1.0 THE PROBLEM

During my first several years as a business appraiser I was continually frustrated with the various Market Approach methods. For some inexplicable reason, half the time the values calculated by the Gross Revenue Multipliers were considerably higher than the values calculated by the Cash Flow Multipliers. The other half of the time the Gross Revenue Multiplier values were considerably lower. I was left with the impossible task of trying to reconcile two values that were often at opposite ends of the spectrum and each was clearly wrong. Buyers always pointed at the low value and said "why not that one," and of course, sellers pointed at the higher value and said "that's the correct one."

Exhibit I Machine Shops

Observations	Selling Price (a)	Gross Revenue (b)	Revenue Multiplier a ÷ b	Cash Flow (c)	Cash Flow Multiplier a ÷ c
1	300,000	1,050,000	0.29	80,000	3.75
2	422,000	950,000	0.44	85,000	4.96
3	305,000	774,000	0.39	104,000	2.92
4	515,000	1,490,000	0.35	225,000	2.29
5	1,012,000	875,000	1.16	133,000	7.61
6	305,000	774,000	0.39	123,000	2.48
7	600,000	979,000	0.61	167,000	3.60
8	301,000	877,000	0.34	166,000	1.81
9	1,000,000	876,000	1.14	168,000	5.95
10	768,000	1,113,000	0.69	223,000	3.45
11	1,050,000	1,205,000	0.87	255,000	4.12
12	750,000	1,279,000	0.59	279,000	2.69
13	345,000	550,000	0.63	125,000	2.76
14	1,300,000	1,000,000	1.30	250,000	5.20
15	385,000	572,000	0.67	157,000	2.45
16	1,225,000	975,000	1.26	285,000	4.30
17	570,000	505,000	1.13	169,000	3.37
18	971,000	1,156,000	0.84	391,000	2.48
19	682,000	959,000	0.71	325,000	2.10
20	600,000	714,000	0.84	245,000	2.45
21	1,182,000	1,222,000	0.97	547,000	2.16
22	1,565,000	1,021,000	1.53	459,000	3.41
23	1,000,000	1,220,000	0.82	572,000	1.75
Avg:	746,000	962,000		241,000	
		Lowest 16% =	0.43		1.95
		Lower Quartile =	0.52		2.45
		Median =	0.71		2.92
		Upper Quartile =	1.05		3.93
		Highest 16% =	1.13		4.84

I spent thousands of hours researching the Pratt's Stats, Bizcomps, and IBA databases looking for some methodology that would eliminate the problem. To illustrate, the typical Market Approach applied by most appraisers today begins with a statistical analysis of a selection of comparables as shown in the exhibit on the left.

This sample of machine shop comparables produced a range of values for the Revenue Multiplier and the Cash Flow Multiplier. It is fairly common for appraisers to select the median value for these multipliers because many believe that the median represents where the market is.

This choice of multipliers works reasonably well when we are valuing a company whose revenues and cash flow are fairly close to the averages of our sample. For example, assume the subject machine shop had revenues of $1,000,000 and cash flow of $250,000. By selecting the median of the multipliers found in the table on the left, the Revenue Multiplier value would equal $710,000 ($1,000,000 x .71) and the Cash Flow Multiplier would yield $730,000 ($250,000 x 2.92). The appraiser could opine a value of $725,000 and no one would

challenge it.

However, suppose our machine shop's sales are skyrocketing, competition is weak in the market, its financial statements are vastly superior to the peer group, and the subject's sales were $1,000,000, and its cash flow $500,000. According to Shannon Pratt, "Simply applying the chosen measure of central tendency of a group of guideline company multiples more often than not fails to capture differences in the characteristics between our subject company and the guideline companies as a group. …a company with an above average return on sales would usually be accorded an above average price/sales or MVIC/sales multiples. …Keep in mind that the two factors that influence the selection of multiples of operating variables the most are the growth prospects of the subject company relative to the guideline companies and the risk of the subject company relative to the guideline companies." To that end Mr. Pratt suggests that one might adjust an observed multiple upward or downward by a percentage, or, even place it in the upper or lower quartile of the sample's range.[1]

So, following Mr. Pratt's advice, the appraiser decides to use the upper quartile of multipliers. The resulting Revenue Multiplier yields a value of $1,050,000 (1.05 x 1,000,000), whereas the Cash Flow Multiplier yields $1,950,000 (3.93 x $500,000), double the Revenue Multiplier value! The opposite would occur if cash flow were only $100,000. The lower quartile Revenue Multiplier would yield $520,000 whereas the lower quartile Cash Flow Multiplier would only yield $245,000. Neither value is considered reasonable. Thus, trying to find a logical approach to reconciling them will be viewed skeptically by the reader.

The Market Approach methodologies employed by most appraisers generally work well when dealing with subjects that are in the mid ranges of profitability compared to the sample of comparables that have been collected. However, when dealing with companies that are either underperforming (something that we, are seeing a lot of lately) or are superstar companies, the resulting calculated values from the Revenue Multipliers and Cash Flow Multipliers seem to end up with one value way too high and the other way too low.

2.0 THE SOLUTION

I challenge every appraiser who is reading this analysis to make a few simple changes to the table of comparables he selects for his next assignment. In addition to listing each comparable's selling price, revenue, cash flow and the resulting Revenue Multiplier and Cash flow Multiplier, the appraiser should also calculate the comparable's cash flow profit margin (SDE ÷ revenues). After completing your table, sort the data by the cash flow profit margin (SDE%) from the smallest value to the largest. The above table would then look like this:

[1] Shannon Pratt, The Market Approach to Valuing Businesses. (New York: John Wiley & Sons, Inc, 2000), p.134

Exhibit II

Observations	Selling Price (a)	Gross Revenue (b)	Revenue Multiplier a ÷ b	Cash Flow (c)	SDE% c ÷ b	Cash Flow Multiplier a ÷ c
1	300,000	1,050,000	0.29	80,000	7.6%	3.75
2	422,000	950,000	0.44	85,000	8.9%	4.96
3	305,000	774,000	0.39	104,000	13.5%	2.92
4	515,000	1,490,000	0.35	225,000	15.1%	2.29
5	1,012,000	875,000	1.16	133,000	15.2%	7.61
6	305,000	774,000	0.39	123,000	15.9%	2.48
7	600,000	979,000	0.61	167,000	17.0%	3.60
8	301,000	877,000	0.34	166,000	18.9%	1.81
9	1,000,000	876,000	1.14	168,000	19.2%	5.95
10	768,000	1,113,000	0.69	223,000	20.0%	3.45
11	1,050,000	1,205,000	0.87	255,000	21.2%	4.12
12	750,000	1,279,000	0.59	279,000	21.8%	2.69
13	345,000	550,000	0.63	125,000	22.7%	2.76
14	1,300,000	1,000,000	1.30	250,000	25.0%	5.20
15	385,000	572,000	0.67	157,000	27.4%	2.45
16	1,225,000	975,000	1.26	285,000	29.2%	4.30
17	570,000	505,000	1.13	169,000	33.5%	3.37
18	971,000	1,156,000	0.84	391,000	33.8%	2.48
19	682,000	959,000	0.71	325,000	33.9%	2.10
20	600,000	714,000	0.84	245,000	34.3%	2.45
21	1,182,000	1,222,000	0.97	547,000	44.7%	2.16
22	1,565,000	1,021,000	1.53	459,000	44.9%	3.41
23	1,000,000	1,220,000	0.82	572,000	46.9%	1.75
Avg:	746,000	962,000		241,000		
		Lowest 16% =	0.43		13.6%	1.95
		Lower Quartile =	0.52		16.5%	2.45
		Median =	0.71		21.8%	2.92
		Upper Quartile =	1.05		33.7%	3.93
		Highest 16% =	1.13		36.0%	4.84

You will notice that companies with the lowest SDE% also tend to have the lowest Revenue Multipliers and, those with the highest SDE% tend to have the highest Revenue Multipliers. For example, observations 1 through 5 have an average SDE% of 12.1% and an average Revenue Multiplier of only .53. However, observations 19 through 23 have an average SDE% of 40.9% and an average Revenue Multiplier of .97, nearly double the lower quartile. This certainly seems logical, for we would all agree that highly profitable companies will generally earn higher Revenue Multiples than unprofitable ones.

We now leave the logical world behind. Notice that companies with the *lowest* SDE% tend to have the *highest* Cash Flow Multipliers and, those with *the highest* SDE% have *the lowest* Cash Flow Multipliers! The suggestion here is that those companies with the lowest levels of profitability earn the highest Cash Flow Multipliers and the companies with the highest level of profitability earn the lowest Cash Flow Multipliers. Looking at observations 1 through 5 again (which had an average SDE% of 12.1%) we find that their average Cash Flow Multiplier is 4.31 whereas, observations 19 through 23 (which had an average SDE% of 40.9%) earned average Cash Flow Multipliers of only 2.37.

It would appear that the appraiser in our example above, whose subject was above average, should have chosen *the upper* quartile Revenue Multiplier and *the lower* quartile of Cash Flow Multiplier. Had he done so, the Revenue Multiplier would have produced a value of $1,050,000 (1.05 x $1,000,000) and the Cash Flow Multiplier would have yielded a value of $1,225,000 (2.45 x $500,000). Clearly, a $1,225,000 value makes far more sense than the

$1,965,000 value produced by the conventional Market Approach above. In addition, the appraiser's task of reconciling a $1,050,000 value and a $1,225,000 is far easier.

I have run over two hundred different types of businesses through the above analysis and have found that the inverted relationship between SDE% and Cash Flow Multipliers is a paradox cuts across almost all industries and all sizes of businesses (there are a few exceptions however).

After properly accounting for the SDE% paradox it is probably the best indicator of a company's Revenue and Cash Flow Multipliers that we as appraisers can use in the Market Approach. We could certainly sort our sample of comparables by SDE% (as we did above) and just by looking at how the data presents itself we could probably select appropriate multipliers. However, we could also use regression analyses which will give us a numerical equation for the inverted relationship between SDE% and Cash Flow Multipliers that will calculate the exact multiplier for us.

Before we discuss the application of regression analysis, we need to understand the subtleties behind the SDE% ratio.

2.1 Size of the Company

The size of a company, in terms of its Gross Revenues, has a direct bearing on its value.

The Pratt's Stats Database of over 11,500 transactions was sorted by size of company. The results below show that, with few exceptions, smaller companies earn lower Cash Flow Multiples and Gross Income Multiples than larger ones. For example, all companies in the table below generated a median Cash Flow Multiplier of 2.50, whereas, those companies with revenues under $500,000 earned only 2.11. Thus, the smallest companies earned multiples of 2.11÷2.50 or 84.4% of what the average sized companies earned when sold. Similarly, companies with revenues between $1,000,000 and $2,000,000 exhibited a median Cash Flow Multiple of 2.77 which was 10.8% higher than the average sized company.

Exhibit III Cash Flow Multipliers by Size of Company

Total Transactions	Total Sales		Cash Flow Multiplier				Gross Income Multiplier			
	Sales Range	Median Sales	Median	Average	Standard Deviation	Coefficient of Variation	Median	Average	Standard Deviation	Coefficient of Variation
3,595	$0-$500,000	241,197	2.11	2.66	1.85	69.5%	0.34	0.61	0.49	80.3%
1,387	$500,000-$1,000,000	693,701	2.51	2.51	1.86	63.3%	0.29	0.51	0.35	68.2%
897	$1,000,001-$2,000,000	1,375,624	2.77	2.77	1.91	59.4%	0.26	0.53	0.44	82.9%
545	$2,000,001-$5,000,000	3,097,922	2.96	2.96	2.17	62.7%	0.22	0.59	0.68	114.5%
143	$5,000,001-$8,000,000	6,305,046	3.95	3.95	2.40	54.6%	0.26	0.74	0.83	112.0%
242	$8,000,001-$25,000,000	13,856,490	4.87	4.87	2.34	45.6%	0.37	0.89	0.85	94.7%
284	$25,000,001+	65,588,925	6.28	6.28	2.42	40.0%	0.34	0.86	0.79	92.3%
Overall Totals										
7,144	All Transactions	772,200	2.50	3.10	2.10	67.7%	0.48	0.60	0.53	87.4%

Pratts Stats Database contained a total of 13,998 transactions as of August 10, 2009
The following transactions were eliminated from the above analysis to avoid potential ratio distortions:
1) Corporate Stock Sales
2) Assets Sales where liabilities were assumed.
3) Companies with negative cash flow
4) Companies with Cash Flow Multipliers over 10.0

The relationship of the size of a company and its resulting multipliers is a well-known phenomenon that has been studied for years. However, the relationship of the size of a company and its Cash Flow Profit Margin (SDE%) is a new area that needs further understanding.

2.2 Size of a Company vs. its Cash Flow Profit Margin (SDE%)

Exhibit IV Cash Flow Profit Margin by Size of Company

Total Transactions	Sales Range	Median Cash Flow Profit Margin
5,002	$0-$500,000	24.7%
897	$500,000-$1,000,000	18.4%
309	$1,000,001-$2,000,000	15.6%
231	$2,000,001-$5,000,000	14.7%
143	$5,000,001-$8,000,000	13.3%
242	$8,000,001-$25,000,000	14.6%
284	$25,000,001+	11.4%
Overall Totals		
7144	All Transactions	20.2%

The following transactions were eliminated from the above analysis to avoid potential distortions:

1) Corporate Stock Sales
2) Assets Sales where liabilities were assumed.
3) Companies with negative cash flow
4) Companies with Cash Flow Multipliers over 10.0

Pratts Stats Database of 13,998 transactions, 8/10/2009.

First, from Exhibit IV we can see that *the larger the company is, the lower its SDE%.* This appears to be a direct contradiction to what we saw in Exhibit III above, i.e., the *larger* the company the *higher* its Cash Flow Multiplier. This apparent anomaly can be explained as follows:

In smaller companies under $500,000 in revenue, the owner typically "wears all the hats." He is the salesman, marketing manager, HR manager, and bookkeeper. All the profits flow to the owner to compensate him for all these jobs. As we see from Exhibit III, companies that size generate cash flow at an average of 24.7% of every dollar of Revenue. For a $500,000 company then, that would translate to $123,500 in Discretionary Earnings. From Exhibit III we saw that a $500,000 company would sell for 2.11 times its earnings, or $260,585 (2.11 x $123,500).

For this company to grow to $2 million, however, the owner must now hire a bookkeeper, an HR manager, and possibly a CFO. The company is now too big for the owner to do everything himself. A $2 million company typically earns $312,000 in Discretionary Earnings ($2 million x 15.6% (from Exhibit IV)). Thus, when a company grows from $500,000 to $2 million, the *additional* $1.5 million in sales added $188,500 to earnings. In terms of absolute dollars that is a large increase in compensation to the owner. However, the increase only yielded a 12.6% SDE% ($188,500 ÷ $1,500,000).

Thus, the larger company in the above example produced a *higher* level of gross revenues and cash flow yet earned a *lower* SDE%. The importance of this peculiarity is that in using SDE% to predict the value of a Market Value Multipliers, it becomes increasingly essential to select a sample of comparables that are as close in revenue size to the Subject as possible, and that are from similar SIC classifications. Otherwise, we might look at the 24.7% SDE% of a $500,000 company and draw the false conclusion that it deserves higher Market Value Multipliers than the $2 million which only produced an SDE% of 15.6%.

2.3 THE LEVEL OF A COMPANY'S SDE% VS. ITS CASH FLOW MULTIPLIER

A second oddity that one must be aware of when comparing the companies of similar size and SIC classification is that *the lower their Cash Flow Profit Margins (SDE%), the higher their Cash Flow Multipliers tend to be.* This seemingly contradicts everything we know about Market Approach science! We just presumed that highly profitable companies that enjoyed higher profit margins would also earn higher Cash Flow Multiples than their underperforming counterparts. This is not the case!

From Exhibit III we observed that larger companies generally earned higher Cash Flow Multipliers and Revenue Multipliers. However, if we look at each of the size groupings in Exhibit III, we can see that there is a considerable range in their respective Multipliers. For example, companies with revenues in the $1 million to $2 million range earned a median 2.77 Cash Flow Multiplier which, on the average, was considerably higher than the 2.11 earned by $500,000 companies. Yet, when we look at the *range of multipliers* for the $1 to $2 million group, we find that the lower quartile only earned a 1.86 multiplier whereas, the upper quartile earned 4.07.

This range of multipliers within a specific size grouping can largely be explained by the level of a company's SDE%.

A statistical analysis of the Pratt's Stats database clearly shows this relationship.

If we performed a regression analysis on the entire Pratt's Stats database of 11,500 sold transactions comparing a company's SDE% with its corresponding Cash Flow Multiplier[2]. The R Squared of the regression would only be .18. Since this factor is low (0 means no correlation and 1.0 means perfect correlation), one would not conclude that SDE% is a good indicator of a company's Cash Flow Multiplier. However, when we filter the Pratt's Stats database further by including only companies near the same revenue level as our subject and which are in a similar SIC Classification, the resulting regression produces an R Squared value that is significantly higher, usually from .40 to .75 or more.

In other words, when we select a small sample of companies that have a similar revenue level and SIC Classification as the Subject, the Subject's SDE% becomes a reasonably good predictor of its potential Cash Flow Multiplier.

However, from Exhibit V below, note that the regression line in the upper graph is *in a downward slope*. This means that as a company's SDE% increases, we move to the right on the horizontal X-Axis. However, the Regression Market Line shows that we will also be moving downward on the vertical Y-Axis, indicating a decreasing Cash Flow Multiplier. *Thus, for a given level of Revenue, those companies that are more profitable and therefore tend to have a higher SDE%, will earn a lower Cash Flow Multiplier.*

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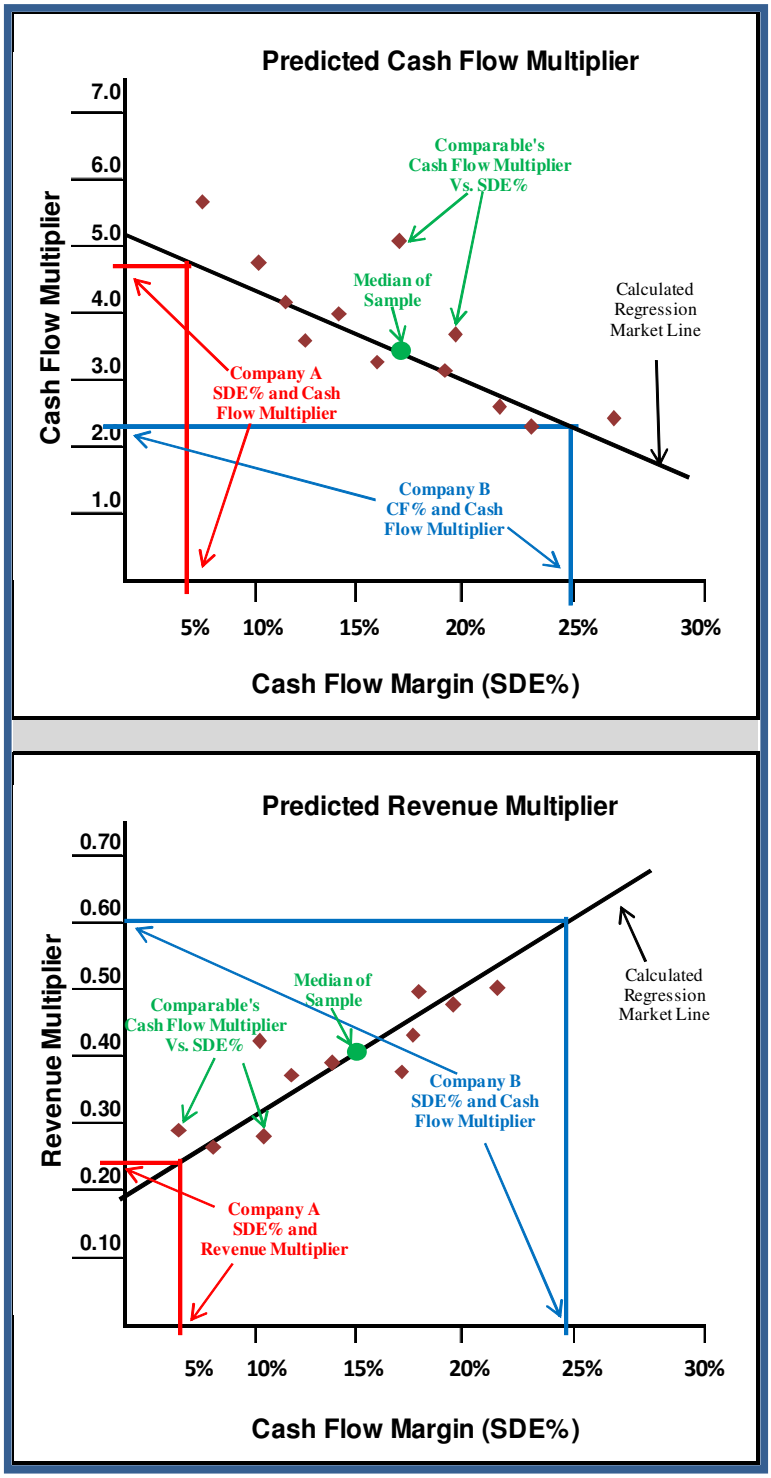
[2] The database was first filtered by removing all transactions where Cash Flow Multipliers were greater than 10 or less than 0, and all corporate stock transfers. There were 4811 transactions in this filtered sample.

EXHIBIT V USING SDE% TO PREDICT MULTIPLIERS



This oddity is easily explained by the example diagrammed in the upper half of Exhibit V. Company A (diagrammed in red lines), with revenues of $500,000 and Cash Flow of $24,000, sold for $110,000. Therefore, its SDE% is $24,000 ÷ $500,000 = 4.8% and, its Cash Flow Multiplier is $110,000 ÷ $24,000 = 4.6. (Observe where the red lines cross the horizontal axis at 4.8% and vertical axis at 4.6.) Company B (diagrammed in blue), also with $500,000 in revenues but with $125,000 in cash flow, sold for $300,000. As we would expect, Company B sold for more money because it had higher earnings (in absolute dollar terms). However, Company B only produced a Cash Flow Multiplier of 2.4 ($300,000 ÷ 125,000) but had a high SDE% of 25% ($125,000 ÷ $500,000). (Observe where the blue lines cross the horizontal axis at 25% and vertical axis at 2.4.)

Company A's higher Cash Flow Multiplier was not a function of a high selling price, but rather the function of a very low level of Cash Flow, the denominator of the equation.

Appraisers typically use the median Cash Flow Multiplier for the sample of comparables to value a business. In the above example, the median was 3.5. If we merely used the median multiplier to estimate both Company A and B's probable selling prices, we would have priced Company A at $84,000 (3.5 x $24,000) and B at $437,500 (3.5 x $125,000). We would have been way low on the first valuation and way high on the second. However, by using the regression formula and the subject's actual SDE% to calculate its Cash Flow Multiplier, we

would have determined that company A with its low SDE% would earn a higher multiplier of 4.6 producing a value of $110,000, whereas company B with its high SDE% would earn a lower multiplier of 2.4 producing a value of $300,000.

When regressing the SDE% against the Revenue Multipliers of a sample of comparables, the resulting R Squared factor is even more compelling than we found above when regressing SDE% against the Cash Flow Multiplier. The R Squared factor typically rises as high as .80 or more, indicating that there is a very strong correlation between a company's SDE% and its Revenue Multiplier. In addition, Revenue Multipliers follow a more logical pattern. From the graph at the bottom half of Exhibit V we can see *that companies with a higher SDE% also earn higher Revenue Multipliers.*

By applying the data from the example above to the graph in the bottom half of Exhibit V, we see that Company A only had a SDE% of 4.8% and, as a result, the regression equation predicted a weak Revenue Multiplier of .22. Company B, however, had a high-level SDE% of 25% and, accordingly, earned an equally strong Revenue Multiplier of .60. Again, if we only decided to use the sample's median Revenue Multiplier of 0.40, *the calculated value for both companies would have been the same - $200,000 (.40 x $500,000).* Simple logic would tell us that both companies could not have the same worth; the second company earns five times as much cash flow!

The regression analysis properly accounts for the difference in a company's profitability when calculating the Gross Revenue Multiplier, whereas, the median of the sample does not.

From all the above statistical testing we can conclude that comparables within narrow revenue range and in the same SIC classification behave in similar and predictable ways, a point appraisers have always contended. *By using Regression Analysis we can tap into that similarity by using a company's SDE% to predict its Revenue Multiplier and Cash Flow Multiplier and the resulting values will be reasonable close and easily reconcilable.*

If readers of my article in IBA's <u>Business Appraisal Practice</u> wish to see how regression methodology can be incorporated into the Market Approach, he is invited to read the articles on regression posted on my website, www.affordablebusinessvaluations.com. Go to the pricing screen and click the "Article 2" button under the Articles Section at the top of the page. The first eight pages of that article were printed above. So continue reading from Paragraph 3.0 on Page 8. To see how the regression analysis can be incorporated into a Market Approach, Article 3 is an excerpt from one of my valuations.

3.0 SELECTION OF APPROPRIATE GUIDELINE COMPANIES

The process of selecting comparables to be used in a regression analysis requires a much higher level of precision than just listing all the transactions found in our target SIC classification. Thus, after applying the various filtering processes described below we generally will end up with a much smaller sample. It is therefore frequently necessary to combine the transactions from Pratt's Stats, Bizcomps, and IBA into a single sample to

obtain a large enough sample (A desirable minimum would be 12 comparables). There are a number of differences between these three databases that must be reconciled in order for the transactions to be lumped together.

If the reader is not familiar with these differences, he is referred to Appendix B on Page 19 for a detailed discussion.

Filtering considerations when selecting a sample of comparables should include the following:

3.1 The Size of the Business

As we discussed earlier, the revenue size of a business has a pronounced effect on its Revenue and Cash Flow Multipliers and its SDE%. As the size of a company increases, its multipliers increase, whereas its SDE% decreases. As such, if we wish to use SDE% as a predictor of the Market Value Multipliers, we must select a sample with the narrowest possible range of revenue among the observations. If the range of revenues among the observations is too large, the size effect on the multipliers will statistically interfere with the size effect on SDE%. In other words, if the Cash Flow Multiplier for one comparable was higher than the other comparables in a sample we would want the regression analysis to conclude that it was due to its low level of profitability, not because its revenue was higher than the others.

Therefore, when searching for comparables, the narrower the range of revenues the better. Assume that our subject is a fast-food restaurant with revenues of $400,000. SIC code 5812, eating and drinking places, has nearly 4,000 transactions in the combined databases of Pratt's Stats and Bizcomps. The SIC classification is so huge that even though I selected a very narrow range of $385,000 to $415,000, my initial search found 138 transactions in Pratt's Stat's and Bizcomp's combined databases. I could have tightened the range from $390,000 to $410,000, but that really is an insignificant reduction in the revenue range. However, I felt it as more appropriate to insert second filtering criteria of just those companies with the words "fast food" in their description. Twenty-four comparables met the refined criteria.

A small homogeneous sample of 15 to 25 observations will generally be much more statistically relevant than a large diverse sample. This is not "cherry picking;" we are merely targeting a narrowly defined search criterion that more precisely matches our subject's characteristics. The appraiser is cautioned that samples of less than 12 have a greater risk of misreading the market even though their R Squared factor might have been above 0.90.

3.2 Include Inventory and Fixtures and Equipment in your Table of Comparables

It is important to look at all the key variables when doing the Market Approach. Pratt's Stats, Bizcomps, and to a lesser extent, IBA will generally report the value for inventory and fixtures and equipment as well as revenues and cash flow. With these four variables we can perform a multiple variable regression analysis that will reveal how each variable contributed

to the overall selling price of the business. The multiple regression analysis will help us identify those transactions where high selling prices may have been the result of high inventory or fixtures values not because of their level revenues or cash flow.

The sample from Exhibit II was broadened to include inventory and fixtures and equipment and is presented below in Exhibit VI. Note observation #14. The SDE% does not adequately explain why this transaction produced such a high revenue and cash flow multiplier. The transaction's SDE% was in the middle range of all the observations; yet, its multipliers were well above the highest range. The fact that the transaction included $1,000,000 in fixtures and equipment would seem to explain why the buyer was willing to pay such a high price for the business. The buyer did not pay a higher price for this business because of its level of cash flow, or SDE%; he paid a higher price because the company had $1 million in fixtures and equipment.

Exhibit VI

Observations	Sold Comparables Analysis								
	Selling Price (a)	Gross Revenue (b)	Revenue Multiplier a ÷ b	Cash Flow (c)	SDE% c ÷ b	Cash Flow Multiplier a ÷ c	Inventory	Enterprise Multiplier	Fixtures & Equip
1	300,000	1,050,000	0.29	80,000	7.6%	3.75	90,000	2.63	250,000
2	422,000	950,000	0.44	85,000	8.9%	4.96	20,000	4.73	250,000
3	305,000	774,000	0.39	104,000	13.5%	2.92	25,000	2.68	150,000
4	515,000	1,490,000	0.35	225,000	15.1%	2.29	30,000	2.16	255,000
5	1,012,000	875,000	1.16	133,000	15.2%	7.61	25,000	7.42	47,000
6	305,000	774,000	0.39	123,000	15.9%	2.48	38,000	2.17	67,000
7	600,000	979,000	0.61	167,000	17.0%	3.60	12,000	3.53	688,000
8	301,000	877,000	0.34	166,000	18.9%	1.81	12,000	1.74	500,000
9	1,000,000	876,000	1.14	168,000	19.2%	5.95	142,000	5.10	102,000
10	768,000	1,113,000	0.69	223,000	20.0%	3.45	53,000	3.21	300,000
11	1,050,000	1,205,000	0.87	255,000	21.2%	4.12	20,000	4.04	353,000
12	750,000	1,279,000	0.59	279,000	21.8%	2.69	25,000	2.60	25,000
13	345,000	550,000	0.63	125,000	22.7%	2.76	30,000	2.52	36,000
14	1,300,000	1,000,000	1.30	250,000	25.0%	5.20	50,000	5.00	1,000,000
15	385,000	572,000	0.67	157,000	27.4%	2.45	30,000	2.26	354,000
16	1,225,000	975,000	1.26	285,000	29.2%	4.30	55,000	4.11	125,000
17	570,000	505,000	1.13	169,000	33.5%	3.37	43,000	3.11	419,000
18	971,000	1,156,000	0.84	391,000	33.8%	2.48	82,000	2.28	168,000
19	682,000	959,000	0.71	325,000	33.9%	2.10	100,000	1.79	1,000,000
20	600,000	714,000	0.84	245,000	34.3%	2.45	20,000	2.37	150,000
21	1,182,000	1,222,000	0.97	547,000	44.7%	2.16	157,000	1.88	256,000
22	1,565,000	1,021,000	1.53	459,000	44.9%	3.41	15,000	3.38	516,000
23	1,000,000	1,220,000	0.82	572,000	46.9%	1.75	35,000	1.69	144,000
Avg:	746,000	962,000		241,000			48,000		311,000
	Lowest 16% =		0.43		13.6%	1.95		1.75	
	Lower Quartile =		0.52		16.5%	2.45		2.22	
	Median =		0.71		21.8%	2.92		2.63	
	Upper Quartile =		1.05		33.7%	3.93		3.78	
	Highest 16% =		1.13		36.0%	4.84		4.54	

Multiple variable regression analysis will recognize these anomalies and gives us a statistical measurement that will allow us to identify transactions that are clearly outliers. In other words, we are trying to build a sample where SDE% is the prime indicator of a comparable's Market Value Multipliers. The selling price for Transaction #14 was not SDE% driven and therefore does not fit that criteria. If we remove it from our sample, the resulting range of Revenue and Cash Flow Multipliers will tighten up considerably giving us a much better measurement of the Market.

Multiple variable regression analysis is important because it helps us identify outliers which when removed from the sample gives us a more accurate measure of the market. However, multiple variable regression analysis also gives us an equation where we can plug in the values of our subject's revenue, cash flow, inventory and fixtures and equipment to calculate the overall estimate of value for the business. Our subject may have extraordinarily high levels of fixtures or inventory and the application of the revenue and cash flow multipliers will not take that into account whereas, the regression equation will. As such, the subject's value predicted by multiple variable regression is often more accurate than the values produced by the Market Value Multipliers.

Multiple variable regression analysis should therefore be included as one of the methodologies applied in your Market Approach. The application of this statistical tool will be discussed in depth below and in the Appendix.

3.2.1 Inventory Issues

The introduction of inventory and fixtures and equipment into our Market Approach requires the appraiser to pay much closer attention to each transaction when building a sample. If the subject is in an industry where high levels of inventory or fixtures are generally required, those transactions in the Pratt's Stats, Bizcomps, and IBA databases that have zero values for these assets should be rejected from your sample. Liquor stores are a good example. We would certainly expect a liquor store to be sold with inventory. Yet, a high percentage of transactions listed with all three databases report a zero value for inventory. It has been my experience that most of these stores actually had inventory, but the buyer and seller negotiated a separate deal to transfer the inventory outside of escrow to avoid paying a broker's commission. As a result, the broker involved in the sale only reported the net transaction value. The reported selling prices for these transactions did not include inventory (even though there was some) and therefore, should not be compared with other transactions that did include inventory in the selling price. To do so will cause the Market Value Multipliers to misread the market.

The appraiser's judgment must be exercised here. If we are dealing with a fast food restaurant, for example, most are sold with a modest level of inventory (usually less than $5,000). However, it is not uncommon for such a business to have no inventory at the close of escrow. Therefore, the fact that a transaction in this SIC category had no inventory is probably reasonable and it should be left in the sample. Again, we must consider what is reasonable in our selection process.

3.2.2 Fixtures and Equipment Issues

Fixtures and equipment is potentially a problem in that some transactions in the databases reported fixtures values from the balance sheets that were net of accumulated depreciation. Some transactions reported the gross amount of fixtures before deducting depreciation and, still others reported the value of fixtures as per the selling price allocation. The difference among these three presentations can be significant and the sample that you selected will definitely have all three variations included.

So when we are inputting the value of our subject's fixtures into the multiple variable regression equation, which value should we use? This again calls for the appraiser's judgment. I typically will look at the sample's average fixtures value as a percentage of average sales. If the average transaction had $50,000 in fixtures and average revenues were $500,000, then I would apply that 10% ratio to my subject's revenues to set a benchmark. Thus, if my subject had $600,000 in revenues the sample would suggest that an reasonable level of fixtures for the subject would be $60,000. If the subject's gross value of fixtures was $50,000, I would be inclined to use that value even though they had been depreciated down to $10,000. If the subject had $250,000 in fixtures on its balance sheet with $190,000 in accumulated depreciation, I would probably use the net value of $60,000 in the regression equation. If neither of those methods produces a reasonable choice, then possibly the value that the buyer or seller is allocating to fixtures makes more sense. Again, since our sample probably contained all three of those variations we probably select a fixtures value for our subject that aligns with the sample's average as closely as possible. Of course, if the subject just purchased $250,000 in fixtures, we might be inclined to use that figure. Again, the appraiser must use his judgment.

3.3 Other Filtering Criteria

The last filtering criterion applied to the remaining database was to eliminate any transaction with negative or near zero earnings. Companies with earnings that are negative or near zero will produce Cash Flow Multiples that are negative or extraordinarily high, causing averages and Standard Deviations to be skewed inappropriately. By way of example: Selling price = $400,000, Revenues = $1,000,000, and Cash Flow = $40,000. The resulting Cash Flow Multiple = 10 ($400,000 ÷ $40,000). One would normally draw the conclusion from a Cash Flow multiple of 10, that the company sold for an extraordinarily high price. In this case, it was just the result of a very small denominator – Cash Flow.

A few years ago I searched the entire Pratt's Stats database and found 843 transactions where the Cash Flow multiples were greater than 10.0 or less than zero. The median SDE% (Cash Flow ÷ Total Revenue) for this group was only 4.4%, whereas, the median for the entire Pratt's Stats database was 19.3%. Thus, companies with Cash Flow multiples greater than ten are more than likely unprofitable companies. Since Cash Flow is the denominator in the Cash Flow Multiplier equation, the high multiples earned for this group are clearly a function of a very low earnings level rather than a high selling price level. In addition, this group also yielded a very high Coefficient of Variation of 127.2%. The 843 transactions in this group are, therefore, loaded with outliers with distorted multiples.

Thus, companies with Cash Flow Multiples that are negative or greater than ten should be rejected when selecting transactions for your samples.

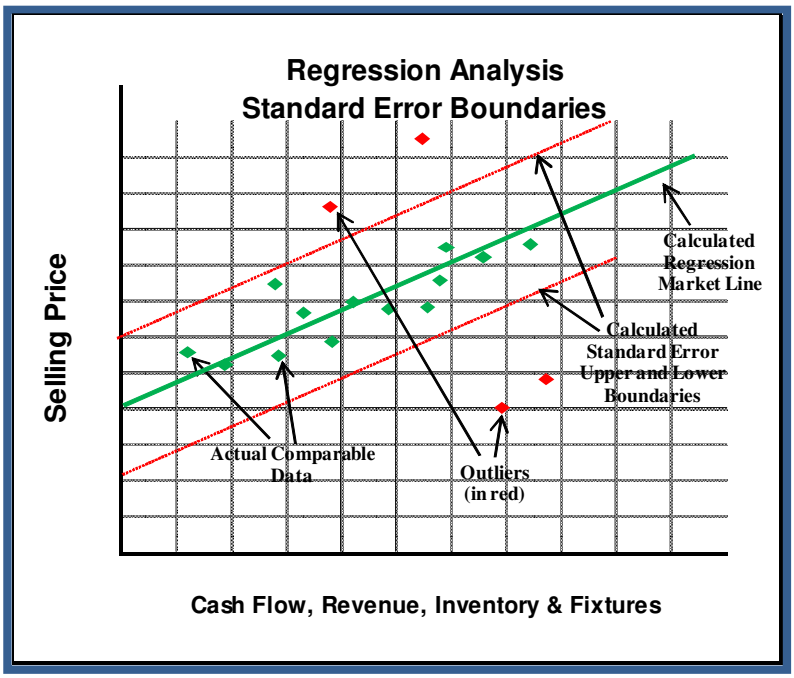
3.4 Regression Analysis

We have now completed the process of selecting a suitable sample of comparables. The second step is to try to identify if there are *individual observations* within that selected sample that might be so far out of alignment with the rest of the comparables that it is distorting our view of where the market is.

Regression Analysis is a statistical tool that we will use that compares various key variables of each guideline company (Gross Revenues, Cash Flow, Inventory, and Fixtures) with its selling price. If each of these key characteristics is plotted on a graph, the regression calculation produces a line that will be the "best fit" between those points versus the selling prices. The regression line, therefore, is the measurement representing the closest relationship between these key variables and the selling prices of all the observed companies in the sample.

Those guideline companies whose actual selling price is radically different from the price calculated by the regression line (i.e. they are significantly out of alignment with the rest of the market) can now be easily identified. The regression analysis not only plots a line that best represents where the market is, but also calculates what is referred to as standard error lines. The standard error is a statistical measurement similar to standard deviation in that it calculates the upper and lower boundaries between which most of the comparables should theoretically fall. Those comparables that fall outside these boundaries are companies whose selling prices were so far above or below the rest of the market that the transactional data must be considered flawed. These "outliers," as they are referred to, will be removed from our sample of comparables.

Exhibit VII Outliers Identified by Standard Error



The example in Exhibit VII graphed the points of 17 comparables on a chart (13 green and 4 red). The regression analysis calculated a line (in green) that is the closest fit to all those points. The regression also calculated a standard error which indicates theoretical boundaries (in red) in which approximately 16% of all companies should fall above the upper boundary line and 16% should fall below the lower boundary line. The four

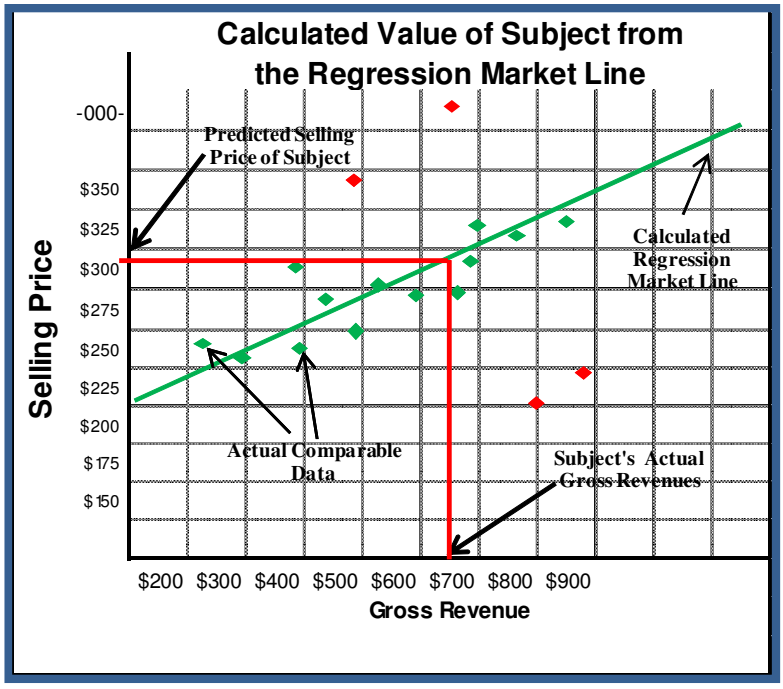
observations in red fell outside these two boundaries and, therefore, are not considered representative of the market. The observations that fall outside the standard error boundaries will be considered outliers.

After the outliers have been removed from our initial sample of comparables, we end up with a sample that is even smaller. Smaller samples carry a greater risk that one or two observations may still skew the results and present a false read of the market. Therefore, coefficient of variation tests should be performed on the second, smaller sample. If the new smaller sample produces CV ratios that are lower than those observed in the original sample, we will conclude that the smaller sample is a more accurate read of the market.[3] It has been my experience that 95% of the time the smaller filtered sample will have better CV ratios than the larger sample that included the outliers.

3.5 Three Regression Calculations to Be Used in the Market Approach

We have discussed above how regression analysis helped us identify outliers within our initial sample of comparables. The resulting smaller sample has now been "sanitized" and, therefore, should give us a more accurate read of the market. As was also noted, the regression analysis calculates a formula from which a line can be graphed that best represents that specific market. By plotting our subject's actual variables on the chart, the Regression Market Line will then enable us to determine the probable value of the subject company.

Exhibit VIII Example Regression Analysis



A good Market Approach should employ three different regression calculations. The first is referred to as a Multiple Variable Regression Analysis. This statistical tool simultaneously compares four key variables of each comparable (Gross Revenues, Cash Flow, Inventory, and Fixtures) with its respective selling price. The regression produces a formula, then, in which we can input our subject's four actual variables and calculate its probable selling price. For demonstration purposes a simplified regression analysis is graphed in Exhibit VIII. The values for the selling prices and the Gross Revenues of 17 comparables were plotted on the chart and a regression line was

[3] [3] The reader is directed to the following source for more discussion on Coefficients of Variation: Shannon Pratt, *The Market Approach to Valuing Businesses*, (John Wiley and Sons, Inc., 2001), p. 212, 133, 134

then calculated. The subject company's gross revenues of $700,000 is then located on the horizontal X-Axis. By moving vertically from that point to the Regression Market Line we can then identify the probable selling price of $300,000 from the vertical Y-Axis on the left side of the chart (note the red lines).

The above chart is a *single variable* regression analysis that regressed revenues against the selling price. A *four variable* multiple regression is literally four of the above charts layered one on top of the other with each layer representing one of the four variables. The calculated Market Line then cuts through all four layers. The multiple regression formula is actually several pages long. However, an Excel Spreadsheet can perform a multiple regression analysis with a few clicks of a button.

A detailed discussion about how to use Excel's regression analysis can be found in Appendix A on Page 16 in the Appendix.

The remaining two regression calculations that appraisers should use in the Market Approach compare the Cash Flow Profit Margins (SDE%) of the comparables against their respective Cash Flow Multipliers and Revenue Multipliers. The resulting two regression equations will predict the most probable Cash Flow Multiplier and the most probable Revenue Multiplier for the subject.

At this stage we have three different probable selling prices for our subject produced by the three different regression equations.

Each of the three regression tests that were undertaken produced an R Squared factor which measures how close all the comparables fit to their respective Market Lines. An R Squared of 0.0 means that the calculated Market Line had no predictive value whatsoever. An R Squared of 1.0 means that the Market Line exactly predicted the selling price for each of the comparables. Thus, R Squared gives us a means to compare how good each regression was at predicting the subject's value in much the same manner as the CV ratio did in the sampling tests done earlier in the report. Thus, in the final reconciliation of values, the appraiser can use the three R Squared factors to determine appropriate weights for each method. (Example, the Revenue Multiplier weight is 0.80 ÷ 2.25 = 0.36.)

Method	Value	R Squared	Weight	Weighted Value
Revenue Multiplier	$500,000	0.80	0.36	$180,000
Cash Flow Multiplier	600,000	0.55	0.24	$144,000
Multiple Regression	550,000	0.90	0.40	$220,000
		2.25	1.00	$544,000

Using R Squared as a weighting measure takes the appraiser out of the guessing game. We have all been asked, "Why did you weight the Cash Flow Multiplier by 50%?" Our answers generally are not convincing.

Secondly, regression analysis significantly raises the bar on the Market Approach. It now is as technically precise as the Income Approach. I have yet to be challenged by any non-

appraiser about my valuation process. Every client has been extremely pleased and clearly overwhelmed by it all. Those appraisal professionals who did raise challenges generally displayed their lack of knowledge of regression analysis and quickly withdrew their challenges.

If readers of my article in IBA's Business Appraisal Practice wish to see how regression methodology can be incorporated into the Market Approach, he is invited to read the articles on regression posted on my website, www.affordablebusinessvaluations.com. Go to the pricing screen and click the "Article 2" button under the Articles Section at the top of the page. The first eight pages of that article were printed above. So continue reading from Paragraph 3.0 on Page 8. To see how the regression analysis can be incorporated into a Market Approach, Article 3 is an excerpt from one of my valuations.

APPENDIX A

USING EXCEL REGRESSION ANALYSIS

The use of Excel regression requires an "Add-in" that has to be installed on your computer. If you have Excel 2007 or 2010, go to Excel Options by clicking the icon button in the upper left hand corner of the spreadsheet. Click "Excel Options" and select "Add-ins" from the menu in the left column. Click the "GO" button at the bottom of the screen. A window will pop up that has several Add-ins that can be selected. Click on "Analysis ToolPak" and on "Analysis ToolPak – VBA." Click on "OK" and go back to the main spreadsheet screen. (You will only have to do this once.)

You will now notice that a new menu tab called "DATA" has been added at the menu ribbon at the very top of the screen. Click on the DATA menu. On the far right side of the menu bar is the "Data Analysis" tool. Click on this option and a window will pop up that will have numerous statistical tools. Scroll down to "Regression" and click on that option. It gets easier after you use it a few times.

Our first regression analysis calls for regressing the comparables' SDE% against their Revenue Multipliers. From the Regression pop-up window the "Input Y Range" will be the entire column of data in your comparables table for Revenue Multipliers. (A typical array reference here might look like: $B$5:$B$30.) The "Input X Range" will be the entire column of data for the SDE%. (A typical array reference here might look like: $D$5:$D$30)

The second regression analysis to be used in the valuation report will regress SDE% against Cash Flow Multipliers. In this analysis the "Input Y Range" will be the entire column of data in your table for Cash Flow Multipliers and the "Input X Range" will be the entire column of data for SDE%.

The third regression analysis will be the multiple variable regression. Your "Input Y Range" will be the column of data that has the selling prices of the comparables (a typical array

reference here might look like: $B$5:$B$30). The "Input X Range" will be the four columns that have Revenues, Cash Flow, Inventory, and Fixtures (a typical array reference might look like $C$5:$F$30. Note the number of rows in this array must equal the number of rows in the selling price array.) These four Input X columns must also be side-by-side. There cannot be any blank spaces for any of the variables. If a transaction had no inventory, enter a zero for this value; blank spaces will produce an error message with regression analysis.

Click on "Confidence Level," "Output Range," "Residuals," and "Line Fit Plots." The Output Range field allows you to place all the regression data in a specific location on your spreadsheet. The cell reference you enter here represents the upper left hand corner where the regression data will begin printing. There is a considerable amount of data here (20-30 columns wide and 30-40 rows deep) so make sure that you select a cell well out of the way, like Z1 or AA1 because the regression will erase everything that is in its way. After completing the above data selections, click on the OK button and the regression data will be instantly printed out and will look something like the following:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.70
R Square	0.49
Adjusted R Square	0.37
Standard Error	294,559
Observations	23

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	1.4923E+12	3.73E+11	4.2997132	0.01290907
Residual	18	1.5618E+12	8.68E+10		
Total	22	3.054E+12			

	Coefficients	*Standard Erro*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	172,937	266,322.47	0.65	0.52	-386,585.85	732,459.63	-386,585.85	732,459.63
X Variable 1	0.103	0.30	0.35	0.73	-0.52	0.73	-0.52	0.73
X Variable 2	1.683	0.55	3.06	0.01	0.53	2.84	0.53	2.84
X Variable 3	0.474	1.65	0.29	0.78	-2.99	3.94	-2.99	3.94
X Variable 4	0.149	0.23	0.65	0.52	-0.33	0.63	-0.33	0.63

RESIDUAL OUTPUT

Observation	*Predicted Y*	*Residuals*
1	495,239	(195,239)
2	460,215	(38,215)
3	462,279	(157,279)
4	756,743	(241,743)
5	505,405	506,595
6	487,200	(182,200)
7	662,210	(62,210)

I highlighted the important data in yellow and reformatted much of the data to two decimals for easier reading. R Square is the measure of the accuracy of our sample. A zero value means that there is no correlation between our Input X variables and the Input Y selling price. A 1.0 R square means the regression formula will exactly predict the selling price. Any R Square value above .50 is generally considered good and anything above .80 is usually excellent.

The Standard Error is the measurement we use to identify the outliers. In this example, the standard error was $294,559, meaning that if the regression formula predicted a selling for one of the comparables that was $294,559 greater than or less than the actual selling price, that observation should be considered an outlier and removed from the sample. The difference between a comparable's actual selling price and its predicted selling price is referred to as the "Residual."

In the Residual section at the bottom of the exhibit we note that observation #5 had a predicted value using the regression equation of $505,405. The actual selling price of $1,012,000, however, was $506,595 *more* than the predicted price. Therefore observation #5 would be considered an outlier because its Residual of $506,595 was greater than the Standard Error of $294,559. Accordingly it should be removed from your sample. If an observation in the above sample had a Residual value of, say, a negative $300,000, it would also be considered an outlier because the actual selling price was $300,000 *less* than the calculated selling price and therefore, exceeded the standard error test of +/- $294,559. Approximately 16% of your samples will have residuals greater than the standard error and 16% of your samples will have residuals less than the standard error. Thus, a typical sample of 25 comparables will have approximately of eight comparables (32%) that are considered outliers.

The regression formula is highlighted in yellow under the "Coefficients" column.

We had our comparables data organized in our table as follows:
Variable 1 was the column of Revenue data for the comparables,
Variable 2 was the column of Cash Flow data,
Variable 3 was the column of Inventory data, and
Variable 4 was the column of Fixtures data.

The regression formula in this example would be written:

Selling price =

0.103 x revenue + 1.683 x cash flow + .474 x inventory + .149 x fixtures + $172,937

(The last value in the equation, $172,937, is labeled as the "Intercept" in the Coefficients column. It is a constant and is not multiplied by anything.)

We would input our Subject's values for the above data into this equation and we would have its predicted selling price.

For the remaining two SDE% regressions we did, the data printout will have just Variable 1 and the intercept coefficient. The regression formulas for these two regressions might look like:

Revenue Multiplier = 0.71 x SDE% + 0.41

Cash Flow Multiplier = 1.52 x SDE% +2.478

We would input our subject's actual SDE% values into these equations and we would have the predicted Revenue Multiplier and Cash Flow Multiplier. From those multipliers we can calculate two predicted selling prices for the subject.

From the above three predicted selling prices we then weight each based on its R Squared factor as we demonstrated on Page 15 to arrive at our conclusion of value for the subject

APPENDIX B

ANALYSIS OF TRANSACTIONAL DATABASES

The Appraiser uses three databases to obtain transactional data: Bizcomps, Pratt's Stats, and the Institute of Business Appraisers (IBA) Database.[4] Each database assembles transactional data somewhat differently than the others. Therefore, it is necessary to make various adjustments to the data points in each to make them reasonably comparable to each other. The appropriate adjustments were developed from information presented in: ValuSource's and IBA's on-line help screens for the IBA database; the Business Valuation Resources on-line help screens and procedural manuals for the Pratt's Stats and Bizcomps databases; Nancy Fannon's book on how to use the databases[5] or, more importantly, from direct observations by the Appraiser.

1.0 SELLING PRICE (ASSET SALE)

The sales of most small businesses are structured in a manner whereby the buyer acquires the inventory, Fixtures and Equipment (FF&E), and intangibles and the seller keeps the cash and receivables and pays off the company debt. This structure is commonly referred to an Asset Sale. Since an Asset Sale is the most common form of transaction in the sale of a small business, it is desirable to reconstruct all the transactions that we will use in our analysis to reflect the selling price for just those three assets. As a result, the selling prices of all the selected transactions will be directly comparable to each other.

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[4] Bizcomps® and Pratt's Stats® data are obtained from Business Valuation Resources website - www.bvmarketdata.com, and IBA data is obtained from ValuSource website - www.vswebapp.com. or the Institute of Business Appraisers (IBA) website – www.go-iba.org

[5] Nancy Fannon & Heidi Walker, "The Comprehensive Guide to the Use and Application of the Transaction Databases," 2009 Edition, Business Valuation Resources, LLC

As we shall see below, all three databases generally report sufficient transactional data in which a selling price can be reconciled for the total value of the inventory, FF&E, and intangibles that were transferred. *In order to calculate a selling price for each database that will align with each other, we will make appropriate adjustments in the reported selling prices to equal the total value of those three assets*. It is fairly common to find insufficient data to make an accurate reconciliation in which case, some guesswork may be necessary. However, appraisers must use their best judgment to determine if the lack of data precludes obtaining a good estimate of an Asset Sale selling price. If so, they must reject that comparable.

PRATT'S STATS

As noted in Nancy Fannon's book,[6] Pratt's Stats indicates that, "Price is generally considered to be the dollar value consideration [note: consideration can be in the form of cash, notes, and/or securities[7]] paid for the business sold including interest-bearing debt. Therefore, the only price reported by the Pratt's Stats database is an invested capital price (which the database refers to as MVIC or Market Value of Invested Capital)." Ms. Fannon also notes that Pratt's Stats FAQs (Frequently Asked Questions) indicated that an Asset Sale typically does not include assumed interest-bearing liabilities and generally, but not always, does not include cash, receivables, prepaid expenses, or real estate.[8] In most cases when an Asset Sale also included cash or receivables, it was noted in the Additional Transaction Information in the transaction report. However, if the submitting broker neglected to mention it, the reported selling price may not be correct. The Appraiser has found instances of this error, but they are fairly uncommon.

Thus with the data available, a typical Asset Sale reported in Pratt's Stats can usually be reconstructed to produce the total value allocated to inventory, FF&E, and intangibles. However, appraisers must read the notes appended to each transaction to confirm what other assets may have been transferred. It is not uncommon that accurate information was not provided by the submitting brokers; thus appraisers must use their judgment as to whether the comparable should or should not be used.

The selling price allocation reported in each transaction may indicate that a portion of the price included covenant-not-to-compete value, consulting agreement value, or earn-out value.[9] Pratt's Stats deducts the portion of the selling price allocated to consulting

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[6] Ibid., p.2-3
[7] Pratt's Stats FAQs, "Definitions: What is the Legend for Pratt's Stats Income Data," from the Business Valuation Resources website, http://www.bvmarketdata.com. p.3
[8] Pratt's Stats FAQs, "Definitions: What is the Legend for Pratt's Stats Income Data," from the Business Valuation Resources website, http://www.bvmarketdata.com. p.2-5.
[9] Earn-outs are that portion of the selling price of a business that are conditional payments. These are payments that a seller will only receive if the buyer achieves certain sales or profitabilty goals in the future. Since they are amounts that cannot be determined as of the sale date, they are generally excluded from the reported selling price of the business.

agreements and earn-outs in its MVIC calculation.[10] As we shall see later Bizcomps and IBA only exclude earn-out value from their reported selling prices.

Suggested Adjustment: Thus in order to reconcile Pratt's Stats' MVIC to obtain the value of inventory, FF&E, and intangibles that will generally align with Bizcomps and IBA values, we must deduct from MVIC any cash, receivables, or non-operating assets that may have been included in the selling price and add back any value allocated to consulting agreements.

Actual observations by the Appraiser find this reconciliation is usually comparable to the other databases' adjusted values. However, one must carefully review that data. If the available information is insufficient to produce a reasonable estimate of the selling price for the three target assets, the comparable should be rejected.

BIZCOMPS

"The Bizcomps transactions are all Asset Sales or have been converted to Asset Sales. As such the price includes FF&E and goodwill or the intangible value. … Bizcomps maintains that their sales prices exclude inventory … [and] non-compete and consulting agreements are included."[11]

Suggested Adjustment: Thus in order to reconcile Bizcomps' selling price that will generally align with Pratt's Stats and IBA's adjusted selling price for inventory, FF&E, and intangibles, we must add inventory to Bizcomps' reported selling price.

IBA

Raymond Miles reports that the IBA database generally excludes cash, accounts receivable, real estate, and "other assets" (such as deposits and prepaids) from the selling price, and generally includes inventory, FF&E, intangibles and covenant-not-to-compete.[12] The Market Analysis Tutorial screen on the IBA website also indicates that the selling price includes consulting agreement value.[13]

Although IBA claims that it excludes real estate value from the selling price, the analysis below found that of the 42 transactions in which real estate was also transferred, 27 transactions had the real estate value added to the selling price. In most cases the inclusion of real estate caused the selling price to appear extraordinarily high with respect to the company's revenue, in which case subtracting the real estate value produced a much more reasonable result. Therefore in transactions involving real estate, appraisers must look at the data and adjust the selling price if it appears necessary. If unsure, the transaction should be

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[10] Ibid., p.2-3f.
[11] Ibid., p.3-3f
[12] Raymond C. Miles, "How to Use the IBA Market Data Base", Part XXVIII, 1999 p.2 (Excerpt obtained with permission from Dave Miles of ValuSource)
[13] Market Analysis Tutorial #3 on IBA website, "IBA Transactional Database Fundamentals," http://go-iba.org/market-data/tutorials/index.html, 2009, p.1

excluded from the analysis. However, as shown in Paragraph 4.1 below, over 95% of the time IBA's adjusted selling price and Bizcomp's adjusted selling price were the same.

Suggested Adjustment: Therefore, other than a possible adjustment for real estate, there are no additional adjustments necessary to reconcile IBA's selling price to align with Pratt's Stats and Bizcomps adjusted values for inventory, FF&E, and intangibles.

2.0 REVENUE

Suggested Adjustment: As will be demonstrated below, all three databases appear to report revenues in the same manner, so no additional adjustments are needed.

3.0 SELLER'S DISCRETIONARY EARNINGS (SDE)

PRATT'S STATS

"Pratt's Stats calculations of EBIT (Earnings before Interest and Taxes), and EBITDA (Earnings before Interest, Taxes, Depreciation, and Amortization) also exclude other income and expenses and interest income or tax benefits. Discretionary Earnings (SDE), then, is equal to adjusted EBITDA plus Owner's Compensation."[14] Owner's Compensation is the wage paid to one owner.[15] Three data fields from the Pratt's Stats transaction report typically will add up to Discretionary Earnings (SDE). Those data fields are Owner's Compensation, Operating Profit (EBIT), and Noncash Charges (Operating Profit plus Noncash Charges equals EBITDA). In nearly 75% of the transactions in the research discussed below, this calculation matched the SDE calculations of IBA and Bizcomps. Of the remaining 25% where the SDE's differed, over half were due to errors in processing the data by one or the other databases. Less than 10% of all the transactions had discrepancies that were due to either minor calculation errors or procedural differences, but it could not be determined from the data which type of discrepancy it was. In other words, the number of differences in SDE found among the databases that were procedural in nature were fairly small. Regardless, in our research below, the discrepancies resulted in the Pratt's Stats SDE value averaging 98.2% of the IBA and Bizcomps value. In other words, the discrepancies do not appear significant enough or frequent enough to adversely skew the results of our analysis.

A portion of the discrepancies among the databases in SDE calculations probably can be attributed to the fact that Pratt's Stats requires significantly more data input from the reporting brokers than IBA or Bizcomps. As a result, the Pratt's Stats analysts can sometimes spot calculation errors that were made in the submitted data. Thus many of the discrepancies are not from procedural differences, but rather computational errors by the other databases. Since all three databases are exposed to poor data reporting by submitting brokers, it is important that appraisers carefully review each transaction to determine if it is

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[14] Nancy Fannon & Heidi Walker, "The Comprehensive Guide to the Use and Application of the Transaction Databases," 2009 Edition, Business Valuation Resources, LLC, p.2-8

[15] Pratt's Stats FAQs, "Definitions: What is the Legend for Pratt's Stats Income Data," from the Business Valuation Resources website, http://www.bvmarketdata.com. p.2

reasonable. However, in the event that a selected sample of comparables has duplicate transactions with different values for selling price, revenues, or SDE, the data from Pratt's Stats will be used in the analysis. If in the appraiser's judgment the transactional data does not appear reliable, it should be excluded from the sample of comparables selected.

Suggested Adjustment: Thus to reconcile Seller's Discretionary Earnings from Pratt's Stats data in a manner that will generally align with IBA and Bizcomps values, we must combine owner's compensation, operating profits, and noncash charges.

BIZCOMPS

Bizcomps defines SDE as net Earnings before Interest, Taxes, Depreciation, and Amortization (EBITDA) plus owner's compensation and any non-business or non-recurring expenses. If there is more than one owner, a hypothetical salary for the lowest paid partner will be deducted from cash flow.[16] Bizcomps points out that this is the convention used by Certified Business Intermediaries (CBI) with the International Business Brokers Association (IBBA). The Bizcomps data is submitted almost exclusively by this group.[17] The description is fairly similar to the Pratt's Stats construction with the exception that Pratt's Stats cited that other income is also deducted from earnings when calculating SDE. Bizcomps does not have a data field for other income so no adjustment is possible. As pointed out in the research below, the procedural differences occur infrequently and are generally small.

Suggested Adjustment: No adjustments to Bizcomps' SDE are needed to make it align with Pratt's Stats' adjusted SDE.

IBA

If one excludes discrepancies caused by obvious computation errors, Bizcomps and IBA presented the same value for SDE 98% of the time.

Suggested Adjustment: No further adjustments to SDE are needed to make IBA and Bizcomps values align with Pratt's Stats value.

4.0 STOCK SALES

IBA

Although all transactions reported in the IBA database are supposed to be assets sales,[18] there are a few transactions that are listed as Stock Sales. Of the 880 IBA transactions in the research below, only three were listed as Stock Sales. None of those were duplicates of

[16] Jack Sanders, "Bizcomps 2011 User Guide," Business Valuation Resources, 2011. P.16
[17] Ibid., p.7
[18] Raymond C. Miles, "How to Use the IBA Market Data Base," Part XXVIII, 1999 p.2. (Excerpt obtained by request from Dave Miles of ValuSource.)

transactions in the other databases so it is not known how IBA presents transactional data on Stock Sales. None of the help screen information on the ValuSource or IBA websites or conversations on the subject with Dave Miles of ValuSource offered any clarification.

Suggested Adjustment: Any transaction that is listed as a Stock Sale in the IBA database should usually be excluded from the transactional analysis.

BIZCOMPS

As noted above, all Bizcomps transactions that were Stock Sales have been converted to an equivalent Asset Sale value. We are not told which transactions were Stock Sales. However, as noted above, the selling price listed by Bizcomps is always the total value for FF&E and intangibles only. Thus it is presumed that all Stock Sale prices have been converted to this value.

Suggested Adjustment: By adding inventory to the listed selling price we will be converting any Stock Sale price to the value of the inventory, FF&E, and intangibles which will generally align with adjusted selling prices from the Pratt's Stats and IBA databases discussed above.

PRATT'S STATS

Pratt's Stats reports both Asset Sales and Stock Sales and generally provides a significant amount of data describing each transaction. Pratt's Stats assumes that what is typically transferred in a Stock Sale is the "entire legal entity of the company, [including] all assets and liabilities unless otherwise specified in the purchase agreement [with the exception of] excess or non-operating assets that have been liquidated and/or transferred prior to the sale or at the point of sale."[19] However, unless a specific allocation of the selling price is noted in the Additional Information section of the Transaction Report, or the Asset Data field is marked "Data is a Purchase Price Allocation," it is generally difficult to determine what assets and liabilities were actually transferred. As such an accurate Asset Sale reconciliation may not be possible. Thus if specific allocation information is not available or the critical data fields for assets and liabilities contain N/A entries, that comparable should probably be rejected.

As noted above, the selling price listed by Pratt's Stats (MVIC) is equal to total consideration paid (cash, notes, and/or securities) plus any interest-bearing debt assumed, less amounts for earn-outs and employment/consulting agreements. To make the Pratt's Stats selling price align with those of IBA and Bizcomps, we added back the consulting agreement value. However, since the entire corporate balance sheet may have been transferred in a sale, a number of adjustments must be made to reconcile MVIC to an equivalent Asset Sale price that we defined in Paragraph 1.0 above.

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[19] Pratt's Stats FAQs, "Definitions: What is Typically Assumed to Be Transferred in a Stock Sale," from the Business Valuation Resources website, http://www.bvmarketdata.com. p.9

The first step in the reconciliation process is to determine what, if any, liabilities were assumed in the transaction. If the Debt Assumed field in the Transaction Report is labeled N/A, Pratt's Stats was not able to definitively determine if any interest-bearing debt was assumed. If no other information is available, it may be necessary to reject this comparable. However, if the Debt Assumed field has either a zero or a dollar amount, the information describing the business sale clearly identified the level of interest-bearing debt assumed.[20] It is also necessary to identify all the non-interest bearing debt that was also assumed. This information is generally only made available when a specific allocation of the purchase agreement is itemized in the Additional Information section. However, if zeros are found in the data fields for Liabilities Assumed, Long-Term Liabilities, and Total Liabilities, then Pratt's Stats determined that no liabilities were assumed in the transaction. In other words, if specific allocation information is not available in the Additional Information section or the Asset Data field is not marked "Data is a Purchase Price Allocation", it will be difficult to make an accurate Asset Sale reconciliation and the comparable should be rejected.

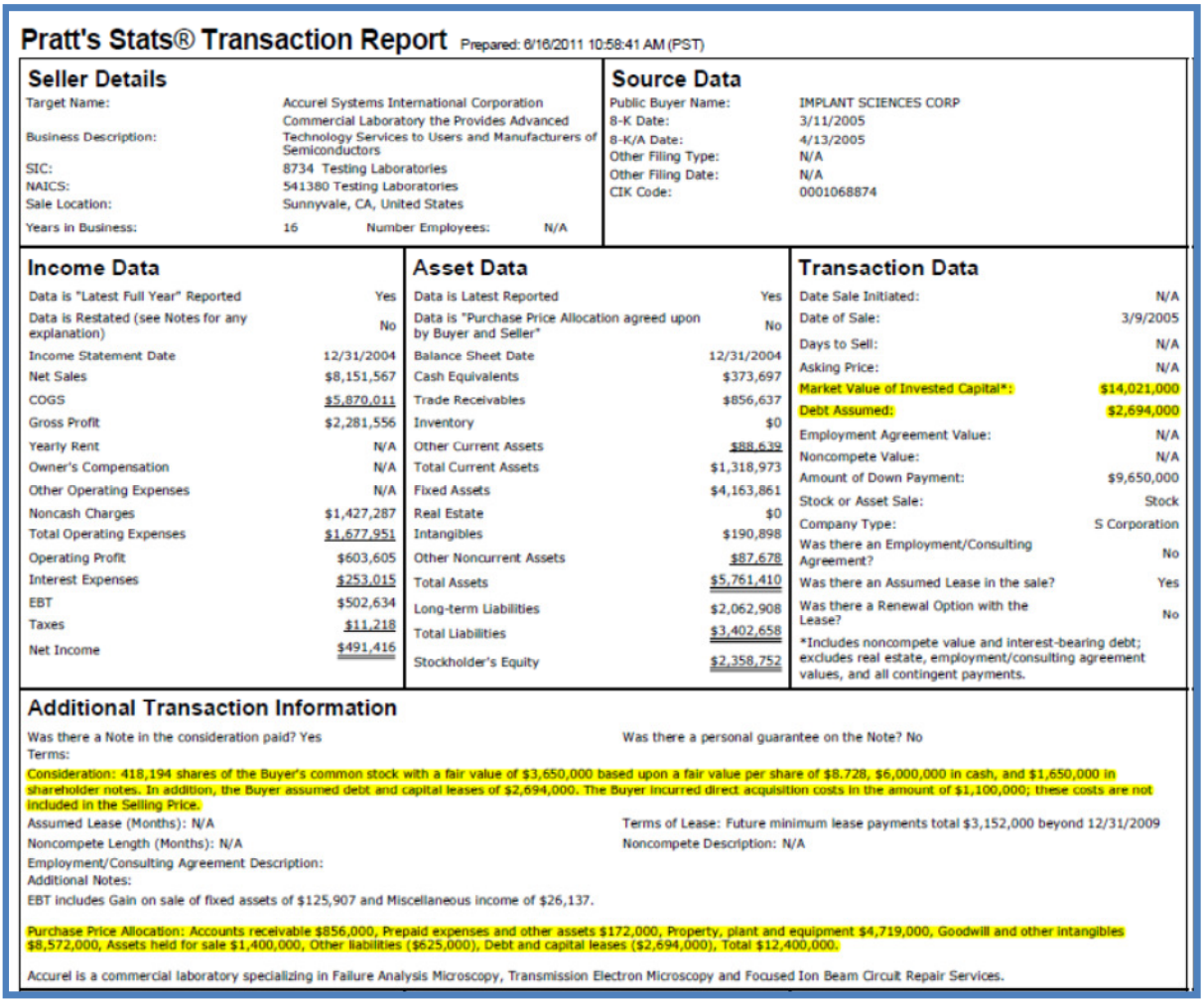
It is necessary to identify all liabilities assumed (both interest bearing and non-interest bearing debt) because total consideration plus total debt assumed equals the total debt and equity used to make the purchase. From basic accounting we know that total debt and equity also equals total assets. Once we have established what the total asset value of the transferred business is, it is a simple task to subtract the value of all the assets acquired except for inventory, FF&E, and intangibles. The resulting value will be an equivalent Asset Sale value (inventory, FF&E, and intangibles) that will generally align with the selling prices in IBA and Bizcomps.

Suggested Adjustments: The following is the formula that will be used to reconcile a Stock Sale value to an equivalent Asset Sale value. An actual sample transaction from Pratt's Stats follows the formula. Again, this reconciliation generally can only be done accurately when the Transaction Report includes a selling price allocation in the Additional Information section or the Asset Date field is marked "Data is a Purchase Price Allocation."

MVIC (Cash, Stock, Notes, IB debt Assumed)	*14,021,000
Plus Additional Non-Interest Bearing Debt	625,000
Plus Employment/consulting Agreement	-0-
Less Cash	(0)
Less Accounts Receivable	(856,000)
Less Other Assets (prepaids & for-sale assets)	(1,572,000)
Asset Sale Value Equivalent	$12,218,000

*Note: Pratt's Stats incorrectly added up Total Consideration. It should have been $13,994,000. That would have made the Asset Sale Value equal to $12,191,000 which is the actual total for inventory, FF&E, and goodwill.

[20] Nancy Fannon & Heidi Walker, "The Comprehensive Guide to the Use and Application of the Transaction Databases," 2009 Edition, Business Valuation Resources, LLC, p.2-3



Pratt's Stats® Transaction Report Prepared: 6/16/2011 10:58:41 AM (PST)

Seller Details

Target Name:	Accurel Systems International Corporation
Business Description:	Commercial Laboratory the Provides Advanced Technology Services to Users and Manufacturers of Semiconductors
SIC:	8734 Testing Laboratories
NAICS:	541380 Testing Laboratories
Sale Location:	Sunnyvale, CA, United States
Years in Business:	16 Number Employees: N/A

Source Data

Public Buyer Name:	IMPLANT SCIENCES CORP
8-K Date:	3/11/2005
8-K/A Date:	4/13/2005
Other Filing Type:	N/A
Other Filing Date:	N/A
CIK Code:	0001068874

Income Data

Data is "Latest Full Year" Reported	Yes
Data is Restated (see Notes for any explanation)	No
Income Statement Date	12/31/2004
Net Sales	$8,151,567
COGS	$5,870,011
Gross Profit	$2,281,556
Yearly Rent	N/A
Owner's Compensation	N/A
Other Operating Expenses	N/A
Noncash Charges	$1,427,287
Total Operating Expenses	$1,677,951
Operating Profit	$603,605
Interest Expenses	$253,015
EBT	$502,634
Taxes	$11,218
Net Income	$491,416

Asset Data

Data is Latest Reported	Yes
Data is "Purchase Price Allocation agreed upon by Buyer and Seller"	No
Balance Sheet Date	12/31/2004
Cash Equivalents	$373,697
Trade Receivables	$856,637
Inventory	$0
Other Current Assets	$88,639
Total Current Assets	$1,318,973
Fixed Assets	$4,163,861
Real Estate	$0
Intangibles	$190,898
Other Noncurrent Assets	$87,678
Total Assets	$5,761,410
Long-term Liabilities	$2,062,908
Total Liabilities	$3,402,658
Stockholder's Equity	$2,358,752

Transaction Data

Date Sale Initiated:	N/A
Date of Sale:	3/9/2005
Days to Sell:	N/A
Asking Price:	N/A
Market Value of Invested Capital*:	$14,021,000
Debt Assumed:	$2,694,000
Employment Agreement Value:	N/A
Noncompete Value:	N/A
Amount of Down Payment:	$9,650,000
Stock or Asset Sale:	Stock
Company Type:	S Corporation
Was there an Employment/Consulting Agreement?	No
Was there an Assumed Lease in the sale?	Yes
Was there a Renewal Option with the Lease?	No

*Includes noncompete value and interest-bearing debt; excludes real estate, employment/consulting agreement values, and all contingent payments.

Additional Transaction Information

Was there a Note in the consideration paid? Yes
Was there a personal guarantee on the Note? No
Terms:
Consideration: 418,194 shares of the Buyer's common stock with a fair value of $3,650,000 based upon a fair value per share of $8.728, $6,000,000 in cash, and $1,650,000 in shareholder notes. In addition, the Buyer assumed debt and capital leases of $2,694,000. The Buyer incurred direct acquisition costs in the amount of $1,100,000; these costs are not included in the Selling Price.
Assumed Lease (Months): N/A
Terms of Lease: Future minimum lease payments total $3,152,000 beyond 12/31/2009
Noncompete Length (Months): N/A
Noncompete Description: N/A
Employment/Consulting Agreement Description:
Additional Notes:
EBT includes Gain on sale of fixed assets of $125,907 and Miscellaneous income of $26,137.

Purchase Price Allocation: Accounts receivable $856,000, Prepaid expenses and other assets $172,000, Property, plant and equipment $4,719,000, Goodwill and other intangibles $8,572,000, Assets held for sale $1,400,000, Other liabilities ($625,000), Debt and capital leases ($2,694,000), Total $12,400,000.

Accurel is a commercial laboratory specializing in Failure Analysis Microscopy, Transmission Electron Microscopy and Focused Ion Beam Circuit Repair Services.

5.0 Applying the Adjustments to Actual Data

To test the accuracy of the above-suggested adjustments, the Appraiser downloaded all the transactions from SIC classifications 7501 through 7599 from all three databases. There were a total of 489 transactions from the Pratt's Stats database, 668 from Bizcomps, and 881 from IBA. The data from each source was then adjusted using the suggested methods above. From the total 2,020 transactions there were 148 duplications between IBA and Bizcomps, 43 between IBA and Pratt's Stats, and 71 between Bizcomps and Pratt's Stats. It is from these duplications that we can see readily see if the suggested adjustments accounted for all differences between their respective presentations of data.

As the Appraiser noted in the Market Approach discussion, business brokers generally submit the same transactional data to all three databases and generally do not change any of the submitted data to conform to any database's procedural differences. Thus even though the manuals or on-line help screens of the respective databases indicate that there are a number of differences in the manner in which they calculate revenues, selling price, and SDE, in actual practice those differences are minimal.

5.1 IBA VS. BIZCOMPS

SELLING PRICE

Of the 148 duplications, both IBA and Bizcomps reported the same selling price in all but 16 transactions. Of those 16, four IBA transactions had real estate included in the selling price. It was not obvious from the IBA data that it was. If it were not for the duplication in Bizcomps, we never would have known that real estate was included in those four IBA selling prices.

Four IBA transactions listed the selling price significantly less than SDE which was probably the result of data processing errors. Those four duplicates found in Bizcomps had selling prices considerably higher than SDE. The IBA selling prices, however, were so unrealistically low that we would have rejected those comparables even if we did not have Bizcomps for comparison.

After rejecting eight of the 16 transactions due to obvious errors, the remaining eight differences in reported selling prices were from either minor processing errors or perhaps procedural differences in the way each database calculated revenue. There was no way one could determine from the data which of the two types of discrepancies occurred. Thus after rejecting obvious data collection errors, at least 95% of the time IBA and Bizcomps calculated the selling price exactly the same way.

As was noted above, the IBA database claims that it deducts real estate value from the selling price. The Appraiser found 42 transactions out of the 148 where real estate was involved. In 27 of those transactions the real estate price was included in the total transaction price. Only 15 transactions deducted the real estate value as suggested in IBA's procedural manual. In almost every situation (except the four described above) the selling prices of those comparables including real estate were so high with respect to their revenues that one could reasonably conclude that the real estate value should be deducted from the selling price. Again appraisers should use their judgment in reviewing the data and reject any comparable that is subject to doubt.

REVENUE

All 148 revenue calculations were the same between the two databases; therefore, no adjustment is required for revenue.

SDE

Of 148 duplications there were only eight discrepancies in reported SDE. In three of those transactions IBA had the same value in the revenue and SDE data fields. Two transactions had real estate included which often leads to data processing errors. Thus after rejecting the obvious errors, the remaining three differences in reported selling prices were from either minor data processing errors or possibly procedural differences in the way each database

calculated SDE. Regardless, 98% of the time IBA and Bizcomps reported the same value for SDE.

Even though IBA does not mention adding back depreciation to SDE[21] whereas Bizcomps does, in practice IBA clearly appears to calculate SDE in the same way Bizcomps does.

5.2 IBA vs. Pratt's Stats

Selling Price

After making the suggested adjustments, all 43 duplications calculated selling prices the same way. Thus there were no other procedural differences in the way each calculated selling price.

Revenue

There were just three discrepancies in the listed revenue amounts out of 43 duplications between the two databases. All three discrepancies arose because IBA used the most current P&L data available, whereas Pratt's Stats used the P&Ls that were available when the sale began. Thus there were no other procedural differences in the way each calculated revenue.

SDE

After making the suggested adjustments for SDE noted in Paragraph 3.0, 21 discrepancies were found in the calculations for SDE out of the 43 duplications. Four differences were due to Pratt's Stats adding owner's compensation to operating profits of a sole proprietorship, which consequently double counted SDE (in a sole proprietorship operating profits are the owner's compensation; there is no separate owner's salary). Three errors arose because IBA used the most current P&L data available, whereas Pratt's Stats used the P&Ls that were available when the sale began. Seven other discrepancies were very obvious data processing errors. Only three of the discrepancies occurred because of procedural differences. Those were the result of IBA's stated policy of not adding back depreciation to SDE. Even though IBA states that it calculates SDE without adding back depreciation, only three instances in a combined 191 duplications between Pratt's Stats and Bizcomps proved that to be true. Thus IBA appears to calculate SDE the same way as the other two databases in over 98% of the time.

5.3 Bizcomps vs. Pratt's Stats

Selling Price

[21] Market Analysis Tutorial #3 on IBA website, "IBA Transactional Database Fundamentals," http://go-iba.org/market-data/tutorials/index.html, 2009, p.1

There were a total of 71 duplications between the Bizcomps and Pratt's Stats samples. Of that total only seven discrepancies appeared between their respective selling prices. Three of those transactions indicated that real estate was also sold. The selling prices reported by Bizcomps were so high with respect to revenues that one could conclude that real estate value was inadvertently added to the selling price. The cause for the remaining four discrepancies could not be determined by the data. However, those four discrepancies represent only 5% of the total duplicate transactions with Pratt's Stats' selling prices averaging just 7% higher than Bizcomps'. Thus the selling prices reported in these two databases appear to be reasonably similar after making the adjustments suggested in Paragraph 1.0.

REVENUE

There were only a total of four discrepancies in the reported revenue of the 71 duplications between Bizcomps and Pratt's Stats. There was insufficient data to determine the cause of the discrepancies, but Pratt's Stats reported revenue averaged only 1% higher than Bizcomps' revenue. Thus revenues reported in these two databases appear to be reasonably similar after making the suggested adjustments.

SDE

As was the case in the duplications between IBA and Pratt's Stats above, the greatest number of discrepancies appeared in the SDE calculations. It is believed that most of the discrepancies occur as a result of the different reporting forms used by the databases. Since the wording for the various data points on each form is different, it is easy for brokers to be confused and enter incorrect information. Of the 71 duplications between Bizcomps and Pratt's Stats, there were 33 discrepancies. Of that total 16 were obvious data entry errors, not procedural differences. Typical errors were: 1) double counting owner's income when determining SDE of a sole proprietorship; 2) operating losses were not included in SDE calculations; 3) owner's salary was not added back to SDE; 4) depreciation was not added back to SDE; 5) different P&L years were used by the different databases; and 6) real estate was also involved.

Of the remaining 17 discrepancies, one was found to be a procedural difference where Pratt's Stats deducted other income from SDE and Bizcomps did not. Sixteen discrepancies had insufficient data to determine whether the difference was due to simple data processing errors or procedural differences. Regardless, where discrepancies were not explainable Pratt's Stats SDE averaged only 1.4% less than the SDE reported by Bizcomps.

SUMMARY

As we have seen above, transactions with real estate have a high percentage of selling price calculation errors. SDE calculations are also frequently done incorrectly. Many brokers do not understand how to properly calculate SDE when an owner of the business also owns the real estate. Brokers often add back the interest expense from the real estate mortgage to arrive at SDE for the business. Thus the calculated SDE will not have any occupancy costs

making the company appear far more profitable than a company that pays rent. As a result, appraisers should use their judgment in selecting a transaction from any database that involves real estate. When there is any doubt, the comparable should be rejected.

Appraisers should also consider rejecting any comparable where the selling price or SDE appears to be extraordinarily high or low with respect to its revenue, or where data points are missing. Transactions with missing SDE or inventory (for companies that obviously should have inventory) give appraisers fewer critical data points to evaluate overall credibility of the transactional data. Liquor store sales, for example, are frequently reported with no inventory. Buyers and sellers typically enter into side agreements to pay for the inventory outside of escrow. As a result, even though a moderate level of inventory passed to the buyer, the transaction does not reflect it. The actual selling price of that business will appear very low compared to a similar store that sold with inventory included in the sale price.

Stock transactions are also highly prone to calculation errors by the submitting brokers. For example, corporations are frequently sold with receivables or other assets or liabilities included. The broker may report the selling price with receivables, but neglect to indicate that they were included in the selling price. The selling price may also have been reduced by the amount of liabilities assumed by the buyer. The broker may report the reduced price but neglect to mention that there were assumed liabilities in the transaction. As a result, the selling price of transactions sold as Stock Sales are often misinterpreted by brokers. Thus as mentioned in Paragraph 4.0, unless a specific selling price allocation is provided with the transactional data, appraisers probably should not attempt to reconcile the value to an equivalent Asset Sale price.