Operating Leverage

What is corporate risk? As pointed out in prior blog posts, a company's risk comes down to the fluctuations of its free cash flows (FCF). Assuming that the past reflects the future, a standard deviation of the company's past FCFs represents its current risk. The reason this is true is that a company exists to benefit its stakeholders, and this is accomplished through paying out FCFs to its bond holders in the form of interest payments, and in paying out FCFs to its stockholders in the form of FCFs. FCFs that are retained fuel the capital gains in the company's stock price, which is value created for the shareholders. Clearly healthy and stable FCFs are critical. If actions are taken to raise and to stabilize free cash flow, then a lower risk and higher return can be obtained in the future, but only through actions taken by management. And vice versa where management takes actions that increase their company's free cash flow fluctuations and or decrease their FCF, thus increasing the risk to the firm and its stakeholders.

Fluctuations can occur for many reasons: unstable raw material or labor expenses, changing utility costs (fuel included), unstable sales volume or sales price (macroeconomic cycles or competition), increased or decreased financial leverage, change in the company's physical asset base or human capital via a start-up, M&A, or restructuring, and finally operating leverage. This list is not exhaustive, but covers many of the potential reasons. Assets are key because it is the physical and/or human assets that ultimately determine the company's FCF and its variance, plus are difficult to impact quickly if the FCFs are too low or unstable. Take for example a piece of equipment that fails often bringing down the entire production line. Such a piece of equipment fails randomly, but frequently, resulting in FCF variance. The company and its FCFs are the sum of all the individual assets that it employs.

So what is operating leverage? Operating leverage is where a company chooses fixed expenses over variable expenses to reduce their operating expense per unit of revenue. Examples would be the hiring of a permanent employee versus a contractor since the contractor is billable at a higher rate (not to mention learning curve losses), or the automation of an assembly line with robots replacing humans since their scrap rate is lower, and their production rate is higher. These both sound great, and they can be, provided that the revenue remains constant and/or growing and is sufficient to cover these fixed expenses. A contractor can have their contract terminated with no repercussion, or an assembly worker can be furloughed, but a full-time employee can not be laid off without unemployment benefits and severance, and the depreciation of the robots and interest on any loans to automate the assembly line do not go away even when the robots are turned off. What this means is that a variable expense system is less sensitive to downturns in revenue than a fixed expense system (i.e., has lower losses), but its profits are also less in good times. So be levering up with operating leverage, management is making a bet on their future revenues, and wish to maximize their profits via this bet.

Like anything in finance, if modeled correctly, operating leverage can be employed safely, minimizing risk while maximizing return. Here are some thoughts on how this can be done:

1. Quantify your Fixed, semi-variable, and variable expenses on your Profit and Loss Statement (P&L). These include Cost of Goods Sold (COGS) and Sales and General Administration expense (SG&A). If you are unsure of an expense and what type it, plot it against revenue, and any expense that correlates well is variable (R^2 above 0.6), and any expense that does not correlate well (R^2 below 0.6) is fixed or semi-variable. Semi-variable expenses have a base fixed rate, then have a variable component added on, so they may act variable initially, then act like fixed expense as revenue lowers.
2. Group all expenses into two buckets, fixed and variable.

3. Study and model the relationship over time of the revenue, fixed expense, variable expense, and profit. Variable expense should be a function of revenue, whereas fixed expense should not, so a break-even point will exist where operating profit equals zero as revenue is reduced (i.e., Earnings Before Interest and Taxes, EBIT). Our goal is to develop a model that mimics historical reality, and then use this model to understand where this break-even point exists. On a per unit basis the following tradition definition exists, but this can be extended in aggregate on an absolute dollar basis to the P&L.

$$P = (S - V) \times N - F$$

Where:

P = Total Profit ($)

S = Sales Price ($/Unit)

V = Variable Expense ($/Unit)

N = Units Produced

F = Fixed Expense ($)

4. Extend this model further deriving the historical Free Cash Flow to Investors (FCFI, see my previous blog post regarding this: **FCFI**) and study where the FCFI no longer is sufficient to meet the interest payments to the bond holder, and/or dividends payments to the stockholder -this is the true break-even point for the company.
5. When looking at the break-even on EBIT and FCFI, look back historically and derive the standard deviations (σ) of these two metrics, and provide for a 3σ buffer between your target operating leverage (i.e., percent of fixed expense) and break-even. Any dip below break-even is insolvency, and our goal is to always stay above this.

The formulas that follow expand upon Step #5 above:

$$EBIT = Sales - COGS_V - COGS_F - SG\&A_V - SG\&A_F - DA$$

$$EBIT_1 = Sales_1 - COGS_{V,1} - COGS_{F,1} - SG\&A_{V,1} - SG\&A_{F,1} - DA_1$$

$$EBIT_2 = Sales_2 - COGS_{V,2} - COGS_{F,2} - SG\&A_{V,2} - SG\&A_{F,2} - DA_2$$

$$COGS_{F,1} = COGS_{F,2}$$

$$SG\&A_{V,1} = SG\&A_{F,2}$$

$$DA_1 = DA_2$$

$$\Delta EBIT = \Delta Sales - \Delta COGS_V - \Delta SG\&A_V$$

$$EBIT_0 + \Delta EBIT \geq 3 \times \sigma_{EBIT}$$

Breaking out the expenses into fixed and variable COGS and SG&A, EBIT can be expressed by the first equation above. If we wish to find the change in EBIT over time this same equation can be extended to time period 1 and 2, thus the second and third equations above. If we assume that no material changes have been made to the company, then the fixed expenses and DA will cancel between the two time periods, leaving only the change in the variable expenses and sales defining the change in EBIT. Finally, as an optimization step, we can define the maximum change in EBIT, added to the base $EBIT_0$ having to be greater than three times the historical standard deviation of EBIT. This maximum change in EBIT can then be worked backwards through the equations to define the optimum operating leverage based upon sales forecasts.