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**CONVERGENT DISCOURSES. Exploring the Contexts of Communication**

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## STATISTICAL ANALYSIS IN FINANCIAL AUDIT. CASE STUDY: VLG RO SRL

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*Abstract: Talks about an interference of statistics in several scientific fields are increasing lately and financial audit does not make an exception. Besides the classical methods used in financial audit, statistics is being more and more used now. It stands at the basis of the confirmation and invalidation of certain theories of the financial audit. With our scientific approach we have tried to show, with the aid of the Pearson correlation coefficient included ( $R^2$ ) included, that a correlation may be established, or not, between the economic indicators used in the context of the financial audit. Even if such correlations will strengthen the connection between those indicators, we promise that with our next scientific approach we will seek to use also other economic indicators to confirm or refute the correlation between those indicators.*

*Keywords: financial audit, statistical analysis, turnover, revenue, staff number*

### **1. Introduction**

The present article aims at proving once more the mixture of statistics with economic and financial analysis, and the auditing of a commercial company. Even if most times the results provided by statistics in the field of financial auditing are identical or similar to the ones extracted from accounting, it should not discourage us as auditors, but confirm our belief that the activity we develop in financial auditing complies with the auditing standards.

Financial auditing can no longer develop as a unique and distinct area within the field of economic sciences. There is a continuous mixture of financial auditing with other fields of the economic sciences. Therefore, besides accounting, we can assert that statistics find an ever-growing use as a part of financial auditing.

In the example below, we will demonstrate the importance of the correlation by data pairs used as a part of statistical analysis, as well as the opportunity of choosing the data pairs so that the results obtained within the statistical analysis are plausible. Last but not least, the results of the statistical analysis may help us detect certain possible risks within the commercial company. [1]

### **2. Research methodology**

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The purpose of this study consists of analyzing the influence of applied statistical method over financial results of a company subject to a financial audit. We intend to acquire auditing evidence by means of using certain statistical methods. For this reason, we will use analytical procedures by data pairs that lead us to a determination of a correlation between the chosen variables. The analysis used in the case studies is a quality analysis of used information, particularly staff number, turnover and total income. In the process of grounding this case study, we also considered the criteria that a commercial company must meet in order to be audited and we chose two of these criteria, as many as necessary according to provisions of the Order of the Ministry for Public Finances no. 3055/2009. Moreover, these particular criteria for auditing economic entities were included also in the Order of the Ministry for Public Finances no. 1802/2014. [2], [3]

The study follows a statistical approach for assessing and testing the influence of statistical results over relevance of financial information in order to obtain the research results. The analyzed period includes financial years 2013, 2014 and 2015, and the dates taken into account during our approach correspond to the twelve months of the financial year.

### 3. Case study

The preparation of this case study included the financial data of the company VLG RO SRL, subject to an auditing contract. Moreover, when performing the statistical analysis, we used Pearson correlation coefficient ( $R^2$ ) in order to establish a correlation between the variables taken into account, i.e. staff number, turnover and total income.

For 2013, we have the following values, as shown in the table below:

*Table 1.* Comparable variables for VLG RO SRL

No.	Period (calendar month)	Staff number	Turnover (Lei)	Total income (Lei)
1.	January	51	5574162	6154220
2.	February	49	6627708	6681676
3.	March	49	6136673	6134525
4.	April	48	7241856	7638927
5.	May	48	7499837	7540995
6.	June	48	6117505	6696893
7.	July	48	7113024	7300975
8.	August	46	7239016	7242463
9.	September	46	6435303	6441331
10.	October	44	6268516	6562908
11.	November	45	7210710	7238261
12.	December	45	4582243	4680188

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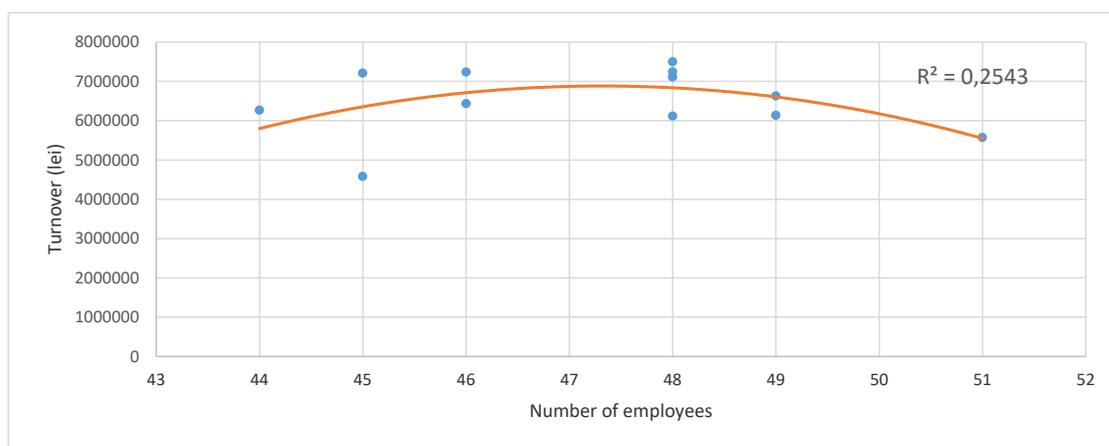
First we analyzed statistically the data pair staff number/turnover, and the five relevant curves we take into account are: linear, logarithmic, polynomial, power and exponential.

In the current case, the results are:

- linear..... $R^2 = 0,0001$
- logarithmic..... $R^2 = 0,0005$
- polynomial..... **$R^2 = 0,2543$**
- power..... $R^2 = 0,0022$
- exponential..... $R^2 = 0,0014$

The curve with the maximum  $R^2$  is displayed in Picture 1:

*Picture 1. Determining  $R^2$  coefficient for the data pair staff number - turnover*



The Picture 1, and according to the interpretation of results for  $R^2$ , leads us to the conclusion that there is a minor association between staff number and turnover, which is true.

The second data pair is provided by turnover/profit and we calculated again the five relevant curves: linear, logarithmic, polynomial, power and exponential.

In this case we obtained the following results:

- linear..... $R^2 = 0,9315$
- logarithmic..... **$R^2 = 0,9388$**
- polynomial..... $R^2 = 0,9376$
- power..... $R^2 = 0,9370$
- exponential..... $R^2 = 0,9169$

The curve with the maximum  $R^2$  is displayed in Picture 2:

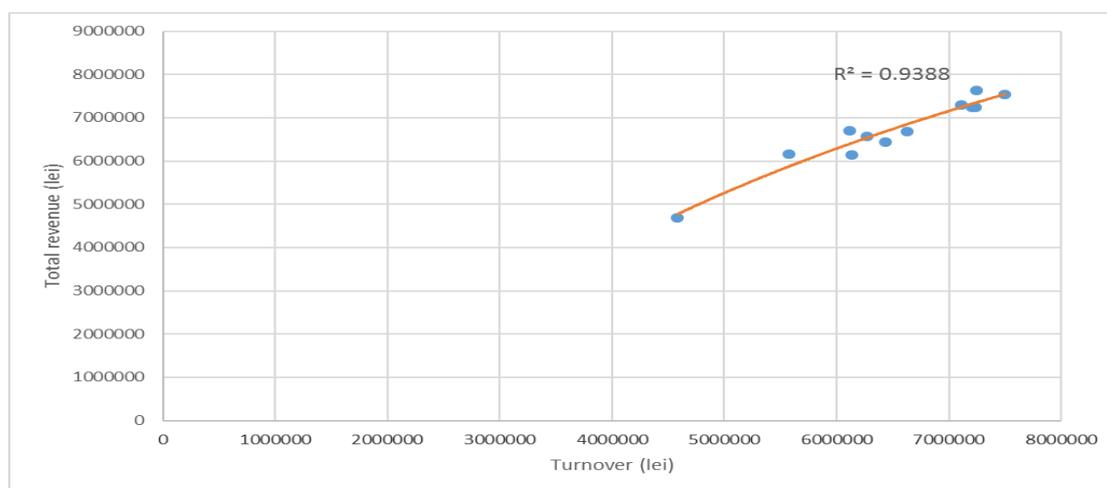
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Picture 2. Determining  $R^2$  for the data pair turnover - income



Considering the specific activity of that particular company (electrical goods wholesale), the obtained result is true and therefore the  $R^2$  correlation coefficient value is higher and exceeds the value of 0.7, which proves a strong correlation between turnover and total income.

For 2014, the values are displayed in Table 2:

Table 2. Comparable variables for VLG RO SRL

No.	Period (calendar month)	Staff number	Turnover (Lei)	Total income (Lei)
1.	January	43	4.330.610,72	4.332.200,35
2.	February	43	3.374.063,90	3.396.899,02
3.	March	42	4.829.862,64	4.890.771,65
4.	April	41	4.552.240,15	4.624.142,82
5.	May	41	5.732.985,49	5.815.403,82
6.	June	44	4.547.469,88	5.307.870,87
7.	July	42	7.045.555,98	7.075.590,40
8.	August	40	7.032.869,80	7.090.873,49
9.	September	42	6.656.991,28	6.691.300,07
10.	October	46	6.049.900,25	6.087.470,96
11.	November	51	7.571.441,15	7.587.400,25
12.	December	51	6.345.854,11	6.447.144,74

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As shown in Table 2, the analyzed period includes 2014, and the displayed information corresponds to the months of that specific year.

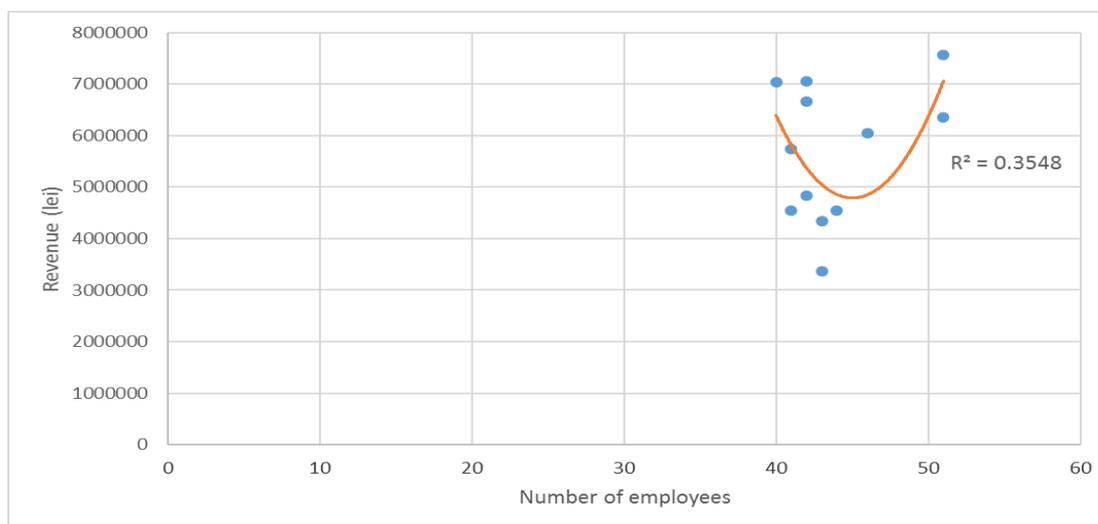
First, we analyzed statistically the data pair staff number/turnover, and the relevant curves that we take into account are: linear, logarithmic, polynomial, power and exponential.

In the present case, the results are:

- linear..... $R^2 = 0,2133$
- logarithmic..... $R^2 = 0,2054$
- polynomial..... $R^2 = \mathbf{0,3548}$
- power..... $R^2 = 0,3013$
- exponential..... $R^2 = 0,3088$

The curve with the maximum  $R^2$  is presented in Picture 3:

Picture 3. Determining  $R^2$  coefficient for the data pair staff number – turnover



As shown in Picture 3, and according to the result interpretation for  $R^2$ , we can assert that there is a minor association between staff number and turnover, which is true.

The second data pair is given by turnover/profit and again we calculated the five relevant curves: linear, logarithmic, polynomial, power and exponential.

In this case we obtained the following results:

- linear..... $R^2 = 0,9755$
- logarithmic..... $R^2 = 0,9724$
- polynomial..... $R^2 = \mathbf{0,9767}$

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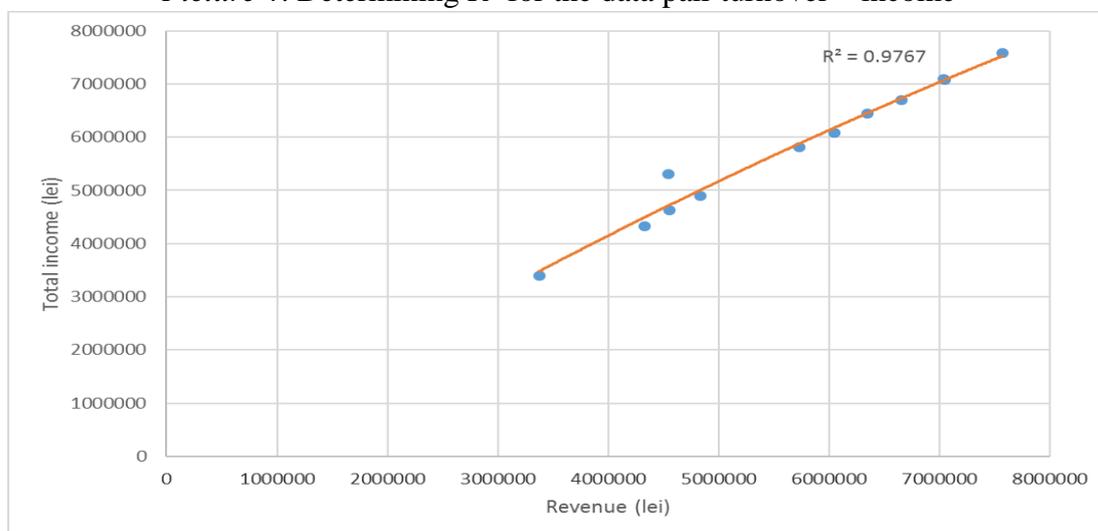
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- power..... $R^2 = 0,9708$
- exponential..... $R^2 = 0,9487$

The curve with the maximum  $R^2$  is displayed in Picture 4:

Picture 4. Determining  $R^2$  for the data pair turnover – income



As shown in Picture 5, and according to the result interpretation for  $R^2$ , we can assert that there is a substantial association between turnover and total income, which is true.

Considering the specific activity of that particular company (electrical goods wholesale), the obtained result is true and therefore the  $R^2$  correlation coefficient value is higher and exceeds the value of 0.7, which proves a strong correlation between turnover and total income.

For 2015, we have the values included in Table 3:

Table 3. Comparable variables for VLG RO SRL

No.	Period (calendar month)	Staff number	Turnover (Lei)	Total income (Lei)
1.	January	53	6308115	6390590
2.	February	53	7165034	7251151
3.	March	55	8161726	8294512
4.	April	61	7521788	7682983
5.	May	60	8696376	8766239
6.	June	59	9392331	9447034
7.	July	60	9588913	10303642
8.	August	64	10362590	10420071

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<b>9.</b>	September	66	11643151	11716016
<b>10.</b>	October	63	11827152	11863132
<b>11.</b>	November	66	12538038	12575208
<b>12.</b>	December	65	8485328	8786214

As shown in Table 3, the analyzed period included 2015, and any displayed information corresponds to the months of that specific year.

First, we analyzed statistically the data pair staff number/turnover, and the five relevant curves that we calculate are: linear, logarithmic, polynomial, power and exponential.

In the present case, the results are:

- linear..... $R^2 = 0,6279$
- logarithmic..... $R^2 = 0,6243$
- polynomial..... $R^2 = 0,6319$
- power..... $R^2 = \mathbf{0,6491}$
- exponential..... $R^2 = 0,6385$

The curve with the maximum  $R^2$  is displayed in Picture 5:

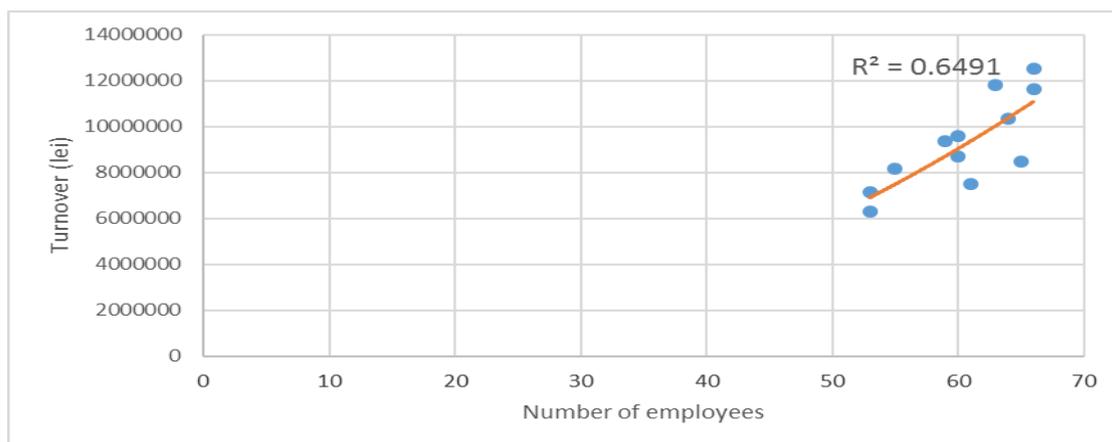
*Picture 5. Determining  $R^2$  coefficient for the data pair staff number – turnover*

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As shown in Picture 5, and according to result interpretation for  $R^2$ , we can assert that there is a minor association between staff number and turnover, which is true.

The second data pair is provided by turnover/profit and again we calculated the five relevant curves: linear, logarithmic, polynomial, power and exponential.

In this case, we obtained the following results:

- linear..... $R^2 = 0,9905$
- logarithmic..... $R^2 = 0,9882$
- polynomial..... **$R^2 = 0,9920$**
- power..... $R^2 = 0,9916$
- exponential..... $R^2 = 0,9744$

The curve with the maximum  $R^2$  is displayed in Picture 6:

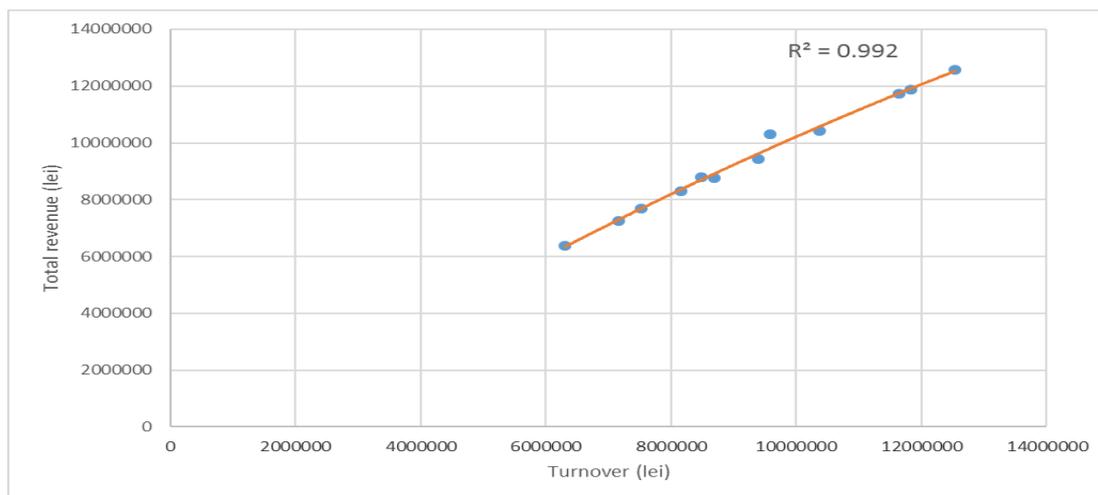
*Picture 6. Determining  $R^2$  for the data pair turnover - income*

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Considering the specific activity of that particular company (electrical goods wholesale), the obtained result is true and therefore the  $R^2$  correlation coefficient value is higher and exceeds the value of 0.7, which proves a strong correlation between turnover and total income.

Certainly, there is the possibility of choice between other data pairs and remake the statistical analysis, but the obtained results will only reinforce the results obtained so far. For example, a potential selected data pair consists of total assets and capitals.

We should not leave out the fact that, in both situations, the highest value for Pearson  $R^2$  correlation coefficient was obtained as a part of the 2<sup>nd</sup> degree polynomial correlation. If we had used a degree higher than 2 as a part of the polynomial correlation, the result would have been even closer to 1.

#### 4. Conclusions

Based on the results determined by the examined data analysis, the study validated the suggested research hypothesis, and it reached the objectives of our statistical approach.

Therefore, in the examined case study, we aimed at proving that well-known results of economic and financial analysis performed within the respective entity may also be achieved through a statistical approach.

But, if the results determined through the statistical analysis were much different than the results of the economic and financial analysis, then certain pieces of information may be incorrect, which may lead mainly to an increased fraud risk.

Our intention is not to minimize the importance of the economic and financial analysis, but to assimilate such a statistical analysis to certain additional tests performed in the auditing activity, where these tests, as mentioned above, may provide information regarding potential risks occurring together with the process of auditing that particular company.

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Moreover, this statistical analysis may influence the auditing opinion if the determined results were completely different than the ones obtained as part of the economic and financial analysis, which is an integral part of financial statements.

The use of statistical methods as part of the financial audit, but also its interconnection with financial analysis and accounting may open up a new research path. This new area aims at analyzing the economic and financial events included in financial audits based on certain financial analysis indexes, by means of advanced statistical and econometrical methods, hypothetically named audiometrics.

### **Bibliography**

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