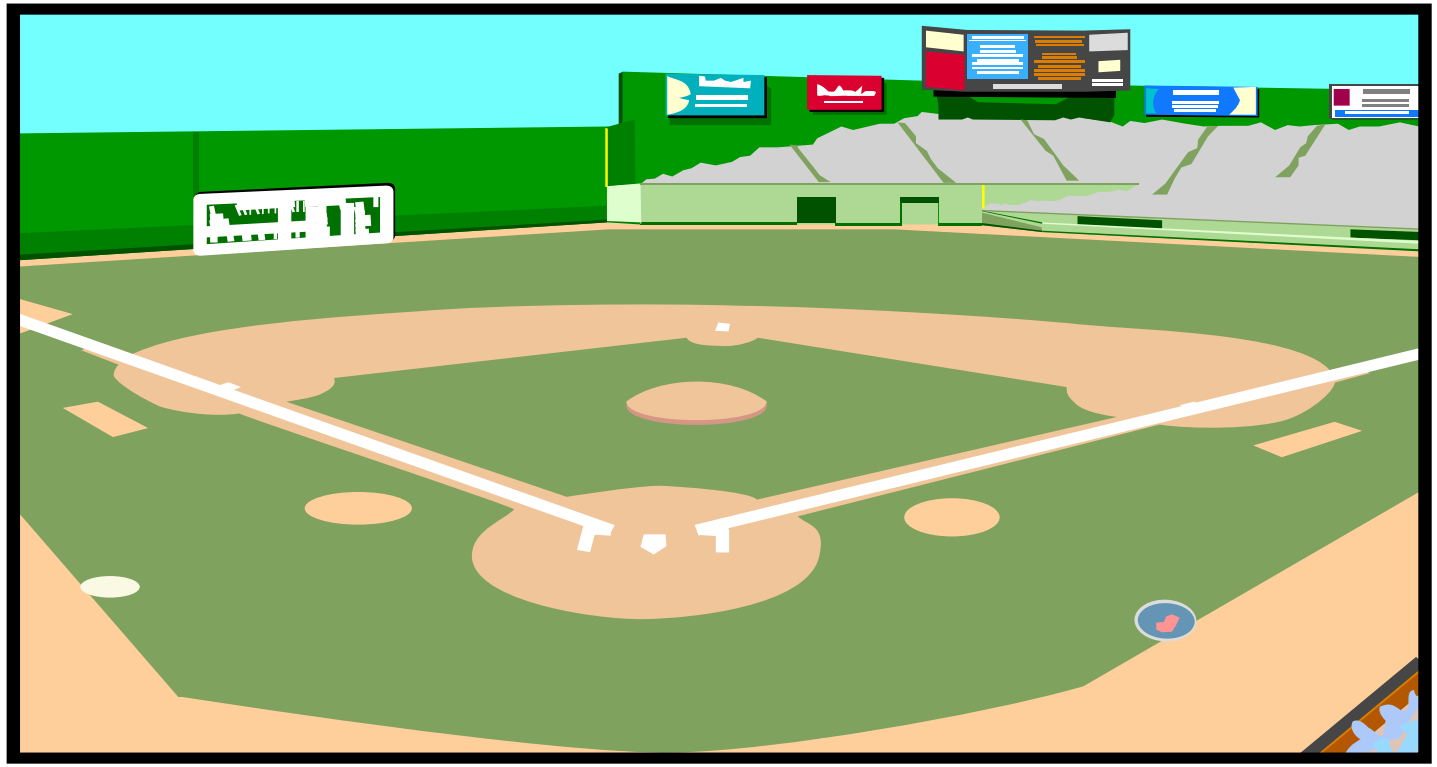
Valuation Discounts: Finding the Level Playing Field



Discounts

- Value must be consistent with data source
- When data source is comparable to asset we value, no discount
  - Real estate: 100% interest in similar property—no discount
  - IBA & Pratt's Stats database—no discounts

Discounts

- Control premiums and discounts for lack of control (DLOC) and lack of marketability (DLOM) are often large adjustments to value
- Historically poorly-supported

Levels of Value (LOV) Charts

- Mercer
- Abrams
- Koeplin, Sarin & Shapiro
- Nath

Level of Value (LOV) Charts—Mercer's Modified LOVs (1998)

Level of Value	Adjustment Up To	Adjustment Down To
Strategic Value	Value of synergy	NA
Control Value	Control Premium	Eliminate synergy
Marketable Minority	Reverse out DLOM	DLOC
Private Minority	NA	DLOM

Nath's LOVs (1990) & Abrams (2000)

Level of Value	Public	Private
Strategic	X	X
Control	X	X
Minority—Well Treated	X	X
Minority—Exploited	X	X

Mercer does not believe in DLOM for a control interest. I disagreed with him in Abrams (1994). Koeplin, Sarin & Shapiro (2000) found 20% to 30% lower prices in acquisitions by public firms of private firms (compared to public).

Adjust for Level of Control

- Minority interests are worth less than control interests
  - No power to get cash out of the business.
  - Cannot set salaries, declare dividends, or force a sale of the firm
  - Control owner can fire the minority owner

Adjust for Level of Control

- Contractual arrangements can vastly change the discounts and values
  - Salary limitations on control shareholders
  - Piggyback & drag-along sale rights
  - Attorneys can protect their clients at the inception of the investment. Later is too late.

Adjust for Level of Control

- Laws and legal procedures can be very important, e.g., to dissolve the entity
  - Requisite quorum of ownership to initiate suit (e.g., California is ⅓)
  - Cost of suit
  - Probability of success
  - Time to accomplish

Adjust for Level of Control

- How to measure is murky and controversial. Traditional measure is through control premiums (CP)

Adjust for Level of Control

- How to measure is murky and controversial. Traditional measure is through control premiums (CP)



	A	B
1	**Calculation of DLOC & Control Premium**	
2		
3	Control Price = P_C	$140
4	Minority Price = P_M	$100
5	Control Premium in Dollars = $CP = $P_C - P_M$	**$40**
6		
7	**Control Premium in Percent = CP% = (B5 ÷ B4)**	40.0%
8		
9	**DLOC% = Discount for Lack of Control in Percent = (B5 ÷ B3)**	**28.6%**
10		
11	**Proof of of DLOC**	
12	Control Price = P_C	$140
13	DLOC% = (B9)	28.6%
14	DLOC$ (also $CP) = (B12 × B13)	**$40**
15	**Minority Price = (B12 – B14)**	**$100**
16		
17	**The Control Premium is how much we increase from the minority**	
18	**price to the control price, i.e., $100 + (40% × $100) = $140**	
19		
20	**DLOC tell us how much we decrease from the control to the minority price,**	
21	**i.e., $140 – (28.6% × $140) = $100**	
22		
23	**General Formula #1 for DLOC: DLOC = CP% ÷ (1+CP%)**	
24	**General Formula #2 for DLOC: DLOC = $CP ÷ ($P_M$+$CP)**	

Control Premiums

- Schwert (1996) found competitive bidding increased acquisition premiums by 9%

Control Premiums

- In 1990, Nath said equal to zero using an Efficient Markets argument
- In 1995, Glass & McCarter, later amplified by Mercer, suggested Mergerstat Premiums are for synergies, not control

Control Premiums

- Mercer (1998 and 1999) suggested CP approx. = 0%, unless the appraiser can show specific performance improvements
- Bargeron, Schlingemann, Stulz, and Zutter found public firms pay 55% higher premiums than private firms, except when the President owns at least 25%—Agency problem.

Control Premiums

- Many now believe CP = 0% if we have normalized income, e.g., owners' comp
  - Fine for public minority to control
  - But this leads to conclusion DLOC = 0%
  - Abrams strongly disagrees, because of risk of moving from well-treated to abused minority interest at any time

Adjusting for Control—Voting Rights Premia

- Lease, McConnell, and Mikkelson (1983) found voting stock in the US sells for 5.4% more than non-voting stock
- Much & Fagan (2000) US VRP = 3.2%
- Megginson (1990) British VRP =13.3%
- Rydqvist (1987) 6.5% Swedish VRP
- Levy (1982) Israeli 45.5% VRP

Adjusting for Control—Voting Rights Premia

- Horner (1988) 20% Swiss VRP
- Zingales (1994) 82% VRP Milan Stk Exch
  - Conjectures Italian legal system ineffective in protecting minority shareholders
- Nenova (1999) made a multi-country regression. Legal rights important in VRP.

Adjusting for Control—Voting Rights Premia

- Chinese professors (2001) found restricted stock discounts of 78% to 85% in China

Control Premiums

- Schwert (1996): competitive bidding increased acquisition premiums 9%
- Bradley, Desai, and Kim (1988) tender offers incr. combined value 7.4%
  - Targets increasingly capture the lion's share
  - Acquirers have a small incr in stk price with Cumulative Abnormal Returns (CARs) of 1%
  - Implies acquirers pay for CF, not synergy!

Control Premiums

- Maquieira, Megginson, and Nail found 1,283 stock-for-stock mergers created operating (not financial) synergies of 8.6% of the pre-merger combined value.
- Franks and Harris (1994) analyzed 1,445 British takeovers, with very similar results.

My Synthesis & Analysis

- Since public firm acquirers are buying CF and not control, we cannot learn about the value of control from them
- The VRP literature is a better place to learn the value of control.
  - Begin with average of American dual-stock studies of 4.3%

My Synthesis & Analysis

- Add approx. 2.5% for the depressing effect of the illiquidity of the voting shares on the VRP = 6.8%, approx. 7%
- Assume control is worth 3 to 4 times the vote, which puts control as worth 20% to 28%.
- Consistent with Mergerstat Going Private median and mean premia of 24% and 32%

My Synthesis & Analysis

- Only for control by a single individual. It should drop rapidly with multiple ownership.

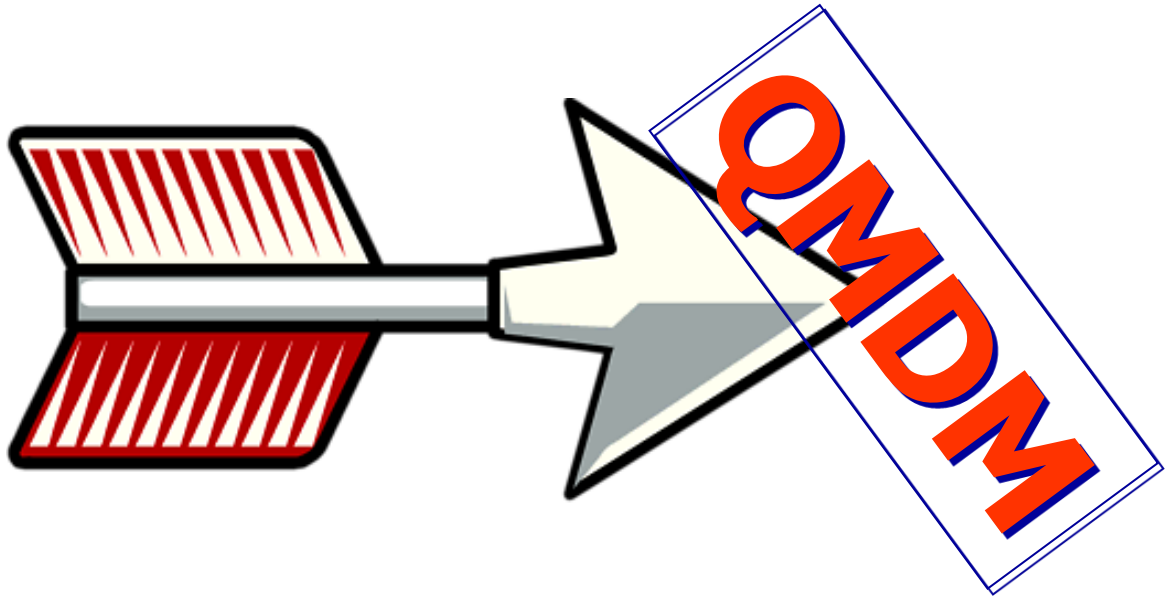
Adjust for Marketability

- Minority interests are less marketable than control interests
  - Takes around 1 year to sell a whole business, 2 – 30 yrs to sell a minority int
  - Thus, control has its own direct effect on value and an indirect effect through marketability

Discount for Lack of Marketability Models

- Economic Components Model (ECM) (Abrams)
- Partnership Profiles regressions (Abrams) for fractional ownership in holding companies, especially real estate
- Quantitative Marketability Discount Model (QMDM) (Mercer)
  - Abrams 2002 pierced and severely wounded this model

Discount for Lack of Marketability Models



ECM: 3 Components

- Component #1:
  Delay to Sale



ECM: 3 Components

- Component #2: Monopsony power of buyer — 9% per Schwert article



ECM: 3 Components

- Component #3: Transactions cost differences
  - #3A Buyers' incremental costs are immediately relevant
  - #3B Sellers' incremental Costs are relevant only after the first sale
    - Buyers do not care that the sellers have to pay brokerage fees or capital gains taxes, but they do care about themselves paying it 10 years later

ECM Tables

- Table 8.5 Restricted stock discount by regression equation
  - X-Coefficient for Avg Yrs to Sell is 13.7% in B54. This means each additional year of restriction increases the restricted stock discount by 13.7%.
  - This is powerful empirical evidence buried in a "boring" regression. It wins in court!

Table 8.5 (cont.)

Abrams Regression of Management Planning Study Data

Regression #1

Regression Statistics	
Multiple R	0.8058
R Square	0.6493
Adjusted R Square	0.5947
Standard Error	0.0873
Observations	53

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	7	0.6354	0.0908	11.9009	1.810E-08
Residual	45	0.3432	0.0076		
Total	52	0.9786			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-0.0673	0.1082	-0.6221	0.5370	-0.2854	0.1507
Rev^2	-4.629E-18	9.913E-19	-4.6698	0.0000	-6.626E-18	-2.633E-18
Shares Sold—$	-3.619E-09	1.199E-09	-3.0169	0.0042	-6.035E-09	-1.203E-09
Mkt Cap	4.789E-10	1.790E-10	2.6754	0.0104	1.184E-10	8.394E-10
Earn Stab	-0.1038	0.0402	-2.5831	0.0131	-0.1848	-0.0229
Rev Stab	-0.1824	0.0531	-3.4315	0.0013	-0.2894	-0.0753
AvgYrs2Sell	0.1722	0.0362	4.7569	0.0000	0.0993	0.2451
Price Stab	0.0037	8.316E-04	4.3909	0.0001	0.0020	0.0053

Regression #2 (Without Price Stability)

Regression Statistics	
Multiple R	0.7064
R Square	0.4990
Adjusted R Square	0.4337
Standard Error	0.1032
Observations	53

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	0.4883	0.0814	7.6365	0.0000
Residual	46	0.4903	0.0107		
Total	52	0.9786			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.1292	0.1165	1.1089	0.2732	-0.1053	0.3637
Rev^2	-5.39E-18	1.15E-18	-4.6740	0.0000	-7.71E-18	-3.07E-18
Shares Sold—$	-4.39E-09	1.40E-09	-3.1287	0.0030	-7.21E-09	-1.57E-09
Mkt Cap	6.10E-10	2.09E-10	2.9249	0.0053	1.90E-10	1.03E-09
Earn Stab	-0.1381	0.0466	-2.9626	0.0048	-0.2319	-0.0443
Rev Stab	-0.1800	0.0628	-2.8653	0.0063	-0.3065	-0.0536
AvgYrs2Sell	0.1368	0.0417	3.2790	0.0020	0.0528	0.2208

ECM Tables

- DLOM calculation with ECM (Table 9.6A)

Table 9.6A
Calculation of DLOM

Section 1: Calculation of the Discount For Lack of Marketability

Component	Pure Discount = *z* [1]	PV of Perpetual Discount [2]	= 1 – Col. [C] Remaining Value	
1	0.0%	0.0%	100.0%	Delay To Sale
2	9.0%	9.0%	91.0%	Buyer's Monopsony Power—Thin Markets
3A	4.9%	5.3%	94.7%	Transactions Costs—Buyers
3B	14.3%	1.2%	98.8%	Transactions Costs—Sellers
Percent Remaining			89.9%	Total % Remaining = Components 1 × 2 × 3A × 3B
Final Discount			**10.1%**	Discount = 1 – Total % Remaining

Section 2: Assumptions and Intermediate Calculations:

FMV—Equity of Co. (Before Discounts)	**$ 75,000**
Discount Rate = *r* [3]	**32.6%**
Constant Growth Rate = *g* (Table 9.2, Row 26)	**2.5%**
Intermediate Calculation: *x* = (1+*g*) / (1+*r*)	**0.7728**
Avg # Years Between Sales = *j*	**10**

[1] Pure Discounts: For Component #1, Table 9.4A, cell D12; For Component #2, 9% per Schwert article. For Component #3A and #3B, Table 9.5, cells I8 and I9 – 2% for public brokerage costs.

[2] PV of Perpetual Discount Formula: $1–(1–x^j)/((1–(1–z)*x^j))$, per equation (8.9), used for Component #3B.
PV of Perpetual Discount Formula: $1–(1–z)*(1–x^j)/((1–(1–z)*x^j))$, per equation (8.9a), used for Component #3A.
Components #1 and #2 simply transfer the pure discount.

[3] The formula is: 0.5352 – (0.0186 ln FMV), based on Table 9.1, B34 and B35.

ECM Tables

- Regression calculation of Delay to Sale (Table 9.4A)

Table 9.4A
Calculation of Component #1—Delay To Sale—$75,000 Firm [1]

	Coefficients	Co. Data	Discount
Intercept	0.1342	NA	13.4%
Revenues[2]	-5.33E-18	7.952E+10	0.0%
Value of Block—Post-Discount [2]	-4.26E-09	$ 75,000	0.0%
FMV-Marketable Minority 100% Interest	5.97E-10	**$ 75,000**	0.0%
Earnings Stability (Assumed)	-0.1376	0.4200	-5.8%
Revenue Stability (Assumed)	-0.1789	0.6900	-12.3%
Average Years To Sell	0.1339	0.2500	3.3%
Total Discount [4]			**0.0%**

Value of Block—Pre-Discount [5]	$ 75,000
Selling Price	$ 75,000
Adjusted Net Income	$ 14,100
Assumed Pre-Tax Margin	5%
Sales	$ 281,991
Sales[2]	7.95E+10

[1] Based on Abrams regression of Management Planning, Inc. data—Regression #2, Table 8.10.

[2] Equal to Pre-Discount Shares Sold in dollars × (1 – Discount). B7 equals B14 only when the discount = 0%.

[3] Earnings and Revenue stability are assumed at the averages from Table 8.5, G60 and H60, respectively, for all FMVs. In the Management Planning data, a correlation analysis revealed that firm size and the stability measures are uncorrelated. Therefore, we assume the same levels for all FMVs.

[4] Total Discount = max(discount, 0), because Disc < 0 indicates the model is outside of its range of reasonability.

[5] In our regression of the Management Planning, Inc. data, this was a marketable minority interest value. This is an illiquid control value and is higher by 12% to 25% than the marketable minority value. The regression coefficient relating to market capitalization in B8 is so small that the difference is immaterial, and it is easier to work with the value available.

ECM Tables

- Table 8.7: Black-Scholes put option for Delay-to-Sale measurement
  - Objective evidence

	A	B
1	**Table 8.7**	
2	**Black-Scholes Put Option—CHTL**	
3		
4		
5	S = Stk Price on Valuation Date	$8.875
6	E = Exercise Price	$8.875
7	t = Time To Expiration in Yrs (Table 8.5, I17)	2.125
8	r = Risk-Free Rate [1]	5.90%
9	stdev = Standard Deviation (Table 8.6, D36)	0.941
10	var = variance	0.885
11	d_1 = 1st Black-Scholes Parameter [2]	0.777
12	d_2 = 2nd Black-Scholes Parameter [3]	(0.594)
13	$N(-d_1)$ = Cum Normal Density Function	0.219
14	$N(-d_2)$ = Cum Normal Density Function	0.724
15	$P=[E\times N(-d_2)\times e^{-rt}]-S\times N(-d_1)$	$3.73
16	P/S	**42.0%**
17		
18	Note: Values are for European options. The put option formula can be found in *Options Futures and Other*	
19	*Derivatives, 3rd Ed.* by John C. Hull, Prentice Hall, 1997, pp. 241 and 242.	
20		
21	[1] According to the Federal Reserve Board website below, the 2 Year Treasury rate on the transaction	
22	date, 8/8/1995, was 5.90%. This should be the continuously compounded rate of ln(1+5.90%) = 5.73%.	
23	Making this correction increases the value of the put from 42.0% to 42.2% in B16—an immaterial	
24	change. Furthermore, we could be even more accurate by interpolating to a 2.125 Year Treasury rate,	
25	which would slightly decrease the value of the put and render it closer to 42.0%.	
26	http://www.federalreserve.gov/releases/H15/data/Business_day/H15_TCMNOM_Y2.txt	
27		
28	[2] $d_1 = [\ln(S/E) + (r + 0.5 \times \text{var}) \times t\ ] / [\ \text{stdev} \times t^{0.5}\ ]$, where variance and	
29	standard deviation are expressed in annual terms.	
30		
31	[3] $d_2 = d_1 - [\ \text{stdev} \times t^{0.5}\ ]$	

ECM Tables

- Table 8.6: Standard deviation of continuously compounded returns

	A	B	C	D
1	**Table 8.6**			
2	**Calculation of Continuously Compounded**			
3	**Standard Deviation**			
4	**Chantal Pharmaceutical Inc. — CHTL**			
5				
6	**Date**	**Close**	**Interval Returns**	
7	1/31/1995	$2.1650		
8	2/7/1995	$2.2500		
9	2/14/1995	$2.5660	0.169928	
10	2/22/1995	$2.8440		0.234281
11	3/1/1995	$2.6250	0.022733	
12	3/8/1995	$2.9410		0.033538
13	3/15/1995	$2.4480	-0.069810	
14	3/22/1995	$2.5000		-0.162459
15	3/29/1995	$2.2500	-0.084341	
16	4/5/1995	$2.0360		-0.205304
17	4/12/1995	$2.2220	-0.012523	
18	4/20/1995	$2.1510		0.013371
19	4/27/1995	$2.6950	0.192991	
20	5/4/1995	$2.6600		0.193968
21	5/11/1995	$2.5660	-0.049050	
22	5/18/1995	$2.5620		-0.037538
23	5/25/1995	$2.9740	0.147560	
24	6/2/1995	$3.3120		0.256764
25	6/9/1995	$5.1250	0.544223	
26	6/16/1995	$6.0000		0.594207
27	6/23/1995	$5.8135	0.126052	
28	6/30/1995	$6.4440		0.071390
29	7/10/1995	$6.5680	0.122027	
30	7/17/1995	$6.6250		0.027701
31	7/24/1995	$8.0000	0.197232	
32	7/31/1995	$7.1250		0.072759
33	8/7/1995	$7.8120	-0.023781	0.092051
34	**Interval Standard Deviation—CHTL**		**0.16900**	**0.20175**
35	**Annualized**		**0.84901**	**1.03298**
36	**Average of Standard Deviations**			**0.94099**

Discount For Lack of Marketability: Minority Interests

- Combined discount for lack of marketability and lack of control is often in the 40% range
- Discount is much smaller if:
  - Control shareholder limited by contract in salary and perks
  - Minority shareholder has piggyback & drag-along sale rights

Partnership Profiles Regression

- (from Quant Bus Val, 1st Ed., Chapter 9)
  - X-Coefficients in cells B21 to B23 show the effects of the three variables:
    - Financial Leverage (Debt/Mkt Value of Assets)
    - Regular Cash Yield
    - Triple Net Lease Partnership
  - We then apply these x-coefficients to the subject company and add the y-intercept to calculate the valuation discount

Table V-2
Regression Analysis of Partnership Profiles Database-1999 [1]

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.839306575
R Square	0.704435526
Adjusted R Square	0.693752473
Standard Error	0.079631408
Observations	87

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	1.254399586	0.41813	65.93953	6.66022E-22
Residual	83	0.526316376	0.00634		
Total	86	1.780715963			

	Coefficients	*Std Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.387231995	0.023	16.5698	4.73E-28	0.340750627	0.4337134
Debt/MVA98	0.115269034	0.043	2.66025	0.00937	0.029086922	0.2014511
RYld98	-2.295558946	0.320	-7.17703	2.75E-10	-2.931724028	-1.659394
TNL	-0.07286963	0.022	-3.35275	0.001207	-0.116098278	-0.029641

Variable	**X-Coefficient**	**Client Data**	**Regress**
Debt/MVA98 (B33)	0.115269034	0.0%	0.0%
RYld98 (Table IV-3, C12)	-2.295558946	0.005528601	-1.3%
TNL	-0.07286963	0	0.0%
Subtotal			-1.3%
Intercept			38.7%
Discount Before Adjustments			37.5%
Adjustments:			
No Public Registration [2]			15.0%
Increased Influence [3]			-5.0%
Total Adjustments			**10.0%**
Discount			**47.5%**

Calculation of Debt/MVA98	
Debt	0
MVA98 (Market Value of Assets-1998) [4]	1,389,185
Debt/MVA98	0.0%

[1] Based on the data in Table V-2B

[2] The Partnership Profiles LPs are publicly registered, which is not true of the Member interests. Thus, the latter should bear a larger discount for that factor.

[3] The Partnership Profiles Limited Partners have no influence over the Partnership, while the subject Member interests do. We decrease the discount to account for that difference.

[4] Table IV-1, C22

Guideline Company Method

- Calculate multiples of publicly-traded (don't use for valuing small companies) and private companies in the same industry, then apply means or medians to the subject company
  - Price/Sales
  - Price/Earnings
  - Price/Cash Flow
  - Price/Book Value
  - Price/EBIT (or EBITDA)

Guideline Companies-Cont'd

- Better yet, use regression analysis
  - Regress Price as a Function of Sales, Net Income (or EBIT, EBITDA, etc.), growth, size, etc.
  - Or Price-Earnings or Price-Sales multiples as a function of …
- Adjust for difference in size, marketability, and growth

Reconciling DCF & Market FMVs

- Problem—FMVs from Mkt often 2 – 4 × DCF
- Weight 50-50?
- Abrams (2014) article to "Reverse Engineer" the hidden growth rates in market prices and multiples
  - GCs implied perpetual growth 9%-16%
  - 1st use saved client $10M in gift tax

Valuing S Corps & Pass-through Entities

The S Corp Problem

- Discount rates in DCFs are from publicly traded firms
- The private S Corps we value differ
  - Do not pay corporate tax
  - Other differences in taxation
  - Buyers probably are not C Corps
- Treating S (and other PTEs) as C Corps is problematic

S vs. C Tax Attributes

Tax Attribute	C Corp	S Corp
Corp Tax?	Y	N (1.5% in CA)
Shareholder (SH) Tax on Retained Earnings?	N	Y
Build-up in Tax Basis on Retained Earnings?	N	Y
Preferential Dividends Tax Rate?	Y	N
Step-up in Basis when Sold?	N	Y

2 Firms with the same NIBT have such different cash flow after tax

Traditional v. IRS S Corp Value

- Appraisers used to "tax affect"—subtract C Corp taxes from S Corp net income
  - Accurate for immediate sale to a C Corp
- IRS victories - Estates of Gross, Heck, Adams, Dallas, and Wall
  - Disallowed tax affecting
  - Treat as a C Corp with no corp tax
  - Result: a 67% increase in the valuation.
  - Implicit Assumptions are Wrong
    - No other tax differences between C and S
    - Will never sell to a non-C Corp buyer

Traditional v. IRS S Corp Value

	Traditional Method—Tax Affect	IRS Gross Method—No Tax Affect
NIBT	$100M	$100M
C Corp Tax to Buyer	$40M	0
NIAT	$60M	$100M
PE Multiple	10	10
Value	$600M	$1B
S Premium		($1B/$600M) – 1 = 67%

Result: IRS Gross Method = C Corp Value + 67% S Corp Premium
$600M + ($600M × 2/3) = $1B

IRS Tax Court Victories

- Est. of Gross v. Comm.
- Adams v. Comm.
- Wall v. Comm.
- Heck v. Comm.
- Dallas v. Comm.

The Governator Wins!



I R S
(Actually Jay Abrams Before Beard & Dying Hair Gray)

In Retrospect—20-20 Hindsight

- Would have been more successful to use a weighted average of FMVs with and without tax-affecting
  - Weights would be probability of each
  - If we assume 50-50, that would lead to an S premium of 33.33% =(50% × 0%) + =(50% × 66.67%)

To Tax Affect or Not Tax Affect — Is that the Question?

- Yes, if the only difference of S and C taxes is the corp tax rate
- No, since there are 5 differences

Arguing Over "The Tax Affect"





5 Differences in C v. S Taxation



5 Differences in C v. S Taxes

- 2 Differences at Corporate Level
- 3 Differences at Shareholder Level

Corp Level Differences in C vs. S Taxes

- #1 C Corp Tax 34% vs. S Corp 0% (1.5% in CA)
- #2 IRC Section 338(h)(10) election
  - Buyer steps-up basis of intangible assets
  - Erickson-Wang found this increases deal price 11% - 17% when public C buys an S Corp

Shareholder Level Differences in C vs. S Taxes

- #3 Taxable Income
  - C Shareholders (SHs) pay tax on dividends
  - S SHs pay tax on net income before tax
  - Difference-S SHs pay tax on income retained
- #4 S SH increases tax basis on ret earn
- #5 Fed Tax Rates—23.8% for C, ordinary income rates (39.6%) for S

Summary of 5 Differences

- Only 1 of 5 differences is "tax affecting"
- This is why both Traditional & IRS Gross Methods are wrong

2 Criteria to Judge an S Corp Valuation Model

- Effectiveness
  - Does it include all 5 tax differences?
  - Does it give the right answer?
  - Probability of error?
- Efficiency
  - How easy is the model to change as necessary, i.e., what does the answer cost?

S CORP VALUATION MODELS

The Trade-Off



Simulation (Effectiveness) vs. Analytic (Efficiency)

2 Types of Models

- Simulation—modeling a process
  - Slower
  - Easier to model complex processes by breaking into simple steps
  - Sensitivity Analysis more difficult
- Analytic (mathematical formula)
  - Fast
  - Sensitivity Analysis is easy

4 S Corp Valuation Models

Author	Type of Model
Grabowski	Simulation
Treharne-Fannon	Simulation
Mercer's QMDM	Simulation
Van Vleet's SEAM	Analytic

Published in *Business Valuation Review*, September 2004

Grabowski's Model

- Identified the 5 C-vs.-S Tax Differences
- Most accurate model to date
- Disadvantages
  - Clunky spreadsheet simulation model
  - Difficult to map the S premium for different assumptions of n = life of the S Corp election

Treharne-Fannon Model

- A simplified Grabowski Model
- Lacks IRC Sec. 338(h)(10) election
- Treharne for Valuing only Minority Interests, Fannon allows control int
- Simulation Model

QMDM

- Deficiencies
  - Same as Treharne-Fannon, plus:
  - No empirical basis for the adjustments, which are many and arbitrary
  - Abrams (2002) shows performs poorly in explaining restricted stock discounts

Van Vleet Model

- Advantage—the only analytic model
- Disadvantages
  - Based on net income, not cash flow
  - Does not account for time
  - Assumes S Corp status is perpetual
  - Depends only on tax rates and payout ratio. Ignores discount and growth rates.
  - For valuing only minority interests

What is a "Better Way"?



The "Better Way": Mathematical Sophistication

- Use mathematics
  - To do repetitive tasks
  - To create flexibility
    - Present value year 1 to n
    - + PV year n+1 to ∞
    - Let n be a variable we enter in the table
    - Avoids fixed width spreadsheet constraints



The Inventor's Dilemma

Presenting math to a hostile audience

The Inventor has a "Flash" of Insight



Trench Coat Mathematics



Abrams' Book (2018) & Model

- Invented math to duplicate Grabowski's complicated spreadsheet into a single cell (with a monster formula) in Excel.
- Maintains the 5 C-to-S differences
- Easy, fast (10-15 minutes), and less expensive to use
- Sensitivity Analysis is easy

Better Living Through Mathematics

- **X?**

Abrams S Corp Valuation Formula:

=(S*(CR*(1-tc)+d-ce-nwc*g/(1+g))-FC*(1-tc))*GM+(S*CR-FC)*(tc-ts)/(1-tdiv)*ADFn+S*(ce-d+nwc*g/(1+g))*z*tcg/(1-tcg)/(1+i)^n-S*(ce-d+nwc*g/(1+g))*tp*ADFn/(1-tdiv)+((((S*(CR*(1-tc)+d-ce-nwc*g/(1+g))-FC*(1-tc)))*tdiv)-((S*(CR*(1-ts)+ d-ce-nwc*g/(1+g))-FC*(1-ts)))*tp)/(1-tdiv)*ADFn+((S*(CR*(1-tc)+d-ce-nwc*g/(1+g))-FC*(1-tc))*(1+g)^n*GM*p)*(1/(1-((((1+i)^(-0.5)+(1+i)^(-15))/30)+(((1+i)^(-0.5)-(1+i)^(-14.5))/(15*i)))*tc)-1)/(1+i)^n

Comparing the S Corp Models

	Grabowski	Treharne-Fannon	QMDM	Van Vleet	Abrams-Grabowski
Effectiveness					
Control Interest	Y-	N/Y-	N	N	Y
Minority Interest					
Small Firm	Y	Y-	N	N	Y
Mid-to-Large	Y-	N	N	N	Y
Efficient	N	N	N	Y	Y
# Yesses	2	½ / 1	0	1	4

The S Corp Premium for Different C Corp Tax Rates and n = S Corp Life

$t_c \backslash n$	Sensitivity Analysis of S Corp Premium: Varying t_c and n					
	2	**4**	6	8	10	50
22%	2%	0%	-2%	-4%	-6%	-17%
25%	4%	2%	0%	-2%	-3%	-13%
28%	5%	4%	3%	1%	0%	-8%
31%	7%	6%	6%	5%	4%	-2%
34%	9%	9%	9%	9%	8%	4%
37%	10%	12%	13%	13%	13%	11%
40%	13%	**15%**	17%	18%	19%	19%
43%	15%	19%	22%	24%	25%	29%
46%	18%	23%	27%	30%	33%	40%
49%	21%	28%	34%	38%	41%	53%

The S Premium is Large When C Corp Tax and n are Large

Average Corp Tax Rate

- Average C Corp tax rate 2000-2010 was 30%, not 40%
  - "The Effective Tax Rate of the Largest US and EU Multinationals," Reuven S. Avi-Yonah and Yaron Lahav, http://ssrn.com/abstract=1949226.
  - For 100 largest US multinationals (Forbes 100). May not apply to smaller C Corps.
  - Lower than PWC study, which had flaws

Take-Away Lessons

- The S Premium is highly firm-specific in both models. Depends on
  - Tax rates (Corp, personal, capital gains, dividends—fed & state)
  - Firm size, growth rate, margins, discount rate (risk), industry

Abrams v. IRS S Corp Value

	Traditional Method—Tax Affect	Abrams-Grabowski with 15% S Premium	IRS Gross Method–No Tax Affect
FMV-C Corp	$600M	$600M	$600M
S Premium	$0	$90M	$400M
FMV-S Corp	**$600M**	**$690M**	**$1,000M = $1B**
Gift Tax @ 40%	NA—Not Allowed	**$276M**	**$400M**
Savings-$			**$124M**
Savings-%			1-($276M/$400M)= **31%**

Summary of the S Premium for 30% and 40% C Corp Tax Rates

C Corp Tax Rate	S Prem	S Prem	S Prem-IRS
Tax Law	2011-2012	Pre-Bush	
30% (Fed & State)	–2% to 3%	12% to 24%	67%
40% (Fed & State)	5% to 20%	20% to 55%	67%

The C Corp tax rate has a large impact on the S Premium—Dividends and Capital Gains tax rates also.

Note: These rates are wider than the preceding pages, because they include a wider range of operating results.

Empirical Results

- I analyzed over 10,000 transactions in Pratt's Stats database
- However, it appears C Corps sell for slightly *more* than S Corps—S premium is negative!
  - Results confounded by data problems—MVIC and lack of trans date financial statements

Empirical Results (Cont'd)

- I conjecture that probably C Corps in Pratt's Stats have higher expected growth rates
- May be systematic differences in quality of information
- Nevertheless, this is significant empirical evidence supporting low S premiums

The Take-Away Message

- The more C Corp double taxation, the greater the S premium
- At sufficiently low tax rates C Corps can actually be *more* valuable than S Corps
- Use the valuation model with all 5 differences

The Best Moves



Best Moves—S Shareholders

- Gift now
  - S premiums are still low now due to low double taxation of C, though higher than 2012
  - S Shareholders should remain S

Best Moves—C Shareholders

- Gift now at lower C Corp FMVs
- Convert later to S unless
  - C taxes decline; or if other benefits of C status are important when S premium is low
    - Pensions
    - Health Insurance
    - Charitable contributions



Probabilistic Valuation Models



Probabilistic Valuation Methods

- Deals with the problem of making fixed assumptions in a DCF when a wide range of outcomes is more realistic
- Most problematic for early stage companies

Probabilistic Valuation Methods

- Solutions
  - First Chicago Method
    - Wtd average of FMVs from multiple DCFs with varying degrees of optimism
    - Simple and realistic
  - More Complex Methods
    - Monte Carlo Simulation
    - Real Options

Demonstrating Expert Bias



Demonstrating Expert Bias

- Flip the Coin 17 Times
- What is the probability of 16 tails? 7,000 to 1.



How Does Value Grow?



How Does Value Grow? (Abrams 2015)

- If Discount Rates are constant over time
  - We can forecast growth in value
  - Value grows at a PV-Weighted CAGR of all future growth rates in cash flow.
  - Mature firm value grows at $g_{\text{wtd avg}}$

$$g* = r - 1/\left[\frac{1}{r-g_1}(1-{x_1}^n) + {x_1}^n\frac{1}{r-g_2}(1-{x_2}^m)\frac{1+g_2}{1+g_1} + {x_1}^n{x_2}^m\frac{1}{r-g_3}(1-{x_3}^o)\frac{1+g_3}{1+g_1} + {x_1}^n{x_2}^m{x_3}^o\frac{1}{r-g_4}(1-{x_4}^p)\frac{1+g_4}{1+g_1} + {x_1}^n{x_2}^m{x_3}^o{x_4}^p\frac{1}{r-g_5}(1 - {x_5}^q)\frac{1+g_5}{1+g_1} + {x_1}^n{x_2}^m{x_3}^o{x_4}^p{x_5}^q\frac{1}{r-g}\frac{1+g}{1+g_1}\right]$$

How Does Value Grow? Abrams' Formula is a Complete DCF in one Cell in Excel

- $$PVCF_{1\to\infty} = \frac{\sqrt{1+r}}{r-g_1}(1-{x_1}^n) + {x_1}^n(1-{x_2}^m)\frac{1+g_2}{1+g_1}\frac{\sqrt{1+r}}{r-g_2} + {x_1}^n{x_2}^m(1-{x_3}^o)\frac{1+g_3}{1+g_1}\frac{\sqrt{1+r}}{r-g_3} + {x_1}^n{x_2}^m{x_3}^o(1-$$

How Does Value Grow? (Cont'd)

- Early-stage firms
  - In addition to growth in cash flows, discount rates decline over time
  - This causes very high growth in value

How Does Value Grow?—Business Strategy Implications

- Academic research shows growth and profitability decline over time
- Businesses eventually suffer from old age
- This causes value to grow less over time
- The remedy—increasing risk by taking on long-term projects with high cash flows
- The impediment—old owners

How Does Value Grow?—Business Strategy Implications

- The remedies
  - Value Enhancement Assignments—Business appraisal as a tool for strategic decision-making
  - Old owners must bring in new blood in mgt

How Accurate Are Valuations?

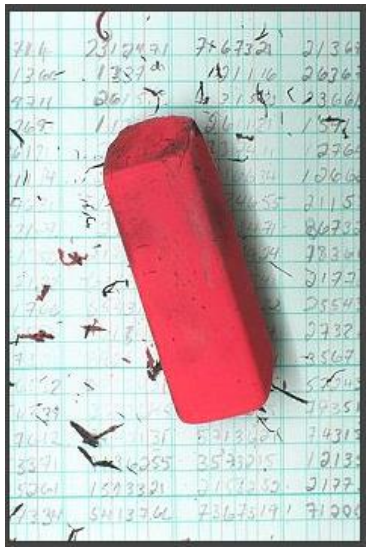


Valuation Accuracy

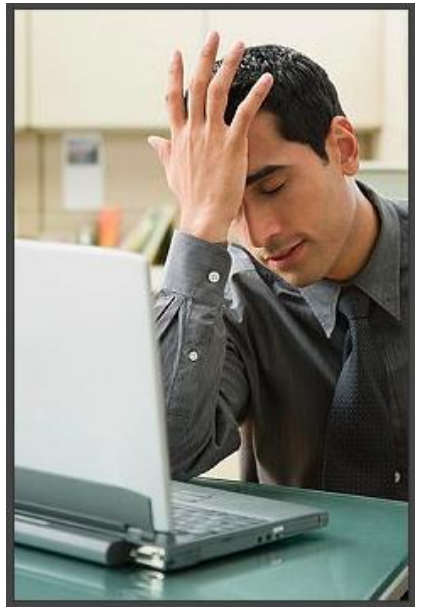
- Nobody knows for sure
- Using Abrams Log Size Model, the discount rate alone creates +/- 7% to 13% for 95% Confidence Interval (CI)
- Could do the same in a DCF using regression to forecast sales and total costs & expenses on a case-by-case basis
- Hard to measure CI for valuation discounts
- Subjective adjustments are important

Common Valuation Errors

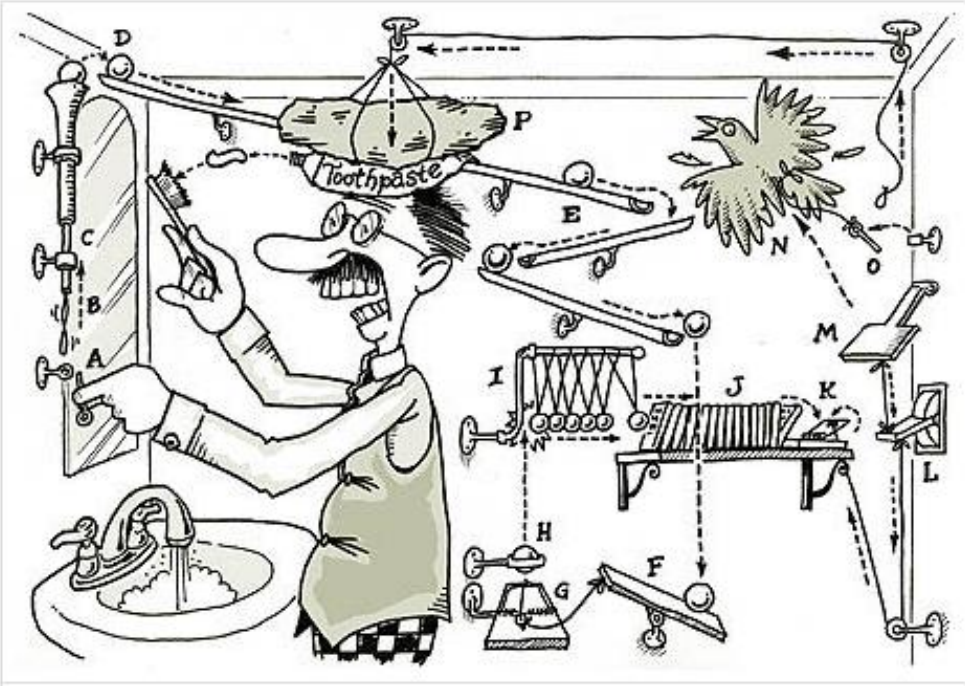








Common Valuation Errors



Common Valuation Errors—DCF

- Using inconsistent measures of income
  - Example: add back excess owners' salaries to value a control interest but not minority
- Treating net income as cash flow
  - When measuring value, discount cash flows, not net income. Can't pay bills with NI.

Common Valuation Errors—DCF

- While a bad idea, must use a higher discount rate for net income than cash flow. Otherwise overvalue 20% to 50%.
- For business damages, discount lost profits, may be mandated by law, even though it is theoretically a less desirable measure than lost value.
  - Perhaps this is the place to use a higher discount rate? Ambiguous in the law

Common Valuation Errors—DCF

- Cash flow < net income
  - Usually by at least 10%, often 20% to 40% in medium-to-high growth firms.
  - Lowest in heavy mfg, then retail, where inventories are large

Common Valuation Errors—DCF

- Average NYSE earnings retention was 50%, now ⅔, which implies Payout Ratio is 33% to 50% for public stocks.
  - That fuels the high growth and high PE multiples
  - Usually unrealistic to assume low retention of retained earnings and high growth
  - POR higher, growth lower for private firms

Common Valuation Errors—DCF

- A common fallacy: Many use Cash Flow = Net Income + Depreciation or EBITDA.
  - These shortcuts overstate cash flow
  - See Quantitative Bus Valuation, Chap 1.

Common Valuation Errors—DCF

- Confusing which year's cash flow to use in the calculation
  - Gordon model requires first forecast year, i.e., $t + 1$
  - PE multiples (or P/CF, P/EBIT, P/EBITDA, P/S, etc.) require last year's income or cash flow (or last 12 months), i.e., $t - 1$.

Common Valuation Errors—DCF

- Failure to account for stub years
  - When the val date is not FYE, there are 2 ways to do it right and easy to get it wrong.
  - First forecast year is a stub year ending with FYE. Must adjust the forecast and the PVFs.
    - If val date is 2/28/2014. Yr 1 forecast for only 10 mos. PVF yr 1 is 5 months after val date, 7/31/14. Yr 2 PVF is n = 16 mos., from 6/30/15 back to 2/28/14.

Common Valuation Errors—DCF

- Or, forecast according to fiscal years ending with the valuation date.
  - Must adjust the forecasts to non FYEs.
  - However, this leaves normal midyear PVFs, with t = 0.5 years, 1.5 years, etc.

Common Valuation Errors—DCF

- Poor forecasting—often due to lack of skills at regression analysis
- Using EOY PVFs and GMMs instead of midyear formulas

Common Valuation Errors—DCF

- Failure to adjust discount rates or PE multiples for size
  - Using discount rates or PE multiples of publicly traded firms on SMEs causes an overvaluation of 50% to 500%
  - Using regression with heteroscedasticity
    - When FMV = –$91 million, something is wrong!

Common Valuation Errors—DCF

- Using geometric mean returns instead of arithmetic means
  - An old debate in the valuation profession
  - Use GM for estimating future values but AM for discounting to present value
    - Using GM causes an overvaluation of 50% to 100%

Common Valuation Errors—DCF

- The overvaluation is inversely related to the size of the business
  - AM – GM is largest for small businesses, less for large ones

Common Valuation Errors

- Lack of use of a good, quantitative model to calculate DLOM, DLOC
  - The worst is lack of any model. The IRS loves that! It always attacks means & medians w/o reasoning.
  - US Tax Court gives thumbs down to using average or median of previous Tax Court cases

Common Valuation Errors—Mkt Methods

- Mindless reliance on messy data
  - Problems with MVIC
  - Lack of strict standards on calculating the deal price
  - Lack of data to calculate growth
  - Lack of transaction date balance sheet info

Common Valuation Errors—Mkt Methods

- Mindless reliance on mean and median valuation multiples rather than using regression (best) or percentile analysis
- Overweighting the market methods
  - Lack of appreciation of its drawbacks
  - Selection bias of high-growth firms
  - Failure to calculate implied growth in the market multiples

Common Valuation Errors

- Lack of a compelling method for valuing pass-through entities
- Valuing Startups

Common Valuation Errors—Valuing Startups

- Using a 1-scenario, overly optimistic DCF when multiple scenarios are more appropriate (probabilistic forecasting)
- Using lower ordinary business discount rates when higher rates (around 30%) are more appropriate for startups
- Failure to consider dilution in ownership from subsequent rounds of investment

Choosing an Appraiser



Choosing an Appraiser

- Professional designation from ASA, IBA, AICPA, or NACVA.
- Tradeoff of quality vs. cost
  - Appraisers range from incompetent, competent, good, excellent, and world class, with everything in between.
  - Independents in general less expensive than the Big 4

Choosing an Appraiser

- Balancing quality vs. cost



  - How much does your client have to lose from lower quality?

Choosing an Appraiser—Cost of Being Outclassed by a Better Expert

- Estate & Gift Tax Example
  - Max value $600M – Min $100M = $500M
  - Gift tax @ 40% × $500M = $200M
    - If a difference in class means a 10% difference in result, it costs $10 million for too little quality.

Choosing an Appraiser—Cost of Being Outclassed by a Better Expert

- Litigation Example
  - If Potential Damages are $200M and each decline in appraiser quality risks 10%, then $20M per drop in quality
- Get the Best on Large Jobs
- Bob Jirovec, CPA/investment banker received a CVA from NACVA—and knew he didn't know enough

Choosing an Appraiser

- Like choosing a doctor
  - An internist might be fine for an ingrown toenail or chickenpox
  - Not recommended for brain surgery, cancer, or an Ebola outbreak
- A CPA who does valuation in the off season may be fine for a small job, but use a specialist when much is at stake

Desirable Qualities

- Technical excellence
  - Math
  - Statistics, especially well-versed in regression
- How these great skills are like
  - Poison oak—in the best sense
  - Building with big Legos



Desirable Qualities

Good communicator



Confidence to stand up to the IRS or opposing counsel



Some Comic Relief—My Jewish Martial Arts Movie

- "Tzitzis of Iron"
  - The fringes with knots
- Using the stage name Bruce Levy
- I would be known as "the alter kicker"
  - In Yiddish, alter kakker means an "old fart"

Desirable Qualities

- Great reputation
  - Publications help—books & signif articles
- Honest and sincere
  - A slick and biased expert increases your probability of an excellent outcome, but also the risk of a terrible outcome.
  - How much risk do you and your client want?

How Attorneys Can Help the Appraiser

- Define the valuation assignment accurately and clearly
  - What business interest(s) are we valuing?
  - Valuation date
  - Purpose(s)—this is critical—remember the attorney who left out one of three purposes and cost an additional $20k for rework we could have avoided.
- Standard of Value (FMV, Fair Value, Marital Value, Investment Value, Business Damages, etc.)

How Attorneys Can Help the Appraiser

- Present the relevant facts in an orderly, logical sequence
  - Attorneys with whom I work frequently use the Background and Valuation Assignment sections of my engagement letter to
    - Save time in laying out the assignment
    - Ensure they've provided complete information and
    - Avoid re-work and hours of discussion to ensure clarity

How Attorneys Can Help the Appraiser

- Inform us of important legal points that can affect values
  - Rights
  - Restrictions
  - Laws
  - Standards of value
  - Relevant court cases
- Read our reports critically
  - Try to understand everything and ask good questions
  - Play devil's advocate, within reasonable limits

Questions to Ask

- What are the most critical and vulnerable assumptions?
- What models and valuation approaches did we not use and why?
- What could go wrong?
- Are the data pristine? If not, how are they messy and what is the impact of that?

Summary

- Infrastructure
  - Premise of value
  - Standards of value
  - Valuation approaches

Summary

- Structure
  - Valuation methods
    - DCF
    - Guideline companies
  - Adjustments (premiums or discounts) for degree of control and marketability
  - Valuing S Corps and non-tax entities
  - Probabilistic valuation models
- Demonstrating expert bias

Summary

- How accurate are valuations?
- Choosing an appraiser
- How attorneys can help appraisers
- Common valuation errors

Final Questions?

