Sustainability performance and value relevance: an analysis of listed European companies

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Abstract

More and more organizations join the sustainability reporting world (ACCA and Corporate Register, 2004). The main drivers are the success of the Global Reporting Initiative (GRI) Guidelines 2002 and the increasing pressure of traditional and new stakeholders (PwC, 2006). The emergence of ethical investment and the relevance of sustainability indexes (Dow Jones, FTSE4GOOD, KLD, etc.) are the expression of the shareholders increasing interest in sustainable development impact of the company’s activities. This situation shows the need of evaluating the incidence of the sustainability performance of the companies in their market value. Different academic studies have tried to show that sustainable (environmental friendly) organizations usually obtain additional profits (Blacconiere and Patten, 1994; Li and McConomy, 1999; Cormier et al, 2005). The objective of this paper is analysing the existence of a positive relationship between the incorporation of a company in a sustainability index (DJSI) and its market value. Most of the studies carried out are based on unifactorial models. This paper is based on the sustainability matter is a multivariate problem, and a factor analysis is used to gather the sustainability performance of a sample of European companies included in the DJSI. Sustainability performance is evaluated using sustainability reports (or corporate social reports) published by companies.

Keywords: Sustainability indexes, value relevance, ethical investment, sustainable performance.

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1. - Introduction

In a relevant part of our Society, financial markets are considered as an important factor that contributes to the degradation of the environment and to social injustice (Murray et al., 2006). On the other hand, financial markets are regarded as potential key actors in the sustainable performance of organisations (Schmidheiny and Zorraquin, 1996, UNEP Finance Initiative, 2004, KPMG, 2005, p. 18). Some facts, like the increasing presence of ethical (socially- and environmentally- oriented) investors, focused on ethical funds, have contribute to this new – more sustainable - view of the stock markets (Rockness and Williams, 1988; Harte et al., 1991).

From the traditional market view, social and environmental reporting (SER) may improve investor making-decision (Richardson and Welker, 2001, Deegan and Rankin, 1997). SER has usually been disclosed by companies on a voluntary basis (Gray et al., 1995). It can be seen that it is essentially qualitative (Adams et al., 1998; Hackston and Milne, 1996) and generally reflects positive aspects of the firm (Deegan and Gordon, 1996).

Recently, the Global Reporting Initiative (GRI) sustainability reporting guidelines were developed with the aim of assisting “reporting organisations and their stakeholders in articulating and understanding contributions of the reporting organisation to sustainable development” (GRI, 2002, introduction). This more accountable approach has a great success in the business agenda and for investor making decisions (Moneva et al, 2006).

In parallel, the emergence of sustainability indexes –Dow Jones Sustainability World Indexes (DJSI), FTSE for Good (FTSE4GOOD), KLD,...- have developed new mechanisms for sustainable oriented investors, specially institutional investors (pension and mutual funds). Companies use these indexes as a reputation factor, including this in their media relationships.

Taking into account this context, the basic aim of this study is to analyse the existence of a positive relationship between the incorporation of a company in a relevant sustainability index (DJSI) and its market value. Complementary, the use of the GRI guidelines is related with the market value of the company.

The rest of the paper is structured as follows. Firstly, we revise the relevant literature on SER and stock market reactions, and propose our hypotheses. In the third section, data and sources of information are shown. Fourth section includes research method and hypotheses of the paper. The analysis and discussion of the results are carried out in Section 5, and the final section contains the main conclusions derived from the results obtained.

2. - Sustainability and financial markets

The number of companies that voluntarily disclose sustainability information is growing (KPMG, 2005), there is an increase in the quantity of information and it is positive-biased (Gamble et al., 1996; Niskala and Pretes, 1995; Deegan and Gordon, 1996). These situations are reproduced identically in the Spanish context (Moneva and Llena, 2000).
It is remarkable the strong increase in the number and quality of GRI sustainability reports (KPMG, 2005, Moneva et al, 2006). This eruption has led to the first question on whether the elaboration of sustainability reports is related to the implantation of sustainability strategies (Kolk, 2004).

There are three different theoretical approaches that could explain this sustainability reporting emergence in business agenda: the interpretative, the radical and the functionalist paradigms (Tilt, 1994). This paper focuses on the later.

The analysis from the functionalist paradigm brings together various theories focused, fundamentally, on the usefulness of social and environmental information for the shareholder/investor (Belkaoui, 1976; Wildavsky, 1994; Freedman and Jaggi, 1988, Deegan, 2004). The analysis of the usefulness has been undertaken considering the individual investor (Epstein and Freedman, 1994) and the aggregate level using the financial markets (Milne and Chan, 1999, Barth and McNichols, 1994, Lorraine et al., 2004). There are no significant results about a positive/negative market reaction to the disclosure of social and environmental information.

At the same time, in financial markets, some firms have paid serious attention to incorporate environmental and social issues within their business planning strategies (Hoti et al., 2005; Hassel et al, 2005). Husted and de Jesus Salazar (2006) suggest that by taking a sustainable strategic approach, firms would increase shareholder’s value, at the same time as they comply with responsibilities/commitments to society and other stakeholders.

In this context, investors have available some mechanisms to their decision making processes: the sustainability stock exchange indexes. One of the most relevant is the Dow Jones Sustainability Indexes (DJSI), which are part of a family of financial indexes that are derived in the same manner as the more well-known financial market indexes, such as the Dow Jones Industrial Average (DJIA) and the STOXX index. The DJSI are based on a selection of leading firms that take environmental and social issues seriously in their business practices.

The impact of the GRI sustainability reporting approach and the belonging to a DJSI on the market value is analysed in the next sections.

3. Data and Information Sources

The statistical tests applied in the present study are based on collected data from different sources of information with perfectly resisted quality. The data base consists of 142 companies for both periods of study. The selected enterprises are of European character and all of them are present in an official stock exchange index. The returns have been obtained from official websites of each one of the market values in which there are present the companies of the sample.

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2 The Dow Jones Sustainability Indexes (DJSI) were started in 1999, and report on the financial performance of leading sustainability-driven firms worldwide (this information is available at [http://www.sustainability-indexes.com](http://www.sustainability-indexes.com)) These sustainability indexes were created by the Dow Jones Indexes, STOXX Limited and the SAM group.
The social and environmental data have been yielded on the part of Sustainable Investment Research International Group (SIRI group) through their Spanish member Economy and Development Foundation. The homogenous format of communication and methodology characterize the analyzed registries. These data contribute information detailed about the following aspects: General information, community, corporate governance, employees, customers, environment, contractors and controversial activities. The initial sample was constructed according to the consistency and representativeness criteria, carrying out a simple random sampling scheme.

The selection of the final sample was made so that all the registries had complete data, that is to say, that all the companies showed both returns data for the different required periods of time (2004 and 2005) and social and environmental character (2003, 2004 and 2005). Share returns were calculated using the following expression (Murray et al, 2006).

\[ R_{i,t} = \ln \left( \frac{P_{i,t}}{P_{i,t-1}} \right) \]

Where \( R_{i,t} \) represents the return obtained by organization \( i \) in the year \( t \), \( P_{i,t} \) makes reference at the price of the share \( i \) at the end of the year \( t \) and \( P_{i,t-1} \) is the price of the share at the start of the year \( t \). First inspection of the sample data show the balanced character of the same one, so that the proportion of companies including in the DJSI (Dow Jones Sustainability Index) is equal to which they are not in the mentioned stock-exchange index. This is fundamental to assure the validity of future estimations. The initial descriptive statistics of the selected sample can be observed in the following table.

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\(^3\) www.siricompany.com
\(^4\) www.ecodes.org
As it can be observed in the previous table, the companies are not distributed of a homogenous form between the different analyzed activity sectors. The primary target of the work is to equip the results at a global level (totality of the sample) of a representativeness adapted with the purpose of testing our initial hypotheses. It is due to this reason by which it has been chosen to omit sectorial results (due to the absence of significance). The companies of the sample include a great diversity of positions in terms of return and quality of social and environmental information.

In this way we can find organizations whose yield has been negative in both analyzed periods and other ones with high share returns. The selection of a variety of companies with unequal situations does that the variance of the variables of the sample increases, harnessing therefore the capacity of pick up of variability on the part of the models that later will set out to examination, as well as the attainment of a better image of the existing reality devoid, in most of occasions, of common situations. The calculation of the Total Score Rating (it represents the score that offers SIRI Group on the social and environmental behaviour of the different companies) has taken place by an unequal weighted method from the original variables, so that it can be considered as a quite trustworthy indicator of the social behaviour of the company in its different slopes.

In general, an increasing tendency of the TRS with respect to the temporary unit is appraised, so that, with predominant character, the social and environmental conscience of the companies of our sample evolves positively throughout the considered periods. Differences between sectors are observed, so that with general character the energy companies display an elevated TRS value with respect to other activity sectors. On the other hand, we observe that the TRS dispersion is also different between the sectors of activity of the sample. Also, it is necessary to comment that these differences are not globally consistent (it does not exist structural permanence) due to the non repetition of behaviour patterns in the different periods of time.

4. -Methodology and Hypotheses

In the course of this work we are going to apply several statistical tests with the purpose of explaining the existence (or not) of a link between the socially responsible behaviour on the part of the company (in its different slopes) and the share return of the same one (expressed by table 1 terms). In this case, some authors have been tested this hypothesis along many years. In this way, it is necessary to establish a series of hypothesis. Two typologies of hypotheses are present, the first one is bound to the inclusion of the company in different socially responsible organizations as H1 and H2 and the second but generalist one makes reference to the monetary impact of reporting like H3 (Waddock and Graves, 1997) (financial performance of CSR policies). Most of investigations made until now conclude that a positive or neutral link exists between social and environmental performance and financial one (Griffin and Mahon, 1997).

To test our hypotheses, nonparametric and parametric methods have been used. Firstly a first approach to the problem is showed calculating the Pearson correlation coefficient between the series of returns in period t+1 and the series of final scores (TRS) in period t. This is because the social and environmental information is not discounted totally in the market until the publication of this type of information is accessible to all the
members of the market. Later the Chi Square test is applied to try to capture the possible nonlinear association between both variables, being maintained the used temporary lapse previously mentioned. For it, the recoding task of both variables becomes necessary, so that continuous in origin they take a functional form of ordinal qualitative character. Cut points for the classification have been drawn up considering 25, 50 and 75 percentiles. Later the hypotheses of our work as well as the methods of resolution of the same ones that are going to be applied are analyzed.

H1: The incorporation of a company in a socially responsible stock-exchange index (Dow Jones Sustainability Index in our case) has a positive repercussion in the share value of the same one. In other terms, the investors will tend to turn aside their funds towards values including in a stock-exchange index whose common denominator is the demonstrated social and environmental behaviour of the company, which would accept the hypothesis that the ethical investment has a relevant presence in the contemporary market with respect to the traditional theories based on the maximization of different magnitudes. For the test of this hypothesis a triple methodology with the purpose of contributing a robust character to the final results has been used. In the first place an equality of means test has been made to corroborate if the companies including in the DJSI have obtained a greater share return or on the contrary the hypothesis number one must be rejected.

Previously to this step it has been verified if the variability of the yields obtained by the companies of the sample (variance of the yields or more commonly denominated volatility) differs between both groups. Later the Chi square test has been applied with the purpose of catching nonlinear relations between the previously commented variables. For the accomplishment of this test, it becomes necessary to recode our returns variables that have a continuous initial nature. It has been chosen to divide it in four categories taking as a reference the 25, 50 and 75 percentiles. Finally the following general linear model has been considered:

\[
R_{i,t} = \propto + B_1 \cdot \log(R_{i,t-1}) + B_2 \cdot DJSI_{i,t} + \delta_i
\]

Where \(R_{i,t}\) represents the return obtained by the company \(i\) in the year \(t\), \(\log(R_{i,t-1})\) is the natural logarithm of the share return of the company \(i\) in the year \(t-1\). \(DJSI_{i,t}\) is a variable that takes the value 1 if the company \(i\) is included in the DJSI in the year \(t\) and 0 if it is not including. \(B_1\) and \(B_2\) are the coefficients of the model and \(\propto\) is the constant term. The measurement of random error comes represented by \(\delta_i\). The rule of decision in this case will be the representativeness or not of \(B_2\) parameter so that the non representativeness of it, would take to us to reject the hypothesis number one.

H2: The incorporation of a company to the Global Reporting Initiative has a positive repercussion on the market value of the same one. This hypothesis turns on the possibility that the companies that publish social and environmental information of an acceptable minimum quality (GRI criteria; Guidelines 2002, next G3 in October) can obtain additional returns. This second hypothesis is going to be tested carrying out the same methodology as H1.
H3: The policies directed to the minimization of the environmental impact of the different activities of the company (quantified by the qualification granted by SIRI Group) have a positive repercussion on the market value of the company, so that those environmentally responsible organizations are better valued by both, the particular and institutional investors. To test this third hypothesis it has been considered the following general linear model:

\[
R_{i,t} = \alpha + B_1 \log(R_{i,t-1}) + B_2 X_{i,t-1} + \epsilon_i.
\]

Where \( R_{i,t}, \log(R_{i,t-1}) \) have been described previously and \( X_{i,t-1} \) represents the factor scores of the environment variable in the company \( i \) in the period \( t-1 \). It has been chosen to leave a coincident time interval coincident with the natural year because the social information of the company of the period \( t \) is published on half of period \( t+1 \) which causes that the possible impact on the return is, if it is the case, on the period \( t+1 \) and not on the previous period. In most of studies made until the moment, the different stakeholders of the company have been represented through the election of individual indicators. By all the academic community it is known that the environmental information (and by extrapolation the social one in general) has a heterogeneous and disperse character. The election of a few indicators to represent variables like impact to customers, employees or environment is not absolutely suitable due to the loss of information (variance of the variables), reason why we must use a methodology that reunites most of information available. This is the reason why we have chosen the factor analysis.

Through this multivariate method we can reduce the dimension of the explanatory variables of the latent one (51 variables in our matrix of initial data) that makes reference to the environmental impact of the company. Another idea that endorses the use of this methodology is the fact of the difficulty that involves the election of a few variables to represent the latent factor. Through the factor analysis all the variables are represented in the final factors extracted so that it is managed to reunite a greater amount of information with no need to make previous elections, which enjoy a high degree of subjectivity. Previously to the application of the factor analysis, a filtrate of indicators has been made so that the variables that have a null explanatory power on the latent variable (environment) are relegated of the process (the inclusion of irrelevant variables can decrease the explanatory power of the model).

5. -Main results

The Pearson correlation coefficient between TRS series in the year 2003 and the return obtained by the companies in 2004 takes a value of -0.030 (sig = 0.727) whereas between the share return of the year 2005 and TRS of the preceding year this measurement of association adopts a value of 0.012 (sig = 0.890). Both correlations are not representative (0.890 > 0.727 > 5%) which makes us think that with the obtained sample and in both analyzed temporary periods, the obtaining of a greater return is not associate to the adoption of a socially responsible behaviour. In figure 5 the correlations between the yields of the companies of the sample and the different released indicators
related to the social and environmental information can be observed. As it can be appraised there is not any significant correlation in no way (positive or negative) so that we cannot either affirm that in our sample the enterprise with good behaviour with each one of the different considered stakeholders (related to the different aspects gathered by the variables) has a positive incidence character on the market value of the same one (at least of linear character).

The Pearson Chi square statistic value for the first period adopts a value of 5,406 (p-value = 0,798 , significance level = 5%) which allows us to accept the null hypothesis of independence of variables. For the second period of analysis the results are similar because the coefficient adopts a value of 7,841 (p-value = 0,550 , significance level = 5%) which confirms that in both periods the obtaining of a good qualification as the social and environmental behaviour of the company in the period t, it does not guarantee to obtain a greater return in the following period (t+1). Next, the results obtained after testing the hypotheses H1 and H2 are showed. Firstly, the test of equality of variances indicates to us that there are not differences in the dispersion of the return series between companies that are included in the DJSI and those that are not included for both years of study. This is because the statistic adopts a value of 0,101 (p-value = 0,751 , Significance level = 5%). This situation is repeated in the second considered period (2005) where the Levene’s statistic reaches a value of 0,007 (p-value = 0,935 , Significance level = 5%).

In the same way, we see that it does not exist differences between companies whose publication of social and environmental information fulfils the GRI criteria because the statistic value reaches a value of 0,126 (p-value = 0,723 , Significance level = 5%) in the first period (2003-2004) and of 0,121 (p-value = 0,728 , Significance level = 5%) in the second period (2004-2005). Therefore and following both tests, we thought that the volatility of the share returns of the companies of the sample is not different based on the property or not to one of the both groups mentioned previously (DJSI, GRI), which indicates to us that the inclusion of a company in one of the mentioned groups is not independent of the degree of risk supported by the investors (in yield terms).
We obtain one first approach to the problem with the results of the tests on the means of the share returns. In the first case (DJSI) the statistic test adopts a value of 0.399 (p-value = 0.691, Significance level = 5%) for the period 2003-2004, which indicates to us that there are not return differences (in average) between the companies that quote in the Dow Jones Sustainability Index and those ones that don’t quote. Identical reasoning we extract if we analyze the values of the test for the period 2004-2005 (Statistic = -0.559, p-value = 0.557, Significance level = 5%). As for the H2 hypothesis, we can observe that there are not differences in returns mean between the companies agreed to GRI criteria and those ones that don’t fulfil it in both considered periods of time which make us reject the H2 hypothesis (accepting the null hypothesis of equality of means) since the values of the statistical tests are 0.014 (p-value= 0.989) for 2004 and 0.166 (p-value = 0.868) in 2005.

Next, we can appreciate in the figure number 6 the values of the Chi square test associated to the hypothesis H1 and H2. We can appreciate as it seems not to exist relation between the quotation of a company in a socially responsible index (DJSI) or the publication of social and environmental information according to the criteria of an organization of recognized prestige (GRI), and the market value of the company. This is why the statistic values are not significant for the different considered periods. Therefore it seems to be that both variables are independent which makes us reject the hypotheses H1 and H2 at the moment.

Figure 6

<table>
<thead>
<tr>
<th></th>
<th>Return 2004</th>
<th></th>
<th>Return 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Value</td>
<td>Sig</td>
<td>Value</td>
</tr>
<tr>
<td>DJSI</td>
<td>1.645</td>
<td>0.649</td>
<td>3.112</td>
</tr>
<tr>
<td>GRI</td>
<td>0.336</td>
<td>0.339</td>
<td>1.730</td>
</tr>
</tbody>
</table>

In the figure number 7 we can observe the coefficients of the regression model in both years studied. As we can appreciate, the values of the individual representativeness tests of the parameters indicate that no of these are significant, reason why we could consider them non different from zero. We can see that the triple used procedure to test H1 and H2 indicates us that any type of relation between the return obtained by the company and the property of this to a socially responsible stock-exchange index or to the fulfillment of a suitable quality of the social and environmental information contributed by an organization of reporting doesn’t exist. Therefore we are ourselves forced to reject both hypotheses (always considering the extracted sample and the period of time indicated).
Next it has proceeded to test H3. In this case we will verify if a responsible enterprise institution with the environment obtains better share returns to others where the respect and the conservation of the environment do not take part of the general policy of the company. That’s why, it has proceeded to consider the regression model explained previously. Before, an analysis of the explanatory power of the different contained variables in the environmental category has been made with the purpose of eliminating those ones that turn out irrelevant to explain the environmental behaviour of the company.

Then, with the extracted variables it has been made an analysis of the latent variable dimensionality (environment) with the purpose of finding out which number of factors explains an excellent variance percentage of the variable (inflicting a minimum loss of information). It has been chosen to make an exploratory factor analysis with the purpose of observing the determining factors of the responsible behaviour of the company with the environment.

The model has been estimated by means of the procedure of maximum likelihood due to the smaller exigency as for the hypotheses on the initial data. A varimax rotation has taken place (without limit of iterations) with the purpose of being able to interpret more exactly the extracted factors. Previously, it has proceeded to release those variables that do not display positive values of variability, this is, those ones whose variance is null. After this first depuration of indicators, it has been chosen to suppress the variables “Supply chain issues”, “Other to air emissions” and “Programs to reduce the impact of products at the end of the life-cycle” in the information handed over by SIRI Group in the period 2003 and no of them in 2004 because of being all significant.

After this initial indicator filtrate we obtain that the environmental variable does not have a unique dimension, reason why we consider that it must be represented by 12 variables in 2003 and by 11 variables in 2004 (due to the factor analysis extracts twelve factors with eigenvalues greater than the unit in 2003 and eleven in the following period). The tests about the adjustment of the factor analysis (KMO Test and Bartlett’s Test of Sphericity) indicate to us that both models (2003 and 2004) are suitable in both years.
Test KMO of the first period adopts a value of 0.840 and 0.877 in 2004. Let us remember that the factor analysis will be more adapted when the value of the KMO is resembled the unit. In addition the Bartlett’s sphericity test indicates to us that the matrix of correlations of the initial variables is not the identity (which would suppose that inputs were uncorrelated) since p-values estimated adopt a value of 0% in both cases, reason why the Null Hypotheses would be rejected.

Null Hypothesis of Bartlett’s sphericity test

\[
\begin{align*}
\begin{pmatrix}
    a_{11} & \cdots & a_{1n} \\
    \vdots & \ddots & \vdots \\
    a_{m1} & \cdots & a_{mn}
\end{pmatrix}
&= I =
\begin{pmatrix}
    a_1 & 0 \\
    \vdots & \ddots \\
    0 & a_n
\end{pmatrix}
\end{align*}
\]

These considerations acquire a crucial relevance at the time of interpreting the potential of the obtained final results. Due to the high dimensionality of the latent variable, (environment one) we have been chosen to make regressions with the first five extracted factors in every period, explaining a high level of variance (near 70%). These factorial scores will be the departure data to estimate the regression models introduced previously. The results of the estimation of both models can be observed in the figure number 9. It will interest to us to observe the tests on the individual significance of the parameters, which indicate to us if the variables introduced in the model have explanatory power (we remember that the environment latent factor is represented by the five factors previously mentioned, \( F_{1,t}, F_{2,t}, F_{3,t}, F_{4,t}, F_{5,t} \), where \( t = 2003, 2004 \)).

We appreciate that for the first period of study all the coefficients of the model are non significant in both, individually and collectively, reason why we could extrapolate that, with the selected sample and in the period of time considered (social and environmental Information 2003, return 2004), the qualification granted by SIRI Group (faithful reflection of the environmental commitment of the company) as for environmental aspects does not influence in the return of the company. That is to say, the investors have not considered (at least on direct way) this information at the time of carrying out the distribution of capital between the different typology of shares in the market values. Nevertheless, in the following period, it seems to be that one of the extracted factors turns out to be significant (\( F_{2,2004} \), so that the environmental behaviour (partially...
represented by $F_{2,2004}$ factor) influences, in certain way, in the share return associated to
the different companies of the sample.

Figure 9

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$</td>
<td>0.146860</td>
<td>0.029292</td>
<td>5.013601</td>
<td>0.0000</td>
</tr>
<tr>
<td>$\log(R_{i,2003})$</td>
<td>-0.017925</td>
<td>0.010886</td>
<td>-1.646797</td>
<td>0.1019</td>
</tr>
<tr>
<td>$F_{1,2003}$</td>
<td>-0.006979</td>
<td>0.014000</td>
<td>-0.498476</td>
<td>0.6190</td>
</tr>
<tr>
<td>$F_{2,2003}$</td>
<td>-0.004603</td>
<td>0.013548</td>
<td>-0.339757</td>
<td>0.7346</td>
</tr>
<tr>
<td>$F_{3,2003}$</td>
<td>0.010973</td>
<td>0.013459</td>
<td>0.815324</td>
<td>0.4163</td>
</tr>
<tr>
<td>$F_{4,2003}$</td>
<td>0.015392</td>
<td>0.013496</td>
<td>1.140.485</td>
<td>0.2561</td>
</tr>
<tr>
<td>$F_{5,2003}$</td>
<td>-0.012121</td>
<td>0.013473</td>
<td>-0.899597</td>
<td>0.3689</td>
</tr>
</tbody>
</table>

R-squared: 0.035824, Mean dependent var: 0.103973
Adjusted R-squared: -0.007028, S.D. dependent var: 0.159195
S.E. of regression: 0.159753, Akaike info criterion: -0.782334
Sum squared resid: 3.445.345, Schwarz criterion: -0.636624
Log likelihood: 6.254.573, F-statistic: 0.835987
Durbin-Watson stat: 2.286.447, Prob(F-statistic): 0.544151

The value of the test of the individual significance of the parameter of the second
extracted factor ($X_{2,2004}$) shows that the considered coefficient is significant since p-
value adopts a value of 0.0019, which is sensibly smaller than 0.05, which makes reject
the null hypothesis ($F_{2,2004} = 0$). Nevertheless, the rest variables of the equation
(represented by the pertinent factorial scores ($X_{i,t}$), turn out to be non significant, since
the corresponding p-values adopted are all higher than 5%. The variables included in the
second factor make reference to the performance reached by the company with respect
to the environment. In this category there are indicators referring to gas discharges,
energy consumption (oil, gas, electricity, renewable energies, others) and treatments of residues (industrialist and common waste). It seems to be that the investors considered the enterprise behaviour as for treatment of remainders, level of emissions and the level of consumption of energy at the time of making their investment decision (because the considered coefficient corresponding to the second factor is positive $F_{2,2004} > 0$). All these variables adopt positive coefficients in the components matrix. Let us remember that the input data make reference to the qualification granted by SIRI Group, reason why the companies, that reached an excellent qualification in the variables mentioned previously in the period 2004, have obtained additional share returns in 2005. It is important to test the behaviour of the residues of the model.

These aspects have been analyzed observing the tests ARCH and White (with cross terms) to check residual homocedasticity, Breusch-Godfrey Serial Correlation LM test for the case of the autocorrelation and Jarque Bera test to see normality (the ideal aspect to obtain would be uncorrelated and homocedastic residuals and normally distributed). Previously the residual correlograms in levels and the quadratic form have been examined. The mentioned test reaches p-values greater of 5%, which makes accept the homocedasticity, uncorrelated and normality of the residuals of the regression model. Following with the test of H3 it is necessary to mention that the obtained results by means the regression model have been confirmed by means of additional tests. For it, it has been codified the factor number two previously characterized so that two groups in a new denominated variable $F_{2,2004v2}$ is constituted. First of them is formed by the companies whose factorial scores in the mentioned factor are negative, and the second one where these values adopt a positive sign. The interpretation of both groups is immediate, in the first case (negative factorial scores) is formed with companies whose energy consumption has been elevated, with inadequate treatment of residues and with gas discharges in increase (or at least surpassing the limits established by the effective allocation of rights emissions). The second one (positive factorial scores) is formed by those institutions whose behaviour in this matter has been slightly more responsible. Once obtained the new variable (symmetrical Boolean), it has taken place a test of means and variances equality between both groups of companies specified previously. The results can be observed in the figure number 10.

Figure 10

<table>
<thead>
<tr>
<th>Group Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F_{2,2004v2}$</td>
</tr>
<tr>
<td>Ri,2005</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Independent Samples Test

<table>
<thead>
<tr>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>.101</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>-2,038</td>
</tr>
</tbody>
</table>

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Firstly, the test for equality of variances indicates to us that a level of risk (volatility), similar in both groups of companies, exists since the test of Levene’s adopts a value of 0.101 (p-value = 0.751, Significance level = 5%). Therefore we accept the null hypothesis that difference in the investment risk (return volatility) between groups of companies does not exist. This consideration is confirmed at sight of the values of the two variances obtained in both groups of companies. While in the first group the share return volatility reaches a value of 16.43%, in the second group (more responsible companies with the environment) the standard deviation of the return series reaches a value of 17.70%. In spite of this conclusion, the test for equality of means indicates to us that difference between the yields obtained between the companies including in the first group and those that adopted a suitable behaviour with the environment exists. This aspect is confirmed when observing the value of the statistics of the test which reaches a value of -2.038 (p-value = 0.044) which is significant at a level of 5% (the assumed one in all the development of the work). In this case there are remarked differences in yield between the environmentally responsible companies and those that aren’t, so that the first ones reach a share return mean of 20.9% whereas the institutions of the other group reach a value of 14.98%. Although both groups of companies reach values of positive yields, the difference among them quantified in almost 6%, is a value to consider observing the globalized present markets. This consideration is of special interest at the time of establishing policies RSC in the company since the particular and especially the institutional investors considered this information at the time of evaluating their investment policies.

6. - Concluding remarks

The results of the present investigation indicate that with the selected sample and in the periods of time considered (2003-2005) the property of a company to a socially responsible stock-exchange index does not repel of positive form in the share returns of the same one. That is to say, there are no differences in yield and risk between companies that comprise of the Dow Jones Sustainability Index and those that aren’t included in this socially responsible stock exchange index. The conclusions are similar for the case of companies certified by the Global Reporting Initiative, so that the fulfilment with quality levels (prefixed by the GRI) of the social and environmental information (voluntary) does not indicate that the risk supported by the investor is smaller or that they are going to obtain additional return with respect to the companies that are not certified. These hypotheses have been tested with a triple parametric, nonparametric, linear and nonlinear methodology, which contributes a greater consistency to the obtained results. Nevertheless and after testing H3 it is appraised how the companies with an environmentally responsible policy (related to power consumption, gas discharges and treatment of residues) obtain a share return superior to those that don’t take care of the environment, maintaining the same level of risk (in average) in each group.
7.- References


GRI (Global Reporting Initiative) (2002), Sustainability Reporting Guidelines, Global Reporting Initiative, Boston, USA.


