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## Letter to the Editor

Dear Editor:

I read with interest the article in the April 2012 issue of *BVU* by C. Fred Hall III, titled "How Regression Analysis Makes the Market Approach More Valuable." I congratulate Mr. Hall for using regression analysis in his own work and for encouraging others to do so through published articles and content available on his website. It is evident that Mr. Hall has put in much time and effort thinking through how appraisers can apply regression analysis to the market approach. However, I'd like to address some concerns that, if not dealt with, could lead to a *Daubert* challenge.

Mr. Hall suggests building a multiple regression model with the four key independent variables of gross revenue, cash flow (aka seller's discretionary earnings), inventory, and fixtures (aka furniture and equipment). This model will suffer from the infirmity of multicollinearity caused by the fact that gross revenue and cash flow can be more highly correlated with each other than either is with the selling price. This will cause one or more coefficient signs to be negative and will either over- or understate the values of all the variable coefficients, preventing the analyst from determining the actual impact of each variable on selling price.

The use of inventory as one of the independent variables in the multiple regression model is problematic. Inventory is typically valued separately by the buyer and seller and transacts on a dollar-for-dollar basis, often after the closing. The selling price of a business's fixed and intangible assets won't change depending upon the value of the inventory, even when there is either excess or deficient amounts of inventory. Therefore, even though inventory values are correlated and associated with selling prices (larger companies have bigger selling prices and inventories), inventory itself is not a value driver and therefore, should not be in the regression model.

I also take issue with using fixtures as an independent variable in the multiple regression model. The use of fixtures is problematic for two reasons. One, we don't know whether the value given for fixtures is book value from the latest balance sheet or the allocated price in the P&S. If the latter, we all know that since fixed assets have shorter depreciable lives for tax purposes than do intangible assets, they are allocated an amount that is higher than their actual fair market value. So, in either case, the wrong values are assigned to fixtures—book value is too low, and

allocated price is too high. But more importantly, fixtures should not be included in the regression model because they are in the selling price and the analyst would be creating a tautology, or a circular reference. How easy it would be to predict selling prices if we only knew the value of the fixed and intangible assets!

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Kudos to Mr. Hall for insisting that a company's degree of profitability (its return on sales) be taken into account when developing a multiple of sales, for certain, and even in some circumstances when developing a multiple of cash flow. However, I would caution the reader that these ratio models

(price/revenue versus SDE/revenue, and price/SDE versus SDE/revenue) are not substitutes for each other and are applicable only in certain situations. Which model to use in any particular situation cannot be automated by some computer program, but will require the use of reasonableness, common sense, and informed judgment.

I also wish to address the weighting of the results of the three different models by using R-squared as the weighting factor. There is nothing in the regression literature to support this procedure, and better ways exist for combining forecasts, such as regressing—in a multiple regression model—the observed selling prices against the predicted selling prices of each model. Therefore, the use of the revenue multiplier model and the cash flow multiplier model together in a valuation assignment is often inappropriate because the analyst will need to choose the more suitable of the two models. This will leave the analyst with only one regression model for the market approach. And this is OK—we use only one model in the income approach, as the single-period capitalization model is mutually exclusive with the multiperiod DCF model.

I appreciate this opportunity to comment on Mr. Hall's article and look forward to reviewing more of his website content on this topic.

Sincerely,

Mark G. Filler, CPA/ABV, CBA, AM, CVA