# **INSIGHTS INTO OPERATING AND FINANCIAL LEVERAGE**

PH.D. LECT. LAURA GIURCA VASILESCU Faculty of Economy and Business Administration University of Craiova e-mail: laurra2004@yahoo.com PH. D. LECT. DANIELA GIURESCU Faculty of Law University of Craiova e-mail: danagiurescu@yahoo.com

Operating leverage reflects the impact on operating income of a change in the level of output. Financial leverage reflects the impact on returns of a change in the extent to which the firm's assets are financed with borrowed money. Despite the fact that both operating leverage and financial leverage are concepts that have been discussed and analyzed for decades, there is substantial disparity in how they are defined and measured by academics and practitioners.

# 1. Introduction

Two of the main business management questions are: should a business increase or reduce the number of units it is producing or should it rely more or less heavily on borrowed money? The answer depends upon how a change would affect risk and return.

Leverage is used to explain a firm's ability to use fixed-cost assets or funds to magnify the returns to its owners. Leverage exists whenever a company has fixed costs. There are three types of leverage in financial management: operating, financial, and total leverage.

Operating leverage is based on the relationship between a firm's sales revenue and its earnings before interest and taxes. Operating leverage arises when an enterprise has a relatively large amount of fixed costs in its total costs.

Financial leverage is a financial technique that uses borrowed funds or preferred stock (items involving fixed financial costs) to improve the return on an equity investment. As long as a higher rate of return can be earned on assets than is paid for the capital used to acquire the assets, the rate of return to owners can be increased. This is referred to as positive financial leverage. Financial leverage is used in many business transactions, especially where real estate and financing by bonds or preferred stock instead of common stock are involved. Financial leverage is concerned with the relationship between the firm's earnings before interest and taxes (EBIT) and the earnings available to common stockholders or other owners. Financial leverage is often referred to as "trading on the equity." Total leverage reflects the impact of operating and financial leverage on the total risk of the firm (the degree of uncertainty associated with the firm's ability to cover its fixed-payment obligations).

### 2. Operational and Financial Leverage - theoretical fundaments

Operating leverage is the name given to the impact on operating income of a change in the level of output. Financial leverage is the name given to the impact on returns of a change in the extent to which the firm's assets are financed with borrowed money. Despite the fact that both operating leverage and financial leverage are concepts that have been discussed and analyzed for decades, there is substantial disparity in how they are defined and measured by academics and practitioners.

The degree of operating leverage (DOL) is sales revenue less total variable cost divided by sales revenue less total cost:

$$DOL = \frac{q(p-v)}{q(p-v)-f} = \frac{Sales-VC}{EBIT} \quad (1)$$

where:

q = quantity p = price per unit v = variable cost per unit f = total fixed costs VC = variable costs EBIT = earning before interest and tax

Operating leverage can be also defined as the impact of a change in revenue on profit or cash flow. It arises, they say, whenever a firm can increase its revenues without a proportionate increase in operating expenses.

The degree of operating leverage is directly proportional to a firm's level of business risk, and therefore it serves as a proxy for business risk.

Financial leverage reflects the amount of debt used in the capital structure of the firm. Because debt carries a fixed obligation of interest payments, the firm have the opportunity to greatly magnify our results at various levels of operations.

The degree of financial leverage (DFL) can be defined as the percentage change in earnings per share (EPS) that results from a given percentage change in earnings before interest and taxes (EBIT), and it is calculated as follows:

$$DFL = \frac{Percentagehangen EPS}{Percentagehangen EBIT}$$
(2)

This measure of degree of financial leverage DFL is affected by the initial earnings EBIT. This measure of financial leverage is not useful to compare companies whose initial profits and earnings that are most certainly different, and it is also inadequate for comparisons over time for the same company.

The degree of combined leverage (DCL) is a measure of the total leverage (both operating and financial leverage) that a company is using:

$$DCL = \frac{\%\Delta EPS}{\%\Delta \text{ Sales}} = \frac{\%\Delta \text{ EBIT}}{\%\Delta \text{ Sales}} \times \frac{\%\Delta EPS}{\%\Delta \text{ EBIT}} = DOL \times DFL \qquad (3)$$

## 3. Operational and Financial Leverage - new correlations

Clarity in regard to operating and financial leverage is important because these concepts are important to businesses. Small and medium-sized business often have difficulty using the highly sophisticated quantitative methods which are used by the large companies. Fortunately, the simple break-even graph is simple and easy to interpret; yet it can provide a significant amount of information. The algebra necessary to compute operating and financial leverage, too, is not very complex. Unfortunately, it comes in a several guises; not all equally easy to understand or equally useful.

The operating leverage reflects the difference in the relative importance of fixed cost. Fixed costs play no role in determining how rapidly profit rises after break-even. This is determined by the ratio of variable cost per unit to price per unit.

It is true, of course, that if a businesses substitutes capital for labor; thereby raising its fixed costs, it will simultaneously reduce a variable cost, labor cost, per unit. Some businesses by their very nature, must employ a high ratio of capital to labor. If at the maximum possible level of output, fixed costs are a large percent of total costs, price per unit will have to be high relative to variable cost per unit in order for the business to be able to earn a profit. If a price much greater than variable cost per unit cannot be obtained, the business will be liquidated.

Since the "bottom-line" for a business is the rate of return on equity, it would seem that the most appropriate method of computing operating leverage is to compute what EBIT will be at various levels of output. In evaluating the wisdom of their investment in a corporation, its owners should use the current market value of its stock, because this is what they would have available to invest elsewhere if they liquidated the stock.

Businesses change the level of output in order increase the rate of return enjoyed by their owners. This can be done either by selling more units or avoiding producing units which cannot be sold without a rate-of-return-reducing reduction in price. Here it is assumed that changing the level of output will not affect price, which is certainly often true in the real world for a small business.

A simpler, more meaningful way to the owner of a business to measure operating leverage is to compute the change in the following ratio resulting from a given increase or decrease in the level of output from its current level.

$$m = \frac{pq - (qv + f)}{pq}$$
(4)

where:

m = profit margin before interest and taxes, that is: EBIT/sales revenue

The value of this ratio is greater the lower is the ratio of variable cost per unit to price per unit; so, the greater is this ratio, the higher is operating leverage.

Operating leverage refers to the fact that a lower ratio of variable cost per unit to price per unit causes profit to vary more with a change in the level of output than it would if this ratio

was higher. Financial leverage refers to the fact that a higher ratio of debt to equity causes profitability to vary more when earnings on assets changes than it would if this ratio was lower.

Obviously, the profits of a business with a high degree of both kinds of leverage vary more, everything else remaining the same, than do those of businesses with less operating and financial leverage. A greater variability of profits, of course, means a higher risk. Therefore, in deciding what is the optimum level of leverage, what is an acceptable risk/return tradeoff must be determined.

The degree of financial leverage (DFL) is sometimes measured as a rate of return on equity when borrowed money is used divided by rate of return as follows:

$$DFL = [q(p - v) - f - i] / e \text{ divided by } [q(p - v) - f] / [e + d]$$
(5)

where:

d - is the value of a firm's liabilities and equity plus liabilities = assets = e + d

- e equity
- d debts

By assuming various levels of debt financing at various interest rates, equation from above can be used to judge the impact at various levels of output of using more or less debt financing or paying different interest rates for a given amount of debt financing.

It is quite simple to compute what the impact on owners' rate of return will be as a result of borrowing a given percent of the money used to finance a firm's assets:

$$re = (d/e)(ra - rd) + ra$$
(6)

where:

d = debte = equityrd = rate on debt (%)ra = return on assets (%)

The return on assets would, of course, vary with the assumed level of output. The return on assets and the return on equity will be:

$$ra = (qp - qv - f)/a$$
(7)  
$$re = (d/e)[(qp - qv - f)/a) - rd] + (qp - qv - f)/a$$
(8)

that is:

The return on equity = (the ratio of debt to equity) times (the return on assets minus the cost of debt plus the return on assets)

Therefore, the bottom-line impact of financial leverage can be measured in the following way:

$$rd - re = [q(p - v) - f - i] / e - [q(p - v) - f] / (e + d)$$
(9)

where:

rd = return with borrowing

389

re = return without borrowing i = interest expense

The amount of assets being financed is held constant in order to determine the advantage of using creditors money, rather than owners' money. Therefore, if there is no borrowing, equity (e) will be greater by the amount of foregone debt (d). The larger amount of equity is measured above as (e + d).

# 4. Conclusions

Operating leverage has often been misleadingly described. It's magnitude is determined by the ratio of variable cost per unit to price per unit, rather than by the relative size of fixed costs.

Because business owners evaluate the success of the operation of their business on the basis rate of the return earned on equity, measures of operating and financial leverage that produce percent rates of return would appear to be more useful to them than those that produce index numbers.

The following equation can be used to determine the current rate of return on equity before taxes and the impact on it of a change in the level of output, amount of debt financing, cost of debt financing, price, and costs. It can be used to compute the impact of either operating or financial leverage or both of them simultaneously. If no debt financing is used, the term d/e would, of course, be omitted from the equation.

$$re = (d/e)[(qp - qv - f)/a) - rd] + (qp - qv - f)/a$$
(10)

A ratio of two versions of this equation produces an index number that will, by placing in the numerator the equation involving the higher level of output and/or debt to equity ratio, measure the degree of operating or financial leverage, that is, a ratio of the rate of return on equity after the level of output is increased or more debt is utilized to the rate of return before these changes are made.

### References

- 1. Allen, D. "How Do You Leverage?", Management Accounting-London, 1994
- 2. Buccino, G. P.; Kraig S., "The Importance of Operating Leverage in a Turnaround," Secured Lender, Sept./Oct. 1997
- 3. Darrat, A. F., Tarun K. M. "Inter-Industry Differences and the Impact of Operating and Financial Leverages on Equity Risk," Review of Financial Economics, 1995
- 4. Dugan, M. T., Donald Minyard, Shriver, A. "A Re-examination of the Operating Leverage-Financial Leverage Tradeoff," Quarterly Review of Economics & Finance, 1994
- 5. Lang, L., Eli O., Stulz, R., "Leverage, Investment, and Firm Growth," Journal of Financial Economics, 1996
- 6. Marston, F., Perry, S. "Implied Penalties for Financial Leverage: Theory Versus Empirical Evidence," Quarterly Journal of Business & Economics, 1996