

# The Tornado Diagram

## ***A Twist on Business Valuation***

By Jon Vencil

### ***What is a company worth?***

This question often perplexes businesses of all types and sizes. For publicly traded companies involved in merger and acquisition activities, the answer often involves an analysis of stock prices which, theoretically, incorporates net cash flow analysis and perceived risk. This method has its own shortcomings, which will not be discussed in this article. But what about privately held companies where information on stock prices does not exist?

Several methods exist to value nonpublic companies. The most common methods employed by accountants are computing earnings before interest and taxes (EBIT), or computing earnings before interest, taxes, depreciation and amortization (EBITDA). Unfortunately, these methods have flaws. Often the income data is distorted for tax planning or other purposes. Additionally, current or potential owners are paid after deduction of expenses to working capital. How can you then value a company's worth?

### ***Identifying Drivers***

An alternate approach to valuation is to start by identifying the drivers of a business' revenue and costs. By identifying these elements, a more accurate picture of the business's current and potential value will emerge. This is important information for decisions such as; whether to buy or sell a business, acquire financing, purchase equipment to expand a business, or devote resources to making the business more profitable.

The most common way to appraise value is to examine annual profit (total revenue minus total costs). Profit alone, however, does not provide sufficient information to value a company. The drivers of profit must be identified. An easy way to identify these drivers is through the transactions that make up the income statement.

To begin the analysis, use all the entries in each income category and calculate a transaction's average dollar value. You may need to export the data to another application to perform the calculations. These average values will serve as a baseline for additional analysis.

### ***Measuring Sensitivity***

Measuring sensitivity is another way of asking, "What really matters in this decision?" One way to answer this question is to construct a tornado diagram. This diagram not only graphically uncovers which variables have the most influence on annual profit, it also ranks them in order of importance.

Each business will have a unique set of variables that influence its total revenue and total costs. Looking at total contribution to profit only can be misleading. For this article we construct a simplified example using a hypothetical landscaping business with eleven product lines. To begin the analysis, calculate the average transaction for each income category. This will be used as the baseline.

One product line in our hypothetical company is Design Services. According to the income statement it generated \$14,060 in revenue over the period. There were 11 individual jobs for design services, so the average job generated \$1,278.18.

Another product line, Installation Services generated \$24,462. There were 70 individual jobs here with an average job generating \$349.96.

Use the income statement to simplify the analysis further. Apply an overall ratio of 58% for cost to revenue.

Which service is driving this business's profitability and hence its long-term value? To find out we must measure the sensitivity of profit to changes in business operation or market conditions.

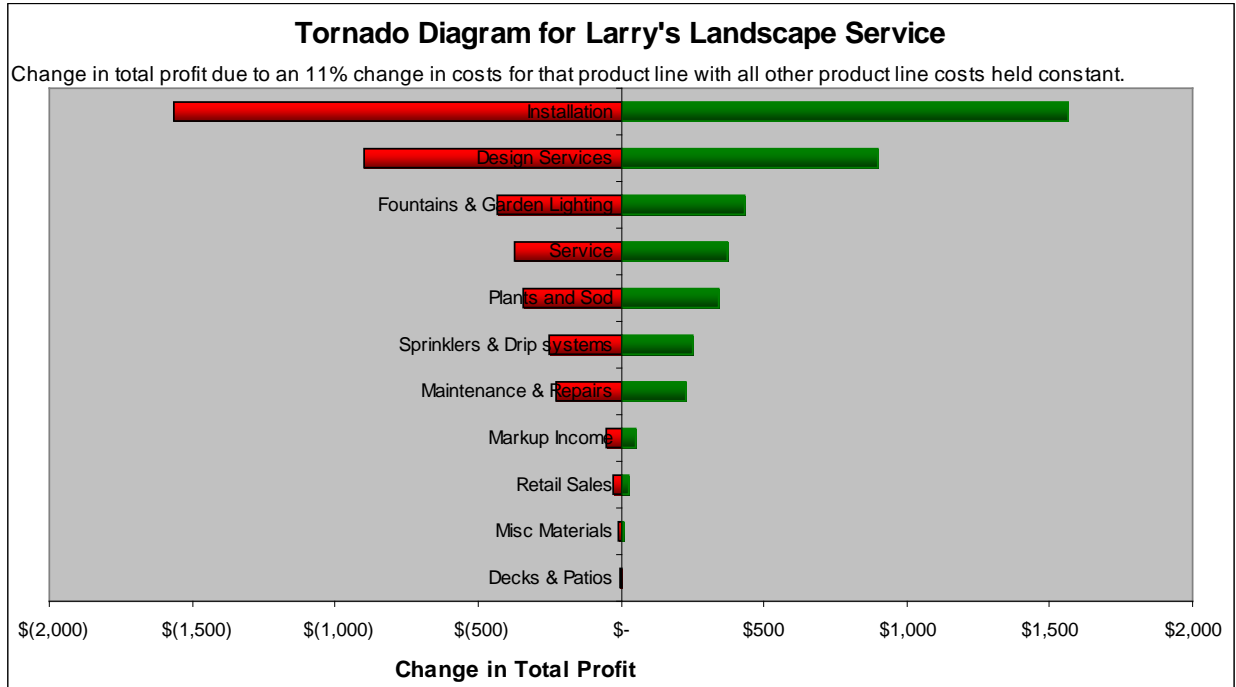
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Using the baseline data calculated earlier, reconstruct the company's total profit equation. Now "adjust" each variable, one at a time, to measure the change in total profit. For example, what if costs per job unexpectedly rise or fall by 11%? What happens to profitability?

Do this for each revenue generating variable and record the result. Now sort these results and plot them on a bar graph. The results are displayed in Figure 1.1.

Figure 1.1 Tornado Diagram



The bars show the change in total profit due to a change in costs for one product line holding all other product line costs and revenue constant.

For example, the profit from Installation Services is very sensitive to changes in costs. Assuming the number of jobs stays constant reducing costs 11% increases profit by approximately \$1,600. Conversely if costs increase by the same percentage profit will be reduced by about \$1,600. Notice that addressing the cost issue on Retail Sales, for example, will have very little effect on profitability.

For this business the implications are that any efficiency efforts should be directed toward the areas with the greatest sensitivity to costs (installation services). Marketing efforts may want to be focused on areas with high average contribution to profit (Design Services), but low total contribution to profit because currently the number of jobs is relatively small.

## Conclusion

Valuation of businesses (public and private) involves more than EBIT and EBITDA. Uncovering the drivers of profit is more important than capturing reported profit. By using a tornado diagram, the drivers of profit can be identified, presented graphically and ranked in their order of importance for value creation. This information can be used in a variety of situation to make smarter, more informed, business decisions.

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