Performance analysis in the construction industry by the DuPont model-Case study

MĂRGINEAN RADU
Ph.D. Student, "1 Decembrie 1918" University of Alba Iulia, Romania
510009, Alba Iulia, Str. Gabriel Bethlen, nr. 5
ROMANIA
marginean.radu23@yahoo.com

MIHĂLȚAN DELIA CORINA
Ph.D. Student,"Valahia" University of Târgovişte, Romania
Str. Lt. Stancu Ion, nr.35, Corpul D, 130105, Târgovişte, Dâmbovita
ROMANIA
dellya_c@yahoo.com

ȚEPEȘ BOBESCU ANAMARIA
Ph.D. Student, "1 Decembrie 1918" University of Alba Iulia, Romania
510009, Alba Iulia, Str. Gabriel Bethlen, nr. 5
ROMANIA
ancatb@yahoo.com

Abstract: The study of performance in industry is an economic subject of general interest for both theorists and practitioners of economics in different industries. The objective of this study is the empirical study of performance through the DuPont model in the construction industry as a useful tool, both to researchers and to industry managers for performance analysis carried out at sector level. Decomposition of Return on Equity (ROE) after Return on Assets (ROA), Return on Sales (ROS), Total Assets Turnover (TAT) and Equity Multiplier (EM) provides an analytical framework appropriate for observing factors that make and influence financial profitability, represented by the value of ROE. By the DuPont analysis performed on a database composed of 19 companies in the construction industry, and by the use of the Pearson correlation coefficient, we scored particular aspects regarding the indicators influence in the model on the profitability and Net Income, proposing ways of growth in the sector and based on results future directions for research.

Keywords: The DuPont model, performance, Return On Equity(ROE), Return On Assets(ROA), Return on Sales(ROS), Pearson coefficient, the construction industry.
JEL Classification: M41, C15.

1 Introduction

The construction industry, perhaps more than other sectors of the Romanian economy was particularly affected by the global economic crisis. Lack of liquidity, rising unemployment, decreased consumer purchasing power caused a significant decrease holistically of the construction industry in Romania. Profile companies in our country have had to deal with a drop in the number of contracts, delays in payments from beneficiaries, and other elements that led to the bankruptcy of many companies, unfinished works or the layoff of employees in the sector.

Having the economic crisis generalized in the Romanian economy, in order to start taking specific measures to counteract its effects, the first responsibility in companies is held by companies management that has the important task to know the sector and the competition in the process of making management decisions. In this sense, the objective of this paper is to provide researchers and practitioners with a useful tool to study the performance of the construction industry through the DuPont model, with the possibility to extend the database of the work and expand research.

The observance of the relationship between the DuPont model indicators (ROE, ROA, TAT, EM), through the financial analysis method of factor decomposition, is likely to provide the financial rate of return result in multiple rates of return, which in

turn provide new directions of analysis taking into account the specificity of each indicator. This is likely to enable the ranking of companies in the sample according to several criteria and provides important information for detailed financial analyses.

2 Literature Review

As Moss, Mishra and Dedah state [5], "the DuPont expansion is an artifact of the conglomeration movement of corporate entities. Originally, the DuPont Corporation used the DuPont expansion to analyze the performance of its ventures. Collins (1985) used a general form of the DuPont expansion to develop a model of optimal debt which emphasizes the choice of equity".

According to Vintilă, Gheorghe, Pocan and Anghel [12], the central idea of this type of analysis is to identify the key factors that directly or indirectly affect the profitability of the company and their size integration into a system of rates which determine its level. Thus, depending on management priorities in managing profitability, factorial decomposition varies. For example, if the company manager aims to improve economic profitability through a better management of the working capital requirements and the operating margin, its attention will be focused on the impact on the rate of return, on its actions in this direction. As a result, within the management, the manager will be helped by the decomposition rate of the economic return on influence factors.

As Camelia Burja states [2], profitability is one of the forms of expressing the economic efficiency with enlightening power of summary so that it encompasses all economic and financial aspects of companies and is a benchmark for decision making and behavior orientation thereof.

In the literature [1, 4], the economic rate of return is defined as a ratio that measures the performance of the total assets of the company, namely the ratio of invested capital through the relation between the year result before deducting the financial burden (interest and taxes) and the permanent capital of the company. It presents additional advantages as it is not influenced by the depreciation policy, provisioning, funding mode or the tax system.

The importance of the economic rate of return is highlighted by its significance, as underlined by I. Mihai [4]:

• It measures the degree of recovering the invested capital expressing in monetary units the gross profit obtained per unit of invested capital.

Without claiming to be exhaustive in an area as vast as performance analysis in economy, we believe that the proposed study may be useful to stakeholders in the construction industry in Romania, by the theoretical foundations and the case study performed with real financial data.

• It measures the effectiveness of financial and material resources allocated to the activity of exploitation and commercialization.

• It measures the performance of total assets, reflecting its economic results, independent of the financing of capital (equity or loan) and the tax system.

The same author emphasizes the conditions that are to be met by this rate, as follows:

• The level of the economic rate of return shall ensure the maintenance of the economic substance of the unit, preserving its value, which is guaranteed if the economic rate is higher than the inflation rate.

• The economic rate of return must ensure in real terms the remuneration of invested capital at the minimum rate of economic efficiency (the average rate of interest) and cover the economic and financial risk of investors (shareholders or creditors).

• The economic rate of return, superior to the interest rate on borrowed capital ensures the enjoyment of leverage (financial leverage) regarding the borrowing of the entity.

• The amount of the economic rate of return should ensure the renewal and growth of assets in a timely fashion. Statistically, it is appreciated that this condition is satisfied if the rate $\frac{GOS}{TotalTangibleAssets}$ is higher than 25% ($GOS =$ gross operating surplus).

The basic model of the economic rate of return used in practice knows two forms:

$$ROA = \frac{Gross\,\Pr ofit}{TotalAssets}\ or$$

$$ROA = \frac{Gross\,\Pr ofit}{PermanentCapital}$$

Below, we present a series of models for decomposing the rate of return, used in the DuPont rate system, which can be found in the literature [12]. They were designed according to the needs of management, starting from basic models mentioned above, as follows:

• A first model considers the operating margin realized by the enterprise (*REI/CA*), the velocity

rate of the working capital requirements in the turnover rate (*CA/NFR*) and the structure rate of the economic asset (*CA/AE*).

$$ROE = \frac{REI}{CA} \times \frac{CA}{NFR} \times \frac{NFR}{EA}, \text{ where:}$$

REI = net operating result before tax;
CA = turnover;
NFR = working capital needs;
EA = economic asset.

• The second model that we present uses the magnitude of fixed costs related to the operating activity, through the ratio of *REI/VA*, the share of value added earned by the enterprise within the earned total turnover (*VA/CA*) and through the *CA/AE* the rate of velocity of the economic asset through the earned turnover.

$$ROE = \frac{REI}{VA} \times \frac{VA}{CA} \times \frac{CA}{AE}, \text{ where:}$$

VA = added value.

Another model to which we focus attention is used where management has interests regarding the productivity of its strategic investments. The focus is therefore on the extent of fixed costs related to the operating activity (like the one above), but also on the productivity of fixed assets, governed by the ratio *VA/IMO* and on the share of strategic investments in all economic assets shown by the report *IMO/AE*.

$$ROE = \frac{REI}{VA} \times \frac{VA}{IMO} \times \frac{IMO}{AE}, \text{ where:}$$

IMO = net fixed assets owned by the entity.

In the Mark T. Soliman's view [9], the DuPont analysis, as a common form of financial statement analysis, decomposes return on the net operating assets into two multiplicative components: profit margin and asset turnover. These two accounting ratios measure different constructs and, accordingly, have different properties. Also, in the work of Mark T. Soliman [9] is highlighted the theoretical importance of *ROE* in the implementation of valuation models in general, and in the residual income model in particular. The standard DuPont analysis decomposes *ROE* into the three multiplicative ratios of Profit Margin, Asset Turnover, and Leverage as follows:

$$ROE = \frac{NetIncome}{Sales} \times \frac{Sales}{Assets} \times \frac{Assets}{Equity}$$

As the equation above shows, *ROE* can be affected by the firm's choice of capital structure, yet changes in the firm's capital structure may not be value relevant. Nissim and Penman (2001) algebraically rearrange *ROE* to abstract away from financial leverage and arrive at *RNOA* as follows:

$$ROE = RNOA + (FLEV \times SPREAD)$$

RNOA captures the firm's operating profitability without the effects of financial leverage.

Herciu, Ogrean, Belascu [3] state that the DuPont analysis can take into account three indicators to measure firm profitability: ROS, ROA, and ROE.

$$ROS = \frac{Sales}{TotalAssets}$$

Return on Sales (Net Profit Margin Ratio) – ROS – measures how profitable a firm's sales are after all expenses, including taxes and interest, have been deducted.

$$ROA = \frac{NetIncome}{TotalAssets}$$

Return on assets – ROA – offers a different take on management effectiveness and reveals how much profit a company earns for every dollar of its assets. Assets include things like cash in the bank, accounts receivable, property, equipment, inventory and furniture. Only a few professional money managers will consider stocks with a ROA of less than 5%.

$$ROE = \frac{NetIncome}{Equity}$$

Of all the fundamental ratios that investors look at, one of the most important is return on equity – ROE. It is a basic test of how effectively a company's management uses investors' money– ROE shows whether management is growing the company's value at an acceptable rate. Also, it measures the rate of return that the firm earns on stockholder's equity. Because only the stockholder's equity appears in the denominator, the ratio is influenced directly by the amount of debt a firm is using to finance assets. Practically, ROE reflects the profitability of the firm by measuring the investors` return.

As generally accepted values of the rates in the model, as high as possible they are considered for ROA, ROS or Total Assets Turnover. For Equity Multiplier or financial lever, the indicator is between 2.5 and 1.66 for the companies that are considered to have an acceptable level of debt and over 5 for the companies that are considered undercapitalized [11].

In this paper we choose to develop and apply the basic DuPont system analysis based on the

calculation of economic return and its development

3 Research Methodology

In order to achieve the purpose of this paper, we studied both national and international literature, including books and articles specialized in the sphere of economic and financial analysis.

To study the profitability of individual companies, financial indicators (data are real) for 2012 have been taken from the website of the Ministry of Public Finance of Romania, from the financial statements of 19 companies operating in the construction industry. The DuPont model, first used by the DuPont Corporation, studies the profitability of a company based in particular on the calculation of the Return on Equity (ROE).

According to the model, developing ROE successively, we can get a more detailed analysis of financial profitability, studying in the same equation the influences that factors like ROS, ROA, Equity Multiplier and Total Assets Turnover have on ROE. Thus it will be seen which are the elements that contributed to profitability, how financing was performed, etc.

The DuPont model is achieved by following the development of ROE:

$$ROE = \frac{NI}{Eq} \qquad (1)$$

Where,
ROE=Return on Equity, NI=Net Income, Eq=Equity

$$ROE = \frac{NI}{Eq} \times \frac{TA}{TA} = \frac{NI}{TA} \times \frac{TA}{Eq} = ROA \times EM \qquad (2)$$

Where,
TA= Total Assets;

$$ROA = Return\ on\ Assets = \frac{NI}{TA};$$

$$EM = Equity\ Multiplyer = \frac{TA}{Eq}$$

$$ROA = \frac{NI}{TA} \times \frac{Tu}{Tu} = \frac{NI}{Tu} \times \frac{Tu}{TA} = ROS \times TAT \qquad (3)$$

Where,

$$ROS = Return\ on\ Sales = \frac{NI}{Tu};$$

$$TAT = Total\ Assets\ Turnover = \frac{Tu}{TA};$$

Decomposed, the DuPont model becomes:

$$\boldsymbol{ROE = ROS \times TAT \times EM} = \frac{NI}{Tu} \times \frac{Tu}{TA} \times \frac{TA}{Eq} \quad (4)$$

For the purpose of explaining the model, ROE is directly influenced by factors that compose the equation, with the entries:

- the ROE increase, based on the increase of ROA, ROS or TAT is a positive phenomenon

is the subject of the next paragraph.

because it shows an improvement, an efficient use of resources by increasing the effects. It is translated in particular by increasing the Net Profit or the Turnover;

- Increasing ROE on the basis of Equity Multiplier is not generally a positive factor, since an increase in this indicator signifies an increasing share of debt in total equity. In other words, based on the financial leverage, we can determine whether funding is mainly based on debt, having the preference to base it on equity. In this respect, we mention:

$$EM = \qquad\qquad\qquad (5)$$

Where,
EM= Equity Multiplyer
TA= Total Assets
TD= Total debts
Eq= Equity
Fl= Financial Leverage

Also for data analysis, we used the Pearson's correlation coefficient. This coefficient is a statistical model of the correlation calculation to establish the intensity of relationship between the same two variables within the data distribution. The Pearson correlation report has the following mathematical formula [7]:

$$r = \frac{\sum(x - \overline{x})(y - \overline{y})}{\sqrt{\sum(x - \overline{x})^2(y - \overline{y})^2}} \qquad (7)$$

Where,
r= The Pearson correlation report
$\overline{x}$ and $\overline{y}$ represent the indicators' average value on the same distribution range.

According to author Răulea [7], the value of the correlation report is between -1 and 1, as follows:

−1	0	1
negative association	*lack of association*	*positive association*

As interpretation, a value greater than 0,4 is a good value. The situation is the following on ranges of values:

- r $\in$ [0; 0.2] → very weak correlation,
- r $\in$ [0.2; 0.4] → weak correlation,
- r $\in$ [0.4; 0.6] → reasonable correlation,
- r $\in$ [0.6; 0.8] → high correlation,
- r $\in$ [0.8; 1] → very high correlation [10].

No matter how great the calculated r is, in order to assess the effect size of the correlation coefficient on the sample population, it is necessary to calculate

r^2, square r, called *the coefficient of determination.* Through this coefficient "we determine the joint association of all factors influencing the two variables and it represents a part of the total dispersion of the variable measure that can be explained or justified by the dispersion of the values of the other variable" [10].

4 Results and Discussions

In conducting the case study we used a database of 19 companies with different weights in the industry, companies that have seen profit and loss in 2012.

In Table 1, according to the size of assets, we present the value of the selected indicators for the companies in the sample:

Table 1. Companies in the sample having indicators for 2012 (lei)

Current No.	Company Name	Total Assets	Turnover	Net Profit	Equity
1	Hidroconstruc ți a S	1.125.019.274	62.355.725	18.438.989	580.217.192
2	Strabag SRL	1.013.624.650	1.403.884.345	5.268.795	15.439.568
3	Tehnologica Radion	886.051.413	560.013.055	4.486.255	334.394.721
4	Arcada SA	532.364.821	46.465.253	7.185.986	138.515.280
5	Spedition Umb	486.738.582	616.762.926	94.399.901	426.890.282
6	Concret Constrcut SRL	417.517.917	61.197.695	394.710	4.959.520
7	Bog Art	292.023.482	339.018.944	1.793.573	90.359.533
8	Porr Construct SRL	194.197.338	148.080.032	393.945	16.325.262
9	Confort SRL Timisoara	92.329.403	254.701.239	-101.374.565	81.956.513
10	Euroconstruct SRL	79.914.149	12.100.606	-4.631.284	11.168.182
11	Moldocor	60.653.609	56.783.959	4.405.925	37.585.343
12	Trust Euro Term	34.225.464	37.264.260	2.015.549	30.931.497
13	Cartel Bau	31.523.545	16.914.828	1.258.067	159.090.158
14	Oyl Company	28.875.833	69.844.128	369.198	8.586.643
15	Axela Constructii	28.402.641	30.373.285	363.535	17.160.417
16	Freyrom	22.422.241	32.924.250	1.319.659	8.097.900
17	Bilfinger Facility Management	3.156.615	7.466.294	-539.751	469.642
18	Romstrade	2.618.197	17.995	-1.191.598	648.511
19	Porr Railway Transport	844.231	2.216.850	27.793	40.109

Source: The author's processing.

Applying the Pearson correlation coefficient between the indicators of firms in the sample, we can specify the following results:
- There could not be found a significant correlation between the size of the company represented by Total Assets and Net Income (0.28 representing a weak direct correlation, significant only for about 8% of the cases).
- The correlation coefficient between Net Income and Turnover is 0.19, showing a very weak direct link, valid for only 3% of the sample cases. Therefore, the Net Income in our study is not influenced by the value of Turnover;

- The correlation coefficient between Net Income and Equity is 0.43, meaning a reasonable direct relationship between the size of Equity and Net Income for about 19% of the population. Thus, in this case we can say that an increase in Equity for companies in the furniture industry may attract increased Net Income, of course, growth being influenced by a multitude of other internal or external factors.

In Table 2, we present companies with calculated DuPont model indicators, positioning the companies from the most profitable to the least profitable in terms of ROE:

Table 2. DuPont model indicators

Current No.	Company	ROS	ROA	TAT	Eq M	*ROE*
1	Porr Railway Transport	0,01	0,03	2,63	21,05	*0,69*
2	Strabag SRL	0,00	0,01	1,39	65,65	*0,34*
3	Spedition Umb	0,15	0,19	1,27	1,14	*0,22*
4	Freyrom	0,04	0,06	1,47	2,77	*0,16*
5	Moldocor	0,08	0,07	0,94	1,61	*0,12*
6	Concret Constrcut SRL	0,01	0,00	0,15	84,19	*0,08*
7	Trust Euro Term	0,05	0,06	1,09	1,11	*0,07*
8	Arcada Sa	0,15	0,01	0,09	3,84	*0,05*
9	Oyl Company	0,01	0,01	2,42	3,36	*0,04*
10	Hidroconstrucita Sa	0,30	0,02	0,06	1,94	*0,03*
11	Porr Construct SRL	0,00	0,00	0,76	11,90	*0,02*
12	Axela Constructii	0,01	0,01	1,07	1,66	*0,02*
13	Bog~Art	0,01	0,01	1,16	3,23	*0,02*
14	Tehnologica Radion	0,01	0,01	0,63	2,65	*0,01*
15	Cartel Bau	0,07	0,04	0,54	0,20	*0,01*
16	Euroconstruct SRL	-0,38	-0,06	0,15	7,16	*-0,41*
17	Bilfinger Facility Management	-0,07	-0,17	2,37	6,72	*-1,15*
18	Confort SRL Timisoara	-0,40	-1,10	2,76	1,13	*-1,24*
19	Romstrade	-66,22	-0,46	0,01	4,04	*-1,84*

Source: the author's processing.

For an overview of the companies in the sample through the calculated indicators, we present in Table 3 a situation of company distribution according to the best values for each indicator:

When the model indicators for firms in our sample have been calculated, we observe an average ROE of 3% for the 19 companies, less than the overall average in history. In general, in industry, a minimum ROE is considered starting from the value of 5%. There are also large discrepancies in terms of company size and profitability that was drawn in 2012, the involved factors being multiple.

By far the most profitable company in our analysis is Porr Railway Transport, with a profitability of 69%. In other words, for every leu invested by shareholders in the company, this made a net profit of 69 bani. A second company according to profitability is Strabag Ltd., with a profitability of 34%. According to the model, although the two companies are well positioned from the point of view of profitability, it is important to note in Table 2 that *Equity Multiplier was very high in both cases*, 21.05 and 65.65. These values are a factor unfavorable to society. We notice that only two companies also fall in the value of this indicator from 2.5 to 1.66 of the 19 analyzed companies.

Deepening the analysis, after we notice the Equity Multiplier value which is also called Leverage (Total Assets / Equity), we will evaluate its component Total Liabilities / Equity for this report, which is also called Financial Leverage or general financial autonomy. A general financial autonomy of about 0.5, ie maximum 50%, is generally accepted. In our case the company has an extremely low overall financial autonomy, the ratio value being much higher than accepted.

We can see that from the sample, four companies had losses in 2012 and most companies realize ROS and ROA relatively small, with some cases where TAT has been positive. We can extend the detailed analysis to other companies for the indicator Equity Multiplier. In general, the high value of this indicator is a negative phenomenon.

For a more detailed view of calculated indicator values, for each company we present a ranking by ROS, ROA, TAT and Equity Multiplier. For the first three indicators in the table, the presented order involves as good a positioning in the ranking. For the last indicator, Eq. M., the situation is reversed, the first position in the ranking is the worst, etc.

Table 3. Arranging companies in the decreasing order of model indicators

	ROS	ROA	TAT	Eq. M.
1	Hidroconstrucita Sa	Spedition Umb	Confort SRL Timisoara	Concret Constrcut SRL
2	Arcada Sa	Moldocor	Porr Railway Transport	Strabag SRL
3	Spedition Umb	Trust Euro Term	Oyl Company	Porr Railway Transport
4	Moldocor	Freyrom	Bilfinger Facility Management	Porr Construct SRL
5	Cartel Bau	Cartel Bau	Freyrom	Euroconstruct SRL
6	Trust Euro Term	Porr Railway Transport	Strabag SRL	Bilfinger Facility Management
7	Freyrom	Hidroconstrucita Sa	Spedition Umb	Romstrade
8	Porr Railway Transport	Arcada Sa	Bog~Art	Arcada Sa
9	Axela Constructii	Axela Constructii	Trust Euro Term	Oyl Company
10	Tehnologica Radion	Oyl Company	Axela Constructii	Bog~Art
11	Concret Constrcut SRL	Bog~Art	Moldocor	Freyrom
12	Bog~Art	Strabag SRL	Porr Construct SRL	Tehnologica Radion
13	Oyl Company	Tehnologica Radion	Tehnologica Radion	Hidroconstrucita Sa
14	Strabag SRL	Porr Construct SRL	Cartel Bau	Axela Constructii
15	Porr Construct SRL	Concret Constrcut SRL	Euroconstruct SRL	Moldocor
16	Bilfinger Facility Management	Euroconstruct SRL	Concret Constrcut SRL	Spedition Umb
17	Euroconstruct SRL	Bilfinger Facility Management	Arcada Sa	Confort SRL Timisoara
18	Confort SRL Timisoara	Romstrade	Hidroconstrucita Sa	Trust Euro Term
19	Romstrade	Confort SRL Timisoara	Romstrade	Cartel Bau

Source: the author's processing.

For a clearer picture of the sample, applying the Pearson correlation coefficient calculation, we highlight the following correlations:
- ROE and ROS: 0,68 with a determination coefficient of 0,46.
- ROE and ROA: 0,75 with a determination coefficient of 0,57.
- ROE and TAT: 0,00.
- ROE and Eq. M. 0,23, with a determination coefficient of 0,05.

Thus we see a direct high correlation between ROE and ROS of 0.68, significant for 46% of the companies in the sample and a correlation between ROE and ROA of 0.75, significant for 57% of the companies analyzed at a significance level chosen by 5%. Thus we can say that an increase in ROS and ROA indicator values can increase profitability in companies in the construction industry in 46% of cases and 57% of cases.

In terms of ROE and Eq. M., the correlation is non-significant at sample level. However, it was desirable to have a negative correlation between the two indicators, reversed, at sector/sample level, where the funding would be made more on behalf of equity and less on debt, showing in the latter case a higher risk due to excessive presence of creditors in the financial assets of the company.

5 Conclusions

From the performance analysis in the construction industry presented by using the DuPont model, we can say that financial profitability represented by ROE is influenced by a number of factors in its structure and financial management. In terms of value indicators, in the model itself and the direct impact on Net Income, there could not be revealed significant correlations between Net Income and Total Assets or Net Income and Turnover. In other words, there cannot be established a significant relationship at sample level between the size of the Net Income and the size of companies or the size of sales. However, there could be revealed a direct reasonable correlation between Net Income and Equity. Thus, their funding from

personal sources can mean a chance to Net Income growth for the industry.

Through the DuPont model we developed a hierarchy of societies according to the model indicators, calculating and presenting the Pearson correlation coefficient links between indicators. Therefore, in order to achieve a ROE improvement in the construction industry we may consider a growth of the asset utilization efficiency by ROA indicator and a growth in efficiency representation of Net Income in Turnover by the ROS indicator. Regarding the Equity Multiplier indicator effect on profitability, a higher percentage can bring an increase in profitability, but on short-term the effect is undesirable. Excessive indebtedness attracts a risk of indebtedness that cannot be easily quantified in the current financial crisis marked mainly by lack of liquidity.

We suggest as future research the study of financial leverage for companies in the construction industry to highlight the effect of excessive indebtedness, which is very common in the sector. Theoretically, in the interpretation of financial leverage, an interest rate higher to ROA determines future losses to the company and not profit.

References

[1]. Balteş, Nicolae et all, *Analiza economico-financiară a întreprinderii[Economical and financial analysis of the enterprise eng.]*, "Lucian Blaga" University's Houseprint, 2003.

[2]. Burja, Camelia, *Analiză economico-financiară[Economical and financial analysis eng.]*, Risoprint Publishing House, 2005.

[3]. Herciu, M., Belascu, L., Ogrean, C., A DuPont Analysis of the 20 Most Profitable Companies in the World, *International Conference on Business and Economics Research*, Vol. 1, 2011, pp. 45-48.

[4]. Mihai, Ioan et all, *Analiză economico-financiară[Economical and financial analysis eng.]*, Mitron Publishing House, 1999.

[5]. Moss, C., Mishra, A., Dedah, C. Decomposing Agricultural Profitability Using DuPont Expansion and Theil's Information Approach, *Association Annual Meetings in Milwaukee*, 2009.

[6]. Păvăloaia, W., Paraschivescu, M., Lepădatu, G.., *Analiza economico-fianciară. Concepte şi studiii de caz[Economical and financial analysis. Concepts and case studies eng.]*, Economica Publishing House, 2010.

[7]. Răulea Ciprian, *Statistică Psihologică şi prelucrarea informatizată a datelor[Psychological Statistics and computerized data eng.]*, university course, http://www.scribd.com/doc/42372943/Statistica-Psihologica la 10.03.2014, 2010.

[8]. Sheela Christina, Karthikeyan, K., Financial Performance of Pharmaceutical Industry in India using DuPont Analysis, *European Journal of Business and Management*, Vol. 4, No. 14, 2012, pp. 84-91.

[9]. Soliman, Mark, T., The use of DuPont Analysis by market participants, on-line publication of "*Social science research network*" eLibrary at http://ssrn.com/abstract=1101981, 2007, accesed at 18.04.2014.

[10].SPSS Easy Learning, http://easyspps.wordpress.com/2010/08/30/coeficientul-de-corelatie-al-lui-pearson-r-11/, accesed at 09.03.2014.

[11].SSIF Goldring, http://www.goldring.ro/gradul-de-indatorare-teorie.html .

[12].Vintilă, G., Gheorghe, I., Pocan, M., Anghel, G., Factorial Analysis of Profitability, *Revista Română de Statistică*, Supliment Trim. II, 2012, pp.256-259.