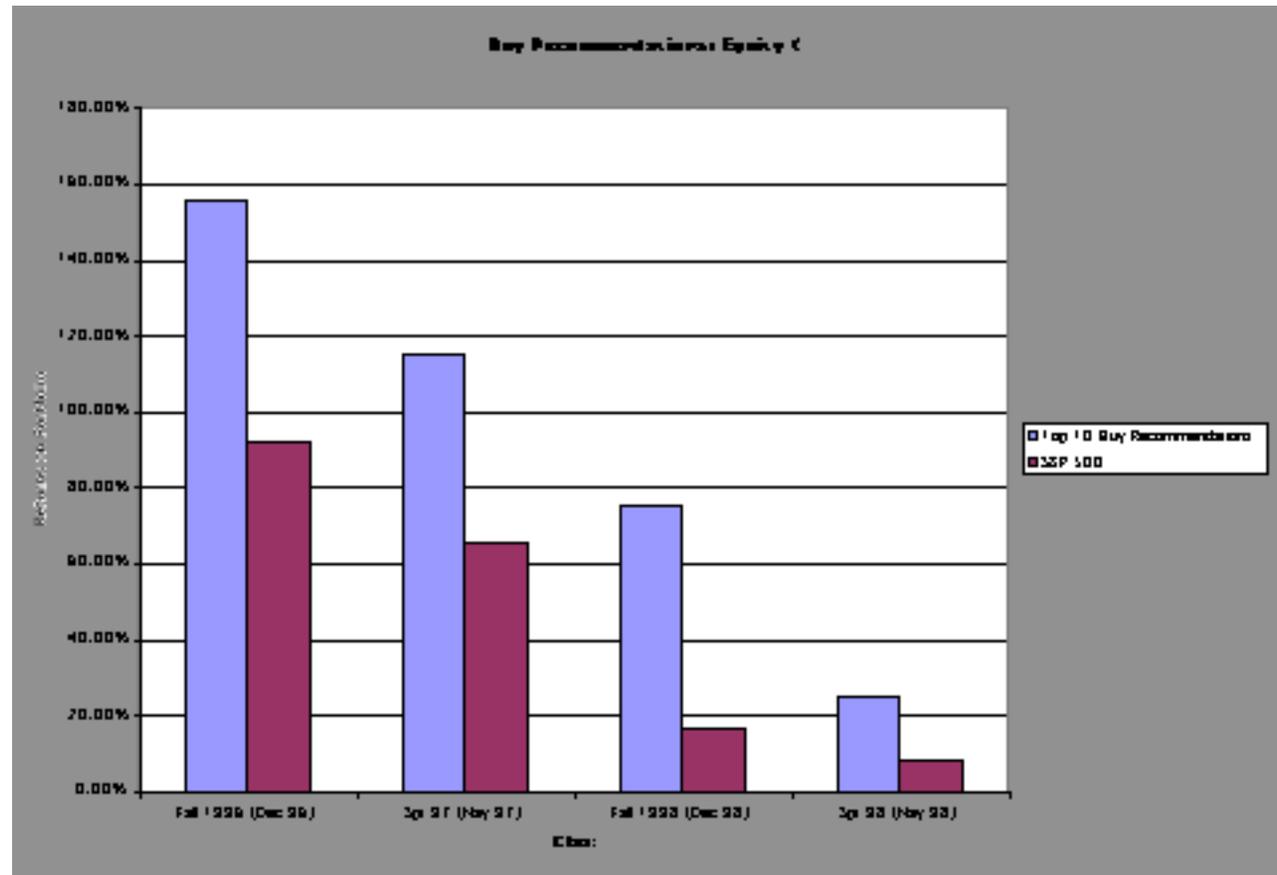
More on the winners...

- About 60% of all buy recommendations make money; about 45% of sell recommendations beat the market.

- There are two or three big winners in each period, but the payoff was not immediate. Buying Apple in 1999 would have led to negative returns for a year or more, before the turnaround occurred.

- Stocks on which there is disagreement among different people tend to do worse than stocks on which there is no disagreement

- 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 <u>different ways</u> by different users. When comparing and using multiples, estimated by someone else, it is critical that we <u>understand how the multiples have been estimated</u>

- **8 times EBITDA is not always cheap…**
  - Too many people who use a multiple have <u>no idea what its cross sectional distribution</u> 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 <u>understand the fundamentals</u> that drive each multiple, and the <u>nature of the relationship</u> between the multiple and each variable.

- **There are no perfect comparables**
  - Defining the <u>comparable universe</u> and <u>controlling for differences</u> is far more difficult in practice than it is in theory.

Value of Stock = $DPS_1/(k_e - g)$

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 ...
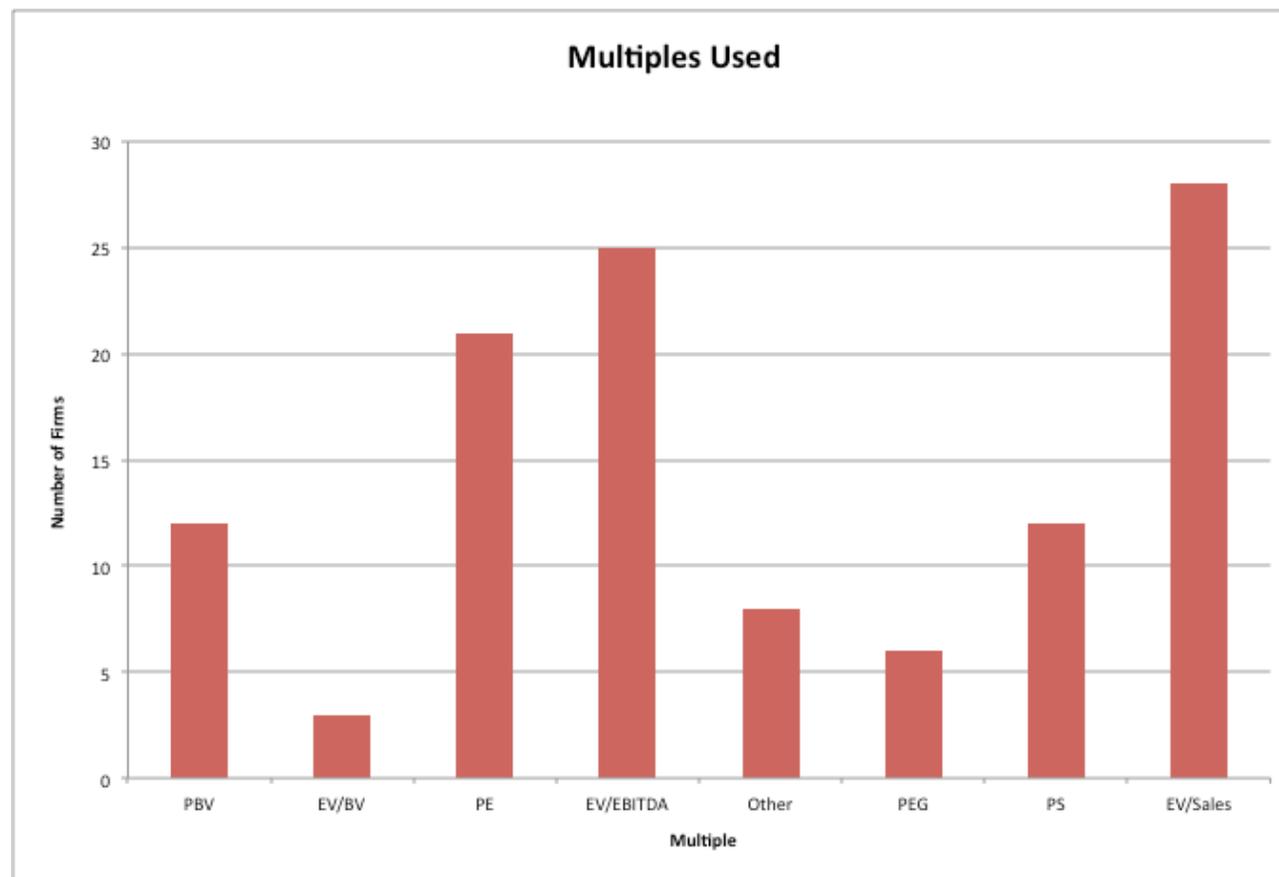
DCF vs Relative Valuations
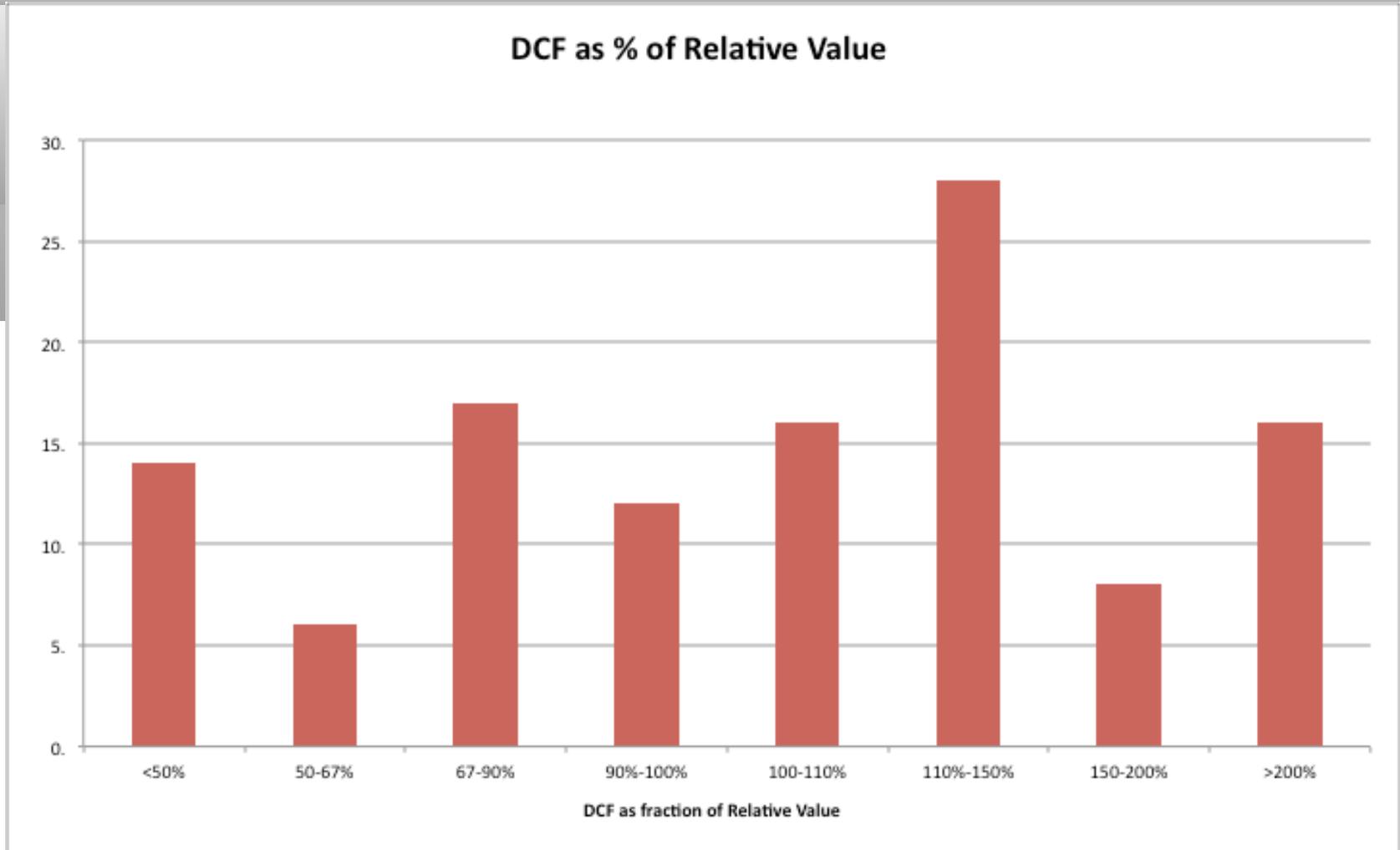
Most undervalued on a relative basis…

Company Name	Price	DCf Value	Multiple used	Relative Value	ecommendatio
Cadiz Inc.	12.00	10.70	EV/Sales	568.65	SELL
Rolter S.A.	$ 116.22	$ 116.22	VS	$ 1,228.49	Hold
Citigroup (NYSE: C)	$ 4.50	$ 5.37	PBV	$ 35.82	Buy
JMBA	$ 2.45	$ 2.52	EV/EBITDA	$ 8.53	Sell
Nabi Biopharmaceuticals	5.8	24.11	VEBITDA	17.45	Buy
Fiat SpA	6.87	7.95	EV/Sales	16.45	BUY
Nokia Oyj (Helsinki: NOK1V)	€ 5.92	€ 6.93	PEG	€ 13.31	Buy
Hovnanian Enterprises	$ 2.88	$2.10	EV/Sales	$ 6.47	SELL
Geeknet	$24	$5	EV/Sales	$52	BUY
Valero Energy	26.79	32.79	VEBITDA	57.58	Buy
Atlantic Tele Network Inc.	$ 37.76	36.05	EV-EBITDA	80.72	Buy
Kodak	$ 2.88	$ 13.47	VEBITDA	$ 5.19	Buy
Valiant Petroleum	5.17	8.05	EV/Sales	9.22	BUY

Most overvalued on a Relative Basis

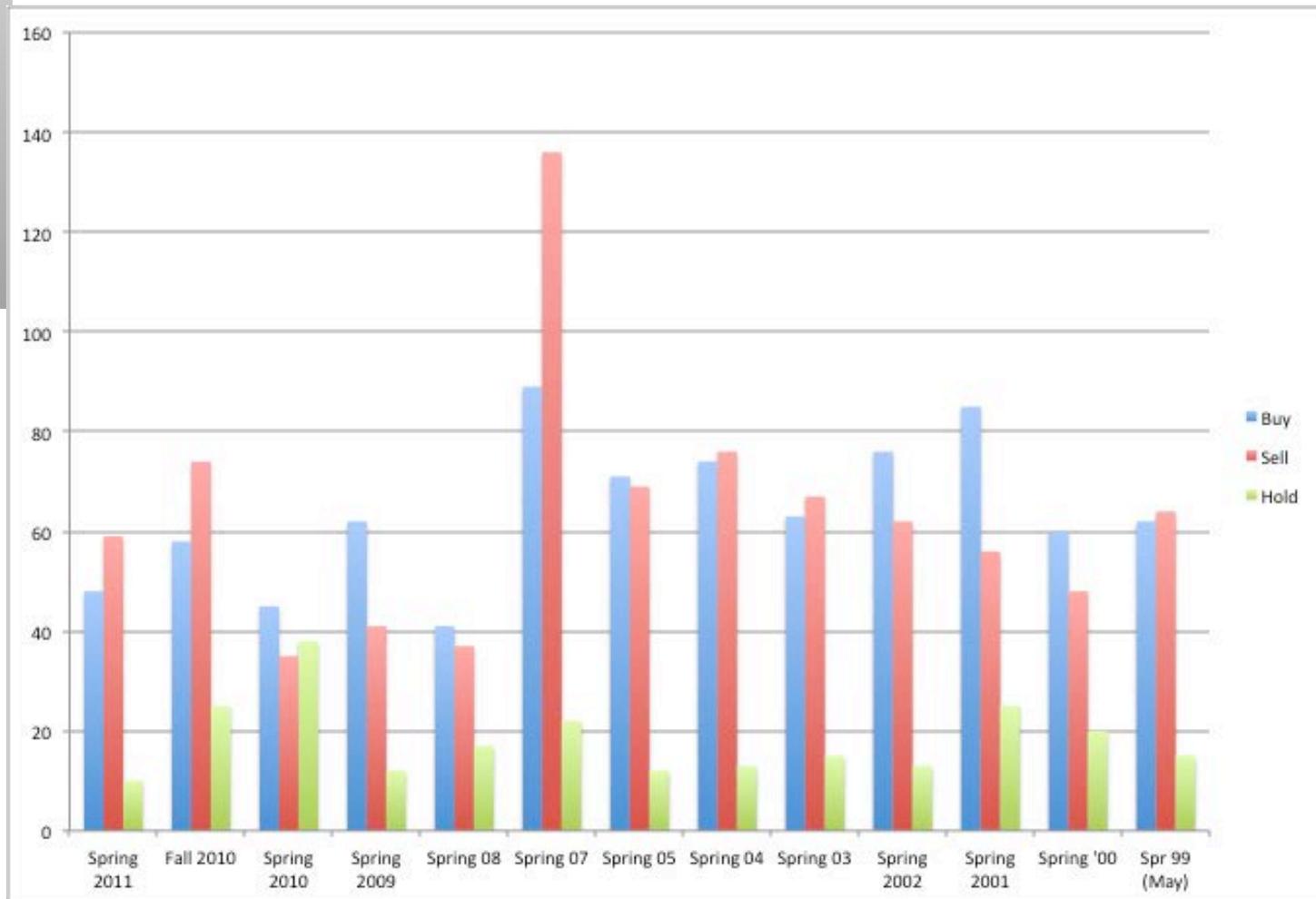| Company Name	Price	DCf Value	Multiple used	Relative Value	Recommendation
OpenTable, Inc.	$90.70	$50.10	PE	$30.48	Sell
Universal Health Services	$54.39	$41.86	EV/EBITDA	$43.20	Sell
Human Genome Sciences	$28.11	$12.09	EV/SALES	$12.30	Sell
NFLX	$229.47	$ 117.09	EV/Sales	$ 70.27	Sell
Lions Gate Entertainment	$6.27	3.20	EV/Revenue	$2.52	Sell
LULU	$ 94.95	$ 63.37	EV/Sales	$ 52.54	Sell
K + S AG	€ 54.96	53.74	PBV	€ 47.10	Sell
ERTS	$21.75	22.51	VEBITDA	$26.76	Buy
Anellotech	144.78	144.78	VS	$37.10	Hold
OpenTable	$90.70	41.74	PS	$13.81	Sell
Pandora Media, Inc.	$ 5.93	$ 5.93	EV/Sales	$ 2.53	Buy
CEMEX	9.39	5.11	P/E	6.40	Sell
Ossurhf.	$ 1.75	$1.88	P/E	$ 1.71	Buy
Amazon	$197.60	$175.70	EV/Sales	$187.90	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

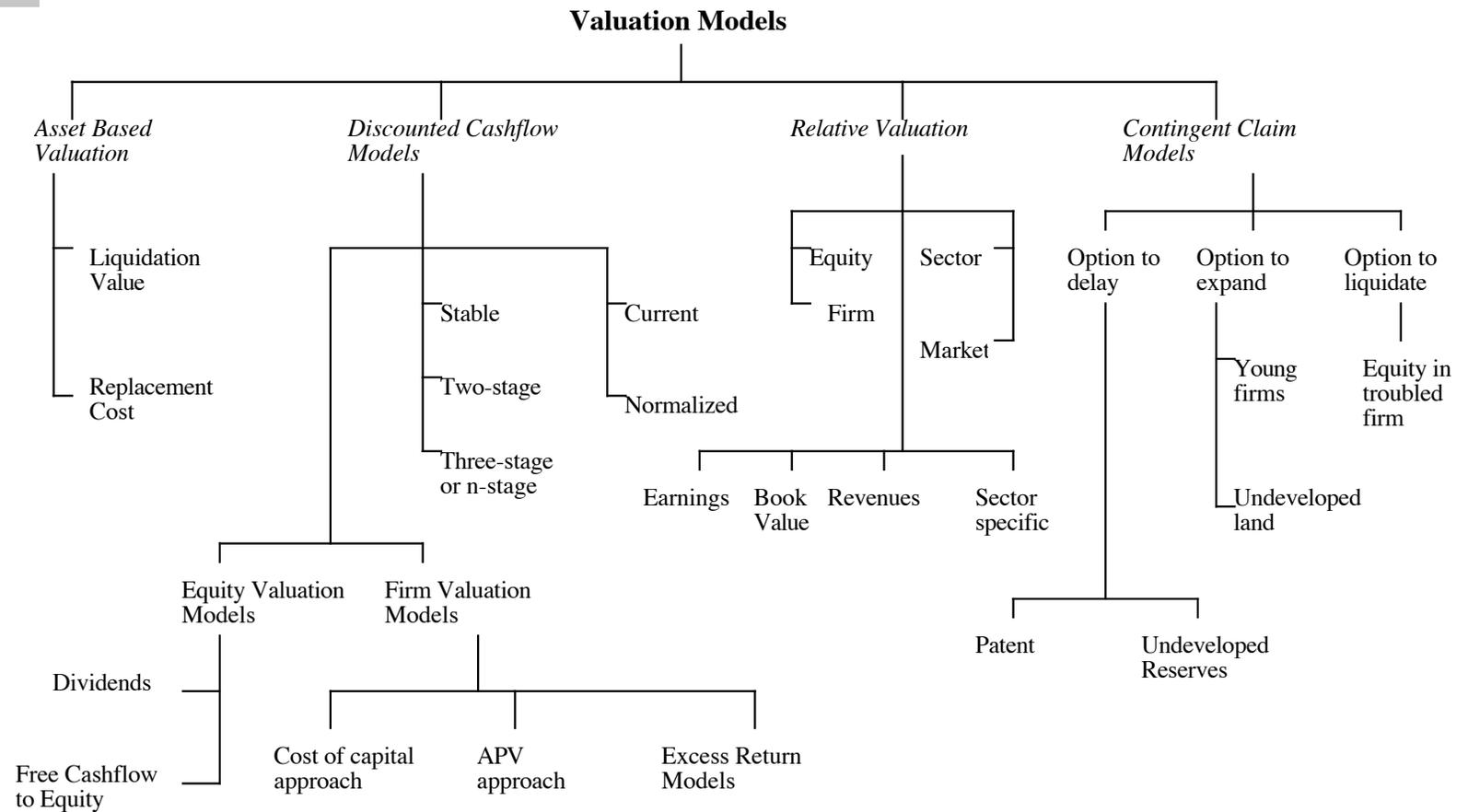■ Any security that shares these features can be valued as an option.

Results of Option Valuations

- Number of firms valued using option models = 10
- Number of firms where equity was worth nothing before DCF model used = 3
- Median Percent increase in value for remaining firms = 58%

Your recommendations were to ..

Choices…Choices…Choices…

Valuation Models

- *Asset Based Valuation*
  - Liquidation Value
  - Replacement Cost

- *Discounted Cashflow Models*
  - Stable
  - Two-stage
  - Three-stage or n-stage
  - Current
  - Normalized
  - **Equity Valuation Models**
    - Dividends
    - Free Cashflow to Equity
  - **Firm Valuation Models**
    - Cost of capital approach
    - APV approach
    - Excess Return Models

- *Relative Valuation*
  - Equity
  - Firm
  - Sector
  - Market
  - Earnings
  - Book Value
  - Revenues
  - Sector specific

- *Contingent Claim Models*
  - Option to delay
    - Patent
    - Undeveloped Reserves
  - Option to expand
    - Young firms
    - Undeveloped land
  - Option to liquidate
    - Equity in troubled firm

Picking your 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?

❏ Discounted Cash Flow Valuation

❏ Relative Valuation

❏ Neither. I believe that markets are efficient.

Some Not Very Profound Advice

- Its all in the fundamentals. The more things change, the more they stay the same.
- Focus on the big picture; don't let the details trip you up.
- Experience does not equal knowledge.
- Keep your perspective. It is only a valuation.
- Luck dominates…

Or maybe you can fly….

WHAT LEMMINGS BELIEVE