

ESG Regulations in the Stock Market, and its Impact on the Volatility of the Main Issuers

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ARTICLE INFO

Received: 📅 March 03, 2024

Published: 📅 March 26, 2024

Citation: Sr Arturo Uribe Rocha. ESG Regulations in the Stock Market, and its Impact on the Volatility of the Main Issuers. Biomed J Sci & Tech Res 55(5)-2024. BJSTR. MS.ID.008755.

Introduction

When we talk about stocks and how they behave over time, it is impossible to predict their future trends and prices. There are endless variables internal and external to the company itself, which could affect the behavior of the share price, and, therefore, depending on the moment of purchase by investors, the return they can earn from them. Let us remember that stocks, as well as many other assets in finance, behave according to supply and demand, so this means that it is the market itself that affects their price. Now, shares “are financial assets that represent a part of the social capital of a company. Each person who acquires a share becomes a partner and has obligations and rights over the company” (GBM, 2022). So, if the shares are a small part of the company itself, why doesn't their behavior depend entirely on the company's results?. Supply and demand allows an asset of any kind to have a price determined by how much or how little the market itself wants it, so we will not only see the price affected by the performance of the asset, but we can also see factors external factors that affect that price, such as political risk, exchange rate volatility, the level of financial education in a country or even how concerned a company may be about caring for the environment, its social impact and its corporate governance. These latter terms are currently known as the ESG pillars, which seek to measure the way in which companies generate value for their community, but not only through economic benefits or job creation, but through 360 policies, that allow us to generate an impact on society as we know it.

Development

All these variables can be grouped into financial indicators that provide us with agile and accurate information to understand the risks as a whole and always seek to have correct diversification of our investment portfolio. One of these indicators is the Var. According to Hans Loof and Andreas Stephan in their paper published in 2019 “The Impact of ESG on Stocks' Downside Risk and Risk Adjusted Return”, the Var is an econometric measure that can be used as a metric of financial risk in a certain period. established time and can be calculated by different methods, always based on the type of data we are analyzing and the normality that our sample allows us to have. So, if the Var is a measure of risk and volatility, this indicator can give us an agile and accurate idea about the risk we assume as investors when buying these shares, if the method used to calculate the indicator is the correct one for the type of data we are analyzing. The term ESG arises from the need for care and improvement of social and environmental conditions in our society, and little by little it has been gaining strength and has been adjusting to our daily tasks and in general to our daily life, but it is until the 2010s when it began to appear on Wall Street, this as reported in its 2022 article by BBVA Spain. “Although their origin dates back several decades, in recent years they have become the reference for socially responsible investment” (Carmen Alvarez, BBVA, 2022). From the birth of this term and the need for more and better companies that are listed on regulated markets, Wall Street proposes 3 new pillars as a measurement of the impact that companies have on our society, “E” for Environmental, “S” for Social and “G”

for Governance. Based then on these 3 pillars, an investor could have a better idea of how the board of directors of their company thinks and the direction and duration that their investment has within the market [1-4].

Let us also remember that investments always have different objectives, but that, according to classic authors of finance literature such as Markowitz, or great investors such as Buffet, investments tend to be mostly equity and this is how we should choose them and include them in our portfolio, so then we should be concerned and thinking about long-term companies. What are the names that will still be there in 10, 20 or 30 years? Amazon, Google, Meta? This is the question. The pillars of ESG measurement then propose that a company aligned with these regulations and that cares beyond the economic, could then give us solid profits over time, although not in such large percentages in short periods, but we would achieve an economic circular where we can invest in companies that generate constant returns, and in turn leave a long-term impact for society in general. This

methodology gives rise to regulations that were applied to world markets and that are fundamentally correct, but once the idea is launched on the market and companies are allowed to decide whether to adopt the methodology, the challenge of who will decide begins. sacrificing performance for social impact, and this is exactly where regulation fails. There is a whole movement that discredits the validity of these regulations, and that even calls into question the ethics of large corporations based on the criterion of whether companies adhere to the regulations out of genuine interest or economic convenience (Tables 1-3). It was not until 2022 that the SEC decided to begin exploring the world of pro-ESG regulations and that around 10 states within the United States promote compliance within companies that decide to be public, but there are still 18 states. In a fight to be left out of this regulation. These new changes have generated alterations within the companies that, if they decided to adopt the criteria, as well as the largest money managers in the world, and companies like Blackrock have a very proactive stance by including these measurements within their main investment funds.

Table 1: Sample of stations used for analysis.

#	Company	Ticker	Industry	Ranking ESG
1	3i Group Plc	III	Diversified Financials	10.4 Low Risk
2	37 Interactive Entertainment Network	002555	Software & Services	14.3 - Low Risk
3	Abercrombie & Fitch Co	ANF	Retailing	15 - Low Risk
4	515J Holding Goup Co	000560	Real State	15 Low Risk
5	ABB Ltd.	ABBN	Electrical Equipment	15.4 - Low Risk
6	361 Degrees International Ltd.	1361	Textiles & Apparel	18.8 Low Risk
7	Schlumberger NV	SLB	Energy Services	20.3 Medium Risk
8	Helmerich & Payne, Inc.	HP	Energy Services	22.3 Medium Risk
9	Tenaris SA	TNRSF	Energy Services	23.3 Medium Risk
10	China Oilfield Services Ltd.	Cholf	Energy Services	24.6 Medium Risk
11	Transocean Ltd.	RIG	Energy Services	25.5 Medium Risk
12	Halliburton Co.	HAL	Energy Services	25.6 Medium Risk

Table 2: Calculation of parametric Var at 95% confidence after Back testing with 100-day Moving Average.

#	Company	Var	Backtesting	¿Fits?
1	3i Group Plc	-6.22%	87.6%	No
2	37 Interactive Entertainment Network	-4.75%	93.5%	Yes
3	Abercrombie & Fitch Co	-3.52%	87.5%	No
4	5I5J Holding Goup Co	-2.15%	88.3%	No
5	ABB Ltd.	-7.5%	96.4%	Yes
6	361 Degrees International Ltd.	-3.54%	91.5%	Yes
7	Schlumberger NV	-5.17%	79.14%	No
8	Helmerich & Payne, Inc.	-6.34%	81.5%	No
9	Tenaris SA	-4.26%	87.35%	No
10	China Oilfield Services Ltd.	-7.56%	92.3%	Yes
11	Transocean Ltd.	-9.56%	85.4%	No
12	Halliburton Co.	-5.75%	92.75%	Yes

Table 3: Var calculation by Garch / EWMA methodology at 95% confidence.

#	Company	Var
1	3i Group Plc	-1.41%
2	37 Interactive Entertainment Network	-1.56%
3	Abercrombie & Fitch Co	-1.83%
4	5I5J Holding Goup Co	-1.26%
5	ABB Ltd.	-0.82%
6	361 Degrees International Ltd.	-1.32%
7	Schlumberger NV	-5.46%
8	Helmerich & Payne, Inc.	-6.57%
9	Tenaris SA	-4.47%
10	China Oilfield Services Ltd.	-6.78%
11	Transocean Ltd.	-9.76%
12	Halliburton Co.	-5.96%

Investment, despite having to adjust investor returns. Starting in 2023, Mexico integrates its stations by listing on the BMV and BIVA, these same ESG regulations that promote care and control of the impact on these 3 pillars, so it is possible to see the same behavior replicated or amplified as with the United States. So we are at a turning point where we could predict or control the impact within our stations to take care of the pockets of our entire society. The impact that has been generated on actions and returns exists, and it is possible to measure it, so being able to generate a review of how this new regulatory framework has benefited or affected us could give us a better idea of the direction of investments as we know them. they can take. The company “Sustainalytics”, which is part of the “Morning-

star” business group, dedicates an entire department at a global level to carry out a classification ranking on the degree of commitment of public companies towards the ESG pillars, where they are classified under a parameter that It ranges from 1 to 100, with <20 being low risk, 20-30 medium risk, 30-40 high risk and more than 40 points being severe risk. This classification is based not only on a comparison against previous years of the integration of these concepts, but also makes a comparison against the total universe of shares in the home market of each issuer.

H0: The Lower the ESG Ranking Score, The Lower the Volatility of the Issuer

Once understanding the operation and relevance of this new regulation, with tools such as this ranking and defining the Null Hypothesis, we selected a sample of 12 stocks belonging to the US market, but that are available for operation within the Mexican market. These actions are part of the Ranking published by Sustainalytics, as the 6 stations with the lowest risk and the 6 stations with the greatest exposure.

Sample of Stations Used for Analysis

The analysis is based on a data panel of daily historical prices of these 12 stations, through which we can calculate the Var by different methods, trying to find the most appropriate one for our type of data. The equation used to calculate Var is the following:

$$Var_{\theta_i,t} = \gamma_0 + \gamma_i + \gamma_1 \Delta ESG_{i,t} + \gamma_2 \Delta ESG_{i,t-1} + \gamma_3 \Delta ESG_{i,t-2} + \gamma_4 \Delta ESG_{i,t-3} + e_{i,t}$$

Var Calculation Equation

Establishing this function and with the historical information, we calculate a parametric Var model through which we calculate the historical volatility of each issuer, which allows us to establish an expected behavior for their risk. This parametric Var was first calculated with the parameters at 90% confidence, with a history of 924 daily closing prices and was complemented with Back testing to corroborate that the degree of confidence was met.

Calculation of Parametric Var at 95% Confidence after Back Testing with 100-day Moving Average

As we can see, of a sample of 12 stations, only 5 meet the degree of confidence established by the parameter, and in some way this is expected, since we are using a Back testing method with historical data assuming that there is normality in them. , but due to the nature of stock prices, they do not behave like a normal one, so a simplified Garch model, known as EWMA, was applied, which allows for non-normal data analysis, with data samples less than 1000 [5,6].

Conclusion

After calculating the Var with the correct methodology for the type of data handled, we can then conclude that the Null Hypothesis is correct, since in the issuers with a higher score in the ESG Ranking, which suggests a greater risk for the investor, The historical Var calculated by EWMA is considerably higher in 100% of the stations analyzed. This analysis was conducted with a small sample of stations,

but it serves to identify trends and lead to a more in-depth analysis that ends up confirming this hypothesis. Returning to the initial idea based on the 2019 paper by Hans Loof and Andreas Stephan, issuers in Europe had a "V" behavior where issuers that took more care of their ESG ranking within the MSCI index obtained higher returns with lower volatilities. but curiously, also those that were on the other side of the ranking, more based on the data obtained from this analysis, the stocks in the United States behave differently. This event could come from a greater age of these regulations in the American market, as opposed to the European market, so, if we wanted to continue this methodology for markets such as Mexico or Latin America, perhaps the result would still not be so conclusive, due to the little historical information available that helps us measure the impact.

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ISSN: 2574-1241

DOI: 10.26717/BJSTR.2024.55.008755

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