THE COMBINED EVALUATION OF THE OPERATING RISK AND OF THE FINANCIAL RISK

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Abstract: While performing its current activity, a company can face two types of risks: the operating risk and the financial risk. The combined effect of these risks obviously influences the shareholders' earnings. In order to quantify this effect, we have used the degree of combined leverage, calculated in two ways, by taking into account the net result of the company and the economic value added. In order to better point out the size of the combined risk, we have made the graphical representation of the degree of combined leverage as a function of the operating result. Using this chart, we have made analyses regarding the dynamic of the combined risk for different intervals of evolutions of the operating result.

Key words: operating risk, financial risk, degree of combined leverage, economic value added

While performing its current activity, a company can face two types of risks: the operating risk and the financial risk. There is a strong connection between these two risks. Because the operating costs are covered before the financial ones, it means that the operating risk precedes the financial one. The higher are the fixed operating costs, the more difficult will be for the company to pay the interests to the creditors.

No matter the activity profile, all the enterprises post fixed costs. In exchange, the costs with interests are only posted by the companies that use bank loans or issue bonds. However, because most of the companies use borrowed capital in order to finance their activity, we can presume that the majority of the enterprises face nowadays both the operating and the financial risk. Considering the relation of interdependence between these two types of risks, they must be analyzed together, because the managers can use either the operating leverage or the financial one in order to decrease the overall risk or to increase the shareholders' earnings.

The combined risk reflects the variability of the shareholders' earnings, as a result of the unfavorable change of the operating and the financing states of the company.

We can notice that the combined risk directly affects the shareholders' earnings, that could increase or decrease with a bigger or smaller percentage, depending on the size of the operating leverage effect and of the financial leverage effect. The cumulated effect of these two leverages generates **the leverage combined effect**, which represents the variation of the shareholders' earnings as a result of using the operating and the financial leverage. Therefore, the existence of the fixed costs, both operating and financial, can cause a change of the return on equity, depending on the variation of the volume of the sold quantity.

In order to appreciate the size of the combined risk, the specialized literature recommends the use of **the degree of combined leverage (DCL)**, calculated as a product between **the degree of operating leverage (DOL)** and **the degree of financial leverage (DFL)**:

$$DCL = DOLxDFL = \frac{\frac{\Delta OP}{OP_0}}{\frac{\Delta S}{S_0}} x \frac{\frac{\Delta Nr}{Nr_0}}{\frac{\Delta OP}{OP_0}} = \frac{\frac{\Delta Nr}{Nr_0}}{\frac{\Delta S}{S_0}},$$

OP – operating profit; S – sales; Nr –net result.

The degree of combined leverage reflects the impact of a change in sales on the net result. The bigger its level it is, the higher is the combined risk. We mention that the level of DCL is always bigger than 1.

If the company only produces and sells a single product, the relation for calculating the DCL can be expressed as follows:

$$DCL = \frac{\frac{\Delta Nr}{Nr_0}}{\frac{\Delta q}{q_0}} = \frac{\frac{\Delta q(p - v) - \Delta F - \Delta I}{q_0(p - v) - F - I}}{\frac{\Delta q}{q_0}} = \frac{\frac{\Delta q(p - v)}{q_0(p - v) - F - I}}{\frac{\Delta q}{q_0}} = \frac{q_0(p - v)}{q_0(p - v) - F - I},$$

q_0 – original sold quantity; p – price per unit;
v –variable cost per unit; F – total operating fixed costs;
I – interests.

Considering the previous relation, the bigger are the operating fixed costs and the interests, the bigger is the DCL and consequently the combined risk.

The company has a variety of possible combinations between the operating and the financial leverage in order to get a certain level of the DCL. Thus, a high level of the fixed costs (that involves a high DOL) will imply the use of a smaller level of borrowed capital (cutting down the DFL) or, if the company has a high level of debts, it can reduce the combined risk by diminishing the operating fixed costs.

When using the combined leverage in order to increase the results, a special attention has to be paid to the fact that investors (shareholders and creditors) will require a higher return once the combined risk increases, in order to compensate the higher risk. As a result, when the DCL grows, the cost of the invested capital grows with a higher rate against the additional earnings, which involves a carefully maneuver of the combined leverage.

Further on, we'll use **the economic value added (EVA)** in order to calculate the degree of financial leverage, which will lead to a change in the formula of the degree of combined leverage. The new relation is:

$$DCL^* = DOLxDFL^* = \frac{\frac{\Delta OP}{OP_0}}{\frac{\Delta S}{S_0}} x \frac{\frac{\Delta EVA}{EVA_0}}{\frac{\Delta OP}{OP_0}} = \frac{\frac{\Delta EVA}{EVA_0}}{\frac{\Delta S}{S_0}}.$$

In this case, the DCL* reflects the impact of the relative variation of the sales on EVA. In order to express the relation in a simpler way, we'll consider that the enterprise only sells a single product on the market. Therefore, the DCL* can be determined as follows:

$$DCL^* = \frac{\frac{\Delta EVA}{EVA_0}}{\frac{\Delta S}{S_0}} = \frac{\Delta q(p - v) - \Delta F - \Delta I - \Delta Ceq}{q_0(p - v) - F - I - Ceq} x \frac{q_0 p}{\Delta qp} = \frac{\Delta q(p - v)}{q_0(p - v) - F - I - Ceq} x \frac{q_0}{\Delta q} =$$

$$= \frac{q_0(p - v)}{q_0(p - v) - F - I - Ceq},$$

Ceq – cost of equity.

This way, the DCL* can be determined as a ratio between the margin of the variable costs and the economical value added. When using the economical value added for calculating the degree of combined leverage, EVA has to be positive, in the opposite case, the DCL would loose its economical significance.

In order to better analyze the level and the evolution of these coefficients, we'll further make the graphical representations of the degree of combined leverage (DCL) and of the degree of changed combined leverage (DCL*), as functions of the operating result. We mention that we'll consider the mathematical approach for these coefficients in stead of the economical one. The use of the mathematical approach will determine the variation of the degrees of leverage on an interval between - ∞ and + ∞. The independent variable is the operating result. The type of the functions is hyperbolic and they have the following mathematical expression:

$$DCL = \frac{OP + F}{OP - I} = 1 + \frac{F + I}{OP - I};$$

$$DCL^* = \frac{Op + F}{Op - I - Ceq} = 1 + \frac{F + I + Ceq}{Op - I - Ceq}.$$

The graphic of these variables has the shape of a hyperbole, as in the following figure.

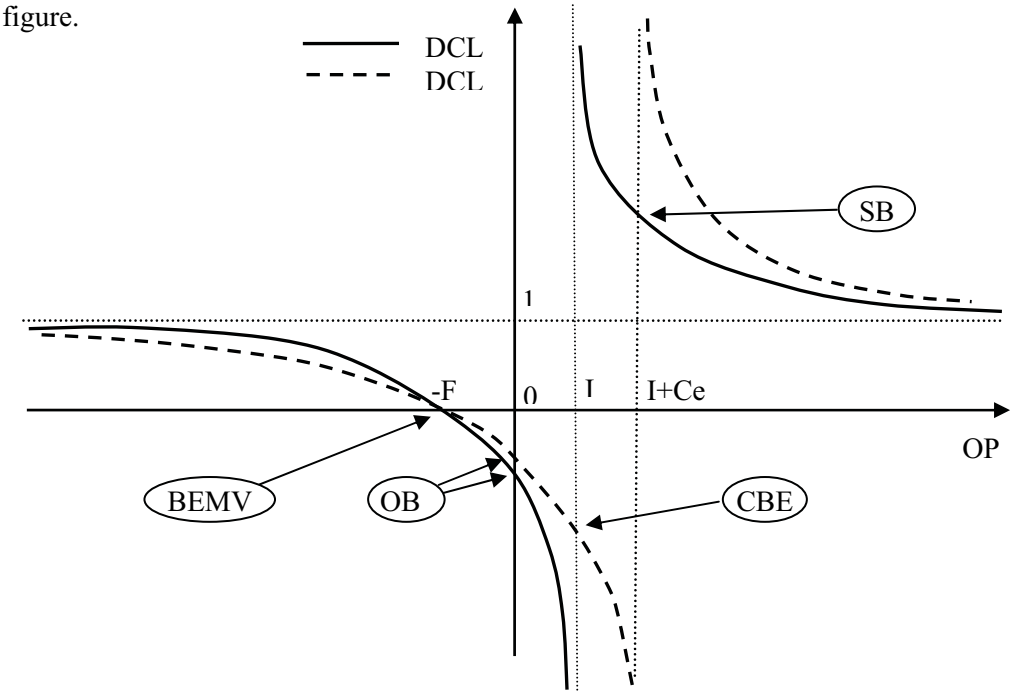

Figure no. 1. The dynamic of DCL and DCL* depending on the operating result

Depending on the level of the operating result, these two coefficients can take the following values:

a) OP < – F: $0 < DCL < 1; 0 < DLC^* < 1$

There is a very difficult situation for the company, because, on this variation interval of the operating result, the company not only posts operating losses, but it has a negative margin of the variable costs. This means that the price doesn't cover the variable cost per unit. The DCL and DCL* have positive values, but under 1, on this variation interval of OP, and have a decreasing trend. The level of DCL is higher than DCL*, which means a higher sensibility of the net result against the economic value added, when the sales change with one percent.

b) OP = – F: $DCL = 0; DCL^*=0$

In this point, the margin of the variable costs becomes null, which means that the price equals the variable cost per unit; the company covers the variable costs, but not the fixed ones. This point can be defined as **the break-even of the margin of the variable costs (BEMV)** and the enterprise shouldn't decrease its operating result under this level. The chart of the two coefficients crosses the x-axis in this point.

c) – F < OP < 0: $-\frac{F}{I} < DCL < 0; \; -\frac{F}{I+Ceq} < DCL^* < 0$

Gradually, the selling price is rising and the margin of the variable costs becomes positive, but still it is not big enough to entirely cover the fixed operating costs. After surpassing the break-even of the margin of the variable costs, the level of DCL* becomes bigger than DCL.

d) OP = 0: $DCL=-\frac{F}{I}; \; DCL^*=-\frac{F}{I+Ceq}$

This is **the operating break-even (OBE)**, which allows the company to entire cover its fixed operating costs and the net result is zero.

e) 0 < OP < I: $DCL < 0; \; -\frac{F+I}{Ceq} < DCL^* < 0$

In this area, the OP yet doesn't entirely cover the interests, which determines a negative net result. The operating risk is very high, especially when the operating result is close to zero. The rise of the operating profit determines the reduction of the DCL that tends toward infinite while the operating result becomes close to the level of the interests.

f) OP = I: DCL takes no values; $DCL^* = -\frac{F+I}{Ceq}$

This is the **creditors' break-even (CBE)**, where the sold quantity allows the enterprise to get an operating result that entirely covers the interests, but the net profit is 0. This is the asymptote of the chart of the DCL function.

g) I < OP < I + Ceq: $1+\frac{F+I}{Ceq} < DCL; \; DCL^* < -\frac{F+I}{Ceq}$

The enterprise has a positive and increasing net result, but still it is not big enough to satisfy the requirements for return of the shareholders. The DCL level becomes bigger than 1 and than DCL* and has a rapid decrease rate. The size of CLC* is negative, heading towards $-\infty$ while the operating result increases. The combined risk is high when the operating result is very close to the level of interests.

h) OP = I + Ceq: $DCL = 1 + \frac{F + I}{Ceq}$; DCL* has no values

The company reaches **the shareholders' break-even (SBE)**. The operating result is big enough to remunerate the invested capital (the borrowed capital and the owned capital), but there is nothing left after covering this cost. The asymptote of the DCL* chart is reached.

i) OP > I + Ceq: $1 < DCL < 1 + \frac{F + I}{Ceq}$; $1 < DCL^*$

This is the most favorable situation for the company, because it generates ***economic value added*** for the shareholders. The level of DCL and DCL* tends towards 1 while the quantity and the operating result grow. The combined risk (operating and financial) has a decreasing trend.

The use of these coefficients must be differently carried out. Thus, if a company faces a lot of difficulties, it hasn't a satisfactory return of the operating activity so that to cover the fixed operating costs, then the use of the cost of the invested capital when determining the degree of the financial leverage is not justifiable, because the enterprise can hardly manage to pay the interests and to refund the installments. In these circumstances, the issue of the effect of the cost of the invested capital on the capacity of the company to create added value for the shareholders is out of discussion. But, if the enterprise has a high performance and uses efficiently the bank loans and has no problem in paying the interests, then it could moot the question regarding the capacity of the sources of capital to generate added value for the shareholders. In this latter case, it is recommended to calculate the degree of financial leverage and of combined leverage using the economic value added.

When constructing the indicators for appreciating the risk, the use of the economic value added is a first step in changing the managers' attitude regarding the level of the shareholders' earnings, the real performances of the operating activity and their correlation with the sources of capital.

REFERENCES

1. Buşe L., Siminică M., Marcu N. — Analiză economico - financiară, Ed. Scrisul Românesc, Craiova, 2003
2. Radu F., Cîrciumaru D., Bondoc D. — Analiza economico – financiară a societăților comerciale, Ed. Scrisul Românesc, Craiova, 2004