DETERMINATION OF THE ECONOMIC VALUE ADDED USING ECONOMETRIC MODELS WITHIN THE ECONOMIC ENTITY

Cristina Mihaela IONESCU (HARALAMBIE)[62]

George Alin HARALAMBIE[63]

Abstract:

Determining the economic value added is a permanent concern among the actors participating in the market through the prism of efforts made to maximize shareholder wealth. The benefits brought by this modern management tool significantly contribute to the existing correlation between the objectives of the management and those of the shareholders, in order to perform a complex financial analysis of the performance with a high degree of responsibility. The study aims to evaluate the relationship between the dependent variable Economic Value Added (EVA) and a set of independent variables Net operating profit after tax (NOPAT), Earning per share (EPS), Return on equity (ROE) and Return on capital employed (ROCE).The time period considered for the analysis covers 6 financial years related to the period 2017-2022, the necessary data being extracted from the annual financial statements of ROMGAZ SA. As a result of the analysis perform, we could find that there is a strong correlation between Return on capital employed (ROCE) and Earning per-share (EPS) and between Return on equity and Net operating profit after tax (NOPAT). Regarding the existing correlation between Economic Value added (EVA) and Return on equity (ROE) we can see that it is a moderate measure.The results of the present study are in line with other research in this field, with the indicators used as a reference for determination of the value economic.

Keywords: *Economic value added (EVA), Net operating after tax (NOPAT), Earning per share(EPS),Return on equity(ROE),Return on capital employed(ROCE)*

JEL Classification*: G31, M21, M41*

Introduction

The current competitive economic environment requires the use of advanced managerial tools and techniques to facilitate the adoption of the most rational managerial decisions regarding the optimal allocation of resources. In this regard, emphasis is placed on the ability of managers to act to maximize the newly created value through clear and easy-to-follow targets in shaping business strategies based on plans drawn in terms of accounting budgets linked to the objectives set at economic entity level in order to achieve encouraging economic results.

The correction of managerial errors due to the analysis of accounting data is achieved by using techniques and tools to quantify managerial performance in close relation to organizational elements.

Promoting value-based management brings additional benefits for shareholders but also for other interest holders with positive effects in performance evaluation, a process that many companies operating in the economic environment go through.

---

[62] *PhD Student "Valahia" University of Târgoviște, Doctoral School of Economic and Humanities, No. 35, Lt. Stancu Ion Street, Târgoviște, Dâmbovița, Romania. E-mail: cristinaionescu91@yahoo.com.*

[63] *Associate Professor Faculty of Economic Sciences from Petroleum-Gas University of Ploiești, Romania*

The perception of economic participants in terms of capital structure and dividend policy is that they need to be adapted to how they generate new value created for shareholders. This entails a number of motivational challenges by encouraging a change in the personnel system for the successful implementation of this value-based management concept.

Managers' reward is aligned with the long-term contribution to creating newly created value for shareholders on performance criteria by identifying opportunities that arise.

Literature review

Starting from the idea of maximizing the value created for shareholders, we have at hand the decision-making variables with which we base our strategy at the entity level through financial analysis techniques that encourage performance, promoting organizational culture. (Arnold & Lewis, 2019)

The massive rise of information technology has brought innovative methods and possibilities for predicting stock exchange assets using mathematical models. (Fialova & Folvarcna, 2020)

Closely in line with the process of implementing the company's strategy is the decision to invest resources, which according to economist Stern Stewart (2019) is achieved through EVA that leads to the adoption of managerial decisions with an optimal allocation of strategic resources. (Stern, 1994)

In the opinion of Khiari Z. and Djaouahdou R., economic value added is described as an indicator in quantifying performance, as it helps optimize the decision-making system from a dual perspective, maximize the wealth of owners and the expectations of investors on the future gains it will generate. (Khiari & Djaouahdou, 2017)

A similar approach is found in Ismail I.(2011) , which argues that the EVA indicator is a blend of accounting, economic and market information that translates it into a complex and comprehensive performance measuring instrument. (Ismail, 2011)

Literature review (Kliestik, Valaskova, Lazaroiu, Kovacova, & Vrbka, 2020) considers that an important factor in profit growth is the increase in economic value.

The information provided by the annual financial statements is the main tool to guide management at economic entity level to diagnose financial condition using financial analysis, using a set of economic indicators to measure economic performance. (Savova, 2021) (Siekelova, Belas, Podhorska, & Durana, 2020)

The main advantage of using the EVA indicator is that it provides relevant information to shareholders in terms of profit taking into account the cost of capital employed. (Robinson, 2020)

The Economic Value Added is a measure of a company’s financial performance based on the residual wealth calculating by deducting its cost of capital from its operating profit ,adjusted for taxes on a cash basis. (Hammer & Siegfried, 2022)

Research Methodology

The aim of the research was to test the multiple linear regression model as well as to explain the statistical-mathematical relationship and the influences between the dependent variable (Economic Value Added) and the independent variables (Net operating profit after tax, Earning per share, Return on equity and Return on capital employed, etc.).

In analyzing the financial results, we studied the correlation between EVA, Net operating profit after tax, Earning per share, Return on equity and Return on capital employed).

The next step was to test the correlations between these indicators and establish the regression equation.

The economical-mathematical modeling was done using the SPSS statistical program version 17.0. For the correlation analysis, we determined both the average and standard deviation in the early phase, establishing the correlation level with the Pearson Index.

The SPSS program (Statistical Package for Social Sciences) is used in statistical data analysis in experimental research. Compared to other similar programs, it is distinguished by the rigorous structure of the analysis performed and the ease of use.The method used is simple multiple regression.

The regression equation is of the form:

Y=aX_1+bX_2+cX_3+α

Where: α0 = the constant term; the free term of the model;

a,b,c= slope parameters; obtained by the method of least-squares are functions of the selection data (from the sample);

ROMGAZ SA recorded during the period 2017-2022 the following financial data that were extracted on the basis of the annual financial statements in order to determine the EVA dependent variable (Economic Value Added) and can be seen in the table below:

Table no. 1

Dynamics of Economic Value Added (EVA) indicator in 2017-2022 at Romgaz SA

Indicators	2017	2018	2019	2020	2021	2022
Average capital employed(1)(Active totale-Datorii totale)	9.391.839	8.975.440	7.101.494	7.746.265	8.981.153	10.076.565
Total Assets	10.983.557	10.918.589	8.171.639	9.216.154	11.292.973	14.328.059
Total Liabilities	1.591.718	1.943.149	641.640	542.289	2.311.820	4.251.494
Weighted Average Cost of Capital WACC(2)	0,988	0,993	0,991	0,992	0,994	0,908
Cost of Capital Employed(1*2) COCE	9.279.137	8.912.612	7.037.581	7.684.295	8.927.266	9.149.521
NOPAT Net Operating Profit After Tax	1.314.929	1.939.278	1.451.576	1.386.537	4.394.378	3.019.511
EVA (COCE-NOPAT)	7.964.208	6.973.334	5.586.005	6.297.758	4.532.888	6.130.010

Source: own processing based on the financial statements of ROMGAZ SA in 2017-2022

The determination of the Economic Value Added (EVA) indicator assumes the calculation of the weighted average cost of capital using the formula

$$CMPG = \frac{CP + R_{CP+}D_f x\ d\ x\ (1-i)}{CP + D_f}$$

CP equity

R_{CP+} rate of return on an investment security
D_f financial liabilities
d interest rate
i = profit tax rate

Table no. 2

Dynamics of the weighted average cost of capital (CMPG) in the period 2017-2022 at Romgaz SA

Indicators	2017	2018	2019	2020	2021	2022
Equity	9.391.839	8.975.440	7.101.494	7.746.265	8.981.153	10.076.565
Financial liabilities	128.520	68.001	73.411	68.083	60.320	1.187.178
Rate of return on an investment security (R_{CP}) $R_{CP} = \frac{(C_1 - C_0 + D_a}{C_0)}$	0,52	0,15	0,42	0,16	0,51	0,21
Interest rate	0,01	0,02	0,19	0,47	0,00	-0,02
Weighted Average Cost of Capital	0,988	0,993	0,991	0,992	0,994	0,908
Dividends per share (D_a)	6,852	4,170	1,61	1,790	3,800	3,420
Course at the beginning of the period (C_0)	25,10	27,8	27,35	25,75	28,35	34,05
Course at end of period (C_1)	31,30	27,80	37,10	28,10	39,00	37,75

Source: own processing based on the financial statements of ROMGAZ SA in 2017-2022

A further step in this analysis is the presentation of the variables used in the econometric model (Table 3).

Table No 3

Variables used in empirical analysis

Indicators	2017	2018	2019	2020	2021	2022
EVA	7.964.208	6.973.334	5.586.005	6.297.758	4.532.888	6.130.010
NOPAT	1.314.929	1.939.278	1.451.576	1.386.537	4.394.378	3.019.511
EBIT	1.853.000	1.531.900	1.237.100	1.378.700	2.098.900	4.532.400
ROCE	0,20	0,17	0,17	0,18	0,23	0,45
earnings per share (EPS)	4,79	3,54	2,83	3,24	4,97	6,60
ROE	0,09	0,12	0,10	0,09	0,20	0,16

Source: own processing based on the financial statements of ROMGAZ SA in 2017-2022

Findings

To ensure the accuracy of the data, a descriptive analysis of the variables was performed as detailed in the table below. As we can see, in the econometric analysis, the distribution of the variables used is characterized by a positive asymmetry (skewness), because it registers positive values, except for the variables Earning per-share (EPS) and Return on equity (ROE). Kurtosis provides information about the distribution of variables. Considering the results presented in table no. 4, we can see that Economic Value Added varies between 4.532.0888 and 7.964.208.

Table no 4

Descriptive statics

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	Skewness Statistic	Std. Error	Kurtosis Statistic	Std. Error
EVA	6	4532888	7964208	6247367,17	1171983,017	,021	,845	,353	1,741
NOPAT	6	1314929	4394378	2251034,83	1228369,076	1,342	0,845	0,882	1,741
ROCE	6	0,17	0,45	0,2333	0,10857	2,221	0,845	5,063	1,741
Earning per-share (EPS)	6	2,83	6,6	4,3283	1,40259	0,755	0,845	-0,159	1,741
ROE	6	0,09	0,2	0,1267	0,04457	1,062	0,845	-0,171	1,741
Valid N (listwise)	6								

Source: authors'own processing using SPSS

To analyze the correlation between the variables, we used the correlation matrix, presented in table no. 5 The correlation matrix is used for multicollinearity analysis. Usually:

- value of the coefficients between 0 and 0.30 marks a weak correlation;;
- between 0.30 and 0.70 a moderate correlation;
- between 0.70 and 1, a high correlation.

Analyzing the data presented in the table, we can see that there are:

- strong correlation between Return on Capital Employed (ROCE) and Earning per-share (EPS) of 0.890;
- a strong correlation between return on equity and Net Operating Profit After Tax of 0.994;
- a moderate correlation between Economic Value Added(EVA) and Return on equity(ROE) of 0.695;

Table no 5

The correlation matrix

		EVA	NOPAT	ROCE	Earning per-share (EPS)	ROE
Pearson Correlation	EVA	1	-0,71	-0,132	-0,026	0,695
	NOPAT	-0,71	1	0,46	0,589	0,994
	ROCE	-0,132	0,46	1	0,890	0,507
	Earning per-share (EPS)	-0,026	0,589	0,89	1	0,611
	ROE	0,695	0,994	0,507	0,611	1

Source: authors'own processing using SPSS

Table no 6

Model Summary

Model	R	R squared	Adjusted R square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	,969a	,939	,694	,647912,513	,939	3,840	4	1	,363	3,610
	a. Predictors: (Constant) Net operating profit after tax(NOPAT),Earning per share(EPS),Return on equity(ROE) and Return on capital employed(ROCE)									
	b. Dependent Variable: Economic Value Added(EVA)									

Source: authors'own processing using SPSS

The model was designed for regressors:ROE,ROCE,NOPAT,,EPS in relation to the dependent variable EVA

R squared indicates the percentage of the variance of the dependent variable that the independent variables collectively explain. R Square measures the strength of the relationship between your model and the dependent variable on a convenient scale from 0 to 100%. In general, a larger r-squared indicates a better fit for the model. In our case, 93.9% of the economic value added variation is explained by Net Operating Profit After Tax, Earning per share, Return on Equity and Return on Capital Employed.

Table no 7

Anova Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6447930335263,392	4	1611982583815,848	3,840	,363b
	Residual	419790623921,443	1	4197906223291,443		
	Total	6867720959184,835	5			

a. Dependent Variable: Economic value added(EVA)
b. Predictors: (Constant) Net operating profit after tax(NOPAT),Earning per share(EPS),Return on equity(ROE) and Return on capital employed(ROCE

Source: authors' own processing using SPSS

Another significant test is given by the ANOVA function. Of significant importance in ANOVA is the F-test, also known as Fisher's test. The higher the F, the higher the significance of the regression equation.

From the analysis of the data presented above we can say that the ANOVA demonstrates as a summary model a significant level of the regression equation, due to the fact that the value of F is 3.840 with an insignificant sig value.

Considering the fact that we have achieved a significant correlation level and at the same time the tests we performed have reinforced the significance of the regression equation. The coefficients of the regression equation is presented below.

Table no 8

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2796540,789	3631924,828		,770	,582	-43351439,657	48944521,234
	NOPAT	-3,424	2,766	-3,589	-1,238	,001	-38,571	31,724
	ROCE	-12768519,781	7125419,948	-1,183	-1,792	,007	-103305564,473	77768524,910
	Earning per-share (EPS)	1358346,692	540841,070	1,626	2,512	005	-5513690,671	8230384,055
	ROE	65193449,472	77053261,481	2,479	,846	,003	-913861066,490	1044247965,435

a. Dependent Variable: EVA

Source: authors'own processing using SPSS

Starting from the coefficients presented in the table above, the regression equation is

$$EVA = 27.965.40{,}789 - 3{,}424\ NOPAT - 127.685.519{,}781\ ROCE + 1.358.346{,}692\ EPS + 65.193.449{,}72\ ROE$$

Following the analysis, we demonstrated that Net operating profit after Tax, Earning per share, Return on equity and Return on capital employed influence Economic Value Added (EVA).

Conclusions

At the level of an economic entity, the process of creating added value involves the adoption of an innovative vision, regarding the evaluation of investment strategies, current operations and the financing of a company's activity by selecting the optimal ones based on a rational and coherent judgment.

In the context of the capitalization of the financial performance, the key determining factors of the economic value must be identified by drawing clear and achievable coordinates to be followed by appropriate tools and techniques with the help of the relevant indicators in order to determine the results.Evaluating these results allows us to adjust possible deviations and to have an overview of the entire activity with the main objective of maximizing the newly created economic value.

In order to ensure the conditions of sustainable development at the economic entity level, it is necessary to analyze the reliable and relevant effects of decisions adapted to future economic consequences, contributing to the optimization of the entity's financial health.

The role played by this indicator is particularly important for employees and investors in terms of facilitating communication between them based on management reports.

EVA is often associated as an attribute of the shareholder wealth creation picture that contributes to the quality of managerial decisions under conditions of efficiency and effectiveness based on strategic thinking.

The multiple linear regression model reveals the economic-mathematical link between Net operating profit after tax (NOPAT), Earning per share (EPS), Return on equity (ROE) and Return on capital employed (ROCE) and Economic Value Added (EVA).

Bibliography

Arnold, G., & Lewis, D. (2019). Corporate Financial Management, Sixth Edition. United Kingdom: Financial Times/ Prentice Hall.

Fialova, V., & Folvarcna, A. (2020). Default prediction using neural networks for enterprises from the post-soviet country. Ekonomicko-manazerske spektrum, 14(1),, 43-51.

Hammer, T., & Siegfried, P. (2022). Value-Based Controlling & International Accounting of Economic Value Added. Oblìk ì finansi, 2(96),, 43-48.

Ismail, I. (2011). Company performance in Malaysia after the 1997 economic crisis: Using Economic Value Added (EVA) as a predictor. African Journal of Business Management Vol. 5(7), 3012-3018.

Khiari, Z., & Djaouahdou, R. (2017). New trends in measuring financial performance: Economic Value – Added (EVA),. Algerian Business Performance Review, no.1, 177-191.

Kliestik, T., Valaskova, K., Lazaroiu, G., Kovacova, M., & Vrbka, J. (2020). Remaining Financially Healthy and Competitive: The Role of Financial Predictors. Journal of Competitiveness, 12(1), 74–92.

Robinson, R. (2020). Computationally Networked Urbanism and Sensor-based Big Data Applications in Integrated Smart City Planning and Management. Geopolitics, History, and International Relations 12(2), 44–50.

Savova, K. (2021). Differences in application of accounting standards - current aspects. Ekonomicko-manazerske spektrum, 15(1), 111-122.

Siekelova, A., Belas, J., Podhorska, I., & Durana, P. (2020). Case Study in V4 Focusing on Mining And Quarrying Sector. Acta Montanistica Slovaca, Volume 26 (1), 70-83.

Stern, G. B. (1994). EVA: Fact and Fantasy. Journal of Applied Corporate Finance, Vol. 7, No. 2, 71-87.