



SOFTWARE INDUSTRY PRICING: A PUBLIC COMPANY ANALYSIS

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Software Industry Pricing: A Public Company Analysis

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This year the software industry will contribute more to the US economy than any other manufacturing industry. The year 2000 trade surplus generated by the industry will \$20 billion. By the year 2008 it is expected that approximately 1.3 million people will be working in the software industry in the US alone. As investors, employees with stock options, professional analysts or regular business professionals it is imperative that we have an understanding of the financial pricing metrics and industry statistics which affect our largest industry and in many ways our future in all industries.

The software industry continues to be one of the fastest-growing and most important industries in the world. One of the largest companies in the world, in terms of equity capitalization - Microsoft Corporation - is a software company. Of the top fifteen companies, in terms of equity capitalization, two are software companies: Microsoft Corporation (at number 4, with \$381 billion in equity capital) and Oracle Corporation (at number 14, with \$214 billion in capitalization). Of course, neither Microsoft nor Oracle are typical of the industry, which is populated by a large number of very small and unprofitable companies. Furthermore, Microsoft's incredible price/sales ratio of about 18 and price/earnings of 47, while not the highest in this industry, are certainly atypical of software companies.

Yet, when we look at most software industry statistics, they tend to be strongly influenced, or more accurately, overshadowed, by Microsoft's performance, simply because it is so large. The purpose of this study is to provide some comparisons of a wide range of software companies, so that the reader will have a more realistic understanding of the characteristics of this industry.

Basic Methodology

We performed our analysis over a four-quarter period, beginning in September, 1999 and ending with June, 2000. We intend to update this information quarterly.

Data Sources

Some of the important parts of any study are the data. The data used in this study were obtained from Primark's Compact Disclosure database. This is a comprehensive electronic database that comprises virtually all publicly traded companies in the United States. Given the volume of companies being analyzed, we were unable to make any adjustments to these data. Stock prices were obtained from Yahoo!Finance.

Software Industry Pricing (cont'd)

Definition of the Industry

We defined the software industry to be composed of those companies whose primary SIC is 7372 (establishments primarily engaged in the design, development, and production of prepackages computer software); we relied on Compact Disclosure's categorization of companies into SIC codes.

Selection of Companies

We chose only companies who had some assets and sales (as opposed to none) and whose stock prices were readily available. Because we did not want to skew our results by including the largest companies, we used only companies whose sales were less than \$1 billion. While these largest companies account for the bulk of the market capitalization in the industry, they represent only 4% of the total number of publicly traded firms engaged in this type of business.

Financial Metrics

For each company we computed over sixty-five concepts. These included: measures of size, 3-year growth rates, expected income growth, current year's and 3-year average margins, standard financial ratios, capital ratios, and a variety of pricing ratios.

Industry Segmentation

We performed the study for the industry as a whole and then repeated it for companies broken into size-based groups, where size is defined as total revenues. We segmented the companies by dividing them into four groups: representing the largest through the 75th percentile company, the 75th percentile to the median, the median to the 25th percentile, and the smallest 25% of the companies. The revenue breakpoints were at \$138.6 million, \$53.6 million, and \$18.6 million.

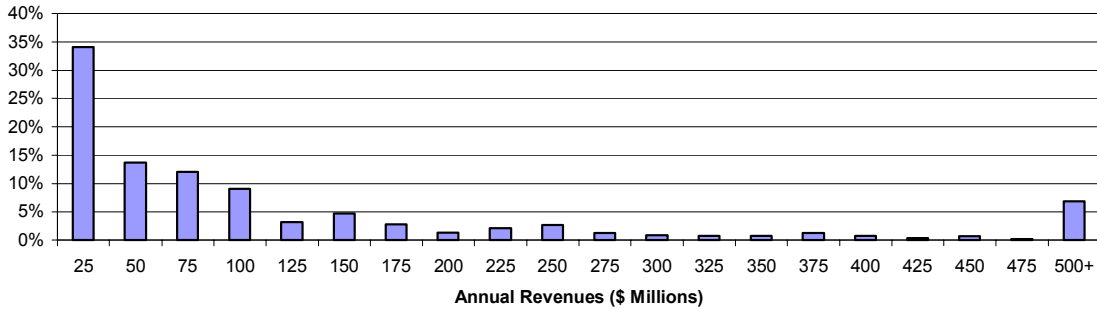
Industry Observations

Using the most recent data, from June, 2000, we noted the following for the industry:

- There were over 328 companies that met all of our criteria.
- The latest twelve months' sales ranged from \$53 thousand to \$966 million, with a median of about \$54 million. Half of all software companies in this group (from the 25th percentile to the 75th percentile) have total revenues of between \$19 million and \$139 million. This is not a terribly big range for such a large industry. These statistics indicate that the software industry is primarily populated by small companies.

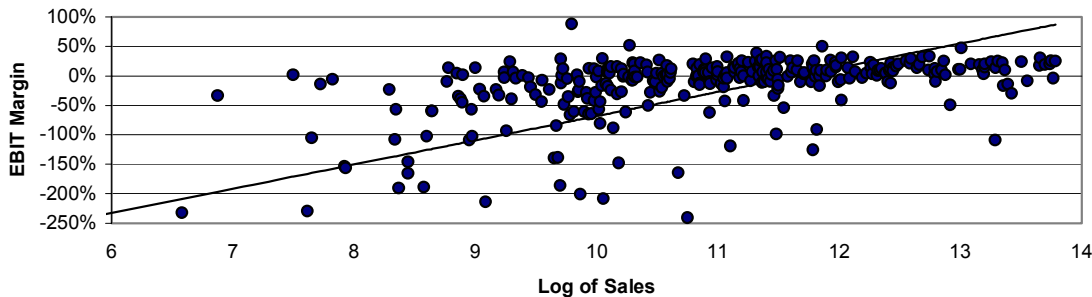
Software Industry Pricing (cont'd)

Distribution of Annual Revenues



- At least 64% of these companies lost money on operations over the last 12 months (based on EBIT) and 64%, but not necessarily the same 64%, lost money on a net income basis. (While there is some overlap between the groups, the reason the two groups have different companies in them is due to non-operating income, which is not included in EBIT.)
- Larger companies tended to have higher operating profit margins.

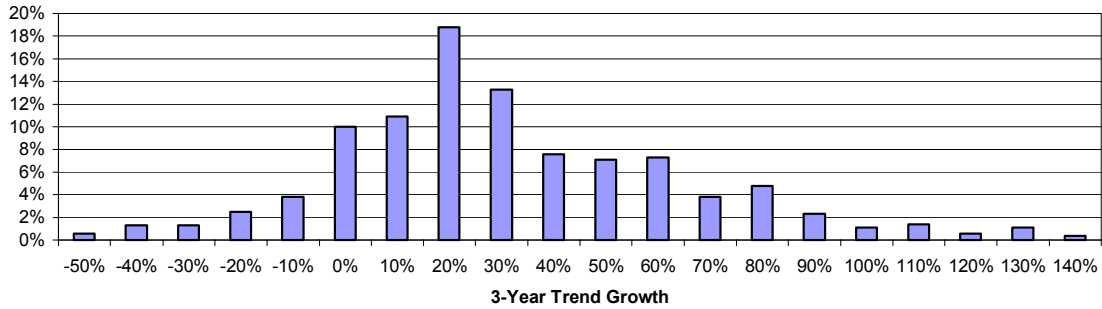
Size vs. Operating Profit Margin



- The median expenditure on research and development as a percent of sales is about 23%, with the middle 50% of the companies spending between 15% and 36% on this function and smaller companies spending a higher percentage on R&D than the larger.
- Median sales growth for the last three years for these companies was over 20%, however, almost one-fifth of the companies shrank during this period. Median growth in net income was over 30%.

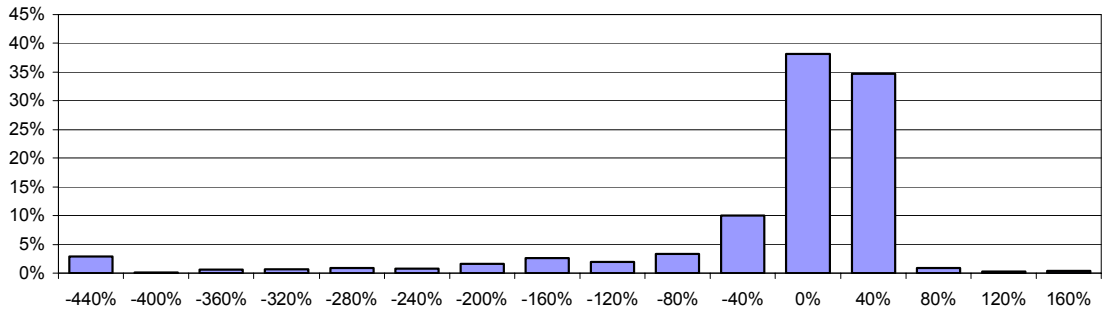
Software Industry Pricing (cont'd)

Distribution of 3-Year Revenue Growth Rates

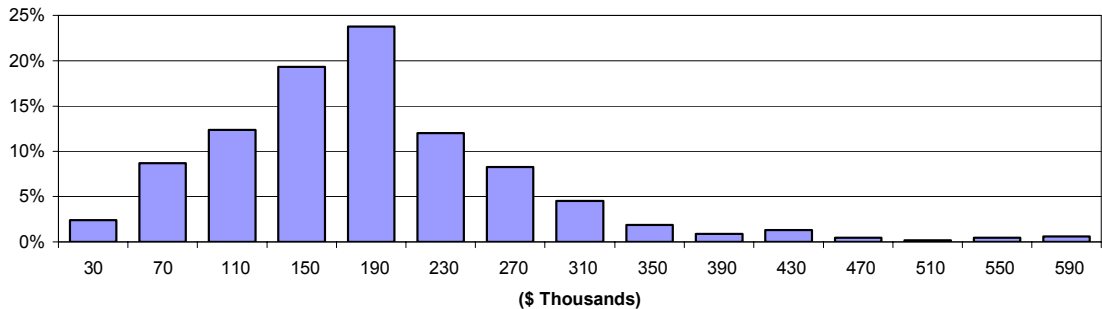


- The median net income margin for the entire group of companies was negative. For those companies with positive net income, the median margin was 6.7% and the rest lost money at a median rate of 17% of sales.

Distribution of Net Income Margins



Distribution of Revenues/Employee



Software Industry Pricing (cont'd)

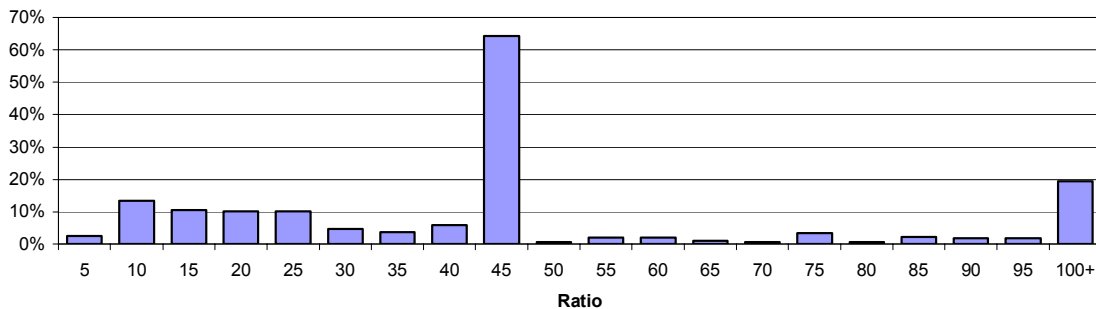
- While there is a great deal of variation across companies, there are some measures that are within relatively narrow ranges: gross margin, with a median of 65%; sales/employee with a median of \$162 thousand; and current ratio, whose median is 2.15. Does this mean these are industry standards? Probably not, however, software companies appear to cluster more tightly around an average of these measures than they do others and we found this to be true for all of the four quarters.

Pricing Ratios

We calculated nine different pricing ratios. These included market value of invested capital ("MVIC," which is the value of all sources of capital: debt, preferred, and common equity) divided by: 1) employees; 2) sales; 3) earnings before interest, taxes, depreciation, amortization, and research and development ("EBITRAD"); 4) earnings before interest, taxes, depreciation and amortization ("EBITDA"); and 5) earnings before interest and taxes ("EBIT"). They also included Market Value of Shareholders' Equity ("MVEq," simply common equity) divided by: 1) pre-tax income; 2) net income; 3) gross cash flow (net income plus depreciation and amortization); and 4) book value of common equity. We eliminated obvious outliers from this group; these outliers could have been caused by bad data or unusual circumstances.

These ratios exhibited a fair degree of dispersion. The one with the greatest amount of dispersion (as measured by the coefficient of variation, which is the standard deviation divided by the mean) was the MVEq/Employees and the two with the least were, surprisingly, MVIC/EBIT and MVEq/Book.

Distribution of MVIC/EBIT Ratios



Software Industry Pricing (cont'd)

Some of these pricing ratios are shown in the table below:

	25 th <u>Percentile</u>	<u>Median</u>	75 th <u>Percentile</u>	<u>Coeff. Of Variation</u>	<u>Observations</u>
MVIC/					
# of Employees	\$207,548	\$598,350	\$1,742,110	2.3	299
Total Revenues	1.4	3.6	12.9	2.1	300
EBIT	14.4	31.5	90.9	1.6	100
MVEq/					
Net Income	15.4	32.7	85.0	1.7	94
Book Equity	1.8	3.9	8.8	1.3	284

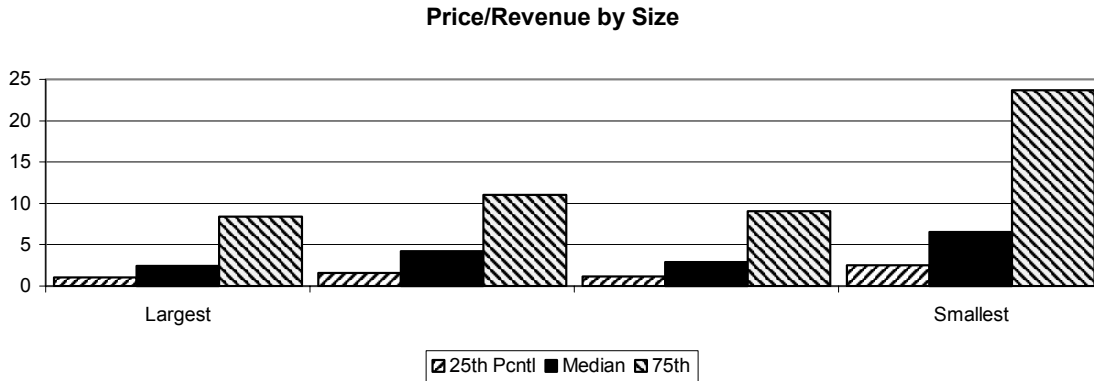
Pricing Ratios by Size

We divided the companies into four groups by total revenues, to determine whether there were any discernible differences in the pricing ratios due to size. The largest 25% are in the group entitled "Largest," the next 25% are in the next group, and the smallest 25% of the companies are in the group entitled "Smallest." The median pricing ratios for each of these groups appear below.

	<u>Largest</u>		<u>Smallest</u>	
MVIC/				
# of Employees	\$606,838	\$688,489	\$499,677	\$569,116
Total Revenues	2.5	3.9	2.9	6.5
EBIT	20.6	46.3	43.3	37.1
MVEq/				
Net Income	31.5	57.3	32.4	34.5
Book Equity	3.9	4.5	3.0	4.4

In this table it is clear that there was no relationship between size and pricing ratios for this group of companies in June, 2000. This is not to suggest that size does not matter; rather the expected relationship between size and value is not evident in these data. The size effect has appeared over long periods of time (25 or more years); not necessarily at a single point in time.

Software Industry Pricing (cont'd)



It should be noted that the sample size decreases substantially when subdividing the entire set of companies, and as the size of the companies become smaller, there are even fewer pricing ratios (since fewer small companies are profitable and all but two of the ratios incorporate company profitability).

The pricing ratios with the smallest dispersions for the group as a whole were also the ones that appeared to have the smallest variations here: price/net income, price/EBIT, and price/book.

Relationships Between Pricing Ratios and Performance

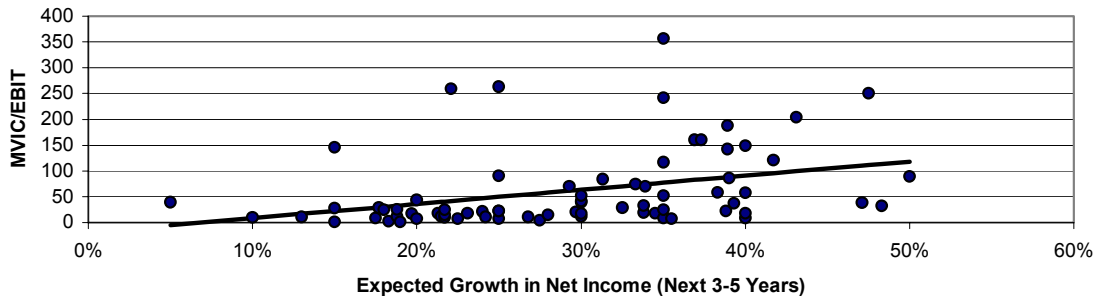
Of course, one of the most important questions is whether there are relationships between any of the pricing ratios and any prospective or historical measures of performance.

Based on our analysis, it appears that the only factors that are to be positively correlated with the pricing ratios are both historical and prospective growth. The higher the historical, 3-year growth in assets, sales, gross income, and EBITRAD, the higher the various pricing ratios. We also noted that there was a reasonably high positive correlation between analysts' expected growth rates (which are consensus estimates of a number of sell-side stock analysts) and pricing ratios. This latter observation confirms what we would normally expect. Of course, analysts follow only about half of these companies.

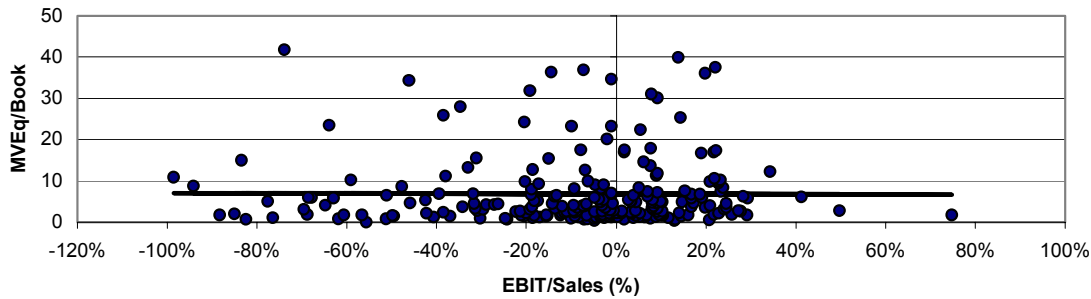
There are, however, what appear to be somewhat contradictory observations from these data. In particular, there are to be significant negative correlations between some of the profit margins and the price/sales ratios. The relationship between the other pricing ratios and profit margins show less significant negative correlations. An explanation for this may be that the companies exhibiting low profitability or losses are ones that are expected to grow rapidly in the future. As mentioned earlier, size (in terms of sales and assets) is also negatively related to these pricing ratios.

Software Industry Pricing (cont'd)

Price/EBIT vs. Expected Income Growth



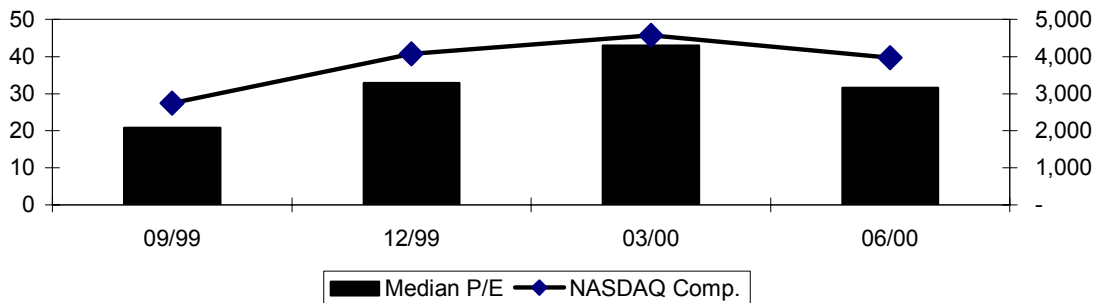
Price/Book vs. EBIT Margin



Trends over Time

Like many NASDAQ stocks, the pricing ratios have exhibited volatility over the last several quarters. The following graph shows the price/EBIT ratios for the last four quarters. While the pricing ratios follow the overall high-tech market, they bear no relationship to the EBIT margins.

Software Company Median P/E vs. NASDAQ Composite



Software Industry Pricing (cont'd)

Conclusions

From this analysis we were able to draw very few conclusions. Our conclusions were:

- We found no positive relationships between the pricing ratios and size and margins.
- The relationships we found were either extremely weak (with correlation coefficients of less than 0.5) or were counterintuitive.
- The study indicated that the key pricing multiples in valuing software companies are the price to sales, price to EBIT, and the price the book multiples.
- The study showed that the most important comparative concepts between software companies are the historical growth rates and the expected future growth rates of earnings.
- Placing a value on a software company is highly dependent on each individual investor's personal expectations for each company and their confidence in the software's acceptance in the marketplace. At present no generalized guidelines can be drawn from the software industry's public company sector.
- The study needs to be expanded to provide additional segmentation within the software industry. At present we are considering the following additional segmentation for our up date to this study of application software: packaged, internet/e-commerce, enterprise, engineering, and edutainment.

Software Industry Pricing (cont'd)

Table 1 Summary Statistics for All Companies

	Percentile			Coeff. Of Variation	Count
	<u>25</u>	<u>50</u>	<u>75</u>		
# of Employees	125	271	644	1.64	300
Amounts in \$ Thousands					
Assets	25,284	74,493	199,969	3.58	328
Sales	18,631	53,649	138,552	1.49	328
EBIT	(10,609)	(2,890)	5,655	(14.26)	328
Net Income	(11,721)	(3,127)	4,092	(8.25)	328
3-Year Growth Rates					
Assets	0.3%	23.1%	60.3%	1.52	325
Sales	5.2%	20.5%	46.9%	1.32	325
EBIT	-39.0%	26.4%	76.8%	15.38	325
Net Income	-39.1%	31.5%	84.9%	8.28	325
Expected Net Inc Growth	25.0%	34.5%	46.7%	0.49	171
Latest 12 Months' Margins					
Sales/Employee	111,361	162,333	219,408	0.79	299
EBIT	-46.0%	-7.3%	7.6%	(5.75)	328
Net Income	-41.5%	-7.1%	6.3%	(5.91)	328
Return on Assets	-28.1%	-5.8%	5.4%	(9.09)	328
Return on Equity	-37.3%	-6.4%	7.3%	(9.69)	328
Avg. Margins for Last 3 Years					
EBIT	-34.4%	-6.7%	7.2%	(5.34)	325
Net Income	-32.6%	-8.4%	5.2%	(5.15)	325
Return on Assets	-22.2%	-5.1%	6.5%	(2.61)	325
Return on Equity	-35.7%	-8.4%	9.5%	(8.98)	325
Other Ratios					
Sales/Assets	0.87	1.25	2.20	3.60	328
Quick Ratio	1.60	2.41	4.03	1.18	328
Current Ratio	1.31	2.15	3.67	1.27	328
Market Value of:					
Shareholders' Equity	47,859	146,771	602,786	3.43	300
Total Invested Capital	47,859	157,195	611,990	3.47	300
Debt+Preferred/					
M.V. Equity	0.0%	0.1%	3.9%	10.58	300
M.V. Invested Capital	0.0%	0.1%	3.8%	2.53	300
Market Value of Invested Capital/					
# of Employees	207,548	598,350	1,742,110	2.30	299
Sales	1.43	3.61	12.88	2.12	300
EBIT	14.35	31.55	90.86	1.56	100
Market Value of Shareholders' Equity/					
Net Income	15.44	32.72	84.98	1.73	98
Book Equity	1.79	3.91	8.71	1.33	285

Software Industry Pricing (cont'd)

Table 2 Median Statistics by Sales Size

	All Companies	Sales Levels (\$ Millions)				271
		\$138.7 & Over	\$53.6 to \$138.6	\$18.6 to \$53.5	\$18.5 & Under	
# of Employees	271	1,433	412	201	76	271
Amounts in \$ Thousands						
Assets	74,493	314,615	92,870	41,880	11,149	74,493
Sales	53,649	292,664	85,540	29,221	7,113	53,649
EBIT	(2,890)	18,197	(1,019)	(3,446)	(4,691)	(2,890)
Net Income	(3,127)	11,938	389	(3,474)	(4,563)	(3,127)
3-Year Growth Rates						
Assets	23.1%	26.5%	26.9%	23.5%	0.5%	23.1%
Sales	20.5%	22.7%	25.5%	20.6%	1.5%	20.5%
EBIT	26.4%	35.1%	18.1%	27.0%	25.1%	26.4%
Net Income	31.5%	41.9%	31.3%	13.8%	30.8%	31.5%
Expected Net Inc Growth	34.5%	26.8%	33.5%	40.0%	50.0%	34.5%
Latest 12 Months' Margins						
Sales/Employee	162,333	215,216	182,358	153,551	95,081	162,333
EBIT	-7.3%	7.2%	-1.2%	-10.0%	-73.3%	-7.3%
Net Income	-7.1%	4.5%	0.6%	-10.8%	-64.0%	-7.1%
Return on Assets	-5.8%	6.0%	-1.0%	-7.6%	-41.3%	-5.8%
Return on Equity	-6.4%	5.9%	0.6%	-10.9%	-53.1%	-6.4%
Avg. Margins for Last 3 Years						
EBIT	-6.7%	7.2%	-0.6%	-12.8%	-65.9%	-6.7%
Net Income	-8.4%	4.3%	-2.4%	-11.5%	-71.3%	-8.4%
Return on Assets	-5.1%	7.4%	-0.6%	-14.5%	-37.1%	-5.1%
Return on Equity	-8.4%	6.4%	-3.8%	-14.8%	-38.0%	-8.4%
Other Ratios						
Sales/Assets	1.25	1.09	1.14	1.21	1.88	1.25
Quick Ratio	2.41	2.20	2.62	2.28	2.66	2.41
Current Ratio	2.15	1.88	2.33	2.22	2.27	2.15
Market Value of:						
Shareholders' Equity	146,771	874,439	315,220	76,773	42,511	146,771
Total Invested Capital	157,195	974,439	358,225	79,413	44,371	157,195
Debt+Preferred/						
M.V. Equity	0.1%	0.0%	0.1%	0.0%	0.5%	0.1%
M.V. Invested Capital	0.1%	0.0%	0.1%	0.0%	0.5%	0.1%
Market Value of Invested Capital/						
# of Employees	598,350	606,838	680,489	499,677	569,116	598,350
Sales	3.61	2.47	3.89	2.90	6.52	3.61
EBIT	31.55	20.57	46.27	43.34	37.15	31.55
Market Value of Shareholders' Equity/						
Net Income	32.72	31.49	57.28	32.42	34.49	32.72
Book Equity	3.91	3.90	4.51	2.98	4.42	3.91

Michael J. Mattson

Mr. Mattson is an experienced professional specializing in appraisal services for acquisition, merger, restructuring and financial and tax reporting purposes. He has also been involved in litigation support related to investment rates, damages and regulatory ratemaking. Mr. Mattson has served as a guest speaker for many professional organizations and has written articles for a number of journals. He has written and edited courses for and taught extensively in business valuation for the American Institute of Certified Public Accounts.

Mr. Mattson is currently a Managing Director with the Financial Valuation Group in Chicago, Illinois. Prior to this, he spent several years at Ibbotson Associates, where he helped develop Ibbotson's *Cost of Capital Quarterly Yearbook*. Mr. Mattson also spent time in PriceWaterhouseCoopers's Valuation Services Group, LaSalle Consulting Group, and with McGraw-Hill/DRI.

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Mr. Rigby has written or edited numerous articles and professional education courses for the American Institute of Certified Public Accountants and other professional organizations. He is co-editor of the AICPA's newsletter the *CPA Expert*. In addition, he is a faculty member for the American Society of Appraiser's professional training programs.

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