Accounting for the Decline in Market Value Multipliers

C. Fred Hall, MBA, CBA, CVA

After reading Toby Tatum's article from the third quarter's BAP regarding declining multipliers used in the Market Approach, I realized we are now confronted with having to deal with what we have suspected all along: the recession appears to have caused cash flow multipliers to decline significantly. I sent Toby's article to several business brokerage offices that I work with and invited their comments. All the brokers responded that the article confirmed their suspicions that there has been significant multiplier compression in recent years.

I decided to do some research into the Pratt's Stats database to see whether or not the results were similar to what Toby found in the BIZCOMPS® database. Pratt's Stats had far more transactional data in 2012 and 2013 that I thought might reveal whether or not BIZCOMPS' small sample size was a statistical fluke. Exhibit 2 clearly shows it was not. The recession has indeed produced a significant amount of volatility in transactional multipliers during the last five to seven years. However, the decline was mostly felt in the smaller sized companies and was only observed in the cash flow multipliers, not the revenue multipliers.

The question raised by Toby is whether or not this decline will skew one's results when employing the Market Approach and, if so, how does one factor in the decline into the market approach? Toby suggested an indexing approach to adjust multipliers of a sample to the current levels. I wish to suggest a second approach that may be more accurate.

Exhibit 1: Transactional Multipliers Over the Last 15 Years

Date Range		Count	Median Revenue Multipliers	Median Cash Flow Multipliers	Median SDE% (SDE/Rev)
From	To				
1-1-1999	12-31-1999	334	0.467	2.449	19.1%
1-1-2000	12-31-2000	320	0.482	2.584	18.6%
1-1-2001	12-31-2001	413	0.461	2.352	20.8%
1-1-2002	12-31-2002	533	0.469	2.359	20.0%
1-1-2003	12-31-2003	493	0.455	2.497	19.2%
1-1-2004	12-31-2004	662	0.488	2.587	20.5%
1-1-2005	12-31-2005	723	0.482	2.576	20.3%
1-1-2006	12-31-2006	711	0.496	2.668	19.2%
1-1-2007	12-31-2007	823	0.497	2.439	21.2%
1-1-2008	12-31-2008	1137	0.472	2.136	22.8%
1-1-2009	12-31-2009	791	0.469	2.032	23.4%
1-1-2010	12-31-2010	898	0.451	1.827	24.6%
1-1-2011	12-31-2011	812	0.472	2.066	22.7%
1-1-2012	12-31-2012	839	0.434	1.992	22.7%
1-1-2013	12-31-2013	265	0.455	1.898	22.9%
	Average		**0.470**	**2.297**	**21.2%**
	Lower Quartile		**0.458**	**2.05**	**19.6%**
	Upper Quartile		**0.482**	**2.54**	**22.7%**

Source: 9,723 Transactions taken from Pratt's Stats Database

First, I assembled a sample of transactions obtained from the Pratt's Stats database. The sample was filtered for all transactions between 1999 through 2013 with revenues under $3 million. Stock sale transactions were eliminated as were companies with break-even or negative cash flow. The filtered sample had 9,723 transactions spread out over 15 years.

The revenue multipliers and cash flow multipliers were calculated from each transaction's revenues, seller's discretionary earnings (SDE or cash flow), and selling price. The data was sorted by the year in which the sale took place and the resulting median value for the multipliers from each year was determined. The resulting sample of 9,723 transactions is listed on the table in Exhibit 1.

From Exhibit 1 we observe that the average revenue multiplier over the last 15 years was .47. The lower quartile was .458 and the upper quartile was .482. Thus, revenue multipliers fluctuate within a fairly narrow range from year to year. Much of the fluctuations can be attributed to the fact that the companies that

Exhibit 2: Declining Cash Flow Multipliers

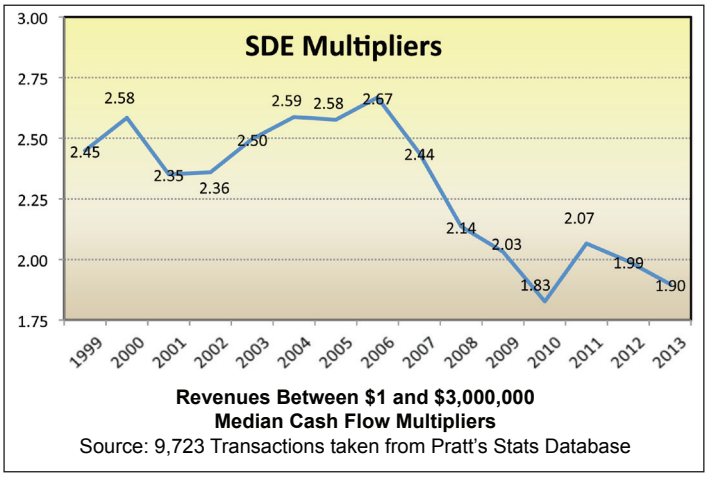
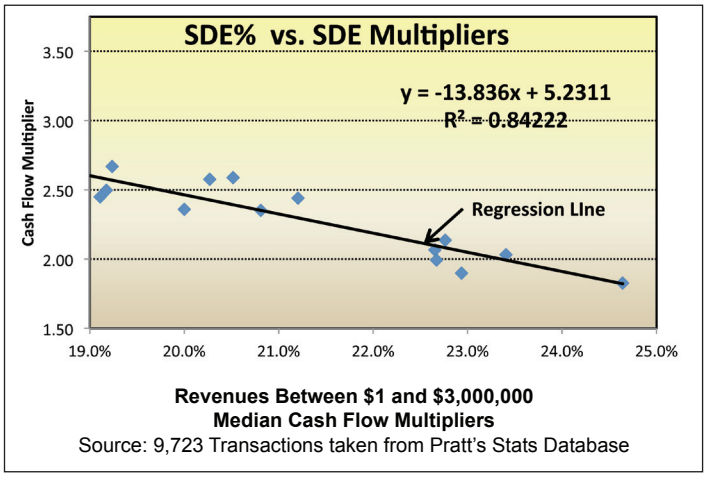


Exhibit 3: Regressing SDE% with Cash Flow Multipliers



are sold each year may be concentrated in different industries or are of varying revenue sizes than were found in prior years. Thus, we would expect their multipliers to be different. Since appraisers typically select a sample of transactions from one specific SIC code, that would effectively eliminate some of the yearly fluctuations due to changing industry concentrations. As a result, using comparables that are several years old should not inappropriately skew the results when calculating revenue multipliers.

Cash flow multipliers, however, have fluctuated significantly over the years. Exhibit 2 is a visual presentation of the data from the table. The graph clearly shows that cash flow multipliers (SDE multipliers) have declined significantly since the start of the recession. One's initial reaction is that appraisers should only use multipliers exhibited during the most recent years to account for this attrition. Toby Tatum's suggestion was to create an index that reflects the current level of the multiplier with respect to its long-term average. The index would then be applied to the subject's calculated multiplier to adjust it to the current trend. A third alternative involves the use of regression analysis which will allow us to use transactions over the last 15 years regardless of the level of multipliers in any one year.

As I discussed in my article, "Using Regression Analysis in the Market Approach," published in the Second Quarter issue of the 2012 BAP, there is a strong correlation between a company's cash flow multiplier and its operating profit margin. (The operating profit margin is calculated by dividing a company's SDE [cash flow] by its total revenues.) By using regression analysis, we can plot the above sample's median operating profit margins (SDE%) against the corresponding cash flow multipliers for each year. Exhibit 3 gives a visual presentation of the resulting regression analysis.

The regression line in Exhibit 3 shows that the level of a company's profitability, as measured by SDE%, closely tracks its cash flow multiplier. This fact is underscored by the regression analysis' very high R squared factor of 0.842. (An R squared of 1.0 would mean there is a perfect correlation between Cash Flow Multipliers and SDE% whereas an R squared of 0.0 would mean there is no correlation.)

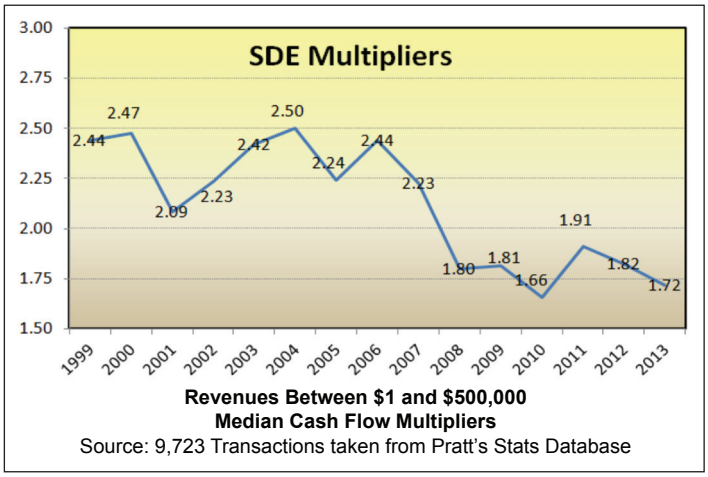
The regression analysis also gives us a formula for the regression line, which can be used to predict the median multiplier in any given year regardless of whether it is a recession year or a boom year. For example, from Exhibit 1 we find that the median SDE% for the recession year 2010 was 24.6 percent. From Exhibit 3, the regression formula of $y = -13.83x + 5.23$ can solve for the 2010 multiplier by inputting that year's known SDE%: $y = -13.83 \times .246 + 5.23 = 1.828$. The 1.828 predicted cash flow multiplier for 2010 is very close to that year's actual multiplier of 1.827. The multiplier for the boom year 2006 is also predicted by inputting that year's SDE% of 19.2% into the same regression equation: $y = -13.83 \times .192 + 5.23 = 2.57$. Again, by using SDE%, the predicted cash flow multiplier for the boom year of 2006 was very close to the actual value of 2.668.

Thus, when we build a sample of transactions to calculate our Subject's cash flow multiplier, we *should* include all transactions that closed throughout the last 15 years. By regressing the comparables' cash flow multipliers or revenue multipliers against their SDE%, we will produce a regression formula that will predict the appropriate multiplier for the subject and that will reflect the operating realities of today's market. A discussion on using regression in the Market Approach follows the section below.

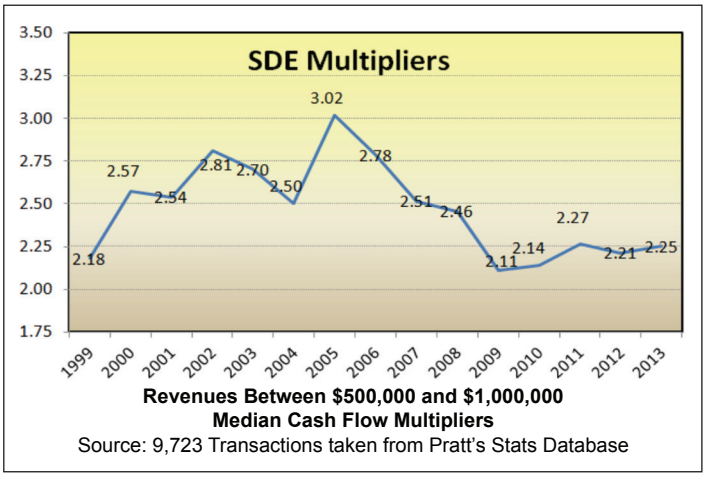
Multipliers by the Size of the Companies

Another point of observation that I found interesting is that the decline in cash flow multipliers affected smaller sized companies far more than larger sized ones. In Exhibit 4 below, I sorted the Pratt's Stats database into four groups to track multipliers for the last 15 years: 1) companies with less than $500,000 in revenue; 2) companies between $500,000 and $1 million; 3)

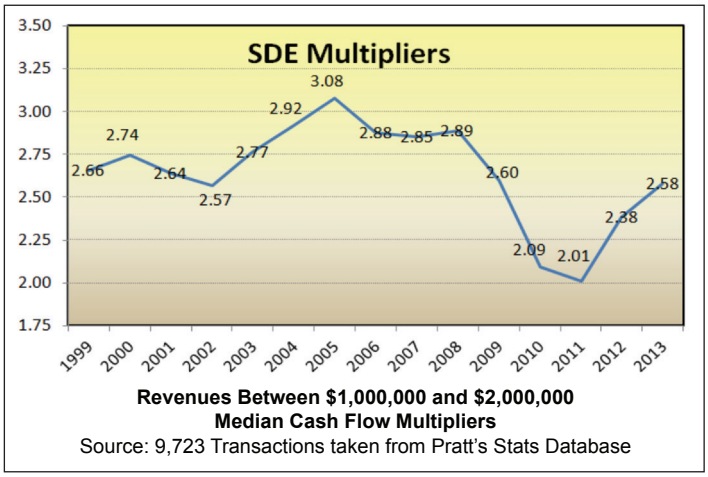
Exhibit 4: The Effect of Company Size on Cash Flow Multipliers



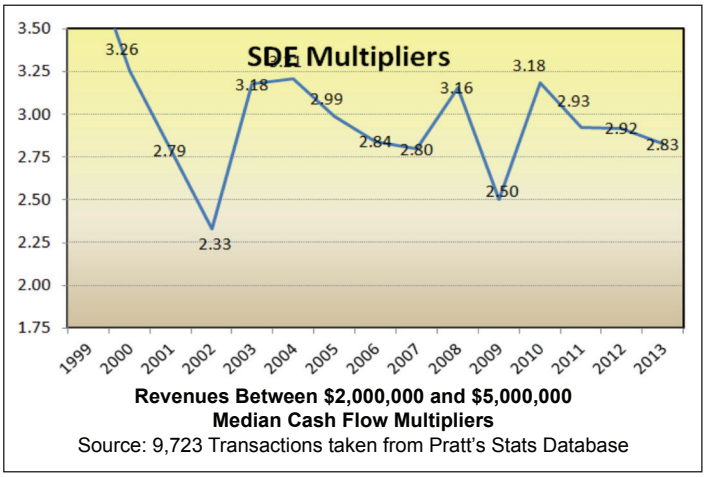
Revenues Between $1 and $500,000
Median Cash Flow Multipliers
Source: 9,723 Transactions taken from Pratt's Stats Database



Revenues Between $500,000 and $1,000,000
Median Cash Flow Multipliers
Source: 9,723 Transactions taken from Pratt's Stats Database



Revenues Between $1,000,000 and $2,000,000
Median Cash Flow Multipliers
Source: 9,723 Transactions taken from Pratt's Stats Database



Revenues Between $2,000,000 and $5,000,000
Median Cash Flow Multipliers
Source: 9,723 Transactions taken from Pratt's Stats Database

companies between $1 million and $2 million; and, 4) companies between $2 million and $5 million.

Companies under $500,000 have been hit the hardest by the recession. Not only have cash flow multipliers dropped 30 percent since 2006, but also they have not rebounded after the economy began improving in 2011. A possible explanation for this decline may be the fact that these smaller companies can no longer produce a high enough living wage at today's inflated cost of living. Thus, demand for these companies has declined and probably will continue to decline. The observed decline in multipliers for this group of small companies, then, may be more demand-driven rather than the result of the recession.

Companies with revenues between $500,000 and $1 million saw their cash flow multipliers drop 20 percent since 2006. However, there has been a modest 6 percent rebound since 2009. Companies with revenues between $1 million and $2 million had multipliers decline 10 percent since 2006, but have rebounded a solid 23 percent since 2009. Their multipliers for 2013 are just 2 percent below the 15-year average. Companies over $2 million have a cash flow multiplier in 2013 that is the same as it was in 2006 and is the same as the average for the last 14 years (1999's multiplier was inordinately high due to a small sample size).

Thus, if you are is using conventional methodologies (median or harmonic mean of a sample) to estimate multipliers for smaller companies, the decline in multipliers since 2006 can cause a significant distortion in your results. You may want to select comparables that are less than six years old or use the indexing method suggested by Toby Tatum. For those companies with revenues greater than $1 million, you should select comparables from over the last 15 years with no single year having too much weight.

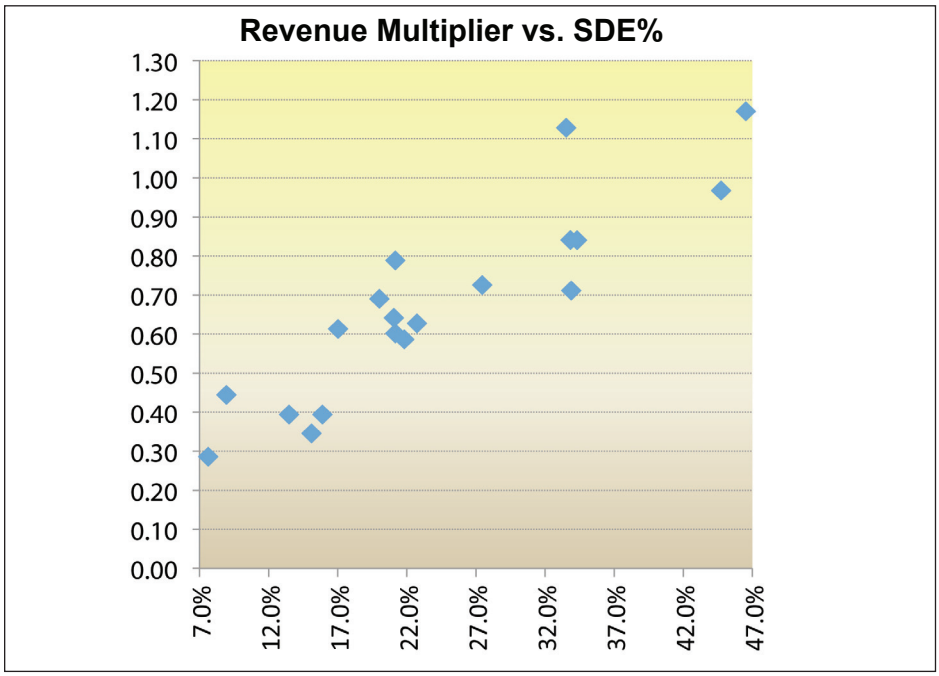
Using Regression Analysis to Predict Multipliers

As we observed above, the use of regression analysis eliminates the need to adjust multipliers for the effects of the timing of the sale. The following discussion on using regression to predict multipliers is considerably abbreviated in this article due to space constraints. I encourage the reader to go to the "Pricing Services" page on my website, www.affordablebusinessvaluations.com, for a complete article on the subject. Included in the article under Appendix A is a step-by-step primer on how to use Excel's regression utilities with this methodology.

Exhibit 5: Sample of Comparables

Obsvn.	Selling Price (a)	Gross Revenue (b)	Cash Flow (c)	Revenue Multiplier a ÷ b	SDE% c ÷ b	Cash Flow Multiplier a ÷ c
1	300,000	1,050,000	80,000	0.29	7.6%	3.75
2	422,000	950,000	85,000	0.44	8.9%	4.96
3	305,000	774,000	104,000	0.39	13.5%	2.92
4	515,000	1,490,000	225,000	0.35	15.1%	2.29
5	305,000	774,000	123,000	0.39	15.9%	2.48
6	600,000	979,000	167,000	0.61	17.0%	3.60
7	768,000	1,113,000	223,000	0.69	20.0%	3.45
8	725,000	1,205,000	255,000	0.60	21.2%	2.84
9	750,000	1,279,000	279,000	0.59	21.8%	2.69
10	950,000	1,205,000	255,000	0.79	21.2%	3.73
11	850,000	1,325,000	279,000	0.64	21.1%	3.05
12	345,000	550,000	125,000	0.63	22.7%	2.76
13	415,000	572,000	157,000	0.73	27.4%	2.64
14	570,000	505,000	169,000	1.13	33.5%	3.37
15	971,000	1,156,000	391,000	0.84	33.8%	2.48
16	682,000	959,000	325,000	0.71	33.9%	2.10
17	600,000	714,000	245,000	0.84	34.3%	2.45
18	1,182,000	1,222,000	547,000	0.97	44.7%	2.16
19	1,195,000	1,021,000	475,000	1.17	46.5%	2.52
Avg:	746,000	962,000	241,000			
			Lowest 16% =	0.43	13.2%	
			Lower Quartile =	0.52	16.5%	
			Median =	0.64	21.2%	
			Harmonic Mean =	0.77	21.2%	
			Upper Quartile =	0.81	33.7%	
			Highest 16% =	0.92	35.2%	

Exhibit 6: Revenue Multiplier vs. SDE%



The first step in understanding regression is a visual example of the relationship between a company's cash flow profit margin (SDE%) and its revenue multipliers. Exhibit 5 is a typical list of comparables that an appraiser would assemble showing each observation's selling price, revenue, cash flow and the resulting Revenue Multiplier and Cash Flow Multipliers. What every appraiser also should do is add a column to the list showing each comparable's calculated cash flow profit margin (SDE ÷ revenues). After completing one's sample table, sort the data by the cash flow profit margin (SDE%) from the smallest value to the largest (see the column highlighted in yellow).

You will notice that companies with the lowest cash flow and SDE% also tend to have the lowest revenue multipliers and, those with the highest cash flow and SDE% tend to have the highest revenue multipliers. For example, the lower quartile of companies had an SDE% of 16.5 percent and a revenue multiplier of only .52, whereas the upper quartile had an SDE% of 33.7 percent and a revenue multiplier of .81. *This, of course, makes perfect sense—companies that are more profitable just sell for higher prices.*

The revenue multiplier and the SDE% for each observation in Exhibit V is plotted on a scatter chart shown in Exhibit VI. You will notice that the blue dots representing each comparable trend upward from left to right. Basically the dots are telling us that the higher the company's profitability (moving from left to the right on the horizontal x-axis), the higher the revenue multiplier is (moving upward on the vertical y-axis). *Visually we can see that the profitability of a company is a driver to its potential revenue multiplier.*

Regression analysis very simply translates the relationship that we can see into a numeric equation. That equation is for a straight line that represents the closest fit to all the blue dots on the scatter chart.

Exhibit 7: Regression Market Line

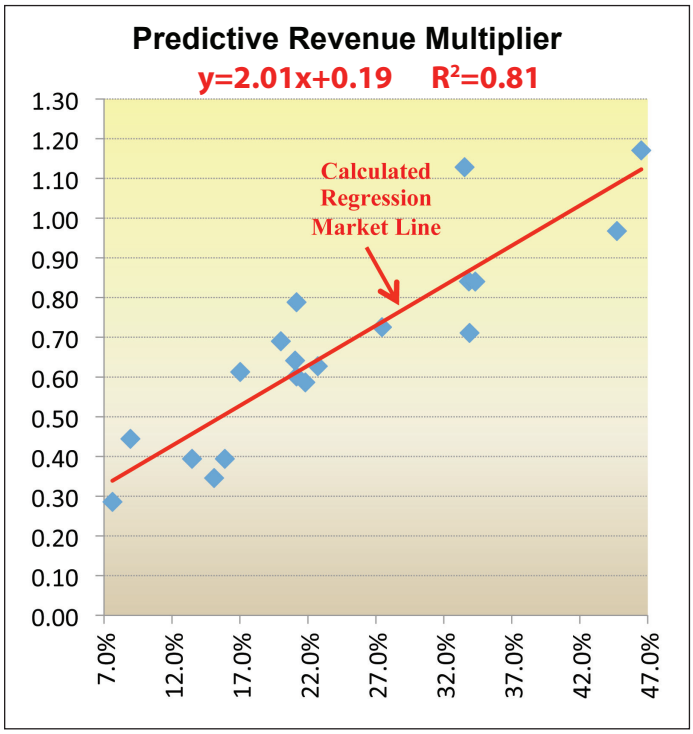
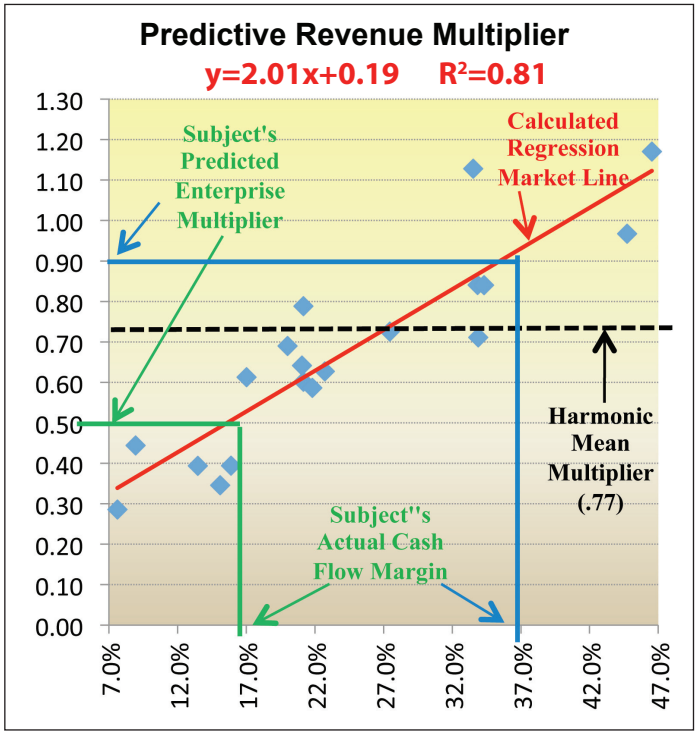


Exhibit 8: Predictive Revenue Multiplier



In other words, the regression line best describes where the market is. We could certainly have taken a ruler and manually drawn a line through the middle of the blue dots and made a good estimate of the market trend line. However, regression does it with exact precision.

Using Excel's regression utility, we can calculate the regression line by identifying the SDE% as the independent variable in the equation and the revenue multiplier as the dependent variable. The regression utility will produce a chart similar to the one on the left. (I again refer you to Appendix A of the article on my website to learn how to use Excel's regression utility).

In Exhibit 7, we have added the regression market line (in red) that was plotted using the calculated regression equation shown at the top of the chart in red (y = 2.01x + 0.19). This line represents the closest fit to all the blue dots.

For demonstration purposes, in Exhibit 8, I have also added a black dotted line that represents the harmonic mean that was calculated for the sample in Exhibit 5. What we notice immediately is that the harmonic mean suggests that regardless of the level of the subject's cash flow, it will always earn the same revenue multiplier—.77; whereas the regression line suggests that as a company becomes more profitable it will earn a higher multiplier.

For example, Exhibit 8 shows the scenarios of two possible transactions. The green lines on the chart represents a company with a low-level of profitability. The 17 percent SDE% suggests that the appropriate revenue multiplier for this company is .53, whereas, the harmonic mean predicts .77. The second company (shown in blue) is highly profitable with an SDE% of 37 percent. The regression equation would suggest a multiplier of .93 (y = 2.01 x .37 + .19). Again the harmonic mean would suggest .77. Logically we can assume that an underperforming company with a 17 percent operating margin is worth less than a highly profitable company with an operating margin of 37 percent. However, the harmonic mean would suggest they are both worth the same.

Regression analysis properly incorporates profitability into determining multipliers, whereas harmonic mean and median do not. Revenue Ruling 59-60, after all, directs us to use methodologies that are based on a company's profitability.

[Note: The discussion on the relationship of a company's SDE% and its cash flow multiplier is considerably more complicated. The reader is directed to article 2 posted on my website www.affordablebusinessvaluations.com on the "Pricing Services" page for an in depth discussion.]

C. Fred Hall, MBA, CBA, CVA, is the CEO of Affordable Business Valuations. He received his bachelor's degree in business from UC Berkeley and his MBA from San Diego State University. He can be reached at cfredhall@att.net or (209) 256-1371.