

# Empirical Analysis of Sustainable Performance in Relation to Stock Exchange Performance: Evidence from Romania

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## Abstract

*Given the substantial advancements in worldwide financial markets and the sharp increase in sustainability concerns, this article proposes an incursion into the empirical analysis of the interaction between companies' sustainable performance and stock market performance, focusing on the specificities of the Romanian financial market. It emphasizes the importance of a comprehensive approach that goes beyond simple financial figure analysis to include aspects such as sustainability, corporate governance, and social impact. The article aims to shed light on this complex relationship through rigorous empirical analysis applied to data specific to the Romanian market. We will thoroughly investigate the connections between companies' sustainability practices and the evolution of stock prices, taking into account the economic particularities of Romania, culminating with the estimation of a multiple linear regression model. Our study reveals that there is a correlation between the market capitalization of a company, its corporate performance and the specific industry or sector in which it operates.*

## Keywords

financial performance, stock market capitalization, stock market performance, stock market performance indicators

## Introduction

Over the past few decades, the concept of sustainability has become increasingly relevant in investment decisions and in evaluating business performance. In this context, there is a growing interest in understanding the impact of sustainability factors on the financial and stock performance of companies (Buse & Ștefan, 2014). Our research advantage lies in focusing on listed companies, thereby obtaining necessary data for analysis. Previous studies have concentrated on capitalization differences between countries and the connections associated with institutional norms and financial development (La Porta et al., 1997; Rajan & Zingales, 2003). The rise in stock market capitalization has been common not only across countries but also in various economic sectors.

When discussing sustainability, we focus on all three of its components: economic, environmental, and social performance. Striking a balance between these elements is the key to success and ensures an increase in market share.

For businesses listed on the stock market, each company's index corresponds to its sustainability level. It has been observed that the pricing behavior of specialists at the New York Stock Exchange, especially during moments when trading imbalances prevail in the market, is the most crucial aspect of stock market performance. Measuring sustainability efforts is commonplace, especially concerning the evolution of shares listed on the stock exchange. Consequently, this is also reflected in aspects such as "improving brand loyalty, enhancing profit margins, risk reduction, purchasing renewable energy, identifying energy-saving areas, reducing carbon footprint, maintaining

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competitiveness, and fostering a workforce dedicated to ecological measures" (Krosinsky & Robins, 2016).

Sustainability also takes into account the implemented innovative techniques, which generate a guarantee of long-term performance within the entity's management, environmental innovations (Lestari & Sunyoto, 2023), intended to reduce the negative impact on the environment through emissions of harmful substances, as well as those around, adopting circular economy approaches (Maldonado-Guzmán & Garza-Reyes, 2023; Yin et al., 2023), as well as focusing on investments in a future that is as prosperous and harmonious as possible for all parties involved. Some researchers argue that "market capitalization should be integrated into strategies for adapting to climate change at a national and regional level, primarily to address the dark effect of environmental degradation" (Azeem et al., 2023). Thus, the global shift towards sustainability, including the new requirements of entity stakeholders, influences how these should be managed (Smith & Sharicz, 2011).

Wamba (2022), indicates that a company's commitment to environmental protection is significantly affected by the company's governance system and the availability of financial resources. It also shows that engaging in environmental protection enhances the accounting and stock exchange performance of companies. These findings suggest that companies' ecosystem protection leads to a paradigm that can form the basis of a responsible governance model aimed at creating value while respecting environmental factors.

It is recognized that performance analysis is not limited solely to accounting figures but is a complex process involving aspects such as sustainability, corporate governance, and social impact (Andreev et al., 2022). In this regard, our approach focuses on a comprehensive understanding of the methods and tools available to investors in evaluating the performance of entities.

Previous studies (Jumaah et al., 2023) reveal a notable positive impact from expression and accountability, stability in politics, and the lack of violence. Conversely, the influence of legal governance was observed to be adverse on the performance of the stock market. Additionally, the authors identified a long-term relationship between governance quality and stock market performance.

Using the PMG/ARDL model and the ARDL bounds testing model to evaluate both short- and long-term relationships, Lone et al. (2023) examined the effects of particular macroeconomic variables on stock market performance in the BRICS economies). Another study used monthly data from July 1997 to June 2011 to investigate causal relationships between macroeconomic variables and stock market performance. Data analysis techniques included factor analysis, Granger causality, regression analysis, ADF and PP unit root tests, the ARCH model, and the Johansen cointegration test. According to Tripathi and Seth (2014), the results show that changes in stock prices are not only a function of how important macroeconomic variables behave; they also play a major role in influencing shifts in another macroeconomic aspect of the economy. Performance inefficiencies are apparent in both areas, but the main problem with the sampled firms' inefficiencies has less to do with profitability and more to do with how poorly they perform in the process of creating market value. The results show that selling and administrative cost-to-total-revenue ratios, as well as profit margins, can be taken into account in order to explain profitability. On the other hand, Tsolas (2012) found little evidence to support the systematic effects of control variables on firm valuation.

## **Purpose of the Study and Research Methodology**

*The aim* of this research was to explore how stock market indices affect the financial performance of firms listed on the Bucharest Stock Exchange. To accomplish this goal, an analysis was conducted on a sample of 72 entities selected from the listed companies on the Bucharest Stock Exchange using its online platform [<https://bvb.ro/FinancialInstruments/Markets/Shares#>], spanning the years 2015 to 2022 (totaling 561 observations). In this study, we will use data collected and analyzed in SPSS, ranging from primary indicators available in the entities' financial data sources to newly calculated indicators based on these. Additionally, we will analyze the nature of the relationship and the intensity of the link between the Dependent Variable and the Independent Variables, using multiple linear regression as a tool to analyze the dependence among the targeted indicators. The *market capitalization* was set as the dependent variable in this study (with natural logarithm values displaying a normal distribution), while the independent variables were determined to meet the corresponding conditions for the *activity sector*, *net turnover*, *gross income*, *the interaction between stock market performance and activity sector*, and *labor productivity*.

Consequently, we mention that our study focused on entities operating in the following fields: agriculture, forestry, and fishing, extractive industry, constructions, wholesales, and retail trade, repair of motor vehicles and motorcycles, transportation and storage, hotels and restaurants, informations and communications, real estate transactions, and professional scientific and technical activities.

The present research seeks to create a multiple linear regression model to explain how financial performance indicators and stock market indicators relate to each other. To create an accurate model without residual factors that might distort the connection between these indicators, both the available indicators and the multiple linear regression model undergo thorough individual and collective statistical tests. These tests employ statistical hypotheses (null and alternative) that either accept or reject aspects related to defining variables or the estimation model itself. Through these consolidated techniques, a combined analysis of time series with cross-sectional data can be achieved. This feature brings with it two major advantages: first, it allows the researcher to consider the relationship between variables and units over a period of time and investigate them, and then utilize the obtained information individually on units that are not primarily observable and measurable. The given estimation model emphasizes heterogeneity among sections, aiming to distinguish them by using various estimations of their intercepts.

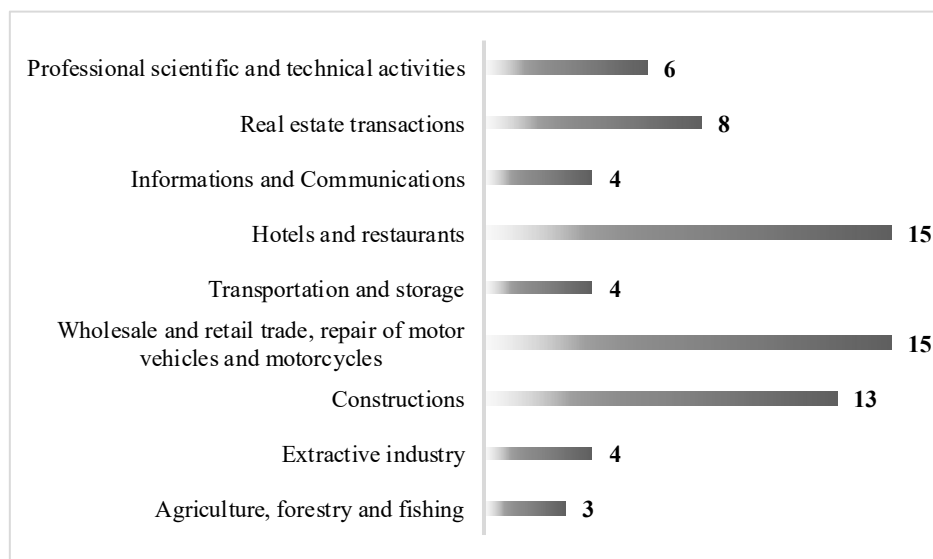


Figure 1. The spectrum of entities subject to statistical analysis

Source: elaborated by the author based on the data taken from BVB/Financial Instruments

### Research hypotheses

To investigate the effect of stock market capitalization on companies' sustainable performance, the hypotheses are formulated as follows:

*Hypothesis 1:* There is a significant relationship between a company's corporate performance and its market capitalization.

*Hypothesis 2:* A company's market capitalization and the particular industry or sector in which it operates are significantly correlated.

The significance of corporate performance in the hypotheses above constitutes the fundamental criterion for assessing the sustainable performance of the company, represented equally by both its financial and non-financial performance.

### Research variables

Many traditional equity indexes - originally intended as performance benchmarks to capture the entire market in a region, asset class, or sector - are weighted by market capitalization (Madhavan, 2016).

In the given study, the *stock market capitalization* was established as the dependent variable reflecting stock market performance, while financial performance and sustainable performance were set as independent variables, and the sector of activity as the indicator variable. Additionally, the

interaction between stock market performance and the sector of activity should be taken into account, as stock market performance can vary depending on the company's field of activity.

*Market capitalization* represents the trading value of all shares of a company listed on the stock market. Also known as *market cap*, this is determined by multiplying the circulating shares of an entity by the price at which they are traded (the current price). Market capitalization is a vital gauge indicating a company's scale, although it's distinct from the actual value of the firm, often diverging. Employing market capitalization to gauge a company's magnitude is crucial as it's a primary metric taken into account in various investor-related matters. Additionally, another significant indicator is the trading risk linked to a company, determined by its market worth.

By the criterion of stock market capitalization, companies can be large, medium, or small. Companies with a high capitalization index usually have a market value of over 10 billion dollars, medium-sized ones range between 2 and 10 billion dollars, and small ones are below two billion dollars. Allocating funds into businesses with a high capitalization index might not yield substantial returns in a brief timeframe. However, over the long haul, these companies typically provide investors with consistent stock value growth and periodic dividend disbursements (Malkiel, 2019).

In practice, the evolution of stock market capitalization, as the value offered by the market to an issuer, is influenced by its two constituent factors: the fluctuation of stock prices on the exchange and the variation in the number of shares issued by the entity, through operations of increasing or decreasing its share capital (Greenblatt, 2010).

### Research models

In the current study, multiple linear regression models are estimated to test hypotheses. Practically, some explanatory variables are excluded from the model for better significance.

The resulting regression equation will be in the form:  $F(x) = Y$ , where  $Y$  represents market capitalization, and  $x$  denotes the economic and financial performance indicators.

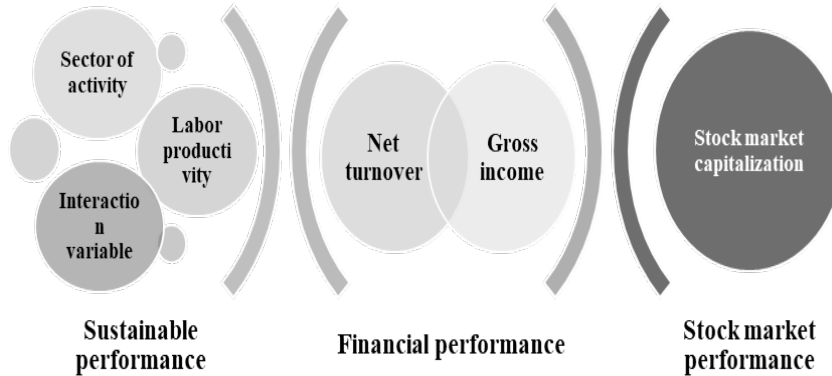


Figure 2. Components of the econometric model

Source: elaborated by the author

To calculate labor productivity, it is more relevant to use operating income. Operating income represents the total sum of sales revenue obtained from the company's core activities, excluding other non-operational revenues, such as investment income or proceeds from the sale of fixed assets. Therefore, operating income directly reflects the efficiency and performance of the company's core activities, which is generated by the work of employees. At the same time, turnover can be influenced by factors such as sales prices or inventory levels, which are not directly linked to labor productivity. Gross profit can also be affected by other costs, such as material costs or depreciation, which are not necessarily related to labor productivity.

It is possible to include both the average number of employees and labor productivity as independent variables in a multiple linear regression model, with stock performance as the dependent variable. This would allow for simultaneous investigation of the effect of these two variables on the company's stock performance. It is important to note that before including these variables, it should

be verified whether they meet the criteria to be included in a multiple linear regression model, such as the absence of collinearity between independent variables and the normality of their distribution.

**Results**

The Jarque-Bera test is based on simultaneously verifying the skewness and kurtosis properties of the residual's series. For a normal distribution, both the value of the Fischer skewness coefficient (sw) and that of the Fischer kurtosis coefficient (k) are zero. The statistical hypotheses are as follows:

- *Hypothesis 0* = the error distribution follows a normal law;
- *Hypothesis 1* = the error distribution does not follow a normal law.

The Jarque-Bera statistic follows a law  $\chi^2_{\alpha,2}$ .

Table 1. Results of Descriptive Statistics

<b>LN (Market capitalization)</b>	
Mean	15.83
Standard Error	0.07
Median	15.97
Mode	12.10
Standard Deviation	1.71
Sample Variance	2.94
Kurtosis (bolting coefficient)	0.18
Skewness (asymmetry coefficient)	-0.31
Range	9.96
Minimum	10.24
Maximum	20.20
Sum	8,882.85
Count	561
Confidence Level (95,0%)	0.14

Source: results received in SPSS after applying the Descriptive Statistics data analysis function.

In the case of errors, the Jarque-Bera test outlines a value of 9.84, with a probability of 0.07, exceeding the critical threshold of the 0.05 test, leading to the acceptance of the null hypothesis, namely: that the errors' distribution follows a normal law.

Table 2. Summary model

<b>Statistical indicators</b>	<b>Recorded values</b>
R (correlation coefficient)	0.93
<i>R squared</i>	0.86
Adjusted R square	0.86
Standard error	0.64
Observations	561

Source: results received in SPSS after applying the Regression data analysis function.

For our finalized model, we obtained an adjusted coefficient of determination of 0.86, indicating that 86% of the variation in LN (Market capitalization) is explained (influenced) by the independent variables. The remaining 14% is determined by other factors not included in the model. The adjusted value of the determination coefficient (adjusted R<sup>2</sup>) is introduced to partially counteract the effect of the mechanical increase in R<sup>2</sup> due to the number of independent variables. The error in estimation, measured as the standard deviation of the residuals (with the degrees of freedom indicated in the ANOVA table below), represents an approximation of the deviation of errors  $\epsilon$  (assuming they

follow a normal distribution), which in this instance amounts to 0.64. The number of observations in the sample is 561.

Table 3. Table of coefficients and statistical tests on them

Indicators	Coefficients	Standard error	t Stat	Significance level	Lower limit 95%	Upper limit 95%
Constant	16,1186	0,360	44,77	2*e <sup>^</sup> (-186)	15,41	16,826
Activity sector	-2,6053	0,055	-47,43	2*e <sup>^</sup> (-197)	-2,71	-2,497
Net turnover	8,85*e <sup>^</sup> (-9)	1*e <sup>^</sup> (-9)	7,56	2*e <sup>^</sup> (-13)	7*e <sup>^</sup> (-9)	1*e <sup>^</sup> (-8)
Gross income	-1,76*e <sup>^</sup> (-8)	5*e <sup>^</sup> (-9)	-3,86	0,0001	-3*e <sup>^</sup> (-8)	-9*e <sup>^</sup> (-9)
LN (Interaction between market performance and activity sector)	0,1681	0,003	50,89	3*e <sup>^</sup> (-211)	0,16	0,175
LN (Labor productivity)	-0,0610	0,029	-2,11	0,0349	-0,12	-0,004

Source: results received in SPSS after applying the Regression data analysis function.

The third results table includes estimated values for the coefficients of the model, as well as the statistics required to test the usual hypotheses regarding these coefficients. It is worth mentioning that, compared to the F-test, the tests on the coefficients are conducted individually. The rows of the table correspond to the variables in the model, also including the intercept (constant) term.

Starting from the coefficients presented in the table above, the equation for multiple linear regression, which has market capitalization as the dependent variable and sustainable performance indicators as independent variables, has taken the following form:

$$LN(\text{Market capitalization}) = 16.1186 - 2.6053 * \text{Activity sector} + 8.85 * e^{(-9)} * \text{Net turnover} - 1.76 * e^{(-8)} * \text{Gross income} + 0.1681 * LN(\text{Interaction between market performance and activity sector}) - 0.0610 * LN(\text{Labor productivity}) + \mathcal{E} \quad (1)$$

Where:

Market capitalization – dependent variable.

Activity sector, net turnover, Gross income, Interaction between market performance and activity sector, Labor productivity – independent variables.

$\mathcal{E}$  – model error (residuals).

### Conclusions and recommendations

Once these regression equations, which originated from the correlation between financial and non-financial performance indicators as independent variables and stock market capitalization as the dependent variable, were obtained, it can be said that the objective of the work has been successfully achieved. This indicates that both financial and non-financial performance indicators have a direct impact on the market value of companies listed on the capital market. Moreover, it emphasizes the mathematical representation of these connections.

This model examines the connections between the financial performance, labor productivity, and industry of the company and the performance of its stock. The direction and strength of the relationship between the variables are shown by the coefficients. A positive coefficient associated with financial performance, therefore, indicates that an increase in net turnover is correlated with a rise in stock performance. On the other hand, a decline in stock performance is correlated with an increase in gross results. Furthermore, negative coefficients for labor productivity and industry indicate that rising levels of these variables are associated with falling stock performance.

In order to examine the effects of variable interactions, interaction terms were added to the model. With this improvement, the relationship between employee count, stock performance, and financial performance would be better understood. From this observation, we can infer that a company demonstrating greater labor productivity tends to exhibit improved financial performance.

However, its stock market performance may be comparatively lower, attributed to the elevated costs linked with managing a larger workforce. On the other hand, a company with high productivity might have better financial and stock market performance because lower production costs could lead to increased profit and stock value, but this is only the case according to the coefficients of the resulting econometric model.

Furthermore, we should take into account the possible influences of other variables, such as company size or employee incentive plans, and include these variables in the model if they are deemed to have a significant impact on financial performance.

Moreover, to broaden the horizons of non-financial performance analysis, as a future direction of econometric analysis, more representative indicators than the average annual number of employees or labor productivity could be considered. For example, these non-financial performance metrics might be assessed using sustainability reports or evaluated through ESG (Environmental, Social, and Governance) ratings offered by specialized rating agencies (Zeghal et al., 2012). Employing these metrics in a multiple regression model allows for examining the connection between stock performance and a company's non-financial performance.

Assessments of ESG ratings, which gauge a company's performance in environmental, social, and governance aspects, are relatively fresh in Romania. However, there has been a surge in interest in these ratings in recent years, aligning with the amplified recognition of the importance of sustainability and corporate social responsibility (Makarenko & Plastun, 2017).

In Romania, there exist multiple ESG rating providers like Sustainalytics, Vigeo Eiris, or ISS ESG, delivering insights on the ESG performance of companies listed on the Bucharest Stock Exchange and beyond. These entities utilize diverse assessment methodologies. Typically, ESG ratings are formulated by gathering and scrutinizing both financial and non-financial company data, allowing an evaluation of their influence on environmental, societal, and corporate governance aspects. However, it is important to pay special attention to the evaluation process and assess the rating criteria used by the ESG rating provider, as these can vary between providers and significantly influence the final rating of a company. Additionally, understanding the interpretation and use of ESG ratings to make informed investment and business decisions is crucial.

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