

**STERN SCHOOL OF BUSINESS**

**New York University**

**EQUITY OVERALL VALUATION PROJECT**

AXA  
COACH  
OPENWAVE SYSTEMS INC  
QWEST  
SONUS NETWORKS  
VARIAN  
XM SATELITE RADIO HOLDINGS

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## INVESTMENT RECOMMENDATION

### AXA

<b>Investment Recommendation:</b>	<b>SELL</b>	Target Price \$ Range:	\$ 11.50 – \$11.77
		Current Price:	\$23.7

#### Valuation Approach:

DDM	Relative Val	Option Val	EVA
\$11.77	\$ 11.49	N/A	\$ (347,313,816)
Stable growth	PBV	N/A	

**Analyst Comment:** Given the nature of the company (Mature, stable growth), the value estimates are particularly sensitive to the ROE and the dividend per share assumptions. I assumed an ROE equivalent to the average sector of 11.9 % and a dividend per share equal to 0.57 which I think is appropriate for a stable mature company. Based on this analysis, the price of the AXA stock should be 8.86 Euro or \$11.77, which is below the actual price range of \$ 23.7 that AXA is trading at currently.

### COACH INC.

<b>Investment Recommendation:</b>	<b>BUY</b>	Target Price \$ Range:	\$ 55.84 – 59.75
		Current Price:	\$53

#### Valuation Approach:

DCF	Relative Val	Option Val	EVA
\$55.84	\$59.75	N/A	\$132,106,993
Three-Stage FCFF	P/E		

**Analyst Comment:** The company is currently priced under the Target Price range and I recommend buying the stock. Both DCF and relative valuation analysis reveal that the current price of the stock is too low. The expected growth in earnings in the next five years is 30%, largely due to the momentum of the fast growth experienced in the last 3 years and high reinvestment rate, and continuously increasing brand recognition.

### OPENWAVE SYSTEMS INC

<b>Investment Recommendation:</b>	<b>BUY</b>	Target Price \$ Range:	\$14 -\$23
		Current Price:	\$14.72

#### Valuation Approach:

DCF	Relative Val	Option Val	EVA
\$32.63	\$49.02	N/A	\$ (1,203,900)
Three stage FCFF	EV/S	N/A	

**Analyst Comment:** The Company is currently priced at the bottom of the valuation range. The company posted positive earnings in the last quarter for the first time in the last three years. The expected growth in earnings in the next three years is 18% largely due to diversification of its product lines and resulting increase in subscriber base and should push the stock price at the top of its valuation range. The stock is undervalued relative to its sector. Regression on EVS returns value per share of \$49.02 with EVS ratio of 2.622 below sector average of 3.59.

**QWEST**

<b>Investment Recommendation:</b>	<b>BUY</b>	Target Price \$ Range:	\$ 4.38 – 5.76
		Current Price:	\$ 4.19

**Valuation Approach:**

<i>DCF</i>	<i>Relative Val</i>	<i>Option Val</i>	<i>EVA</i>
\$ (1.02)	\$ 4.38	5.76	\$ (1,066,000)
Two-Stage FCFE	EV/EBITDA		

**Analyst Comment:** The firm is leveraged beyond its optimal debt ratio and suffers high cost of equity, 16.84%. In the two-stage FCFE model, Qwest’s equity value is at (\$1.02) per share. We conclude DCF is not a good valuation tool for valuing troubled firms - Qwest equity holders’ residual claim of cash flows is negative. Qwest’s stock is currently trading at \$4.19 per share. Though this is a risky security that does not have much intrinsic value embedded, we believe the value of Qwest’s equity as a call is worth between \$4.38 and \$5.76 per share. We issue a buy recommendation on this stock.

**SONUS NETWORKS**

<b>Investment Recommendation:</b>	<b>BUY</b>	Target Price \$ Range:	\$4.51-\$11.31
		Current Price:	\$5.84

**Valuation Approach:**

<i>DCF</i>	<i>Relative Val</i>	<i>Option Val</i>	<i>EVA</i>
\$11.31	\$4.51 - \$7.28	N/A	(\$7,036,730)
Three-Stage FCFF	PE/G		

**Analyst Comment:** The Company is currently priced near the bottom of the valuation range. Given its positive cumulative net earnings over the current fiscal year and its recent expansion efforts in China and eastern Asia, the company is positioned for rapid growth over the next few years. In this instance, the DCF valuation is more accurate than the relative valuations because of its growth prospects and the growth of its sub-sector (Voice over IP technology). The relative valuations do not fully take into account the opportunities available to it in China, for which Sonus has successfully executed a few entry deals (giving it early-mover advantage in those markets).

**VARIAN**

<b>Investment Recommendation:</b>	<b>SELL</b>	Target Price \$ Range:	\$29.40 – \$44.99
		Current Price:	\$37.09

**Valuation Approach:**

DCF	Relative Val	Option Val	EVA
\$29.40	\$44.99	N/A	(\$18,838)
Three-Stage FCFF	PE	N/A	

**Analyst Comment:** Although the semiconductor equipment firm looks cheap compared to the industry as well as the market, its fundamentals do not justify its current price of \$37.09. Even assuming a higher growth rate of 18-20% would not justify its current price under a DCF valuation. Furthermore, VSEA operates in a highly cyclical industry in which growth can be difficult to predict. VSEA is probably one bad earnings report away from a correction.

**XM Satellite Radio Holdings**

<b>Investment Recommendation:</b>	<b>SELL</b>	Target Price \$ Range:	\$30-32
		Current Price:	\$38.64

**Valuation Approach:**

DCF	Relative Val	Option Val	EVA
\$31.38	<\$1.00	NA	\$(570,000,000)
High growth FCFF	EV/Sales	N/A	

**Analyst Comment:** Based on our analysis and the current price range of the XMSR stock (\$38-40), I would recommend selling this stock. The company is grossly overvalued primarily based on the highly optimistic future growth expectations in subscriptions. Despite of the fact that the FCC only granted two licenses for satellite radio in the United States (XMSR and Sirius), and this segment has very high barriers to entry (cost of satellite and original programming), this business is still at a very early stage in the industry lifecycle, and there is high risk of lower than expected growth in new subscriptions. Currently, both XMSR and Sirius are spending large amounts of their capital on marketing programs, aimed to attract new subscribers, which results in prohibitively high acquisition costs per subscriber that at current subscription rates (\$9.95/month for XMSR and \$12.95/month for Sirius) would take up to 2 years per customer to recoup.

**Appendix**

Intrinsic Valuation.....6

Relative Valuation.....15

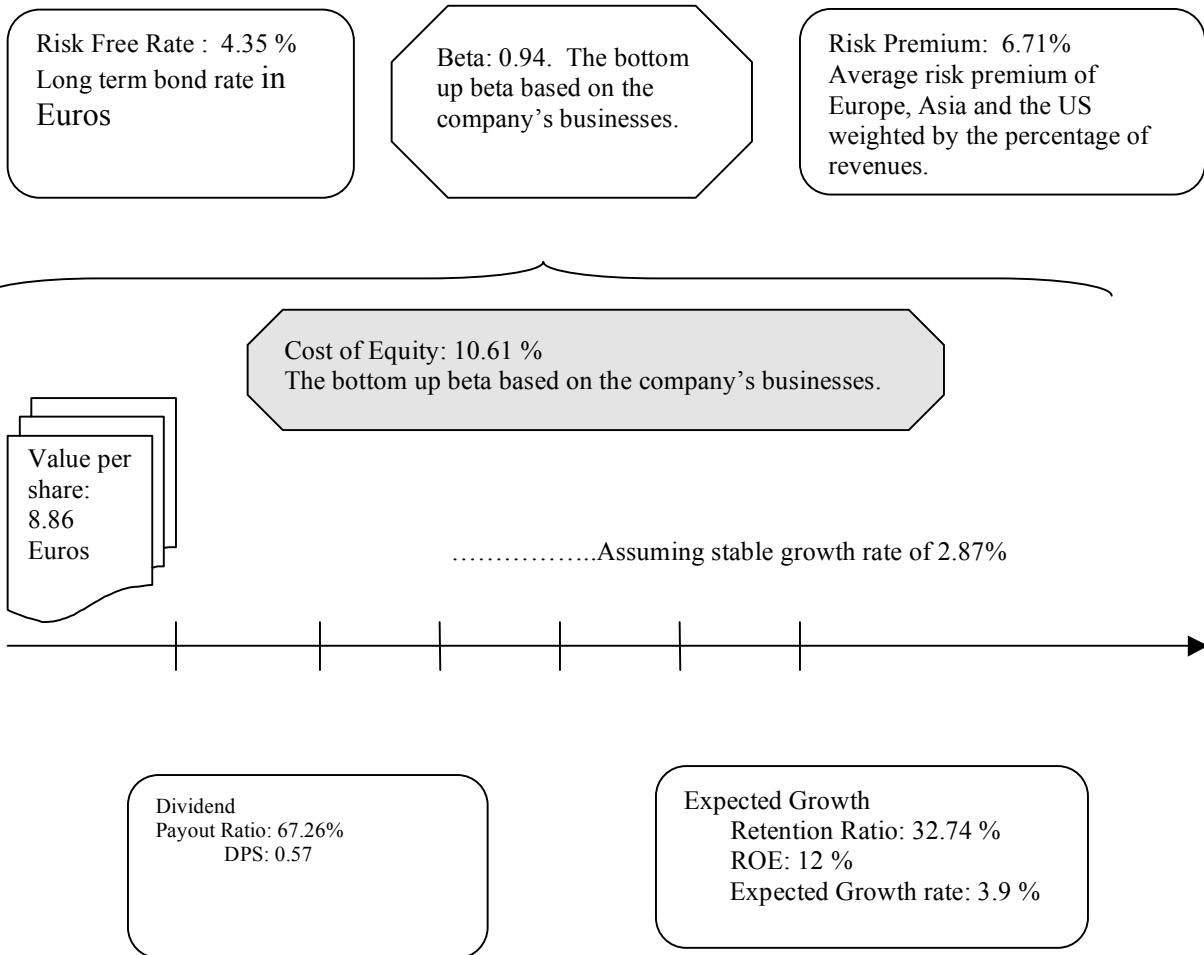
EVA Analysis.....26

Control Premium..... 29

**INTRINSIC VALUE VALUATION**

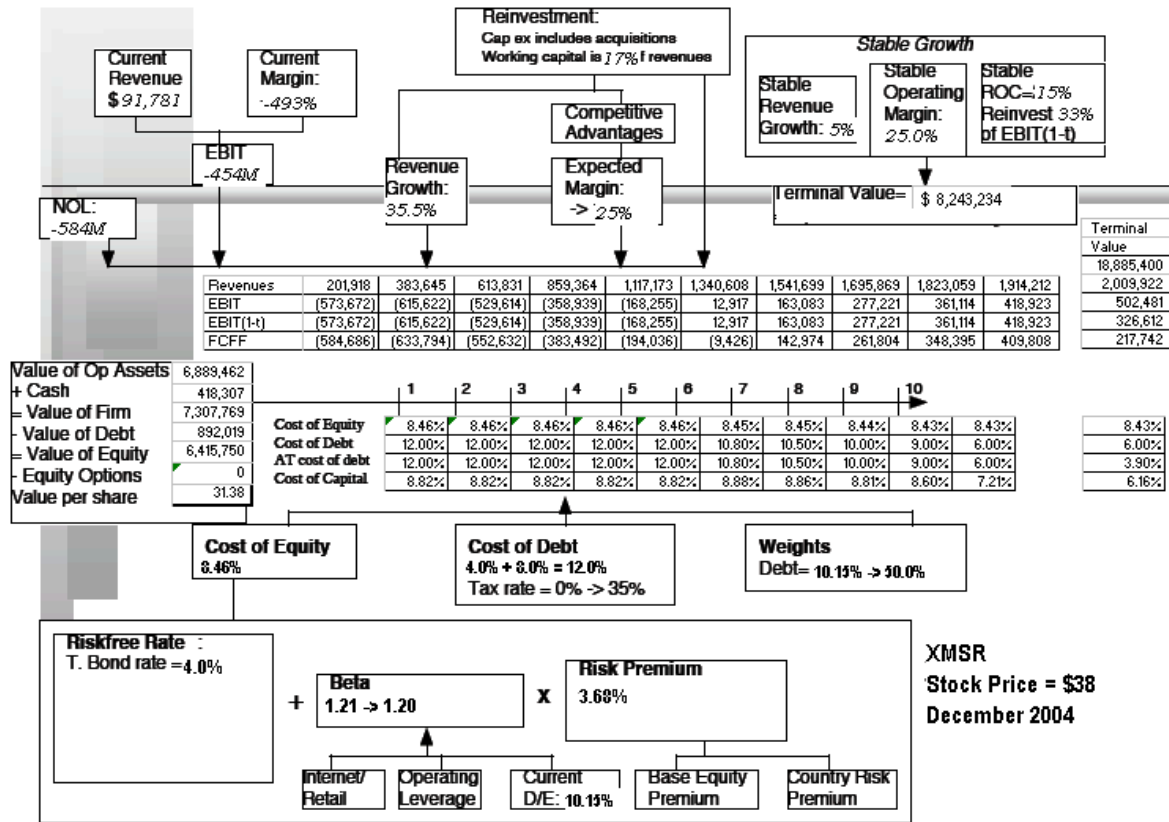
**AXA**

Given the nature of the company (Mature, stable growth), the value estimates are particularly sensitive to the ROE and the dividend per share assumptions. I assumed an ROE equivalent to the average sector of 11.9 % and a dividend per share equal to 0.57 which I think is appropriate for a stable mature company. Based on this analysis, the price of the AXA stock should be 8.86 Euro or \$11.77, which is below the actual price range of \$ 23.7 that AXA is trading at currently.



**XM SATELLITE RADIO HOLDINGS**

To evaluate XMSR's intrinsic value, I used the high-growth discounted cash flow model. Given the nature of the company (early-stage high-growth), the value estimates are particularly sensitive to the growth and stable-growth ROC assumptions employed, which are the key assumptions. The main driver of XMSR's going concern in the future will be the growth (35.5% annual compounded) in subscriptions, which has been rather remarkable since the company went live with its service. Based on my DCF analysis the price of the XMSR stock should be circa \$31, which is below the actual price range of \$38-40 that XMSR is trading at currently.



**VSEA**

To value VSEA, we used the 3-stage FCF model since the company is currently in a high-growth phase and has very little debt. The firm is likely to change its financing mix in the coming years. High growth is expected to last for five years, followed by a five year transition period. The key drivers of the model are the company's 5-year growth rate and its beta. The expected growth rate, based on fundamentals is 6.97%. However, the average analyst forecast for 5-year growth is 18%. Based on this discrepancy, we used a composite 12.5% growth rate to value VSEA. We also used a bottom-up beta calculated by using the average betas of other semiconductor equipment firms. VSEA's levered beta is 2.22. Based on our DCF valuation, VSEA should be worth \$29.40, which is less than the current price of \$37.09.

VARIAN SEMICONDUCTOR (VSEA) DCF VALUATION											
Current Cashflow to firm					Analyst Estimate (g): 18%						
EBIT(1-t): 47,948					Reinvestment Rate: 77.2% * ROC: 9.03% = 6.97%						
- Net Capex 16,855					<b>Expected growth in EBIT(1-t) = .5*(.0697) + .5*(.18) = 12.5%</b>						
- Chng WC 20,163					Stable Growth:						
= FCFF 8,109					g= 5%						
Firm Value	\$779,473					Beta= 1.20					
+ Cash	\$398,216					(D/D+E)= 10%					
- Debt	\$10,716					Capex/Depreciation= 104.00%					
=Equity	\$1,166,973					Terminal Value <sub>10</sub> = 59512 / (.0837 - .05) = 1,763,949					
-Options	\$97,071										
Value/Share	\$ 29.40										
EBIT (1-t)	\$ 45,127	\$ 50,691	\$ 56,941	\$ 63,961	\$ 71,846	\$ 80,703	\$ 83,608	\$ 85,012	\$ 84,750	\$ 82,737	
-Reinvestment	\$ 37,018	\$ 34,662	\$ 38,995	\$ 43,869	\$ 49,353	\$ 55,522	\$ 48,680	\$ 41,561	\$ 34,520	\$ 27,956	
FCFF	\$ 8,109	\$ 16,029	\$ 17,946	\$ 20,092	\$ 22,493	\$ 25,181	\$ 34,928	\$ 43,450	\$ 50,230	\$ 54,781	
Discount at Cost of Capital (WACC) = 12.49%(.9926) + 5.89%(0.0074) = 12.44%											
<b>Cost of Equity</b>	<b>Cost of Debt</b>				<b>Weights</b>						
12.49%	5.89%				E= 0.9926						
					D= 0.0074						
<b>Riskfree Rate</b>	<b>Beta</b>				<b>Implied Risk Premium</b>						
4.15%	2.225				3.75%						
	<b>Unlevered Beta</b>				<b>Firm's D/E Ratio</b>						
	2.213				0.81%						





**QWEST**

Qwest is a financially distressed firm that generated negative earnings and free cash flows over the past years. It has negative book value of equity of (\$1,016) million and extremely high debt balance, \$17,413 million. The firm is leveraged beyond its optimal debt ratio and suffers high cost of equity, 16.84%. In the two-stage FCFE model, Qwest’s equity value is at (\$1.02) per share. We conclude DCF is not a good valuation tool for valuing troubled firms - Qwest equity holders’ residual claim of cash flows is negative.

Cost of Equity =	16.84%
Net Income =	(\$303)
Net Income without interest income from cash=	(\$415)
Growth rate in Net Income =	4.55%
Equity Reinvestment Rate for high growth phase=	27.00%

The dividends for the high growth phase are shown below (upto 10 years)

	1	2	3	4	5
Expected Growth Rate	4.55%	4.55%	4.55%	4.55%	4.55%
Net Income	(\$434.35)	(\$454.10)	(\$474.75)	(\$496.33)	(\$518.90)
Equity Reinvestment Rate	27.00%	27.00%	27.00%	27.00%	27.00%
FCFE	(\$317.08)	(\$331.49)	(\$346.56)	(\$362.32)	(\$378.80)
Cost of Equity	16.84%	16.84%	16.84%	16.84%	16.84%
Cumulative Cost of Equity	116.84%	136.51%	159.49%	186.34%	217.71%
Present Value	(\$271.39)	(\$242.84)	(\$217.30)	(\$194.44)	(\$173.99)

Growth Rate in Stable Phase =	2.00%
Equity Reinvestment rate in stable phase =	18.69%
Cost of Equity in Stable Phase =	8.80%
<b>Price at the end of growth phase =</b>	<b>(\$5,297.45)</b>

Present Value of FCFEs in high growth phase =	(\$1,099.96)
Present Value of Terminal Equity Value =	(\$2,433.26)
Value of equity in operating assets =	(\$3,533.22)
Value of Cash and Marketable Securities =	\$1,756.00
Value of equity in firm =	(\$1,777.22)
Value per share =	(\$1.02)

**SONUS**

A three-stage FCFF model was used to value Sonus. Using this form of discounted cash flow model, the value of Sonus was calculated to be \$11.31. This implies that the stock is undervalued by 94% at a current market price of \$5.84 (as of Dec. 10, 2004).

The key drivers to this value are:

- the growth rate assumed during the firm’s high growth period
- the duration assumed of the high growth period
- the debt ratio assumed during the stable growth period

Of these three drivers, the debt ratio is the least important, not because it has the least impact on the valuation of the company, but because it is the least likely to change. Most companies in this sector (i.e., networking equipment) do not have high debt-to-capital ratios (it is difficult for most technology companies to issue substantial amounts of debt financing, and it is even tougher for them during the earlier stages).

The growth rate during the high growth period is the most important variable because it has the greatest impact on the value of the company, and it is one that can change based on different factors (market conditions, financing availability, capital expenditures, management objectives, etc.). As can be seen below, changing the length of the high growth period does not have as much of an impact on Sonus’s valuation as changing the assumption of the growth rate during the high growth period. Changes in capital spending and the return of capital of the firm would directly affect the growth rate, and thus affect the valuation of the company.

Keeping all other variables constant, changing the growth rate of the firm during the high growth period affects its valuation as follows (growth rate used in the valuation in bold):

Growth Rate (High Growth Period)	Value per Share
15%	\$6.74
20%	\$8.92
<b>24.31%</b>	\$11.31
30%	\$15.39
35%	\$20.04

Keeping all other variables constant, changing the length of the high growth period affects its valuation as follows (length of growth rate period used in the valuation in bold):

Length of High Growth Period	Value per Share
5	\$9.30
7	\$10.64
10	\$11.31
<b>13</b>	\$11.32
15	\$11.59

## Valuation – Fundamentals & Relative Approaches for a Sample of Seven Companies

Keeping all other variables constant, changing the debt ratio during the stable growth period affects its valuation as follows (debt ratio used in the valuation in bold):

Debt Ratio (Stable Growth Period)	Value per Share
5%	\$11.31
10%	\$11.95
15%	\$12.66
20%	\$13.46
25%	\$14.37

The valuation of the company can be visually depicted as follows:

### Output from the program

Cost of Equity =	11.71%
Equity/(Debt+Equity) =	99.15%
After-tax Cost of debt =	2.93%
Debt/(Debt +Equity) =	0.85%
Cost of Capital =	11.63%

### Intermediate Output

Expected Growth Rate	24.31%
Working Capital as percent of revenues =	-3.34% (in percent)

The FCFF for the high growth phase are shown below (upto 10 years)

	Current	1	2	3	4	5	6	7	8	9	10	Terminal Year
Expected Growth Rate		24.31%	24.31%	24.31%	24.31%	24.31%	20.05%	15.79%	11.52%	7.26%	3.00%	
Cumulated Growth		124.31%	154.53%	192.10%	238.80%	296.86%	356.37%	412.63%	460.18%	493.60%	508.41%	
Reinvestment Rate		121.75%	121.75%	121.75%	121.75%	121.75%	100.40%	79.06%	57.71%	36.37%	15.02%	
EBIT * (1 - tax rate)	\$79,732	\$99,116	\$123,212	\$153,166	\$190,401	\$236,690	\$284,143	\$328,999	\$366,914	\$393,560	\$405,367	\$417,527.62
-(CapEx-Depreciation)	\$62,492	\$122,066	\$151,742	\$188,632	\$234,490	\$291,496	\$288,703	\$263,329	\$214,488	\$145,050	\$61,752	\$64,246.43
-Chg. Working Capital	\$34,580	(\$1,396)	(\$1,735)	(\$2,157)	(\$2,681)	(\$3,333)	(\$3,417)	(\$3,230)	(\$2,730)	(\$1,919)	(\$850)	(\$1,517.93)
Free Cashflow to Firm	(\$17,339)	(\$21,555)	(\$26,795)	(\$33,309)	(\$41,407)	(\$51,473)	(\$1,143)	\$68,900	\$155,157	\$250,428	\$344,465	\$354,799.12
Cost of Capital		11.63%	11.63%	11.63%	11.63%	11.63%	10.98%	10.32%	9.67%	9.02%	8.36%	
Cumulated Cost of Capital		1.1163	1.2462	1.3911	1.5530	1.7336	1.9239	2.1226	2.3278	2.5378	2.7500	
Present Value		<b>(\$19,309)</b>	<b>(\$21,502)</b>	<b>(\$23,944)</b>	<b>(\$26,663)</b>	<b>(\$29,691)</b>	<b>(\$594)</b>	<b>\$32,461</b>	<b>\$66,652</b>	<b>\$98,681</b>	<b>\$125,260</b>	

Growth Rate in Stable Phase =	3.00%
Reinvestment Rate in Stable Phase =	15.02%
FCFF in Stable Phase =	\$354,799.12
Cost of Equity in Stable Phase =	8.65%
Equity/ (Equity + Debt) =	95.00%
AT Cost of Debt in Stable Phase =	2.93%
Debt/ (Equity + Debt) =	5.00%
Cost of Capital in Stable Phase =	8.36%
Value at the end of growth phase =	<b>\$6,614,758.73</b>

### Valuation

Present Value of FCFF in high growth phase =	<b>\$201,350.57</b>
Present Value of Terminal Value of Firm =	<b>\$2,405,359.69</b>
Value of operating assets of the firm =	<b>\$2,606,710.26</b>
Value of Cash, Marketable Securities & Non-operating assets =	<b>\$299,901.00</b>
Value of Firm =	<b>\$2,906,611.26</b>
Market Value of outstanding debt	<b>\$13,181.52</b>
Market Value of Equity =	<b>\$2,893,429.74</b>
Value of Equity in Options =	<b>\$89,955.01</b>
Value of Equity in Common Stock =	<b>\$2,803,474.74</b>
Market Value of Equity/share =	<b>\$11.31</b>

## Valuation – Fundamentals & Relative Approaches for a Sample of Seven Companies

### COACH, INC.

For Discounted Cash Flow Valuation we have used Three-Stage-Growth model. The main assumptions are highlighted below. Based on these assumptions, the value of the company's stock came out as slightly overvalued.

#### High-Growth Period

- Revenues growth is 30%
- Bottom-up Beta is 1.04
- High-Growth period is 5 years
- Pretax Operating Margin is 30%
- 3% Debt Financing
- Working Capital/Revenue is 40%
- Marginal Tax Rate is 35%

#### Stable Period

- Revenue growth rate is 4%
- Capital Expenditures are 120% of the Depreciation
- Pre-Tax Operating Margin is 20%
- Bottom-up Beta is 1.00
- 20% Debt Financing

	<i>Base</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
EBIT (1-	\$ 313,319,796	\$ 392,832,662	\$ 491,854,466	\$ 614,934,413	\$ 767,595,426	\$ 956,508,950
Depreciation	\$ 42,854,000	\$ 55,710,200	\$ 72,423,260	\$ 94,150,238	\$ 122,395,309	\$ 159,113,902
- Capital Expenditures	\$ 67,700,000	\$ 88,010,000	\$ 114,413,000	\$ 148,736,900	\$ 193,357,970	\$ 251,365,361
- Change in WC	\$ (6,854,000)	\$ 158,532,720	\$ 206,092,536	\$ 267,920,297	\$ 348,296,386	\$ 452,785,302
= FCFF	\$ 295,327,796	\$ 202,000,142	\$ 243,772,190	\$ 292,427,454	\$ 348,336,379	\$ 411,472,189

<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>
\$ 1,114,141,625	\$ 1,237,333,856	\$ 1,306,624,551	\$ 1,307,931,176	\$ 1,236,589,476
\$ 198,574,150	\$ 237,494,683	\$ 271,693,918	\$ 296,689,758	\$ 308,557,349
\$ 275,146,052	\$ 298,926,744	\$ 322,707,435	\$ 346,488,127	\$ 370,268,818
\$ 486,593,271	\$ 479,937,931	\$ 421,718,521	\$ 308,229,381	\$ 146,341,950
\$ 550,976,451	\$ 695,963,864	\$ 833,892,513	\$ 949,903,426	\$ 1,028,536,056

<b>Terminal Value</b>	<b>\$ 20,650,144,755</b>
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## Valuation – Fundamentals & Relative Approaches for a Sample of Seven Companies

Value of Firm	\$	10,843,917,352
+ Cash and marketable securities =	\$	434,443,000
- Value of Debt	\$	728,885,692
Value of Equity	\$	10,549,474,660
- Value of Equity options issued by firm	\$	-
Value of Equity per Share	\$	55.84

Going through a sensitive analysis of the most significant inputs, we have noticed that the most important parameters are the growth rate during the high growth period and pre-tax operating margin in perpetuity.

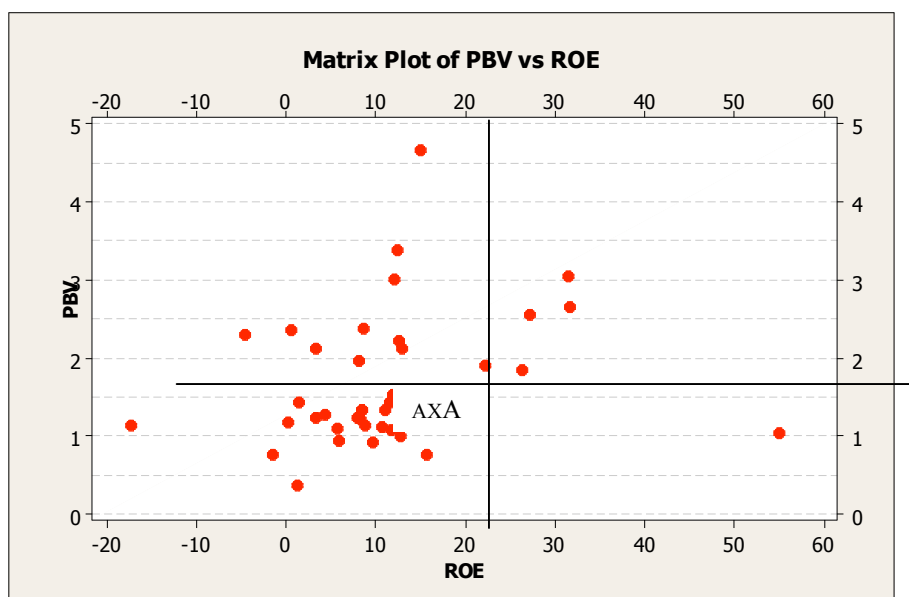
The assumptions we have made for these two variables are the most feasible due to the company's significant current growth and growth potential and due to the nature of the company's product lines. Coach is selling brand-name products at a high margin, resulting in high operating margin.

		-100%	-80.0%	-60%	-40.0%	-20%	0.0%	20%	40.0%	60%	80.0%
Growth Rate in High Growth Period	30%	\$ 1.0	\$ 1.2	\$ 1.7	\$ 2.5	\$ 4.9	\$ 12.4	\$ 34.0	\$ 90.2	\$ 222.3	\$ 508.3
		10%	13%	16%	19%	22%	25%	28%	31%	34%	37%
Pre-Tax Op. Margin in perpetuity	20%	\$ 26.8	\$ 35.5	\$ 44.2	\$ 52.9	\$ 61.7	\$ 70.4	\$ 79.1	\$ 87.8	\$ 96.6	\$ 105.3
		2.25%	2.50%	2.75%	3.00%	3.25%	3.50%	3.75%	4.00%	4.25%	4.50%
Growth Rate in Stable period=	4.0%	\$ 45.2	\$ 46.4	\$ 47.7	\$ 49.0	\$ 50.5	\$ 52.1	\$ 53.9	\$ 55.8	\$ 58.0	\$ 60.3
		10%	20%	30%	40%	50%	60%	70%	80%	90%	
Debt to refinance in Stable Growth period Length of Growth Period=	20%	\$ 50.3	\$ 55.8	\$ 63.0	\$ 72.6	\$ 86.1	\$ 106.6	\$ 141.5	\$ 214.2	\$ 458.3	
		0%	20%	40%	60%	80%	100%	120%	140%	160%	180%
Cap Ex / Depreciation=	120%	\$ 73.5	\$ 70.6	\$ 67.6	\$ 64.7	\$ 61.7	\$ 58.8	\$ 55.8	\$ 52.9	\$ 50.0	\$ 47.0
		0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4
Beta=	0.99	\$ 63.0	\$ 61.5	\$ 60.0	\$ 58.6	\$ 57.1	\$ 55.8	\$ 54.4	\$ 53.1	\$ 51.8	\$ 50.6

**RELATIVE VALUATION**

**AXA**

Given the nature of AXA business, the appropriate ratio to use is the Price to Book value. A simple matrix plot of the ROE and PBV of 20 comparable firms, shows that AXA is positioned the down left box meaning that it has a low PBV which is due to its low ROE.



Regressing PBV against ROE and expected 5 years growth in earning of 20 comparable firms (European companies in the multi line insurance industry) gives the following equation:

$$\ln \text{PVB} = 2.58 + 0.562 \ln \text{Growth} + 0.250 \ln \text{ROE}$$

Predictor	Coef	SE Coef	T	P
Constant	2.5794	0.6256	4.12	0.001
Growth	0.5621	0.2148	2.62	0.018
ROE	0.25033	0.07336	3.41	0.003

S = 0.350709    **R-Sq = 53.8%**    R-Sq(adj) = 48.3%

It is important to notice that to run this regression, I only used firms with positive return on equity. Based on this equation with an R squared of 53.8%, the appropriate PBV of AXA based on the regression is:

$$\ln \text{PVB} = 2.58 + 0.562 (\ln 1.3\%) + 0.250 (\ln 9.5\%)$$

$$\text{PVB} = 0.64$$

Comparing to the current PBV of 1.34, AXA seems overvalued. The factors that account for low price to book value for AXA include low ROE comparing to an industry return of 11.9% and low expected growth on earning comparing to the average of comparable firms.

**XM SATELLITE RADIO HOLDINGS**

Given the fact that XMSR is one of the two companies (Sirius is the other one) that have a distinctly different business model than other entertainment/broadcasting companies as well as the fact that XMSR is an early-stage high-growth company (while the entertainment/broadcasting industry consists of predominantly mature companies), valuation against comparables makes little sense. Nevertheless, I conducted regression analyses (see below for results) of 22 radio holding companies, XMSR and Sirius. I regressed the companies' EV/Sales ratio (since XM does not have positive earnings) against their Pre-tax Operating Margins. Despite a 99% R-squared, the regression is useless, as XMSR and Sirius are the two outliers (see graph). Moreover, the regression equation does not make any sense, as increasing operating margin results in lower EV/Sales multiple. Therefore, using the regression equation to evaluate XMSR relative to comparable companies is an exercise in futility.

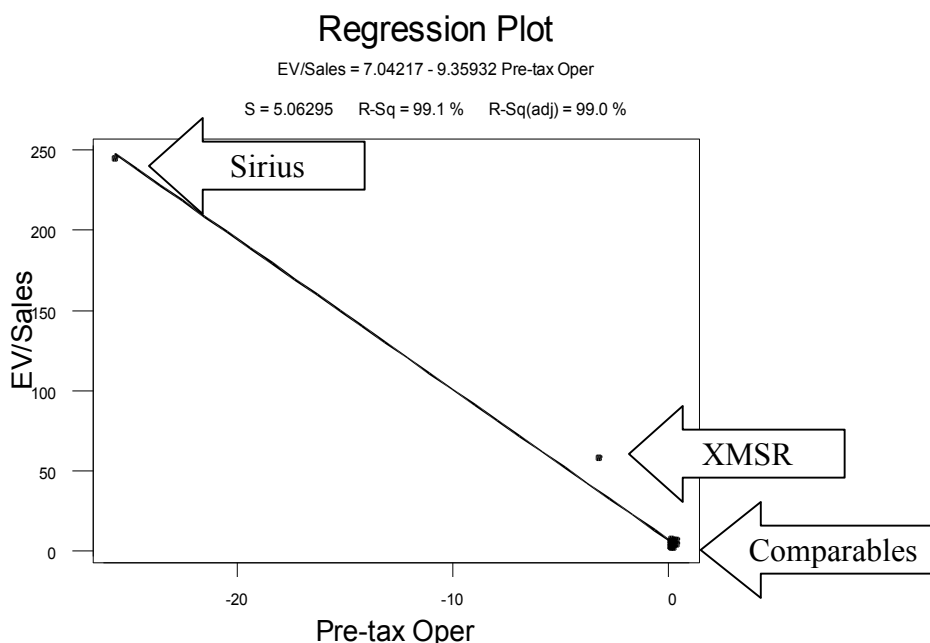
It's important to note that regressing XMSR against internet, wireless and cable TV comparables produces similar results. This is not surprising as both XMSR and Sirius command a premium in the equities market based solely on the very high growth expectations.

The regression equation is  
 $EV/Sales = 7.04 - 9.36 \text{ Pre-tax Operating Margin}$

23 cases used 1 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	7.042	1.077	6.54	0.000
Pre-tax	-9.3593	0.1993	-46.95	0.000

S = 5.063      R-Sq = 99.1%      R-Sq(adj) = 99.0%





## Valuation – Fundamentals & Relative Approaches for a Sample of Seven Companies

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Using the EV/Sales regression formula for the market, XMSR EV/Sales ratio is predicted to be below 1, when the actual EV/Sales ratio is over 50. This means that XMSR's predicted price should be below \$1.00, which once again illustrates that the stock is valued by the market because of anticipated very high growth in revenues.

Enterprise Value/Sales = 0.676 + 0.143 g(rev) + 0.103 After-tax Operating Margin - .022 (Debt/Capital) - 0.518 (CapEx-Depr) /EBITDA ( $R^2 = 46.6\%$ )

### VSEA

Valuing VSEA using a regression was difficult, given the small number of comparable semiconductor equipment firms. The PE ratio made the most sense for this valuation, since semiconductors are a cyclical manufacturing industry. We regressed the PE ratio against the five year growth rate and the beta. The  $R^2$  of 40.8% was relatively low. The regression output was as follows:

Forward PE = 35.3 + 9.1 Expected Growth in EPS: next 5 - 6.21  
Regression Beta

Predictor	Coef	SE Coef	T	P
Constant	35.279	7.504	4.70	0.001
Expected Growth in EPS: next 5	9.14	17.80	0.51	0.617
Regression Beta	-6.210	2.237	-2.78	0.017

S = 5.50898    R-Sq = 40.8%    R-Sq(adj) = 30.9%

Solving for VSEA, we get: Forward PE = 36.8 + 9.1(.24) - 6.21(2.60) = 22.84

Compare this to VSEA's actual forward PE of 18.83. By this measure, VSEA looks undervalued. VSEA's implied stock price by this measure is the implied PE multiplied by the forward EPS, or: 22.84 \* \$1.97 = \$44.99. This is significantly higher than the current stock price of \$37.09, making VSEA look undervalued.

We also valued VSEA based on an industry average PE ratio. VSEA actually looked slightly undervalued by this measure, since the industry average PE is higher than VSEA's implied PE.

We also valued VSEA using two separate market regressions:

PE = 11.947 + 0.875 g - 0.052 Payout + 4.054 Beta

PE = 0.920 g - 0.026 Payout + 12.702 Beta

The outcome using these regressions is as follows:

PE(VSEA) = 11.947 + 0.875(.24) - 0 + 4.054(2.6) = 22.70

22.7 \* \$1.97 = \$44.72 > \$37.09

PE(VSEA) = 0.929(.24) - 0.026(0) + 12.072(2.6) = 31.61

## Valuation – Fundamentals & Relative Approaches for a Sample of Seven Companies

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$$31.61 * \$1.97 = \$62.27 > \$37.09$$

By both measures, VSEA is currently undervalued when regressed against the market.

**OPEN WAVE**

EV/S returned the most reliable data resulting in the valuation. The wireless networking sector requires significant capital expenditures and benefit from amortization and thus the EV/EBITDA multiple could yield reliable results with meaningful number of comparable companies, which in this case was not available. In performing the EV/S analysis, we assumed the expected operating margin of 20.82%. We believe that Openwave will improve its operating margin from the current negative 1.04% in the next financial quarter to positive operating margins based on estimated revenue growth of 18%. The 20.82% operating margin is expected to be achieved in the next year.

The continuation of the high growth rate hinges on the growth in subscriber base and its ability to spread overhead costs. The company’s professional services business which has the highest gross margin of 17.4% grew approximately 77% as compared to the maintenance and software business with a lower gross margin of approximately 7% with a growth rate of negative 15%. The Company has made efforts to diversify its service line and grow its customer base in the fiscal 2002 with its February 2004 acquisition of Nombas, Inc., a provider of platform-independent script engine technologies and tools and July 30, 2004 acquisition of Magic4 Ltd. (Magic4), a provider of messaging software for mass-market mobile phones.

The sector regression equation:				
LN EVS Ratio = 0.973 + 0.130 Pre-tax Operating Margin_1 + 1.04 Value Line Beta				
Predictor	Coef	SE Coef	T	P
Constant	0.9734	0.3023	3.22	0.004
Pre-tax Operating Margin	0.1304	0.1065	1.22	0.235
Value Line Beta	1.0445	0.3256	3.21	0.004

S = 0.733740 R-Sq = 41.8% R-Sq(adj) = 36.0%

The below regression returns the expected EVS of the company 2.6222.

LN EVS Ratio = 0.973 + 0.130(-6.9)+ 1.04 (0.854) = 0.96416

EVS Ratio = 2.622

The value per share of the company using the above returns value per share of \$49.02.

Enterprise Value= 762623754.3 – Market Value of Debt (147,243m647) = 615,380,106.60

The market sector average EVS: 3.59.

The Company’s market regression EVS returns a more favorable result. Again, we believe this is a result of overvaluation of the entire wireless networking industry.

The market regression equation:			
EVS= 0.676 + 0.143 g(rev) + 0.103 After-tax Opr Margin -.022 (Debt/Capital) – 0.518 (CapEx-Depr) /EBITDA (R2 = 46.6%)			
Variable	Coef	Company value	
Growth in revenue	0.143	18	2.574
AT Operating Margin	0.103	20.82	2.14446
D/C	-0.022	54.68	-1.20296
CapEx-Depr/EBITDA	-0.518	1.34	-0.69412
Constant	0.676		3.49738
			3.49738

**QWEST**

We defined 20 comparable firms in the Telecom Service sector for relative valuation purpose. On average, these comparables have enterprise values that are 3.9 times their EBITDA. Based on this multiple, Qwest’s enterprise value is \$23,696 million and per share price is \$4.57. This what market values if Qwest is an average Telecom Service firm. However, we see a discount in Qwest’s stock price, currently trading at \$4.19. We believe the market applies a discount to Qwest’s price due to that fact that it is financially distressed and has a higher than average risk level.

We also ran a sector regression based on these same comparable firms. We regressed V/EBITDA against Effective Tax Rate and Reinvestment Rate of these comparables.

Predictor	Coef	SE Coef	T	P
Constant	7.5198	0.9337	8.05	0.000
Eff Tax Rate	-6.368	3.157	-2.02	0.059
Reinvestment Rate	6.9053	0.6189	11.16	0.000

S = 2.82164    R-Sq = 87.8%    R-Sq(adj) = 86.4%

EV/EBITDA = 7.52 - 6.37 Eff Tax Rate + 6.91 Reinvestment rate

**Qwest’s per share price from this equation to be \$4.38.** (Assuming 35% normal corporate tax rate in the stable state)

The Option Pricing Model is more effective in valuing Qwest’s equity. The output from this model indicates that Qwest has an 87% chance of bankruptcy (  $N(d2)=0.1256$  ) before the end of its option period (average debt maturity). However, the value of its equity as a call is \$10.008 million. This gives us \$5.76 per share price for Qwest’s outstanding stocks.

Stock Price=	<b>\$13,974.73</b>	T.Bond rate=	<b>4.50%</b>
Strike Price=	<b>\$26,489.00</b>	Variance=	<b>0.405132</b>
Expiration (in years)=	<b>1.2</b>	Annualized dividend yield=	<b>0.00%</b>

d1 =	1.057334803
N(d1) =	0.854820565

d2 =	-1.147565875
N(d2) =	0.125573965

Value of equity as a call =	<b>\$10,007.52</b>
Value of outstanding debt =	<b>\$3,967.26</b>
Appropriate interest rate for debt =	<b>7.14%</b>
Shares Outstanding	<b>1738.77</b>
Price per Share	<b>\$5.76</b>

## Valuation – Fundamentals & Relative Approaches for a Sample of Seven Companies

### SONUS

The set of 24 comparable companies for Sonus was defined as networking companies with positive EBITDA. For this company and industry, two types of multiples seemed most appropriate: EV/EBITDA or PE/Growth. A regression of EV/EBITDA against the effective tax rate, the reinvestment rate and the EPS growth rate produced an  $R^2$  of 4%. Therefore, it was eliminated as a good multiple to use. A regression of the PEG ratio against the reinvestment rate, the EPS growth rate and the return on equity produced the following results:

The regression equation is

$$\text{PEG Ratio} = 5.77 - 8.36 \text{ ROE} - 3.22 \text{ Reinvestment Rate} - 12.6 \text{ EPS Growth}$$

24 cases used 1 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	5.770	1.652	3.49	0.002
ROE	-8.361	8.719	-0.96	0.349
Reinvest	-3.223	1.777	-1.81	0.085
EPS Grow	-12.598	7.174	-1.76	0.094

S = 2.501      R-Sq = 41.0%      R-Sq(adj) = 32.1%

Plugging the company's information into the regression equation produces the following:

$$\text{PEG Ratio} = 5.77 - 8.36 (10.2\%) - 3.22 (121.75\%) - 12.6 (24.31\%) = -2.07$$

This result is non-conclusive because the company does not have a negative PEG Ratio. Since the  $R^2$  is only 32.1%, other variables should be introduced to explain the dependent relationship of the PEG Ratio.

The average PEG Ratio of the set of 24 firms is 2.955. Using this as a representative of the industry average, Sonus's predicted value can be calculated as follows:

<b>Industry Average</b>	2.955
<b>Sonus Networks</b>	
Earnings	25,117
# of shares outstanding	247,771
EPS	0.10
Price	\$5.84
Growth Rate	24.31
<b>Equity Value</b>	<b>\$7.28</b>

This indicates that the firm is undervalued.

## Valuation – Fundamentals & Relative Approaches for a Sample of Seven Companies

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For a US market, the regression equation used for the PEG Ratio is as follows:

$$\text{PEG} = 5.697 + 0.757 \text{ Beta} - 0.005 \text{ Payout} - 1.689 \ln(g) \quad (R^2 = 29.2\%)$$

Plugging in for Sonus's financial information yields the following PEG ratio:

$$\text{PEG} = 5.697 + 0.757 (2.01) - 0.005 (-21.75\%) - 1.689 \ln(24.31) = 1.830$$

Sonus's predicted value can be calculated as follows:

<b>Calculated PEG Ratio</b>	1.830
<b>Sonus Networks</b>	
Earnings	25,117
# of shares outstanding	247,771
EPS	0.10
Price	\$5.84
Growth Rate	24.31
<b>Equity Value</b>	\$4.51

This indicates that the stock is overvalued.

Whereas the average company in the industry is adding economic value through its projects, Sonus is not. This can be explained by the fact that Sonus is reinvesting its capital at a very high rate, and its EVA should “normalize” (i.e., relative to the industry) in subsequent years.

**COACH**

**Regression Analysis: Sector**

For the relative valuation analysis, we have analyzed 53 companies in the retail (special lines) sector. Coach has higher PE ratio than the industry average of 25%. This is due to the market’s expectations of the company’s growth and its substantial reinvestment rate into future projects.

$$\text{Current PE} = -19.7 + 103 \text{ Expected Growth in EPS (Next Five Years)} + 24.5 \text{ Value Line Beta} - 8.7 \text{ Payout Ratio}$$

$$\text{Current PE} = -19.7 + 103 (28.5) + 24.5 (1.25) - 8.7 (0.0) = 40.29$$

Predictor	Coef	SE Coef	T	P
Constant	-19.74	10.10	-1.95	0.056
Expected	102.80	35.27	2.91	0.005
Value Li	24.509	6.955	3.52	0.001
Payout R	-8.67	11.67	-0.74	0.461

S = 11.41    R-Sq = 32.5%    R-Sq(adj) = 28.4%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	3	3069.4	1023.1	7.86	0.000
Residual Error	49	6379.2	130.2		
Total	52	9448.6			

According to this regression, the predicted value of P/E should be \$40.29 for Coach Inc., and the actual P/E ratio is 36.16. The stock is slightly undervalued. Implied price of the stock from the regression equation should be: P/S = PE (E/S) = 40.29 (1.483) = \$59.75, which is also higher than the actual stock price.

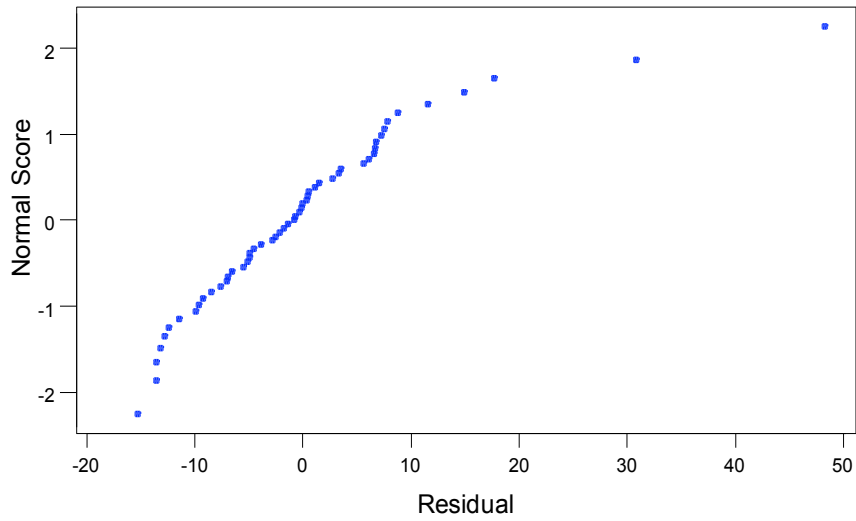
**Regression Analysis: Market**

$$\text{PE} = 11.947 + 0.875 g - 0.052 \text{ Payout} + 4.054 \text{ Beta} \quad (R^2 = 25.8\%)$$

PE = 11.947 + 0.875 (.285) - 0.052 (0.0) + 4.054 (1.25) = \$41.95, which is very close to the sector number, and still implies that the stock is undervalued.

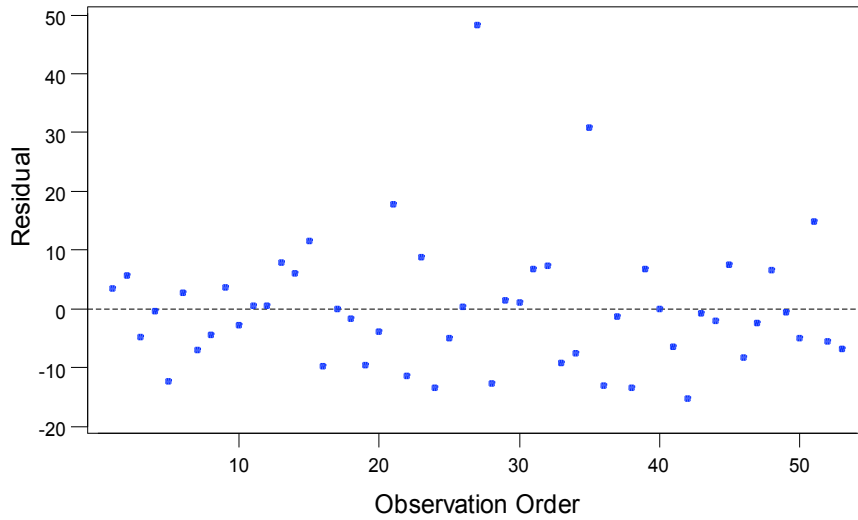
### Normal Probability Plot of the Residuals

(response is Current)



### Residuals Versus the Order of the Data

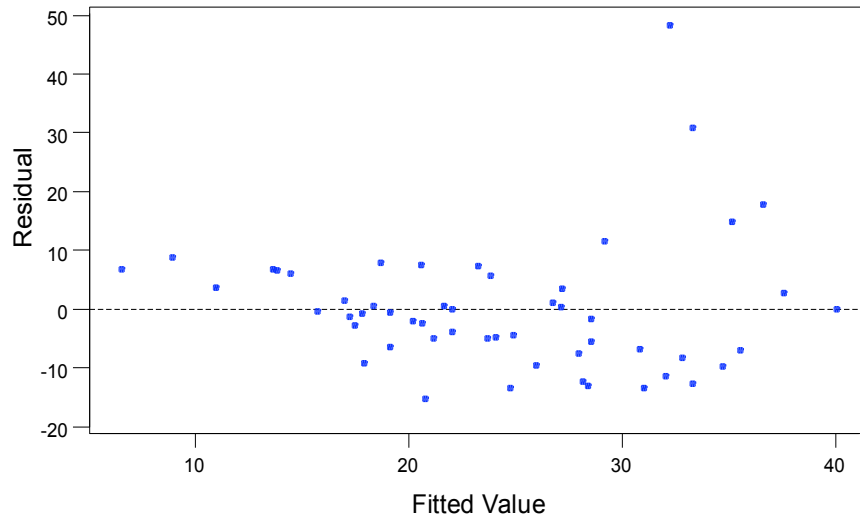
(response is Current)





### Residuals Versus the Fitted Values

(response is Current)



**EVA ANALYSIS**

**AXA**

$$\text{Equity EVA} = (\text{ROE} - \text{Cost of Equity}) * \text{Equity Book Value}$$

$$(9.5\% - 10.61\%) * 31,289,533 = -347,313,816$$

Economic Value Added for AXA is negative (-347,313,816) as the company's return on Equity is below its cost of Equity.

Comparison to the industry EVA shows that life insurance companies are returning positive EVA while property insurance companies are not. AXA may consider altering its investment mix to include more value adding projects in the life insurance market to improve its equity EVA.

Industry Name	(ROE - COE)	Equity EVA
Insurance (Life)	2.47%	\$ 51,284.99
Insurance (Prop/Cas.)	3.77%	\$ (8,361.61)

**XM SATELLITE RADIO HOLDINGS**

Economic Value Added for XMSR is negative (-570M) as the company's return on capital (-33%) is below its cost of capital (8.82%). This does not compare favorably with the broadcasting/entertainment industry and market in general.

**VSEA**

<b>VSEA EVA</b>		<b>Industry EVA</b>	
ROC	9.07%		
WACC	12.44%		
spread	-3.37%		-4.73%
<u>BVC</u>	<u>\$ 558,750</u>		<u>\$ 558,750</u>
EVA	\$ (18,838)		\$ (26,429)

VSEA's EVA was negative over the last twelve months. However, the industry average EVA for semiconductor equipment firms is more negative than VSEA. In relative terms, VSEA is a more valuable firm than the industry average.

**OPEN WAVE**

The company suffers from high cost of equity relative to the industry average of 15.8%. This is translating into a high cost of capital as the company has a relatively low cost of debt. The company has significantly low debt capacity and improvement on the cost of capital by leverage is deemed difficult. It is recommended the company lower its cost of equity through reducing the high exposure to high risk premium in Japan and diversifying its line of business or to take on higher return investments to improve its EVA.

Industry Name	(ROC – WACC)	Capital Invested	EVA
Wireless Networking	-3.25%	14,601.80	(474.97)
Openwave Systems	-4.36%	275,921.54	(12,039.71)

**QWEST**

Qwest’s EVA from the past year is (\$1,066) million. Its cost of capital was significantly higher than its return on capital due to overleveraged capital structure and disappointing operating results. The Telecom Service sector as a whole has an average cost of capital of 9.20% and an average return on capital of 20.08%. The sector as a whole is by far more profitable than Qwest. In an unlikely scenario where Qwest survives its financial distress and returns profitable, it should make 10.88% spread on its operating capital.

**SONUS**

The EVA of Sonus is calculated as follows:

Average BV of Capital	\$256,327.50
Return on Capital	8.89%
Cost of Capital	11.63%
Spread	-2.75%
EVA	(\$7,036.73)

(Note: The EVA number is in \$US thousands.)

The EVA of the average company in the telecom equipment sector is calculated as follows:

Average BV of Capital	\$256,327.50
Return on Capital	19.05%
Cost of Capital	9.28%
Spread	9.77%
EVA	\$25,041.99

(Note: The EVA number is in \$US thousands.)

Whereas the average company in the industry is adding economic value through its projects, Sonus is not. This can be explained by the fact that Sonus is reinvesting its capital at a very high rate, and its EVA should “normalize” (i.e., relative to the industry) in subsequent years.

**COACH**

The spread between return on capital and cost of capital is significantly higher for Coach than for the industry (industry average spread is 15.58%). Using industry average spread of 15.58%, and multiplying it by Coach's book value of capital of \$434,029,000, we get EVA of \$67,621,718.20 which is higher than the industry's average EVA of \$59,280,000 by 14%.

<b>WACC</b>	7.6%
<b>= ROC=</b>	67.0%
<b>ROE=</b>	68.2%
EVA = (ROC - Cost of Capital) * (Capital Invested in Project)	
	\$ 257,837,079
Equity EVA = (ROE - Cost of Equity) * (Equity Invested in Project)	
	\$ 290,977,050

### Control Premium

#### **XM SATELLITE RADIO HOLDINGS**

We believe that the firm value of XMSR will increase through taking control of the company and improving financial and operational management. Specific measures to extract value through control are suggested as the following:

- 1) Decrease debt ratio  
The Company is currently overleveraged relative to its high growth stage peers in the high tech industry.
- 2) Improve profit margins  
We believe the Company has room to improve its profit margins through more effective management of programming costs and customer acquisition costs coupled with revenue enhancement measures such as increasing advertisement income.

Value of control of XMSR is measured based on the following assumptions:

- Operating margin improves by 20%. The current EBIT is negative.
- Debt ratio decreases from 10.2% to 5%. This reduces cost of capital from 8.82% to 8.63%.

The new value per share of the company is \$31.38, \$2.65 increase from the current stock price of \$34.13. The overall MV of equity increases by \$562 million.