FINANCIAL PERFORMANCE OF EUROPEAN COMPANIES INVOLVED IN ENVIRONMENTAL ACTIVITIES OF CORPORATE SOCIAL RESPONSIBILITY

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Abstract

The purpose of this research is to determine the linkages and interdependencies between the financial performance of companies with an economic activity carried out in European countries and the specific dimensions of Corporate Social Responsibility (CSR), focusing on the environmental component. The research is based on network analysis which implies the configuration of Gaussian Graphical Models (GGMs) and Structural Equation Modelling (SEM). The research endeavour entails the economic determinants that lead to the involvement of companies in social responsibility activities and measures their influence on the financial results and the structure of the companies' specific management strategies.

Keywords: financial performance, Corporate Social Responsibility, environment, environmental policies, management strategies.

JEL Classification: M14, M16, Q53

Introduction

Considering the global economic and social context faced nowadays and the challenges brought by the Covid-19 pandemic, there was recorded a decrease of the negative influences generated on the environment as a result of the economic activities carried out by companies globally, due to the stagnation of a lot of economic activities, including industrial activities, in the context of the fast spreading of the new coronavirus on the entire planet. A lower level of the environmental dedicated indicators in the last months of 2020 requires a wake-up call and a focus on the pre-pandemic situation of these indicators. There is a big question about the extent of companies' involvement in carrying out economic activities supposed to affect and

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damage the environment in reducing the negative effects of these activities, in order to control and minimize the negative effects generated by their activity, involvement which may be realised by using their own funds or by starting campaigns or even by supporting and promoting actions of corporate social responsibility dedicated to the environment.

The research aims to identify the social, political, but especially economic factors that lead to the company's management decisions of involvement through actions and investments of own funds dedicated to corporate social responsibility (CSR) activities specific to the environmental component and how those decisions may affect the level of financial performance of companies. The aim is to establish the main influencing factors in this regard, as well as the existing interdependencies and links between environmental and social actions and the financial performance of companies, in order to establish the types of links between them, but also the cause-effect relationships that provides an overview of the ways that companies operate on the market from the perspective of involvement in minimizing the negative effects generated on the environment and society.

The paper aims to present the reasons why the involvement of companies in social responsibility actions supposed to reduce the level of global pollution and carbon dioxide emissions, respectively to improve air quality in large cities takes place to a greater or lesser extent, by comparison and reference to their financial results, in particular the financial performance. The result which is targeted means to determine whether the existence and intensity of these actions are directly related to the results obtained by companies as a result of economic activities, or these results, if they are favourable, positive, determine the involvement of companies in actions of corporate social responsibility focused on the environment and community's health and safety.

The end of the Covid-19 pandemic in Europe and the European Union will also consist in restarting all economic activities, which would generate a negative impact on the environment and air quality. In this sense, the research presents forecasts related to the extent to which companies, now economically affected, will also interfere in environmental actions after the end of the pandemic. The following forecasts are based on the evolution of companies in this regard since 2009, an year with a great economic difficulty generated by the global economic and financial crisis that time, and until 2018.

The research also aims to identify the policies and targets imposed by the authorities, especially at the level of the European Union in terms of carbon dioxide emissions into the atmosphere and the level of pollution**.** The paper shows the extent to which these regulations and laws, as well as other recommendations dedicated to the way that the economic activities are done on the market. The paper spots if the regulations are exceeded somehow, in the sense of the existence of an own and self-involvement of a higher intensity and economic value at the level of the European companies and how these policies and targets may affect companies' financial performance.

1. Literature review

In order to determine whether one of the main reasons that conduct to the involvement in actions meant to combat the negative effects of economic activities on the environment we must focus on the environment dedicated regulations and policies imposed at the European level, which should be respected as long as a company wishes to carry out economic activities on the territory of a certain European state. This also shows and supports the involvement of the state and existing environmental dedicated institutions at its level or at the level of the Union or the European Community in limiting and reducing negative effects on the environment. It is desired to identify these regulations and detail them, in order to find out the extent of the involvement in this regard that companies should demonstrate. However, the restrictions imposed could not be the only factor leading to the involvement in CSR actions targeting the environment, thus taking into account the financial performance of the company and the impact of financial results on the decision of companies to become more involved in environmental actions.

By referring to the corporate social responsibility actions in which large companies have been involved over the years, the aim is to establish the connections between these management decisions and the financial performance of enterprises, in order to determine how, in what way and to what extent do the above-mentioned actions affect the company's performance indicators and whether, based on their achievements**,** there are some favourable economic results recorded previously and a forecast of superior results to be recorded in the future, this kind of positive results being generated by social and environmental implications of this type.

In this case, there is a causal relationship between CSR and the financial performance of the enterprise, one being dependent and determinant for the other. CSR has a direct and positive effect on the return on the company's assets, an indicator as known as ROA (Return On Assets), an effect which is mutual, also, of ROA on CSR, the same type of reciprocal effect being encountered in the case of CSR and the return on company's own capital as known as ROE (Return On Equity) (Dewi, 2014, pp. 2-3). Usually the purpose of a company is to maximize her financial performance indicators, so that shareholders' requirements and expectations are met and satisfied. If a company does not act with social responsibility, the resulting costs could become more significant, representing a financial burden that could reduce profits, which can lead to the emergence of a less socially conscious entity. In reverse, if the company adopts socially responsible policies it becomes more profitable, and socially responsible investments will be an imbold for companies to increase investment in CSR programs (Fullenbach, 2017, p. 213)

In order to be able to determine the intensity and the way in which the links between CSR and the indicators of the company's financial performance are created, it is necessary to take into account some research hypotheses. We can consider, on the one hand, the fact that companies are involved in more and more extensive social and environmental responsibility campaigns in order to obtain the best possible financial results and to report a higher level of profitability years after year. On the other hand, what a second research hypothesis implies is that the most profitable companies are

those that have a higher CSR behaviour. Recording an increasing and constant involvement over time in this regard and good financial results will determine the company to get involved in actions dedicated to social and environmental issues. This hypothesis has also been validated, which shows that companies that report the best results of financial performance through ROA and ROE indicators obtain a higher index of social behaviour, an aspect observed not only in global rankings, but also in following CSR policies that are adopted and implemented more and more often (Fernandez, 2016, p. 143).

Although the main hypotheses stated a positive link and a positive and favourable effect on the company, generated by the existing relationships between CSR and the financial performance, there are hypotheses that support the existence of both positive and negative relationships or even lack of interdependencies in this regard, or the impossibility of establishing them. The negative effect on financial performance is based on the costs of corporate social responsibility actions, which involve a number of the company's own funds, increasing costs from year to year, taking into account the need to commit large sums of money through which to be able to support social and environmental actions, and to be effective and reduce the negative effects generated by the economic activities of the company**.** The expenses with the environment, respectively with the socially responsible campaigns, may damage the company's performance, leading to a decrease of its profitability. This could be one of the reasons why companies choose to get involved as little as possible in CSR actions, also taking into account their main goal, that of making a profit, a goal that, in most cases, can lead to lack of social responsibility. However, the inversely proportional link between CSR and the financial performance of the company is not the only one that determines the lack of involvement of companies in CSR actions or the low involvement. This can depend to a very large extent on the requirements and expectations of shareholders. Also, by referring to the effects of CSR actions on financial performance, it can be stated that they do not affect performance in any way, having positive effects only on the company's image in the community and the ethical nature of management, shareholders and employees, effects that are not of an economic nature.

Regarding the financial performance of the company, it can be determined with the help of indicators that record and show the financial results, depending on the company's assets, liquidity and solvency, but also the financial structure and risk taking**.** However, we can consider that the financial performance has in its composition other elements, not only of economic nature, but also of social, human nature, being in this case mentioned the concept of CSR. Performance is not only determined by profit and assets, but also by the extent to which a company is involved in social responsibility actions. The impact of these factors, which include environmental, community, charitable, fundraising and donation issues, cannot be quantified by a unit of measurement, but their magnitude can be determined by the number of campaigns carried out by companies, by the funds allocated for these campaigns, but also by the impact of the actions carried out on the community and the environment, an impact that will support the efficiency and effectiveness of the actions which take place and their success.

At the same time, distinct from the CSR actions of the companies, most companies establish budgets for the expenses with the environment, their level being able to be closely related to the company's performance. The expenses allocated to the environment can be higher the more prosperous and financially valuable the company is, but they can also be higher based on purely ethical reasons imposed by the company's shareholders or management, both to show care for nature and as well as to reduce some of the negative effects generated by the company through the activity on the market itself, being targeted, in this sense, especially companies in the oil, extractive industry, the industry that handles fuels, natural gas or even substances that can harm the environment.

By referring to the aforementioned issues and the reasons and motivation based on which companies carry out CSR actions, we cannot establish with certainty which of them have a greater influence, a higher impact on the company's decisions, or which are, in fact, the basis of the company's involvement in such social actions. Most of the time, the company's financial results are a decisive factor in running campaigns for the community and the environment. A low level of performance, for example, may be generated by the lack of involvement in CSR actions, while some managers may consider that the allocation of too high funds from the company and the neglect of other sectors and branches of economic activity have led to a decrease in the level of performance. The nature of the link between CSR and the company's performance and its impact is difficult to establish. The lack of CSR measurements and specific indicators for this lead to an increase in the subjective nature of interpretations of CSR results. One thing is certain, the decision of a company to allocate financial resources for a social responsibility campaign is based on a multitude of factors, without knowing which of them has a greater impact in making that decision. The set of factors includes a series of independent indicators such as environmental actions, social actions dedicated to the community, the company's involvement in the social life of the community, environmental problems identified, the company's mission and vision, the ethics and social responsibility component established at company level, environmental policies imposed at local and national level, national or European Union regulations, but also the costs of CSR actions, factors that, analysed separately but also together, lead to the establishment of the company's action plan, capitalized by involvement in CSR actions (Giannarakis et. Al., 2016, pp. 7-12).

2. Research methodology

The research carried out in this paper was based on the modelling, comparison and interpretation of panel data reported and compiled for 194 companies in the oil, gas and fuel industries carrying out specific economic activities in 26 European countries, during 2009-2018.

The indicators used in this research are specific to the financial performance of the enterprise, along with other indicators that support the orientation of companies towards CSR actions, respectively the management of resources within the undertaken activities**.** Also, the groundings of the research and the validation of the results and

conclusions was performed through a complex econometric analysis based on two coordinates: (i) network type analysis by Gaussian Graphical Models (GGMs) configured through 2 estimation methods (EBIC - Extended Bayesian Information criteria with graphical lasso - EBICglasso and Pcor - partial correlations) and (ii) Structural Equation Modelling (SEM) configured by the Maximum Likelihood Estimator (MLE) method.

For the panel data analysis of the financial performance of European companies, as well as for the analysis of the management of the natural resources used by the company and the involvement in social and environmental responsibility actions, the following benchmarks were used:

- Return on Assets (ROA): indicator of financial performance, measures the efficiency of the use of assets, in terms of profit, calculated as a percentage ratio between the net result (net profit) of the financial year and total assets;
- Return on Equity (ROE): indicator of financial performance, measures the return on long-term funds of the company, calculated as a percentage ratio between the net result of the financial year (net profit) and equity;
- Total assets: the value of all assets (cash in the house, money from bank accounts, fixed assets, inventory items, goods, raw materials, materials, including receivables) held by the company;
- CO2 emissions (greenhouse gases): specific indicator of the level of pollution, it shows the level of greenhouse gases released into the atmosphere as a result of industrial economic activities, measured in tons;
- Gas emissions: represents the value of gases released into the atmosphere by companies as a result of activities (USD);
- Energy consumption: represents the cost of energy used in an enterprise (USD);
- Water consumption: represents the cost of water used in a company (USD);
- Waste of resources: indicator that shows the value of resources consumed, but not actually used by the company in the activity, respectively lost resources, which could have been reused in the activity;
- Expenditures for the environment: indicator of social responsibility and environmental policy at company level, shows the amount of amounts allocated annually by a company to protect the environment;

For the case study of the current research, we used data reported for the period 2009-2018 by a number of 194 companies based in 26 European countries (as entailed in Table no. 1).

Table no. 1. Distribution of companies according to states

Country	No. of companies	Country	No. of companies
Austria	3	Italy	5
Belgium	8	Lithuania	1
Bulgaria	4	Luxemburg	4
Croatia	3	Norway	27
Cyprus	3	Netherlands	5

Denmark	1	Poland	5
Switzerland	2	Portugal	1
Finland	1	Romania	14
France	10	Slovenia	1
Germany	2	Spain	3
Greece	5	Sweeden	9
Island	2	Great Britain	67
Irland	7	Hungary	1

Source: Own processing of panel data

In order to support the current topic, as well as to demonstrate the established hypotheses, we have empirically assessed the data reported by 194 companies in the oil, gas and fuel industry having the headquarters in Europe. Of these 194 companies, 67 firms are engaged in the main economic activities deployed in the United Kingdom, which left the European Union in January 31st, 2020**.** Also, 27 companies are located in Norway, a country outside the European Union, and 14 companies have their headquarters and main activities in Romania, the best known of these being: Rafinăria Astra Romana SA, OMW Petrom SA, Societatea Națională de Transport Gaze Naturale Transgaz SA, Rompetrol Rafinare SA, Societatea Națională de Gase Naturale Romgaz SA. On the other hand, countries with only one company in the economic and industrial branch selected for the current study were analysed, states such as Denmark, Finland, Lithuania, Portugal, Slovenia, Hungary, the analysed companies having a certain monopoly on the fuel market, or having a distinct industrial specificity, the latter situation also being encountered in the case of Switzerland, Iceland, Austria, Croatia or Spain.

Given Table no. 1 on the distribution of companies analysed by country, the first 6 states in the panel that reported data for most companies operating in the fuel industry on their territory were analysed using bar charts. Thus, ranking first in the top were the United Kingdom (67 companies), Norway (27 companies), Romania (14 companies), France (10 companies), Belgium (8 companies) and Ireland (7 companies).

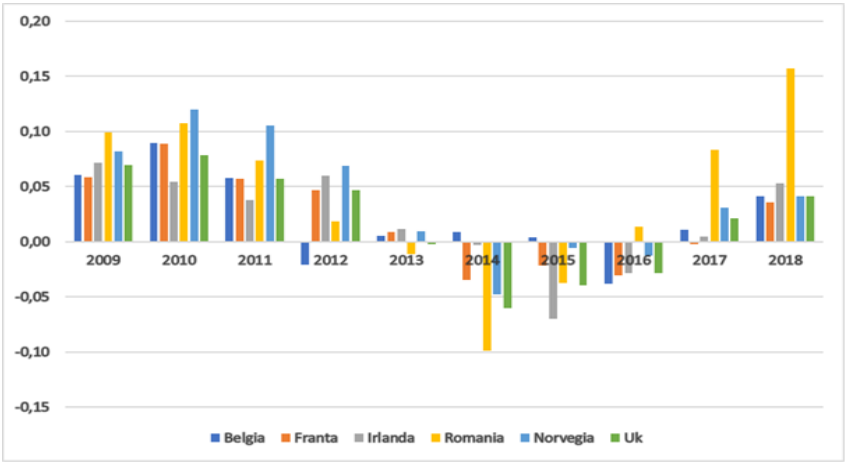

Figure no. 1: Return on assets, 2009-2018, (%)
Source: Own processing of panel data

According to Figure no.1 it can be seen that, in the period 2013-2016, in the case of companies from all the 6 analysed states the financial performance decreased, going even to negative values, the most affected companies being, however, from Romania, which recorded for its companies a negative return on assets for 3 consecutive years, in the period 2013-2015, together with the companies from Great Britain, which, with a much higher number of companies in the panel than all the other states in the analysed database, also reached negative values of asset profitability in the period 2014-2016. After that, the years 2017 and 2018 were marked by the economic recovery of companies, especially those in Romania and Norway.

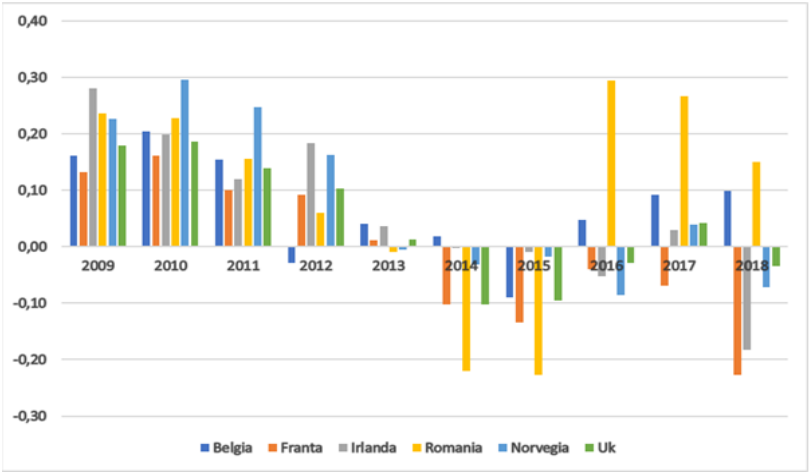

Figure no. 2: Return on equity, 2009-2018, (%)
Source: Own processing of panel data

In the period 2009-2018, the financial performance of the companies from the analysed states was affected, this aspect being, however, an event with gradual emergence and spread, in the sense that, for 4 years, from 2009 to 2012, the results obtained by the companies from the aforementioned states were favourable, but with slight decreasing trends from year to year, following that, from 2013 to 2018, a negative return on equity has been reached in most countries. Negative and unfavourable results were reported for France in 2018, as well as for Ireland**.**

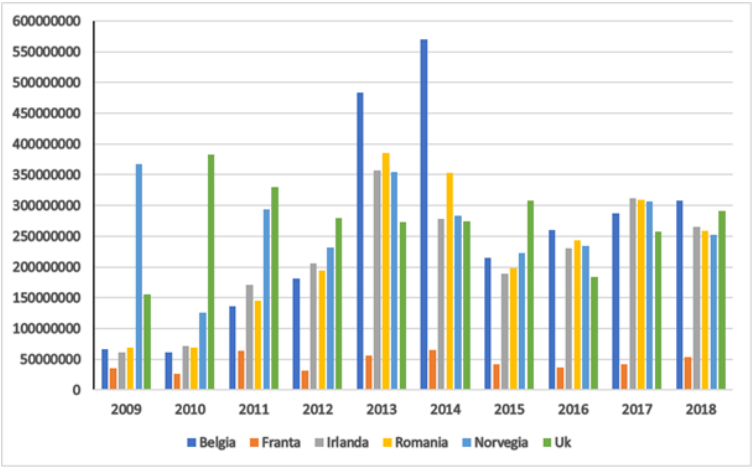

Figure no. 3: Expenditure on environmental protection, 2009-2018, (USD)

Source: Own processing of panel data

Regarding the expenses on environmental protection, it can be observed that all the companies from the analysed states had a contribution in this respect in the period 2009-2018, the orientation of the big entrepreneurs towards environmental and social responsibility actions being more and more intense. Thus, we can observe that the 8 analysed companies from Belgium allocated significant funds in the period 2013-2014, exceeding the involvement of the 27 companies from Norway and the 67 companies from the United Kingdom. The lowest funds were allocated by companies in France, the trend in the 6 analysed states being relatively constant in the last 3 years, with small variations in a positive sense, namely an upward involvement of companies on environmental protection.

3. Results and discussion

3.1. Network analysis of data by Gaussian graphical models (GGMs)

Network-type analysis using Gaussian graphical models encounters the problem of establishing the model used. Gaussian graphical models are of significant interest for modern studies. Such a model selected for a random vector X = (X1, ..., xp)

is determined by a graph G on p nodes. The model includes all normal multivariate distributions N (μ, Θ - 1) whose inverse covariance matrix satisfy that Θjk = 0 when {j, k} is not an edge in G. In order to choose a method for preselecting a small set of models, the estimation method EBICglasso is used, along with the method of Partial correlations (Pcor). They are based on a series of analysis and research models, including the deduction-based model, lasso. It was originally an acronym for "the smallest operator of absolute contraction and selection". Today, lasso is considered a term and not just an acronym. Lasso is used for prediction, to lead to model selection, but also as a component of estimators on the basis of which deductions can be made.

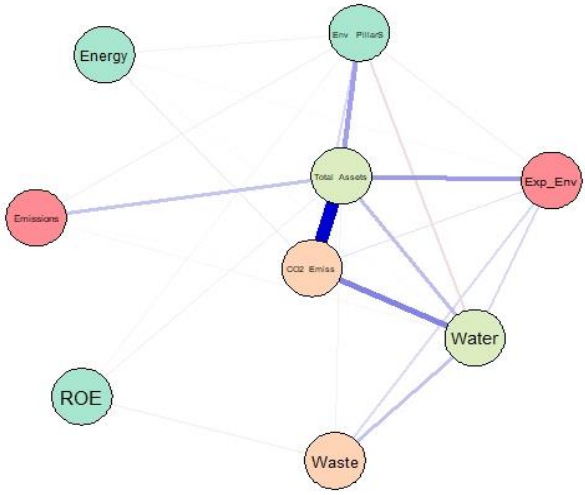

Figure no. 4: Network type analysis by GGM model estimated with EBICglasso

Source: Own data processing using the Rstudio package

Deduction commands made available through the Stata and R econometric packages implement methods known as double selection, partial division and / or cross division. Each of these methods can represent a linear, logistic, or Poisson-type regression used to model a continuous, binary, or counting result. The combinations made between the Bayesian method and lasso lead to very good, coherent results, based on which the hypotheses and theoretical aspects of the study can be supported.

Following the modelling of the data, it was found that there is an extremely strong link between CO2 emissions and the value of all the company's assets. Also, there are high intensity links between these assets and gas emissions, the environmental pillars, respectively assets and the total expenditure allocated to the environment, the rest of the indicators having low links between them, insignificant. At the same time, the link between the company's rate of return on equity and the company's spending on the environment or water or energy consumption is insignificant, thus suggesting the

lack of significant influences exerted by these indicators on each other. Instead, according to the results obtained, the allocation of the company's own funds for environmental expenditures depends to a large extent on the value of the company's assets, their influence being prioritized, in order to allocate funds to minimize the company's financial efforts.

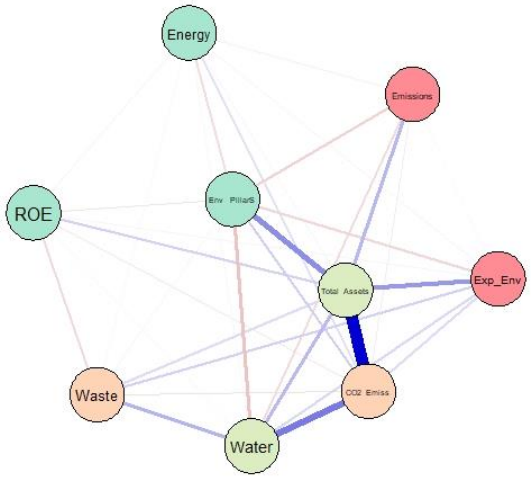

Figure no. 5: Network type analysis based on partial correlation (Pcor)
Source: Own data processing using the Rstudio package

The results of the model that was developed show a very high intensity link between total assets and carbon dioxide emissions. At the same time, the relations between assets and environmental expenditures, respectively environmental pillars are significant, as well as those between the water used in the economic activity of companies and CO2 emissions. Important links, but of a lower intensity, also exist between the water used and the total assets, respectively between the wasted resources and the consumed water.

3.2. Data modelling through structural equations (Structure Equation Modelling - SEM)

Structural Equation Modelling (SEM) is a general framework that involves simultaneously solving systems of linear equations, along with a number of techniques such as regression, factor analysis, path analysis or latent growth curve modelling. The method involves making a combination of link-based models and complex relationships between the analysed indicators and latent variables or factors. SEM structural equations allow the graphical representation, estimation and testing of the links and the intensity generated by them on a set of analysed variables.

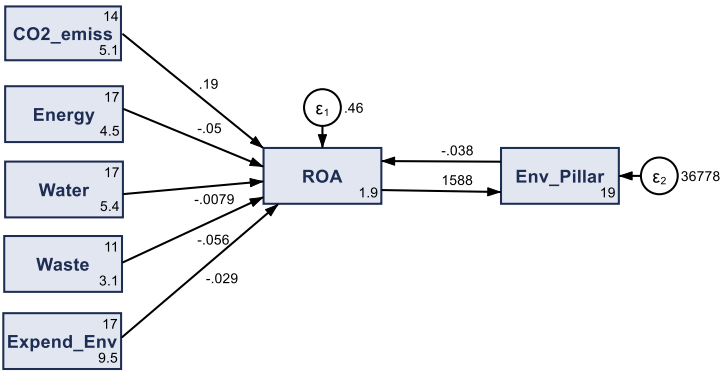

Figure no. 6: The influence of environmental indicators on the profitability of the company's assets

Source: Own data processing using the State econometric package

Following the modelling procedure by structural equations, one can observe the influence exerted by the environmental indicators on the financial performance of the European companies. Thus, a positive link between carbon dioxide emissions and the return on the company's assets is established, as opposed to the negative impact generated by energy consumption, water, loss of resources and environmental protection costs. Of all the influencing factors, the strongest negative impact on asset profitability is generated by the waste of resources, along with the value of energy consumed in economic activity.

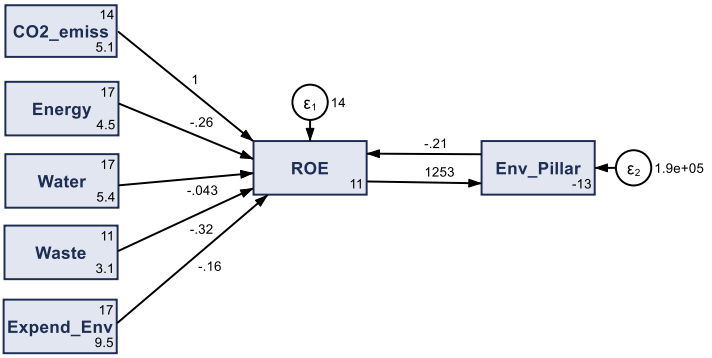

Figure no. 7: The influence of environmental indicators on the return on equity of European companies

Source: Own data processing using the State econometric package

Based on the obtained model, it was possible to establish the interdependence between the selected indicators, following the modelling by structural equations resulting in a

significant positive influence on the return on capital of the company which has a positive influence on reducing carbon dioxide emissions. The least negative influence occurs in the case of water used in the economic activity of companies.

Conclusions

This research aimed to establish the links and interdependencies between the financial performance of European companies and the environmental dimension specific to Corporate Social Responsibility (CSR). The research was also configured to identify the relationships between the selected environmental indicators and the companies' financial performance indicators, in order to establish their type, as well as to measure and quantify the impact generated.

The research also considered the identification of the reasons and motivations that conduct the management level of the company to take the decision of involving the company in social and environmental responsibility actions. The initial assumptions started from the existence of a reason, a factor or aspect that influences and determines the establishment of a decision of the company in the direction of a better management of resources and their protection and conservation. The current study started from the premise that a company will invest and allocate financial and / or human or material resources for environmental protection only if it would be legally forced to take such measures, either in following the identification of some advantages that could have advantages on the financial performance of the enterprise.

The aspects related to the profit and the impact on the profitability of the company's assets or equity will be the basis of the management's decision regarding the involvement in social and environmental responsibility actions. In this sense, following the analyses carried out in this research endeavour, it was observed that, if a possible involvement in actions to reduce the impact of economic activity on the environment will have positive effects on the company's assets, then the involvement would be deep, strong, intensified at certain intervals, suggesting that the environment and the community are of superior interest to a company when it can positively influence its financial resources.

Therefore, following the research conducted and stated in the current study, it was possible to identify the reasons for a company's involvement in CSR actions dedicated to the environment, in terms of their effects and intensity on the financial performance of the company, respectively in terms of the impact generated on the profitability of the company, entailed by specific indicators of the environment and good management of the natural resources used in current and future economic activities.

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