

## BASICS FOR A GRAPHICAL MODEL OF RISK – PERFORMANCES CORRELATION

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*ABSTRACT: A company runs a business with the goal to get a minimum level of performance. Before making an investment decision, an adequate analysis of the risk-performance correlation has to be done. In order to emphasize the connection between these two terms, in this paper, we propose a graphical model for analyzing the correlation between the size of the risk and the size of the performances. In this respect, we'll define the performance as a function of two variables: efficiency and efficacy. The risk is considered as a function of the same variables, the efficiency and the efficacy, and it comprises two components: the operational risk and the financial risk. The graphical model analyses the strategy of the company regarding the concentration of its effort on the efficiency or the efficacy and, respectively, the correlation between the performance and the risk depending on the adopted ways.*

*Key words: performances, risk, efficiency, degree of operating leverage, degree of financial leverage*

*JEL codes: G34*

### Introduction

By investing in a particular business, a company hopes to get a minimum performance, higher than the banking interest rate. No matter their profile, all the performed activities are affected by the risk and the generated performance must reward the assumed risk. This is the reason which for it has to be a proper correlation between the level of the risk and the level of the performance.

### Literature review and research methodology

The investments in businesses with a higher or smaller degree of risk depends on the attitude of the management, of the shareholders, on the size of the organization (a strong company will be able to take more chances, because it can face the consequences of the risks), on the circumstances form the market etc. There are companies that are willing to invest in businesses with a high degree of risk, with the goal to get bigger earnings, but also there are conservative companies, that prefer the less risky activities. No the matter the chosen solution, a careful analysis of the correlation risk-performances has to be done for the identified businesses, before making an investment decision. In order to point out the connection between these two terms, we shall further propose a graphical model for analyzing the correlation between the size of risk and the size of the performances.

In this purpose, we'll define **the performance** as a function between two variables, *the efficiency* and *the efficacy* [6].

*The efficiency* can be defined as the degree that the company succeeds to meet the demands of its internal environment. In order to reach the desired efficiency, the enterprise must optimize the capacity to produce goods, meaning achieving an adequate output of the equipments, a proper management of the supplies, implementing the measures for increasing the labor productivity and

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the staff qualification, providing a high flexibility of the organizing structure etc. Obtaining the targeted efficiency requires adopting internal measures by the company's management that can aim both the quantitative and the qualitative issues of the performed activity. The efficiency can be quantified by measures such as the yield, the productivity, some rates of return (on assets, revenues and expenditures).

**The efficacy** regards the capacity of the enterprise to meet the requirements of the external environment. It can be appreciated by the degree of satisfying the expectations and the exigencies of the customers, of the suppliers, of the state, by the capacity to create value added for the shareholders, by accomplishing some social objectives etc. We can notice that reaching efficacy implies taking measures that should meet the expectations of the company's partners and it can be appreciated through the following measures: the economical value added, the return on equity, the promptitude in following the customers' orders, in paying the debts to the suppliers, the quality of products, the measures of sustainable development (the degree of polluting the environment, social investments) etc.

Considering the previous mentioned issues, we can state that a company reaches performance when it is both efficient and efficacy or when it succeeds to meet the demands of the internal and the external environment. In this respect, we can state that there is a direct correlation between the level of the performances on one side and the level of the efficacy on the other hand.

**The risk** can be regarded as a function of the same variables, the efficiency and the efficacy, and it has two components: the operating risk and the financial risk. There is an indirect relationship between the level of the risk effects and the level of the efficiency and efficacy: the smaller are the risk effects, the bigger are the efficiency and the efficacy and vice-versa. Thus, if an enterprise has a low efficiency of the assets, of using the labor force, it gets weak financial results then we can affirm that it faces a major risk.

We notice that there is a strong connection between the factors that influence the performance and the components of the risk:

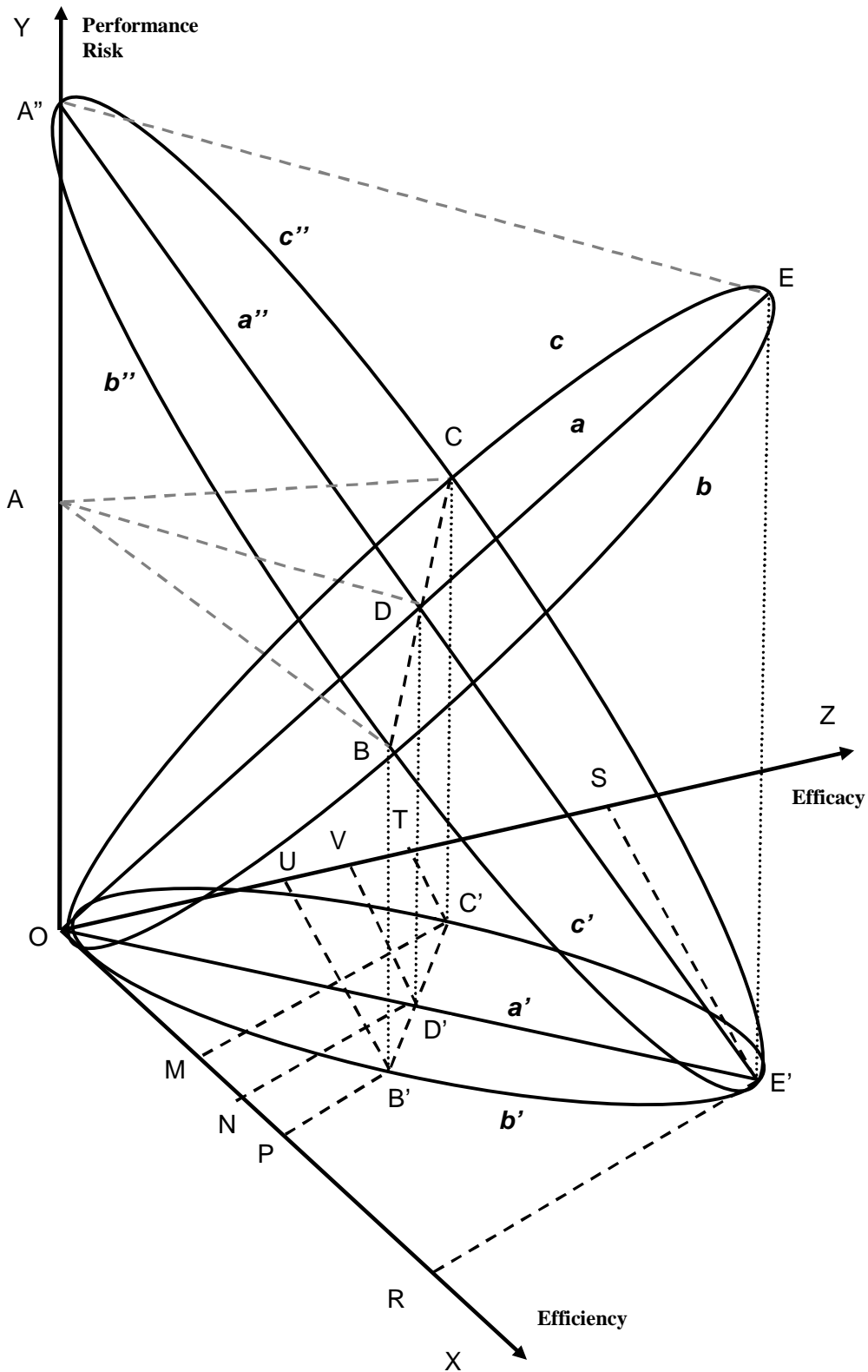
- the efficiency is closely connected with the operating risk; a low level of the company's efficiency is due to a high level of the effects of the operating risk, because the operating result will be directly affected by the low return of the assets, by the low labor productivity etc. On the contrary, if the efficiency is high, the operating profit will be high, which implies a low effect of the operating risk.

- the efficacy is closely connected with the financial risk. If the enterprise has a low efficacy, this means a reduced remuneration for the shareholders or creditors, which is a signal of the appearance of the financial risk. In exchange, if the financial results are big, then the level of the efficacy is big and the financial risk is reduced.

In order to make the connection between the efficacy and the financial risk, we shall further consider that the efficacy only regards the degree of meeting the creditors' and shareholders' demands, ignoring the other partners of the enterprise.

## Results

The next figure plots the level of the performances and of the risk (the Y-axis) depending on two factors, the efficiency (the X-axis) and the efficacy (the Z-axis). We consider that the company has three ways of achieving the performance, meaning the three options from the graph: *a*, *b* and *c*. The ideal variant is *a*, which implies an even combination between the efficiency and the efficacy. The variants *b* and *c* require a concentration of the effort on one of the two determinant factors.



**Fig. 1. The risk – performances correlation for a company**

In order to get the A performance, the enterprise can be situated in one of the points B, D or C. Obviously, the optimum situation, in this case, is the point D, situated on the straight line *a*. The segment BC has the maximum length inside the ellipse OBCE. Also, the ellipse OB'E'C' represents the projection of the ellipse OBEC of the surface of the basis.

In the previous graph, is also plotted the evolution of the risk effects, depending on the same influence factors, the efficiency and the efficacy. The chart has the shape of an ellipse (A''BE''C) and its projection on the basis is the same ellipse OB'E'C'. The ellipses OBEC and A''BE''C intersect each other in the segment BC.

When constructing these charts, the existence of a correspondence between the level of the risk and of the performance was taken into consideration; thus, the variant *a* of achieving the performance is associated with the variant *a''* of the risk, which is obtained by an even combination of the operating risk with the financial one. The variant *b''* of the risk (when the operating risk is lower and the financial one is higher) corresponds to the variant *b* of achieving the performance (when the enterprise concentrates on the efficiency to the detriment of the efficacy). In the variant *c*, the enterprise has a higher efficacy than the efficiency and its correspondent is the variant *c''* of the risk, which for the financial risk is lower the operating one.

In the point O, the level of the performance is null and the effects of the risk have the maximum level (A''). While the performance is increasing, the risk is reducing and it reaches the zero value in the point E', where the performance is maximum. The points B, D and C reflect a perfect correspondence between the level of the risk and the level of the performance (the performance and the risk have the same value, A). In the point B, the efficiency is bigger than the efficacy (the segment OP is bigger than OU) and in the point C the efficacy is higher than the efficiency (OT is bigger than OM).

If the performance is lower than A, the risk surpasses the results, which signifies an unfavorable situation for the company. Once the point A is surpassed, the performance is higher than the risk and the situation is favorable for the enterprise.

On the OB' section, we can notice a higher growth rhythm of the efficiency against the efficacy, meaning a bigger decreasing rhythm of the operating risk against the financial one. Once the point B' is reached, on the section B'E' the efficacy has a higher growth rhythm. Also, the financial risk has a decreasing trend bigger than the operating risk. A reverse situation is on the arc c', respectively a higher relative growth of the efficacy and a higher decrease of the financial risk on OC', while on the arc C'E' the efficiency and the operating risk have a bigger dynamic. Thus, we can consider that the points B' and C' (respectively B and C) are inflexion points, that mark the shift from one factor to another.

The points B and C reflect the biggest disequilibrium between the efficiency and the efficacy, which is an unfavorable situation for the enterprise. Also, the biggest difference between the level of the operating risk and of the financial risk is obtained in these points.

Although the efficacy has a higher dynamic than the efficiency both on the arc OC' and on the B'E', these two situations are different. Thus, on OC', the efficacy is higher than the efficiency and the difference between them is increasing till the point C', which signifies an accentuation of the disequilibrium between the two factors. On the same arc, the financial risk is lower than the operating one and the maximum difference is in the point C'. On the section B'E', the efficacy is lower than the efficiency, but the enterprise surpasses the point of maximum disequilibrium (B') and the decisions that are taken now are about to reestablish the equilibrium between the two determining factors, which is reached in the point E'. Also, the operating risk is lower than the financial risk, but their levels tend to become equal once approaching the point E'. In the point E', the risk effects don't materialize (the operating and the financial risk don't generate unfavorable events).

A similarly interpretation can be done for the arcs OB' and C'E'. As a result, it is recommended for the enterprise to be situated on the right side of the chart, which is accomplished when adequate measures are taken in order to equilibrate the weight of the two factors. Also, this situation is so much the more favorable, because, once approaching the point E', the performance is increasing while the effects of the risk are decreasing.

The maximum performance that the company could achieve is represented by the point E on

the graph, which implies no risk effects. In this point, the efficacy equals the efficiency (OS equal to OR) and the operating risk equals the financial risk.

We have to mention that, according to this approach, a zero performance doesn't mean a null result, but the minimum level of the performances that the enterprise could achieve, in specific circumstances; also, a zero level of the risk means the minimum level that the effects of the risk could reach, when it materializes.

We can see from the graph that the variant *a* is the optimum one, because the levels of the efficiency and of the efficacy are equal and an equilibrium between the degree of satisfying the demands of the internal environment and the degree of satisfying the demands of the external environment is achieved. Also, it is achieved the equilibrium between the operating and the financial risk, which allows a better risk management and also a greater freedom when maneuvering the operating and the financial leverage.

In the variant *b*, the efficiency is much bigger than the efficacy and the pace of production is higher than the pace of achieving financial results. The company has a good productivity and output for the labor force and for the assets, but it encounters difficulties in selling the production on the market. The return on sales is low, as a result of a high competition (the offer exceeds the demand), which doesn't allow selling at big prices, or as a result of the increasing the product stocks. In this case, paying a special attention to the marketing activity is imposed in order to raise the sales.

The effects of the operating risk are lower than the effects of the financial risk, which means that the results of the company cover the fixed operating expenses. In exchange, the high financial leverage involves large amounts of interest to be paid, that are difficult to cover. The use of the financial leverage is not made efficiently by the enterprise because it doesn't succeed to meet the shareholders' and the creditors' demands.

It is recommended for the enterprise to be placed in this area when it is in financial distress and it tries to achieve a new equilibrium by raising the efficiency in the detriment of the efficacy. This will lead to the decrease of the production at a lower pace than the pace of diminishing the operating assets. This measure often implies reducing the number of personnel, because it has positive effects on short term. But, on long term, it will reduce the internal potential for developing the company.

If an enterprise faces such a situation, it must concentrate its effort on raising the efficacy and on diminishing the leverage and the cost of the invested capital. Also, it must aim a higher growth rate for the efficacy against the efficiency.

The variant *c* signifies a bigger level of the efficacy against the efficiency, while the index of the results has a superior dynamic against the index of the operating assets. In this case, the enterprise posts a low efficiency when using the production factors, as a result of the deficiencies occurred in providing proper equipments, in their maintenance and use, in providing adequate personnel as volume and qualification. The enterprise has a high volume of sales, a satisfactory return on sales, but it meets difficulties in making the targeted level of production.

The company succeeds in meeting the demands of the market by an efficient marketing activity that aims at satisfying the customers, but also by knowing perfectly the offer of the competition. At the same time, the accounted financial results allow covering the cost of the invested capital and the company succeeds to create value added for the shareholders. For this reason, the financial risk is very low, but the enterprise faces a high operating risk; in the case it materializes, it will affect the remunerations of the shareholders and of the creditors.

Even if a company aims the efficacy, it must not neglect the efficiency. Also, the enterprise must reduce the operating leverage by a more efficient investment policy or by resizing the running investments.

Obviously, the variant *a* is the objective that each company aims at. In reality, most of the companies are situated either on the *b* or on *c* curve from the graph. No matter if the target is the efficiency or the efficacy, respectively reducing the operating risk or the financial one, the

enterprises must set as a secondary objective improving the level of the other variable, because, in the opposite way, they will face a deterioration of their position on the market.

The performances – risk correlation model can be transposed into an algebraic form, by considering that the performance is appreciated by the return on assets (ROA) and the risk by the degree of combined leverage (DCL). These two indicators can be calculated as follows:

$$ROA = \frac{NR}{TA} = \frac{S}{TA} \times \frac{NR}{S} = E_{TA} \times ROS \quad (1)$$

$$DCL = DOL \times DFL, \quad (2)$$

NR – net result;  
 TA – total assets;  
 S – sales;  
 $E_{TA}$  – efficiency of total assets;  
 ROS – return on sales;  
 DOL – degree of operating leverage;  
 DFL – degree of financial leverage.

We notice that the return on assets is determined as a function of the two factors specified at the graphical model, meaning the efficiency (appreciated by the efficiency of total assets) and the efficacy (appreciated by the return on sales). Also, the degree of combined leverage depends on two factors, the operating risk (appreciated by the degree of operating leverage) and the financial risk (appreciated by the degree of financial leverage).

In order to appreciate the performances – risk correlation, we shall calculate the rate between the level of the performances and the level of the risk, as a ratio between the return on assets and the degree of combined leverage, such as:

$$P/R = ROA/DCL = \frac{E_{TA}}{DOL} \times \frac{ROS}{DFL}. \quad (3)$$

The bigger is the level of this rate, the better is the correlation between the performances and the risk.

We can see that the rate between the performances and the risk can be expressed as a product between other two factors:

- The first factor is the ratio between the efficiency of total assets and the degree of operating leverage, which actually points out the correlation between the efficiency and the operating risk;
- The second factor is the ratio between the return on sales and the degree of financial leverage, which points out the correlation between the efficacy and the financial risk.

Depending on the level of these two factors, one could appreciate, in relative terms, if the company takes a higher operating risk or, on the contrary, a bigger financial risk. The measures that can be taken in order to increase the performances and to balance the efficiency and the efficacy can be also identified.

### **Conclusions**

The previous model takes into consideration two types of risks a company faces, the operating risk and the financial one. These are the main risks that could affect the activity and they must be regarded together, because there is a strong interconnection between them. Thus, this model emphasizes the way the managers can use the operating and the financial leverage in order to

reduce the risk and the possibilities to combine these leverages to optimize the risk – performances correlation. The model can be used as a managerial instrument so as to identify as well the best combination between efficiency and efficacy and thus to satisfy the interests of the internal and external environment.

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