

A PROFITABILITY REGRESSION MODEL IN FINANCIAL COMMUNICATION OF ROMANIAN STOCK EXCHANGE'S COMPANIES

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Abstract

The rate of profit is one of the most important indicators for the stakeholders and shareholders of the companies in the modern economy. In the present article we clearly identified the relationship between the net profit margin and other three composite financial indicators for the companies that are included in BET Index, the most important index of the Romanian Stock Exchange. We identified the regression model that includes, with a significance level of 95%, the stockholder's equity, long-term liabilities, provisions, deferred revenues over a year, total liabilities, working capital and current assets.

The regression model was validated by using many statistics: Multiple R, R Square, t test, F test and p-values. Finally, we obtained the complete valid regression model regarding the profitability of Romanian Stock Exchange's companies.

Key words: *financial indicators, integrated communication, profit regression model, Romanian stock exchange profit model.*

JEL Classification: *D24, M21, M41*

I. INTRODUCTION

The performance is analyzed in all the economic areas. (Grashuis, 2018) explores variability in the financial performance of the largest US farmer cooperatives with emphasis on efficiency, productivity, and leverage. (Leleu, Al-Amin, Rosko, & Valdmanis, 2018) made a robust analysis of hospital efficiency and factors affecting variability. Some authors (Zhong & Enke, 2017) studied the daily stock market return forecasting by using cluster and classification mining procedure. According to (Falat & Holubcik, 2017) in the modern economy there is an important relationship between marketing strategy compared to financial situation, respectively financial characteristics of selected communication channels and tools.

The financial performance could also be influenced by the integrated communication in the companies. (Marjanova, Sofijanov, Davcev, & Temjanovski, 2017) argue that usage of integrated communication leads to increased profitability. (Dillingham & Ivanov, 2017) investigate whether or not inoculation messages are a viable preemptive crisis communication strategy to protect the 'stay in market' beliefs of inexperienced investors amidst a major stock market downturn.

The relationship between the rate of profit and other financial indicators was analyzed by many authors. One of the purpose of (Mihut (Vasiu), 2015) results in a ranking of companies listed and traded on the Bucharest Stock Exchange guided by the financial performance obtained. Some studies (Vatavu, 2014) reveal that based on the results of the static regression models and their statistically significant coefficients, debt, tangibility, size, liquidity and the variable of inflation and crisis are the determinants of return on assets. Tangibility, business risk and the level of taxation have a negative impact on return on assets.

According to (Stefan (Belcic-Stefan), 2016), the implications of analyzing the relationship between the profit rate and other financial indicators are even more relevant as the Romanian capital market could benefit from increased visibility with its reclassification as an emerging capital market in the near future. Some authors (Chersan, Carp, & Mironiuc, 2013) identified a potential in using data mining technologies along with auditing financial indicators.

At a global level, there were studies (Fernandes, Stasinakis, & Bardarova, 2018), (Garrido, Verbeke, & Bravo, 2018) that evaluate the efficiency of peripheral European domestic banks and South-American (Chilean) financial institutions. These studies examine the effects of bank-risk determinants on their performance.

All these studies reveal that the financial performance of the company has a big importance for the communication with stakeholders and shareholders, from real financial data to estimated financial information.

II. METHODOLOGY

Sample

In order to highlight the relationship between the net profit margin and the other financial indicators, we analyzed 13 companies that are listed by Bucharest Stock Exchange. These companies compose the BET index, which is the oldest index of the Romanian Stock Exchange. They are active (Bucharest Stock Exchange, 2017) in areas such as financial-banking (TLV, FP, BRD, BVB), energy (SNP, SNG, EL, TGN, TEL, COTE, SNN), telecommunication (DIGI) and medical services (M). At the end of 2016, the stock market capitalization of all companies listed on the Bucharest Stock Exchange was 32 billion euros.

Procedures

By the present article we analyzed the relationship between the net profit margin as the dependent variable and other three complex financial indicators as independent variables. The formulas we used for the indicators are the following:

The dependent variable (Y):

Y = the net profit margin

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Total Revenues}}$$

The independent variables (X1, X2, X3)

X1 = the rate of Stockholder's Equity + Long-term liabilities + Provisions + Deferred revenues over a year

$$X1 = \frac{\text{Stockholder's Equity} + \text{Long - term liabilities} + \text{Provisions} + \text{Deferred revenues over a year}}{\text{Total Liabilities} + \text{Stockholder's equity}}$$

X2 = the rate of Working Capital

$$X2 = \frac{\text{Working Capital}}{\text{Total Liabilities} + \text{Stockholder's equity}}$$

The working capital is calculated using the following formula:

$$\text{Working Capital} = \text{Stockholder's Equity} + \text{Long - term liabilities} + \text{Provisions} + \text{Deferred revenues over a year} - \text{Current assets}$$

X3 = the leverage rate

$$X3 = \frac{\text{Total Liabilities}}{\text{Total Liabilities} + \text{Stockholder's equity}}$$

The regression model has the following general parameters:

$\alpha = 0.05$ (confidence level = 95%);

type of model: simple linear regression;

the constant (interceptor) is zero.

We forced the interceptor to be zero because the net profit margin depends only on the independent variables. Logically, the net profit margin cannot have a constant value "by default".

We collected the data from the official site of Bucharest Stock Exchange (www.bvb.ro) and from the official site of the biggest retail broker from Romania (www.tradeville.eu). All the data refers to the year 2016, because at the moment of writing this article the results for 2017 were not yet published and communicated by the companies.

Results

The results of the regression model are presented using 3 levels:

- the creditworthiness of the model;
- total variance decomposition and F test (ANOVA);

- estimates for model parameters, their standard errors, T test, confidence interval for model parameters.

Level 1

Regarding the model's creditworthiness, the obtained values are presented in Table 2.

Table 2 – Regression Statistics for the model

| <i>Regression Statistics</i> | |
|------------------------------|----------|
| Multiple R | 0.936441 |
| R Square | 0.876921 |
| Adjusted R Square | 0.752306 |
| Standard Error | 0.115559 |
| Observations | 13 |

Multiple R is 0.936, which means there is a strong relationship between Y parameter and X1, X2, X3 parameters. In the regression statistics we can see that R^2 is 0.8769 which means that 87.69% of the net profit margin is explained by the X1, X2, X3 parameters, so X1, X2, X3 are determinant factors included in the model. For our application, as all the listed creditworthiness indicators are close to 1, we can conclude that the simple linear regression model is good.

Level 2

Regarding the total covariance decomposition and the F test, the computed values are presented in Table 3.

Table 3 – ANOVA values

| ANOVA | df | SS | MS | F | Significance |
|------------|----|----------|----------|---------|--------------|
| | | | | | F |
| Regression | 3 | 0.951455 | 0.317152 | 23.7496 | 0.000131 |
| Residual | 10 | 0.13354 | 0.013354 | | |
| Total | 13 | 1.084995 | | | |

In our model we have 4 regressors (X1, X2, X3, Y) and 13 observations. In this context, $df=3$ and the total variance (1.0849) is decomposed into 2 components:

variance explained by regression is 0.9514;
residual variance is 0.1335.

The percentage of the variance explained by regression in the total variance is 87.69%, so the regression model is really relevant. The value of F is 23.749 and the value of Significance F is almost zero (less than 0.05), which means that we accept that the chosen pattern adjusts the sample data in a correct manner.

Level 3

Regarding the estimates for model parameters, their standard errors, the t test and the confidence interval for the model parameters, the values are presented in Table 4.

Table 4 – Coefficients and statistical values

| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% |
|-----------|--------------|----------------|----------|-----------|-----------|-----------|
| Intercept | 0 | | | | | |
| X1 | 0.684894 | 0.096787 | 7.076319 | 0.0000390 | 0.469239 | 0.900548 |
| X2 | -0.60953 | 0.157965 | -3.85863 | 0.003167 | -0.9615 | -0.25756 |
| X3 | -0.27253 | 0.087074 | -3.12984 | 0.010693 | -0.46654 | -0.07851 |

By analyzing the thresholds for significance for the independent variables X1, X2, X3 we can notice that all P-values are less than $\alpha=0.05$. Also, the values of the coefficients are between the limits of the confidence interval and the confidence intervals don't contain the zero value.

Having all these data, the regression equation has the following form:

$$\hat{Y} = 0.684 \times X1 - 0.609 \times X2 - 0.272 \times X3 \quad \text{meaning:}$$

| | |
|----------------------------|--|
| Net Profit Margin = | |
| $0.684 \times$ | $\frac{\text{Stockholder's Equity} + \text{Long-term liabilities} + \text{Provisions} + \text{Deferred revenues over a year}}{\text{Total Liabilities} + \text{Stockholder's equity}}$ |
| $- 0.609 \times$ | $\frac{\text{Working Capital}}{\text{Total Liabilities} + \text{Stockholder's equity}}$ |
| $- 0.272$ | $\frac{\text{Total Liabilities}}{\text{Total Liabilities} + \text{Stockholder's equity}}$ |

III. DISCUSSION, LIMITATIONS, CONCLUSIONS AND FUTURE DIRECTIONS

As a conclusion, from statistical point of view, taking into account the stages presented in levels 1 and 2, the obtained regression model is valid for $\alpha=0.05$. Having the complete regression model, it can be noticed that the net profit margin depends positively (+0.684) on the combination of stockholder's equity, long-term liabilities, provisions and deferred revenues over a year. Also, it can be noticed that the net profit margin depends negatively on the working capital rate and the total liabilities rate.

The main limitation of the model stems from the fact that the analyzed data are only for the financial year 2016, the model being built on the most recent financial data published by the companies from the BET Bucharest Stock Exchange index (13 companies).

Based on the model identified in the current article, we can highlight the following directions for the future research: model comparisons for specific economic domains (e.g.: specific models for telecom/medical/energy), model testing and validation for several financial years. Also, another future direction could be the analysis of the regression model in a wider context of the regional stock exchange markets (e.g.: Central and Eastern European stock exchange markets).

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