# The Break - Even Point and the Leverage Effect – Instruments for Assessing the Economic and Financial Risk

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**Abstract:** The establishing by any company, depending on the domain of activity, of an minimum objective to be attained, so that the business should become profitable, is the aim principle of this article. In order to attain this goal, the assumed risk is considered, which implies the use of certain assessing instruments, as the break-even point and the leverage effect. This approach stands for a significant step in making strategic decisions, being a way to evaluating company security in case in which market conditions become unfavourable.

**Keywords** decision; return; benefit; loss; financial forecasting; risk

**JEL Classification:** D81; G32; M 41

## 1. Introduction

A way of assessing the proficiency of a company is achieved with the help of the break-even point which influence management decisions regarding the activity of production and trade.

The results of an enterprise are influenced by a series of economic and social events as depending on the nature of activity and its position in the economic environment. The increase of energy price, the increase of salaries, the development of competition, the appearance of new technologies, can lead the company to its *incapacity to adapt in due time and with the lowest cost to the variations of environment.* (Coșea, Nastovici, 1997, p. 30)

For a complete analysis of the financial proficiency of a company, the risk involved is considered, as any activity is subject to the economic (exploiting), financial and bankruptcy risk.

There are two possibilities for assessing the risk: the break-even point and the leverage effect.

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In order to attain a goal, any company must know its break-even point, as any change of result as a consequence of the variation in turnover is measured with the help of the leverage quotient.

## 2. Resources – Stages

### 2.1 The Evaluation of the Operating Risk

The economic risk appears in the moment in which the company is incapable of adapting in due time and with the lowest consumption of financial resources to the modification of changes in the economic and social environment.

The appearance of the economic risk leads to diminishing the result of the operating activity as caused by the increase in costs, by the expenses with salaries in total accordance with the turnover and other economic indicators.

The estimation of the operating or economic risk is achieved by using as instruments for analysing the break-even point and the leverage quotient.

#### 2.1.1 The Operating Break-Even Point

Any activity involves a capital consumption which is subject to certain ***risks*** accompanying the ***return***.

The return is directly proportional with the risk degree, as the higher is the return expected, the greater is the assumed risk and vice versa.

The concept of ***break-even point*** is based on the analysis of ***variable costs*** and ***fixed costs***.

The break-even point is characterised by the return or the level of activity which the company must reach in order to cover the total of costs (either fixed or variable) so that it does not release any benefit or loss.

The comparison between the rate of turnover and the break-even point allows the determining of the result's nature:

If CA = Break-even point = Null result (dead point)

CA > Break-even point = Benefit

CA < Break-even point = Loss

A major objective of any business is to get over the break-even point. The break-even point allows the company to have the following possibilities mirrored by figure 1.

The break-even point emphasizes the minimum level of activity to which the company must be situated in order not to be in loss. Exceeding this level, the activity performed becomes profitable. The smaller the critical level is, the more reduced the economic risk (of exploiting) will be.

The determining of the break-even point can be performed in accordance with the informational necessities of the manager, in physical, value-related or day-accounted units, for a single products or for the entire activity of the company.

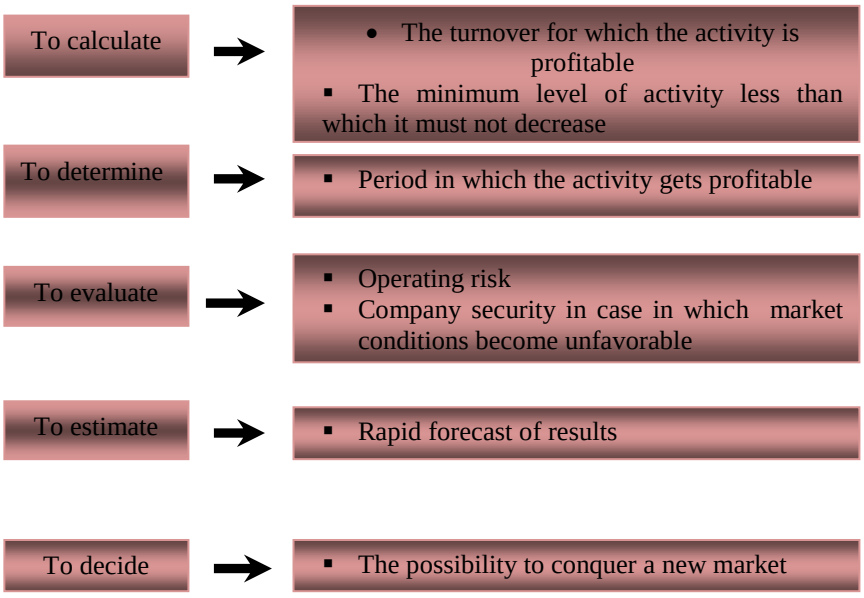


**Figure 1 Possibilities to Surpass the Break-Even Point**

Adapted from: Béatrice et Francis Grandguillot, 2010/2011, p. 87

**Determining the Break-Even Point**

A firs way for assessing the risk of operation is described in *table 2*, which is based on the security margin, the certainty level and the efficiency gain or the turnover index.

1. The break-even point is useful at first in **recovering expenses from incomes without profit**

(B=0):

$B = CA - CT = 0 \quad \rightarrow \quad CA = CT = Cv + Cf$

At the dead point B =0 → CA – (Cv + Cf) = 0 → MCV – Cf = 0

MCV = Cf, variable costs margin = fixed costs

If we compare the turnover rate to all the ratio elements, we obtain:

$\frac{MCV}{CA} = \frac{Cf}{CA}$ from which there results the critical turnover :

$$Critical\ CA = \frac{\text{Cf}}{\frac{\text{CA}-\text{Cv}}{\text{CA}}} = \frac{\text{Cf}}{\frac{\text{Mcv}}{\text{CA}}}$$

2. Determining the ***security margin (Ms)*** or the ***position indicator*** stands for the capacity of the enterprise to adapt to market requirements. A high value of the indicator indicates the lack of risk and the development of company activity in conditions of certainty.

$$Ms = CA - Critical\ CA$$

3. The determining of the ***certainty interval (Is)*** expresses the company capacity to adapt to market and competition environment requirements, and reflects the position of the turnover as to the break-even point. A high value of the indicator (over 20%) shows a comfortable situation protected by potential risks.

$$Is = \frac{CA - Critical\ CA}{Critical\ CA} \times 100$$

4. The determining of the ***efficiency gain*** (Se) and the ***turnover index*** expresses the level up to which the rate of turnover can decrease in order to attain the break-even point.

The more diminished is the rate of turnover, the more reduced is the turnover index, and the company enters the loss area, the financial and economic equilibrium being not maintained.

$$Se = \frac{CA - Critical\ CA}{CA} \times 100$$

The smaller is the index value, the easier it becomes for the break-even point to be attained by companies.

The Break-even point at C.N.F.R NAVROM Joint Stock Co. Galați is determined on the basis of the data from table 1:

**Table 1 Operating Break-Even Point**

| Cr. No. | Indicators | Financial Period | | |
|---|---|---|---|---|
| | | **2008** | **2009** | **2010** |
| **1** | Turnover (CA) | **199.945.306** | **156.160.170** | **185.905.402** |
| **2** | Variable expenses (Cv) | 69.112.028 | 56.148.502 | 78.803.620 |
| **3** | Variable Costs Margin Mc (1-2) | 130.833.278 | 100.011.668 | 107.101.782 |
| **4** | Fixed expenses (Cf) | 121.702.815 | 94.601.808 | 110.507.676 |
| **5** | Critical turnover (Critical CA) | **186.004.608** | **147.722.998** | **191.820.302** |
| **6** | Security margin (Ms) | +13.940.698 | +8.437.172 | -5.914.900 |
| **7** | Certainty interval (Is) | 7,49 | 5,71 | -3.08 |
| **8** | Efficiency gain (Se) | 6.97 | 5.40 | -3.18 |

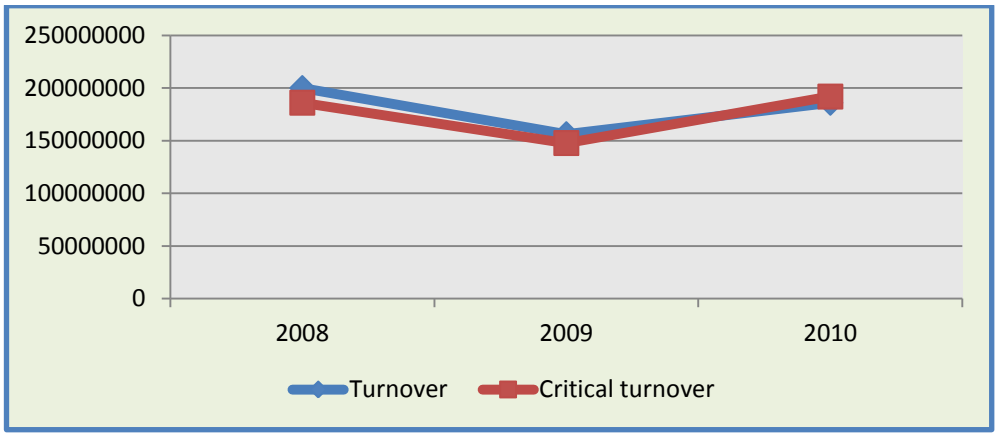


**Figure 2 Graphic Representation of the Operating Break-Even Point**

From this analysis, there can be drawn the following conclusions:

In the first two years, 2008 and 2009, the volume of activity was over the break-even point within the benefit area, there being recorded values higher to critical ones.

The situation becomes unstable, the certainty interval decreasing all along for the analysed period under the 10% level, which expresses the firm's incapacity to adapt the market, the operating risk being high, this leading to the continuous

diminishing in the industrial production and, consequently to diminishing the volume of merchandise offered to transport from 2008 until now. The lack of commodities has generated a harsh competition, which led to a significant decrease in tariffs, and finally to a continuous diminishing in profit.

The efficiency gain is diminished in 2010, when the enterprise enters the loss area, and the economic and financial equilibrium being not maintained.

### 2.1.2 The Operating Leverage Quotient

Another way to appreciate and assess the operating risk can be achieved on the basis of the **operating leverage quotient** (CLE).

The quotient estimates the risk to which the company is subject to, its incapacity to adapt in due time and minimum of effort to changes in the economic and social environment.

The appearance of the operating result is determined by the variable costs margin, the contribution of fixed expenses and by the turnover's getting close to the break-even point. The calculation of the operating leverage quotient is achieved in table 2 by taking over the data from table 1, according to the formula:

$$CLE = \frac{MCV}{Rexp}$$

The leverage quotient expresses the ***elasticity of the result*** obtained by the company as compared to the dynamics of the activity volume.

$$e = \frac{\frac{\Delta Rexp}{Rexp}}{\frac{\Delta CA}{CA}}$$

The bigger the volume of the activity exceeding the critical volume, the more reduced the value of the elasticity quotient, and the smaller the operating risk.

**Table 2 Operating Leverage Quotient**

| Cr. No. | Indicators | Financial Period | | |
|---|---|---|---|---|
| | | **2008** | **2009** | **2010** |
| **1** | Turnover (CA) | 199,945,306 | 156,160,170 | 185,905,402 |
| **2** | Variable expenses (Cv) | 69,112,028 | 56,148,502 | 78,803,620 |
| **3** | Variable costs margin Mcv (1-2) | 130,833,278 | 100,011,668 | 107,101,782 |
| **4** | Variable costs rate (rcv)(2/1) | 0.35 | 0.36 | 0.42 |
| **5** | Rate of the variable costs margin (rmcv) (3/1) | 0.65 | 0.64 | 0.58 |
| **6** | Operating result (Rexp) | 12,196,999 | 8,302,347 | 2,288,566 |
| **7** | **Elasticity quotient** | **-** | **1.67** | **-16.42** |
| **8** | **Operating Leverage Quotient (CLE)(3/6)** | **10.97** | **12.39** | **49.28** |

From the data presented, it results that the operating activity is subject to the maximum risk, because of the very high values of the index, which have exceeded the unitary value.

There may be noticed, yet, that in the first two years, the greater the break-even point, the more reduced the operating risk.

In 2010, the elasticity quotient is negative, which reflects a high operating risk.

The avoiding of the operating risk can be performed by an increase of the turnover and the commercial margin in a percentage higher than variable expenses, and the fixed expenses being maintained as relatively constant.

### 2.2 The Assessment of the Financial Risk

The financial risk is related to the financial structure of the company with respect to the currency risk, the indebtedness risk, the interest rate risk, the inflation risk and the insolvency risk.

The evaluation of the financial risk is achieved through calculating the financial break-even point and the financial leverage quotient.

#### 2.2.1 The Financial Break-Even Point

The financial break-even point as an instrument for analysing the financial risk is established for a methodology resembling to the economic risk, with the difference that there are taken into account the expenses which concern interests. These are

considered as fixed expenses as compared to the rate of turnover up to a certain level of activity.(M. Muntean, 2006, p. 173)

**Determining the Break-Even Point**

Determining the financial break-even point is obtained through the calculation ratio:

$$Critical\ CA = \frac{\text{Cf} - \text{Dob}}{\frac{\text{CA}-\text{Cv}}{\text{CA}}} = \frac{\text{Cf} - \text{Dob}}{\frac{\text{Mcv}}{\text{CA}}}$$

Based on the data in *table 3*, there is calculated the financial break-even point for the company analysed:

**Table 3 Financial Break-Even Point**

| Cr. No. | Indicators | Financial Perios | | |
|---|---|---|---|---|
| | | **2008** | **2009** | **2010** |
| **1** | Turnover (CA) | **199,945,306** | **156,160,170** | **185,905,402** |
| **2** | Variable expenses (Cv) | 69,112,028 | 56,148,502 | 78,803,620 |
| **3** | Variable costs margin Mc (1-2) | 130,833,278 | 100,011,668 | 107,101,782 |
| **4** | Fixed expenses (Cf) | 121,702,815 | 94,601,808 | 110,507,676 |
| **5** | Interest expenses | 2,628,194 | 2,247,645 | 2,200,032 |
| **6** | Critical turnover (Critical CA) | **181,987,805** | **144,213,246** | **188,001,465** |
| **7** | Security margin (Ms) | + 17,957,501 | +11,946,924 | -2,096,063 |
| **8** | Certainty interval (Is) | 9.87 | 8.28 | -1.11 |
| **9** | Efficiency gain (Se) | 8.98 | 7.65 | -1.13 |

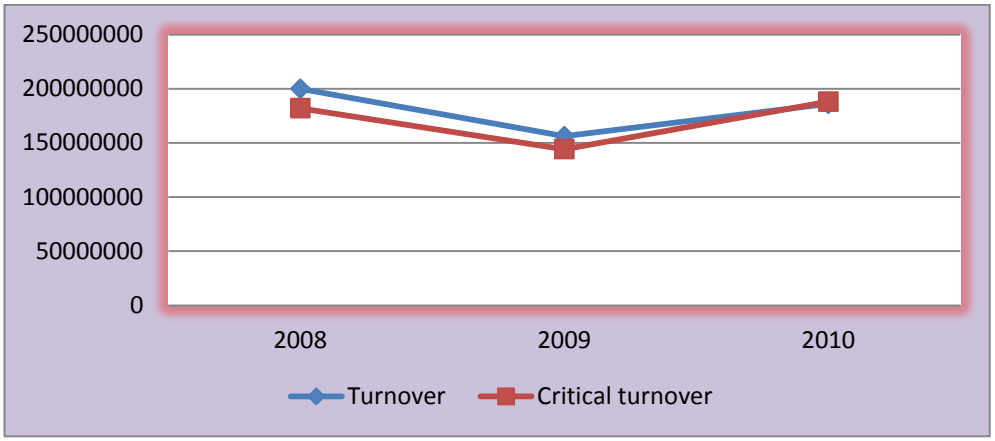


**Figure 3 Graphic Representation of the Financial Break-Even Point**

Subsequent to the performed analysis on the calculation of the break-even point or the critical turnover up to which the company can cover the total costs, so that no benefit is released and no loss at the deadlock, there have been noticed the following:

In the 2008-2009 period there was recorded a greater turnover than the critical one, which indicates that the company is in the benefit area, yet in 2010 the rate of turnover is outmatched by the break-even point, so that the company is placed in the loss area. In order to reach the dead point, the turnover must be equal to the break-even point. In the point in which the turnover line crosses the critical turnover line or the breakeven point, the dead point is obtained (see figure 3).

The certainty margin has a positive value in 2008 and 2009 which indicates the lack of risk in the performing of activity in good conditions, followed by a negative value in 2010, which indicates the presence of the financial risk;

As for the certainty interval, in normal conditions it must reach values of over 20%, yet in the case of the company analysed, the interval diminishes from one year to another, which implies a lack of adaptation to the requirements of the market and competition;

The turnover index or the efficiency determines the level up to which the rate of turnover can decrease up to reaching the break-even point. From the analysis, there can be noticed a more diminished level, which makes the break-even point more attainable.

### 2.2.2 Financial Leverage Quotient

This risk becomes evident by the sensitiveness of the net result to the variations of the exploiting result, and it is estimated by the financial leverage quotient (CLF).

$$CLF = \frac{Rexp}{Rexp - Chfin}$$

For the calculation of the financial leverage quotient, there are taken over data from the profit and loss account of NAVROM Joint Stock Co. Galați and is presented in *table 4*:

**Table 4 Financial Leverage Quotient**

| Cr. No. | Indicators | Financial Period | | |
|---|---|---|---|---|
| | | **2008** | **2009** | **2010** |
| **1** | Turnover (CA) | 199,945,306 | 156,160,170 | 185,905,402 |
| **2** | Operating result (Rexp) | 12,196,999 | 8,302,347 | 2,288,566 |
| **3** | Financial expenses (Chfin) | 10,119,851 | 8,821,664 | 9,113,492 |
| **4** | Rexp-Chfin (2-3) | 2,077,148 | -519,317 | -6,824,926 |
| **5** | **Financial leverage quotient (CLF)(2/4)** | **5.87** | **-15.98** | **-0.33** |

From the analysis of the results presented, it results that the values of the financial leverage quotient are different from one period to another. Except for 2010, when the result of the financial activity is profitable, within the two years, i.e. 2008 and 2009 respectively, the expenses on interests have a high influence upon company activity.

By the nature of the activity performed, the company is subject to different risks: the credit risk, the currency risk, the risk regarding the interest rate and cash.

### 2.3 The Evaluation of the Total or Global Risk

The evaluation of the total risk or the economic and financial risk is accomplished with the help of the total leverage quotient (CLT), thus describing the risk to which the company activity is subject to in maintaining a financial-economic equilibrium.

The calculation of the total leverage quotient implies the multiplication of:

$$CLT = CLE \times CLF = \frac{Mcv}{Rexp - Chfin}$$

In the case of C.N.F.R. NAVROM Joint Stock Co. Galați, there are obtained the following results from *table 5*:

**Table 5 Total Leverage Quotient**

| Cr. No. | Indicators | Financial Period | | |
|---|---|---|---|---|
| | | **2008** | **2009** | **2010** |
| **1** | Exploiting Leverage Quotient CLE=Mcv/Rexp | 10.97 | 12.39 | 49.28 |
| **2** | Financial Leverage Quotient CLF=Rexp/(Rexp - Chfin) | 5.87 | -15.98 | -0.33 |
| **3** | Total Leverage Quotient CLT = CLE x CLF | 62.98 | -192.58 | -15.69 |

The descending trend of the total leverage quotient reflects the reducing in the degree of global risk, but in the meantime, it is subject to risks because of the inefficiency of the operating activity, which affects the financial performance of the enterprise.

The economic crisis unleashed at a global level in 2008 and continued in 2009 did harshly affect the financial results of 2010, as a consequence of the continuous diminishing of the industrial production which led to cutting in the volume of merchandise offered to transport.

The lack of commodities generated a fierce competition, finalised within the harsh decrease in tariffs, which did considerably affect the year 2010. As a corrective step to reducing costs, a part of the transport capacities were withdrawn towards conservation and others were quashed. In the future, the company has in view the taking over of certain river transport activities in Brazil, Columbia, Sierra Leone in order to exploit the exceeding transport capacities.

## 3. The Leverage Effects within Financial Forecasts

Using the results of the financial period in 2010 from the profit and loss account, the leverage quotients from *table 5*, and estimating the increase of turnover with 10% in the subsequent period, there can be assessed the chain effects of this increase upon results forecasted within 2011 as a result of calculations performed:

The increase of the ***operating results***

$ELE = CLE \times \Delta rCA = 49.28 \times 10 = 493\%$

$Rexp_{2011} = Rexp_{2010} \times 5.93 = 2{,}288{,}566 \times 5.93 = 13{,}571{,}196\ lei$

The increase of the ***net result***

$ELF = CLF \times \Delta rRexp = 0.33 \times 493 = 162.69\%$

$Rnet_{2011} = Rnet_{2010} \times 2.6269 = 2{,}214{,}634 \times 2.6269 = 5{,}817{,}622\ lei$

The increase of the ***net result***

$ELT = CLT \times \Delta rCA = 15.69 \times 10 = 156.90\%$

$Rnet_{2011} = Rnet_{2010} \times 2.5690 = 2{,}2146{,}34 \times 2.5690 \cong 5{,}817{,}622\ lei$

If we replace with values resulted in 2011, we will obtain the following forecast quotients:

$$CLE = \frac{Rexp_{2011} - Cf_{2011}}{Rexp_{2011}} = 9.14$$

$$CLF = \frac{Rexp_{2011}}{Rexp_{2011} - Chfin_{2011}} = 3.04$$

$$CLT = CLE_{2011} \times CLF_{2011} = 27.78$$

**Table 6 Financial Forecasts for the Year 2011**

| Cr. No. | Indicators | Achievements | | | Forecasts |
|---|---|---|---|---|---|
| | | **2008** | **2009** | **2010** | **2011** |
| **1** | Turnover (CA) | 199,945,306 | 156,160,170 | 185,905,402 | 204,495,942 |
| **2** | Operating result (Rexp) | 12,196,999 | 8,302,347 | 2,288,566 | 13,571,196 |
| **3** | Net result (Rnet) | 9,684,500 | 6,267,428 | 2,214,634 | 5,817,622 |
| **4** | Fixed Expenses (Cf) | 121,702,815 | 94,601,808 | 110,507,676 | 110,507,676 |
| **5** | Financial Expenses (Chfin) | 10,119,851 | 8,821,664 | 9,113,492 | 9,113,492 |
| **6** | Quotient of the financial leverage CLE=(Rexp+Cf)/Rexp | 10.97 | 12.39 | 49.28 | 9.14 |
| **7** | The Quotient of the Financial Leverage CLF=Rexp/(Rexp- Chfin) | 5.87 | -15.98 | -0.33 | 3.04 |
| **8** | Quotient of the Total Leverage CLT = CLE x CLF | 62.98 | -192.58 | -15.69 | 27.79 |

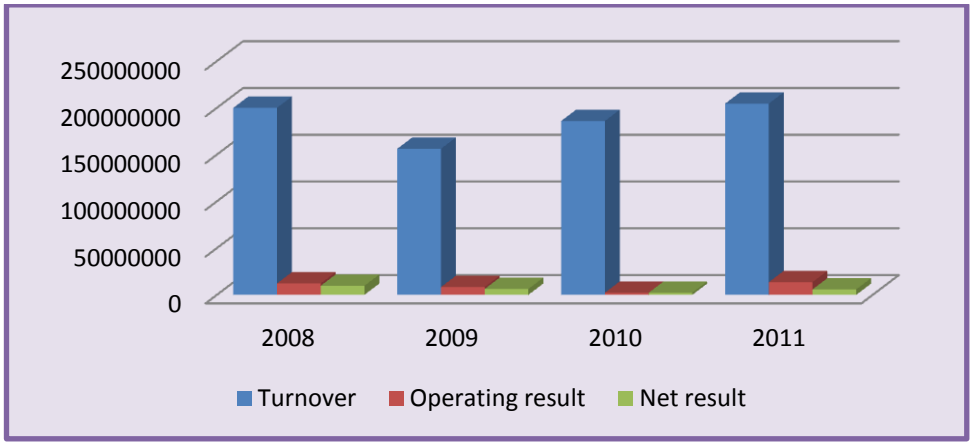


**Figure 4 The Evolution of Financial Results**

Subsequent to the research performed, it must be noticed that the increase in turnover with 10% does favourable influence all results (operating result, net result) by way of a chain of effects beneficial to the financial performance.

## 4. Conclusions

In conclusion, the approaching of the break-even point and the assessment of risks is an analysis necessary for stetting and elaborating the forecast horizon. The whole study is concluded with an inefficiency of the operating activity, which affects the financial performance of the enterprise.

The time horizon forecasted in 2011 was achieved by estimating a turnover increasing with 10%. Subsequently to the analysis performed, there was noticed an influence of turnover on results via a chain of effects beneficial to the financial performance, and in the case of leverage quotients there may be noticed a decrease, which reflects a reduction of the economic, financial and total risk.

As a rule, an analysis on the performance of a company aims at all non-financial and financial aspects of the activity, as the performance is not limited to only the accounting and financial results, maximum profitability, financial equilibrium and capacity to generate the cash necessary to the future functioning and expending. In order to be proficient, a company must take account of the future development perspectives generated by its material, financial, human, informational, and organisational resources.

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