

Spring 1996

Problem 1

Price/BV for AlumCare = 4

P/BV ratio for HealthSoft = 2

If AlumCare's Price is thrice that of HealthSoft,

Let MV of Equity for AlumCare =

\$	100.00
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Then MV of Equity for HealthSoft =

\$	33.33
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BV of Equity for AlumCare =

\$	25.00
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BV of Equity for HealthSoft =

\$	16.67
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P/BV of Equity after merger = $(100+33.33)/(25+16.67) =$

3.20

Problem 2

Expected Growth = Net Margin * Sales/BV of Equity * Retention Ratio

.06 = Net Margin * 3 * .40

Net Margin = 0.05

Price/Sales Ratio = $.05 * (1.06) * .6 / (.12 - .06) =$

0.53

Problem 3

Unlevered Beta (using last 5 years) = $0.9 / (1 + (1-.4)(.2)) =$

0.80

Unlevered Beta of Non-cash assets = $0.80 / (1-.15) =$

0.94

Levered Beta for Non-cash assets = $0.94 (1 + 0.6(.5)) = 1.222$

Cost of Equity for Non-cash Assets = $6\% + 1.22(5.5\%) = 12.71\%$

Cost of Capital for Non-cash Assets = $12.71\%(.667) + .07 * .6 * (.333) = 9.88\%$

Estimated FCFF next year from non-cash assets = $(450-50)(1-.4)(1.05)-90 =$

\$	162
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Estimated Value of Non-cash Assets = $162 / (.0988 - .05) =$

\$	3,320
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Cash Balance 500

Estimated Value of the Firm =

\$	3,820
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- Value of Debt Outstanding = 800

Value of Equity

\$	3,020
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Fall 1996

Problem 1

After-tax Operating Margin = 0.18
WACC = 13.55% (.6) + 6% (.4) = 0.11
Value/Sales Ratio = .18 (1.05) / (.1053-.05) =

3.42

Value/Sales Ratio of Generic Brand = 3.42 * 0.5 =

1.71

Value of Brand Name = 342 - 171 = 171 million

Part II

- a. True; if firms have different risk levels, they will have different PE/g ratios.
(Some of you also pointed out that the growth periods have to be the same. That is true too.)
- b. Firm B will have the higher Value/EBITDA multiple.
Everything else about the two firms is identical.
- c. Price/BV ratio will drop by more than half.
- d. P/BV = 2.5
Value of Equity will drop by 30% after special dividend.
Value of Book Value will drop by same dollar amount.
Net Effect = (2.5 * .7) / (1 - .75) = 7

Spring 1997

Problem 1

Expected PE/g ratio for GenieSoft = 2.75 - 0.50 (2) =	1.75
Expected PE/g ratio for AutoPred = 2.75 - 0.50 (1) =	2.25
Actual PE/g ratio for GenieSoft = 50/40 =	1.25
Actual PE/g ratio for AutoPred = 20/10 =	2.00

Both GenieSoft and AutoPred are undervalued relative to the market.

Problem 2

EBITDA	\$	550	
Depreciation	\$	150	
EBIT	\$	400	
EBIT (1-t)	\$	240	
		Next Year	

EBITDA	\$	578
EBIT	\$	420
EBIT (1-t)	\$	252
- Reinvestmer	\$	84
FCFF	\$	168

Firm Value \$ 4,200

Value/FCFF	25.00
Value/EBIT	10.00
Value/EBITDA	7.27

Problem 3

I would use a higher Value/EBITDA multiple because the comparable firms have a lower return on capital.

Spring 1998

Problem 1

Current PBV = $(ROE - g) / (COE - g)$

$1.5 = (ROE - 5\%) / (12\% - 5\%)$: Solving for ROE = 15.5%

If you add 3% to ROE, (I also gave full credit if you used 15.5% (1.03))

$PBV = (.185 - .05) / (.12 - .05) = 1.93$ 1.9286

This assumes that the growth stays the same, but payout ratio goes up

If you had assumed that the payout ratio would remain the same, but growth would change:

Current Payout Ratio = $5 / 15.5 =$ 32.26%

New Growth Rate = $0.32 * 18.5\% =$ 5.92%

New PBV = $(.185 - .0592) / (.12 - .0592) =$ 2.07

Problem 2

Predicted V/S Ratio for Estee Lauder = $0.45 + 8.5 (.16) =$ 1.81

Predicted V/S Ratio for Generic Company = $0.45 + 8.5 (.C$ 0.875

Difference in V/S Ratios = 0.935

Value of Estee Lauder Brand Name = $0.935 (500) =$ \$ 467.50

Problem 3

Value of Straight Debt portion of Convertible = $12.5 (PVA, 10\%, 10 \text{ yea} \boxed{\$ 173.19}$

Value of Conversion Option = $275 - 173.2$

\$ 101.81

Value of the Firm =	\$ 1,000.00
Value of Straight Debt =	\$ 273.19
Value of Equity =	\$ 726.81
Value of Conversion Option =	\$ 101.81
Value of Warrants =	\$ 100.00
Value of Equity in Stock	\$ 525.00
Value per Share =	\$ 26.25

Fall 1998

Problem 1

Value of Equity in Common Stock = $50 * \$ 20 =$ \$ 1,000.00
Value of Equity in Management Options = $10 * \$ 15 =$ \$ 150.00
Value of Conversion Option = $140 - 100 =$ \$ 40.00
Value of Equity = \$ 1,190.00

Value of Equity = \$ 1,190.00
Value of Debt = \$ 150.00
Value of Firm = \$ 1,340.00
- Value of Cash = \$ 250.00
Value of non-cash assets = \$ 1,090.00

Problem 2

- a. Firms with high risk and/or low quality projects (ROE) will have low PEG ratios
I would therefore Delphi Systems for my undervalued stock. It has a low PEG ratio, low risk and a high ROE
- b. Firms with low risk and high quality projects will have high PEG ratios
I would therefore pick Connectix as my overvalued stock, since it has a high PEG ratio, high risk and a low ROE.

Problem 3

a. $\text{Value/FCFF} = (1+g)/(WACC - g) = 1.05/ (.10-.05) =$ 21 ! Answer is 20 if you look at Value/FCFF1
(If you assume that the multiple is Value/Current FCFF, this will become $(1+g)/(WACC - g)$ which would yield 21.

b. If the ROC is 12.5%, the reinvestment rate = $g/\text{ROC} = .05/.125 = 0.40$

$\text{FCFF} = \text{EBIT} (1-\text{tax rate}) (1 - \text{Reinvestment Rate}) = \text{EBIT} (1-.4)(1-.3)$

$\text{Value /EBIT} = 21 (1-.4) (1-.3) = 8.82$

! Answer is 8.40 if you look at Value/EBIT1

Spring 1999

Problem 1

FCFF on non-cash assets = \$ 200 million (1-.4) (1 - 4/10) =	72	! Reinvestment rate = g/ ROC = 4/10
Unlevered Beta for non-cash assets = 1.20/.9 =	1.33333333	! Reflects the fact that the average firm has 10% debt
Levered Beta for non-cash assets = 1.33 (1 + 0.6(15/85)) =	1.47082353	
Cost of Equity for non-cash assets = 6% + 1.47 (5.5%) =	14.09%	
Cost of capital for non-cash assets = 14.09% (.85) + 10% (1-.4) (.15) =	12.88%	
Value of non-cash assets = 72 (1.04)/(.1288 - .04) =	\$ 843.24	
Value of cash =	250	
Value of firm =	\$ 1,093.24	

Problem 2

PE = Payout ratio (1+g)/(r - g)	
Payout ratio = PE (r -g)/(1+g)	
r = Cost of Equity = 6% + 0.9*5.5% =	10.95%
g = 5%	
PE = 10.59	
Payout ratio = 10.59(.1095 - .05)/(1.05) =	0.60
g = (1-Payout ratio) (ROE)	
.05 = (1 - .6) ROE	
ROE = 12.5%	

Problem 3

Firm Value = 5000 + 1500 + 1000 =	7500	
Firm Value net of cash = 7500 - 1750 =	5750	
Taxable Income = 250/(1-.4) =	416.666667	! Net income includes interest income
Taxable Income before interest income =	291.666667	
EBIT = 291.67 + 100 + 80 =	471.67	
EBITDA	721.67	
Non-cash Value/EBITDA = 5750/722 =	7.96	! If numerator is non-cash, denominator cannot include interest income
Alternatively,		
Firm Value = 5000 + 1500 + 1000 =	7500	
EBITDA + Interest Income =	846.67	
Value/EBITDA = 7500/847 =	8.85478158	

Spring 2000

Problem 1

EBIT at Reliable without auto parts subsidiary = $500 - 200 =$	300
EBIT at Chemical products subsidiary =	250
EBIT at Auto Parts Subsidiary =	200

Tax rate =	40%
Reinvestment Rate = (Growth/ROC) = $6\%/12\% =$	50%
Cost of Capital =	10%

Value of Reliable (stand-alone) = $300 (1-.4) (1-.5)(1.06)/(.10-.06) =$	\$2,385	! Alternatively, we could have valued Reliable on a consolidated basis and subtracted the 50% of the auto parts subsidiary.
Value of Chemical subsidiary = $250 (1-.4)(1-.5)(1.06)/(.10-.06) =$	\$1,988	
Value of Auto Parts subsidiary = $200 (1-.4)(1-.5)(1.06)/(.10-.06) =$	\$1,590	

Value of Reliable (with subsidiaries) = $2385 + 0.1 (1988) + 0.5 (1590) =$	\$3,379
Value per share =	\$33.79

Problem 2

- will become more sensitive to changes in expected growth rates. (The value of growth is a present
- Firm A will have the higher PEG ratio, because it has the lower expected growth rate.
- Low tax rate, high return on capital, low reinvestment rate: Best possible combination
- The price to book value ratio will drop. The simplest way to do this is to use the following equation:
 $PBV = (ROE - \text{growth rate}) / (\text{Cost of equity} - \text{growth rate})$
 Incidentally, this is true only if the price to book value ratio is greater than 1, which it is in this case.
- Enterprise Value = (Market Value of Equity + Market Value of Debt - Cash and Marketable Securities)
 $= (150 * 10 + 1000 - 500) / (250 + 100) =$ 5.71