The role of ESG factors in mitigating crisis effects on Moroccan public companies' financial performance

Le rôle des facteurs ESG dans la prévention des effets de crise sur la performance financière des entreprises marocaines cotées à la Bourse de Casablanca

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Abstract

Starting from late 2019, the global COVID-19 outbreak has led countries to impose repetitive lockdowns to prevent citizens from its spread and preserve their health. This health crisis has quickly turned into an economic crisis affecting global macroeconomic indicators and by extrapolation worldwide stock markets performance. Since Environmental, Social and Governance (ESG) factors have been appraised by literature in developed countries for their positive effects on companies, this paper is aimed at studying whether ESG factors have had a role in mitigating the Moroccan stock market crash on the financial performance of ESG compliant listed in the Casablanca Stock Exchange (CSE). This study was conducted based on an event study methodology using the daily stock returns of the 10 companies constituting the CESG10 Index as of January 2022. Our findings suggest that, although ESG companies have proven to outperform the market in developed countries, this positive effect is not to be automatically extrapolated to developing countries as the ESG umbrella did not have a significant role in mitigating the crisis effect on the stock performance of Moroccan public companies.

Keywords:

Environmental Social Governance; ESG; Stock markets; Event study; Developing countries; COVID-19.

Résumé

À partir de fin 2019, l'épidémie mondiale de COVID-19 a conduit les pays à imposer des confinements répétitifs pour empêcher leurs citoyens de la propagation du virus. Cette crise sanitaire s'est rapidement transformée en crise économique affectant les indicateurs macroéconomiques mondiaux et par extrapolation les performances des marchés boursiers internationaux. Compte tenu du fait que les facteurs environnementaux, sociaux et de gouvernance (ESG) ont été valorisés par la littérature dans les pays développés pour leurs effets positifs sur les entreprises, cet article vise à étudier si ces facteurs ont eu un rôle dans l'atténuation des conséquences du crash boursier marocain sur les entreprises cotées les plus conformes aux critères ESG de la Bourse de Casablanca. Cette étude a été menée sur la base d'une méthodologie d'étude d'évènement en utilisant les rendements boursiers quotidiens des 10 sociétés de l'indice Casablanca ESG10 à Janvier 2022. Nos résultats suggèrent que, bien que les entreprises ESG se soient avérées plus performantes dans les marchés boursiers des pays développés, cet effet positif ne doit pas être automatiquement extrapolé aux pays en développement car l'égide ESG n'a pas joué un rôle significatif dans l'atténuation de l'effet de la crise sur la performance boursière des 10 entreprises publiques marocaines les plus conformes.

Mots clés:

Environnemental Social Gouvernance; ESG; Marchés boursiers; Etude d'évènement; Pays en développement; COVID-19.

1. Introduction

Since November 2019, economies all over the world had to experience the negative effects of the COVID-19 outbreak. The health crisis caused by this infectious disease quickly induced serious economic and financial consequences on the economic indicators of nearly every country around the world.

The crisis has also spread to affect equity markets worldwide. In fact, after the World Health Organization has declared COVID-19 as a global pandemic with heavy potential consequences on the health of humanity, the most significant stock markets around the world have experienced significant risk aversion from risk averse investors leading to heavy stock selling in the end of the first quarter of 2020 (He et al., 2020). As a result of investors pulling their capital , major stock markets around the world have lost more than 15% of their market capitalization starting the end of February 2020 (AlAli, 2020). At the time of writing, these financial markets seem on the way of recovery from their worst decline since the Great Recession 2008 (Song et al., 2022).

These significant disturbances in the financial system have raised several challenges for policymakers and governments. First, the need to restore equity markets' performance is essential. On the other hand, there is a clear room of improvement for policymakers and governments by capitalizing on the lessons from this COVID-19 induced financial crisis in order to be able to be more resilient to similar shocks in the future. These two objectives can be fulfilled at the same time through a key concept that has gained the interest of a significant number of stakeholders in the last decade: sustainable finance.

Sustainable finance in the context of companies can be reflected by being compliant with Environmental, Social and Governance (ESG) factors. These three sustainability key concepts have been appraised significantly over the last decade by researchers in developed countries. While ESG compliance is still a new concept in many developing countries, policymakers such as capital markets authorities have lately began to show interest. In Morocco, the "Autorité Marocaine du Marché des Capitaux" (AMMC) has instigated several initiatives to develop ESG compliance and promote ESG disclosure. For example, it is of interest to notice that for listed companies on the Casablanca Stock Exchange (CSE), it has become mandatory to issue an ESG sustainability report since February 2019 (AMMC, 2019) along with the traditional yearly financial reports. To further promote corporate ESG compliance, the AMMC has launched a thematic index, namely Casablanca ESG10 which we refer to in this study as CESG10. This index regroups the 10 most ESG compliant companies listed in the Casablanca Stock Exchange based on an annual assessment of their sustainability efforts. The

list of the companies integrated in the index is revised in September of each year and published on the official website of the Casablanca Stock Exchange.

In light of the recent COVID-19 crisis and given the growth of the interest around ESG worldwide and specifically in the Moroccan context, it seems of interest to study whether being ESG compliant in the Moroccan corporate scene has been a factor in mitigating the impact on the stock performance of CESG10 companies.

Hence, this paper is aimed at studying the response of the 10 company stocks of the Casablanca ESG 10 index to the COVID-19 crisis using an event-study based methodology during the COVID-19 crisis that has started in March 2020.

The objective of our research is to highlight the potential role of ESG factors in mitigating negative effects on corporate financial performance in order to promote their adoption by Moroccan public companies.

We structured our research as follows. First, we compiled the financial data from the official website of the Casablanca stock exchange. We then computed 10 linear regression single market models based on these data and historical data for the Moroccan All Shares Index. We calculated the abnormal returns during the event period using the 10 regression models and the actual performance of the 10 most ESG compliant firms in the exchange. Finally, we computed abnormal returns for longer periods after our event period in order to observe their evolution.

This paper is organized as follows. Section 2 presents a literature review around the impact of COVID-19 on stock markets worldwide. Section 3 presents the event study methodology implemented to study the impact of COVID-19 crisis on the 10 stocks of the CESG10 index. Section 4 presents the results of the study. Section 5 discusses our reported findings and concludes.

2. Literature review

To further the understanding of our research topic in light of the previous works that have been conducted, we find it appropriate to introduce a literature review about the impact of COVID-19 on the performance of stock markets around the world.

Given the amplitude of the shock induced by COVID-19 on the worldwide economy, many studies have addressed its impact on capital markets of different countries. Previous studies have shown strong dependence between investors' sentiment and the spread of diseases (Ichev & Marinč, 2018) which explains the transfer of the developments of the health crisis to the financial markets. The major part of the literature investigating the topic has confirmed the negative impact of the disease on national stock markets of major developed countries (Al-Awadhi et al., 2020; Baek et al., 2020; Gupta et al., 2021; Khanthavit, 2020; Li et al., 2021). Based on the findings of Khanthavit (2020), the stock market responses were triggered by the worldwide media coverage of the disease rather than the actual events induced by the outbreak. This is in contrast with the results of Al-Awadhi et al. (2020) and (Baig et al., 2021) who explained a causality relationship between the increase of the pandemic related to confirmed cases and number of deaths and the increase in illiquidity and volatility of the Chinese and US stock markets. It is of interest to note that the observed increase of the market volatility has shown to be indifferent across the stocks of companies from all industries (Baek et al., 2020) in the US stock market.

Stock markets of developing countries have been negatively affected by the outbreak of the pandemic mainly as a result of spillover and contamination effects (Hanif et al., 2021) from developed countries' stock markets. These have shown to be the main vector of transmission of the negative investor sentiment (Belaid et al., 2021). It is appropriate to note that a study conducted by Al Samman (2021) on Gulf Cooperation Council countries demonstrated a higher decline in the stock prices of companies listed in Saudi Arabia, United Arab Emirates and Qatar exchanges as a result of the pandemic. This negative effect has been explained by Abdeldayem and Al Dulaimi (2020) by the enhancement of investors' herd behavior. In other words, the massive sell behaviour during the period of declining stock market indices has led to a significant decrease in liquidity and market capitalization. Herwany et al. (2021) have further demonstrated, through an event study-based methodology, a significant drop in the stock returns of companies listed in the Indonesian stock market following the COVID-19 period. A comparative analysis conducted in the context of BRICS countries by Kumar et al., (2021) revealed that the COVID-19 crisis has caused more volatility in the stock markets of China, Brazil and South Africa than the 2008 financial crisis. In the Middle East and North

African countries, Alaoui Mdaghri et al. (2020) have presented empirical findings on country and sector levels inducing that the COVID-19 had significantly decreased the liquidity of 6 MENA countries financial markets. In light of these findings, it can be deduced that nearly every stock market in the world has experienced a significant effect on its market financial performance, either in a more direct way as observed in developed countries or through spillover or contamination effects as observed in developing countries. Given the potential positive effect of ESG compliance on companies, it appears appropriate from the authors' point of view to address whether ESG compliant companies have shown better resilience to this COVID-19 financial crisis.

Based on previous research conducted around ESG factors that we have presented in the above literature review, we present the following hypotheses which our research aims to answer:

H1: ESG factors have a positive effect on the financial performance on compliant companies in Morocco in times of crises

H2: ESG factors do not have an effect on the financial performance on compliant companies in Morocco in times of crises

H3: ESG factors have a negative effect on the financial performance on compliant companies in Morocco in times of crises.

Furthermore, it is appropriate to note that in the event study methodology we have adopted, we have computed 10 single index market models meaning that the explanatory variable is, in each of the 10 models, the MASI return and response variables are the returns of each company stock. This approach is based on Coutts et al.'s (1994) research and has been adapted by the authors from previous event-study based research (HERWANY et al., 2021; Kumar et al., 2021).

3. Event study methodology

This article examines the resilience of ESG compliant company stocks to the financial crisis caused by the COVID-19 starting February 2020 using an event study methodology. The event study methodology can be used to assess the impact of specific events on market actors, such as public companies. The event study methodology has been widely used in accounting and finance-related studies after undergoing several enhancements (Fama et al., 1969; MacKinlay, 1997). This approach is mainly based on the market efficiency theory stating that stock prices reflect publicly available information and react to the different economic events that happen around the listed companies. The event study method is based on calculating the

abnormal returns of listed companies' stocks following a pre-defined economic or social event. This method is based on the estimation of "normal returns" during an event window to be compared to actual stock returns during the same period. Normal returns can be estimated using differences approaches but the most common one is the single index market model (Coutts et al., 1994) retained in this study.

Figure 1 presents the timeline of the application of the event study methodology in this study as adapted from de Jong (2007). The following sections describe the data used and present each component of the event study and the selected parameters for each period.

Figure 1**: Illustration of the applied event study methodology**
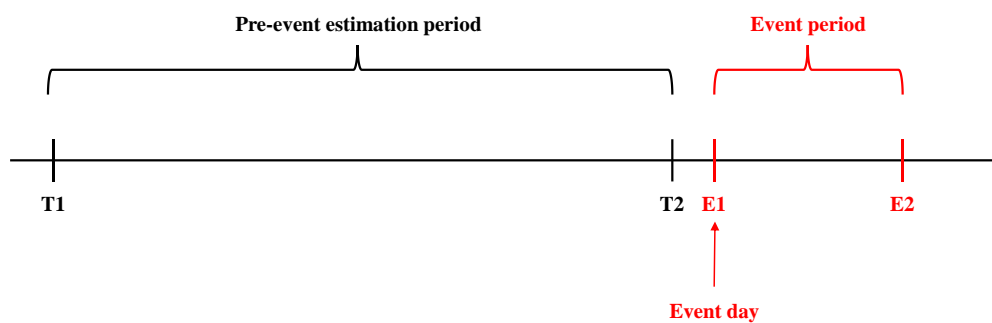
Source: Adapted from De Jong (2007)

3.1. Data description

To determine whether Moroccan ESG compliant companies had a better response the Moroccan stock market crash induced by the COVID-19 outbreak, we refer to the performance of companies constituting the CESG10 Index as of January 2022. CESG10 Index is a thematic index launched 27 September 2018 by the AMMC. This index comprises the 10 most ESG compliant public companies listed in the Casablanca Stock Exchange based on annual assessment of their sustainability efforts. The list of public companies comprised in the index is annually revised in September and published on the Casablanca Stock Exchange official website. As of January 2022, the CESG 10 Index comprises 10 companies which we describe in Table 1.

Table 1: **Detail of CESG10 Index companies as of January 2022**

Company	Business description	GICS Industry Group	Ticker
Attijariwafa Bank SA	Attijariwafa Bank SA is a Morocco-based financial and banking group. The Company is engaged in the provision of banking and insurance products and services. The Company's banking activities include personal and professional banking, corporate banking, investment banking and international banking.	Banks	ATW
Lydec SA	Lydec SA is a Morocco-based company engaged in distribution of water and electricity, wastewater collection and storm water and public lightning for five million people. Its main activities comprise the distribution of electricity and drinking water, as well as the drainage services in the Region of Casablanca and Mohammedia, Morocco. Its activities are targeted at individual customers, professionals and businesses.	Utilities	LYD
Bank of Africa	Bank of Africa, formerly Banque Marocaine du Commerce Exterieur SA is a Morocco-based bank. It operates both domestically and internationally through its network of branches. BMCE offers a range of financial, investment and insurance products and services to individuals, professionals and corporate clients, among others. The Bank's portfolio of products includes accounts, credit cards, as well as short and long term loans, among others.	Banks	BOA
Itissalat Al Maghrib Ste SA	Itissalat Al Maghrib Ste SA, is a Morocco-based company primarily engaged in the provision of telecommunications services. Its portfolio of products includes fixed	Telecommunication services	IAM

	line telephones, mobile telephones, as well as Internet services. It offers solutions for individual customers, professionals and businesses and its services portfolio includes mobile services, Internet and Television services.		
Managem S.A.	Managem S.A. engages in the exploration, extraction, upgrading, and marketing of minerals substances in Morocco, Europe, and internationally. The company operates in two segments, Mining and Hydrometallurgy. It explores for cobalt, silver, zinc, copper, cobalt oxide, zinc oxide, fluorite, gold, and lead deposits; and specialty chemicals, such as cobalt cathodes, cobalt oxide, nickel derivatives, copper sulphate, sodium sulphate, gold coal, and arsenic trioxide.	Metals and Mining	MNG
Banque Populaire SA	Banque Populaire SA is a Morocco-based bank engaged in the provision of financial products and services. The Bank operates mainly as a credit institution in the form of a public limited company with a board of directors. It has two main roles: to serve as a credit institution to carry banking operations and to operate as a banking organization for the Banque Populaire Group.	Banks	BCP
Marocaine pour le Commerce et l'Industrie Banque SA	Marocaine pour le Commerce et l'Industrie Banque SA (also known as BMCI SA) is a Morroco-based company specialized in the banking industry. Its activities are reported into four main segments: Individuals, Professionals, Private Banking and Companies. The Individual segment includes credit, insurance, saving and investment and remote banking.	Banks	BCI

Lafargeholcim Maroc SAS	Lafargeholcim Maroc SAS is a Morocco-based company engaged in the production of construction materials. The Company's portfolio of products includes cement, concrete, aggregates, plaster and lime. The Company operates production plants in Casablanca, Meknes, Safi and Tetouan. Its concrete production is carried out in Casablanca, Berrechid, Rabat, Sale, Tanger, Meknes and El Jadida.	Construction Materials	LHM
Ste Nationale de Siderurgie SA	Ste Nationale de Siderurgie SA is a Morocco-based company specializing in the manufacture of steel products. It offers round reinforcing bars, used for reinforcement of construction materials; merchant bars, used for mechanical construction and steel framework structures, and wire rods, used to make nails and springs. The Company operates three production centers, Nador Center Rolling Mill, Jorf Lasfar Center Rolling Mill and Jorf Lasfar Center Steel Works.	Metals and Mining	SID
Imiter Ste Metallurgique SA	Imiter Ste Metallurgique SA, formerly Societe Metallurgique d'Imiter SA, is a Morocco-based company engaged in the mining industry. The Company's main activities include extracting, exploiting and marketing of all ores.	Metals and Mining	SMI

Source: Casablanca Stock Exchange official website, public website www.investing.com

To conduct the present study, we extracted the daily closing prices of CESG10 Index companies and of the Moroccan All Shares Index (MASI) from the Casablanca Stock Exchange official website which offers historical data for all its listed companies. MASI is a consolidated index that reflects the overall performance of the Casablanca Stock Exchange. Similar to previous event studies, MASI was used as the reference index for determining market return.

We extracted historical 3 years daily closing prices between 2018 and 2021 in order to compute the daily returns of the 10 selected companies' stocks. Daily returns were computed as the natural log of present day closing price divided by previous day closing price as detailed in formula (1).

$$R_{it} = ln\left(\frac{C_{it}}{C_{i(t-1)}}\right) \qquad (1)$$

R_{it} corresponds to the return of stock i on day t while C_{it} is the closing price of the stock on day t. Table 2 presents descriptive statistics of our set of data for each company and for the MASI Index as well.
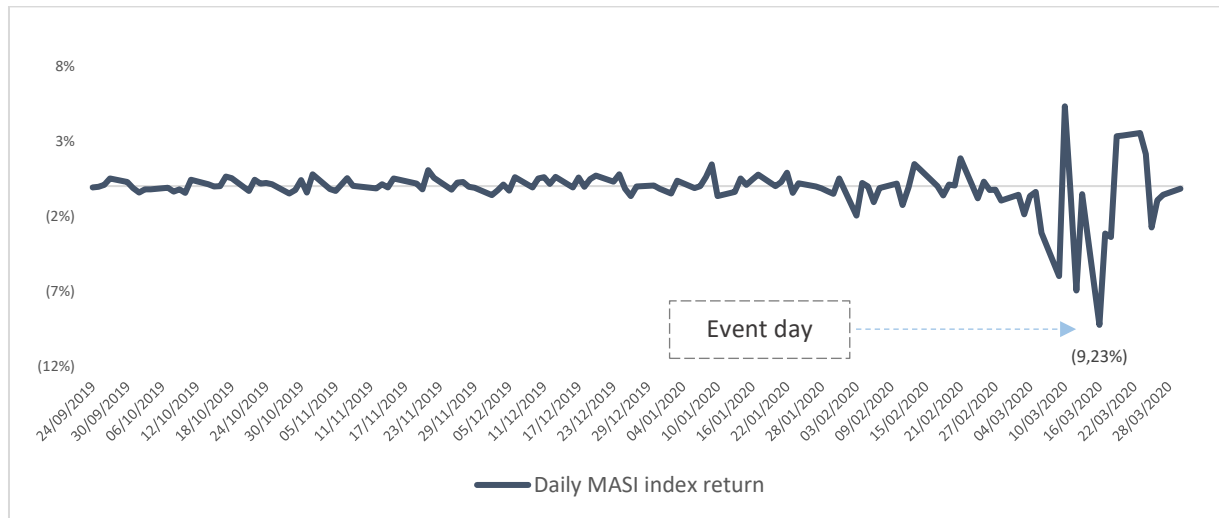
3.2. Event window

The event study method relies on the determination of abnormal returns of the studied subjects during the event window. In this section, we determine the event window which is the time window in which we are going to measure the abnormal returns of sample companies.

The event we are examining in this study/paper is the ESG-compliant companies' reaction to the financial stock market crash caused by the COVID-19 outbreak in comparison with the market.

The event window by definition comprises the event day which represents in this study the stock market crash following COVID-19 outbreak in Morocco. Several COVID-19-related studies on stock markets report 20 February as the day of the Dow Jones crash and retain it as the event day (Pisani & Russo, 2021). To determine the event day where COVID-19 has caused the Moroccan stock market crash, we refer to the daily market return as reflected by MASI. Figure 2 shows the daily MASI index return between September 2019 and March 2020. We can clearly confirm that the Moroccan stock market didn't react as fast as other stock markets to the COVID-19 outbreak. This delay may be caused by several factors such as the retardment of the COVID-19 related restrictions by the Moroccan government. The figure clearly shows that on 16 March 2020, the daily MASI return has significantly dropped to a minimum return of -9.23%. To support our event day estimation, it is appropriate to note that 16 March 2020 matches the date when the Moroccan government has announced the closing of businesses and the suspension of all international flights to and from the country. Based on these two structuring observations, we choose the date of 16 March 2020 as the event day for studying Moroccan ESG-compliant companies' resilience to the COVID-19 stock market crash.

Figure 2: **Daily Moroccan All Shares Index return between September 2019 and March 2020**

Source: Authors' analysis, Casablanca Stock Exchange

To determine the post-event resilience (and potential recovery speed) of our studied sample, we retain a post- event period of 10 trading days. Hence, our event window is composed of 10 trading days spread between 16 March 2020 and 27 March 2020 during which we will calculate the abnormal returns of the 10 selected most ESG compliant companies listed on the Casablanca Stock Exchange.

3.3. Estimation window

Next, we determine our estimation window or pre-event period for calculating the expected return of the sample company stocks. Our event study is based on daily data and uses the Market Model to determine expected stock returns. The estimation window's primary role is to be able to give an estimation of stocks' normal return during the event window. To do so, the daily stock returns are regressed on the market return during the estimation window (Ullah et al., 2021) to be able to estimate the parameters of the single index market model. The calculation of expected normal returns is given by formula (2):

$$ER_{it} = \alpha_i MR_t + \beta_i + \varepsilon_i \qquad (2)$$

Where ER_{it} gives the expected return for stock i on day t, MR_t gives the return of the market on day t as proxied by the MASI return, and α_i and β_i are the regression slope and intercepts for each one of the 10 stocks regression models.

To determine the market return model for each stock, it is appropriate to use an estimation window which falls before the event day. Since our study relies on daily stock returns, we take into account researchers recommendation for the estimation window to be within the 31 to 120 days range (Ullah et al., 2021). We follow the recommendation of Craig Mackinlay

(1997) and estimate our single index market model based on 120 trading days before the event date. We have retained a relatively long estimation window in order to smooth out the preliminary signals of market decline emanating mainly from the financial markets of the developed countries where the crisis started before the Moroccan financial market. Hence, our estimation window covers the period from September 24, 2019 to March 13, 2020.

Table 3 presents the regression results obtained for each stock return model regressing daily returns on MASI returns during the estimation period.

3.4. Abnormal returns calculation

As stated above, the event study methodology is based on the calculation of abnormal returns during a pre-defined event window. Abnormal returns are computed as the difference between expected returns and actual returns as detailed in formula (3).

$$AR_{it} = ER_{it} - R_{it} \qquad\qquad (3)$$

AR_{it} represents the abnormal return of stock i on day t, R_{it} gives the actual return of the stock, and ER_{it} is the expected "normal" return of stock proxied by a single index market model with the MASI index as a reference. The detailed equation for computing normal returns is detailed above in formula (2).

We retain the widely used approach which consists in calculating expected returns during the event window using the above-estimated single index models for each stock and compute abnormal returns by comparing actual returns to expected returns.

To strengthen our understanding and have a view on the mid-term resilience of ESG-compliant companies to the COVID-19 financial crisis in the Moroccan stock market, we calculate cumulative average abnormal returns for each company of the CESG10 index during different post-event windows 10, 20 and 30 trading days starting from the event day (See table 6).

Furthermore, we run the T-test on the resulting abnormal returns calculations to determine their statistical significance as presented in tables 4 and 5.

4. Results

4.1. Descriptive statistics

Table 2: **Descriptive statistics of stock returns during pre and post-event windows**

Company	Number of trading days	Mean	Standard deviation	Min	Max
Estimation window from 24 September 2019 to 13 March 2020					
ATW	120	-0.07943%	1.43775%	-7.78425%	6.04332%
LYD	120	-0.30871%	2.49525%	-10.53008%	7.36914%
BOA	120	-0.14807%	1.76480%	-8.23995%	8.05032%
IAM	120	-0.03031%	1.38501%	-7.82223%	5.65353%
MNG	120	-0.14050%	2.73107%	-10.37745%	9.51759%
BCP	120	-0.09815%	1.45592%	-8.70114%	7.17439%
BCI	120	0.08813%	2.19694%	-9.51435%	9.42968%
LHM	120	-0.10430%	1.84513%	-9.15102%	4.50198%
SID	120	-0.18436%	2.90682%	-10.51329%	8.69013%
SMI	120	-0.03249%	2.27258%	-8.96122%	5.77182%
MASI	**120**	**-0.07215%**	**1.15315%**	**-6.93459%**	**5.30536%**
Event window from 16 March 2020 to 27 March 2020					
ATW	10	-1.33464%	4.59342%	-10.52298%	3.92106%
LYD	10	1.56452%	2.64201%	-3.61287%	3.91978%
BOA	10	-0.49995%	4.94021%	-10.43322%	3.91933%
IAM	10	-0.45075%	4.81118%	-10.08440%	3.91695%
MNG	10	-2.41639%	3.80500%	-10.39897%	3.18048%
BCP	10	-1.00742%	4.67326%	-10.51291%	3.91493%
BCI	10	-1.77918%	4.41680%	-10.52814%	3.91580%
LHM	10	-1.05361%	4.67005%	-10.38801%	3.85973%
SID	10	-0.31687%	4.71876%	-10.50960%	3.91103%
SMI	10	-0.86178%	3.20140%	-4.05257%	3.83679%
MASI	**10**	**-0.77037%**	**4.06626%**	**-9.23168%**	**3.51910%**

Source: Authors' analysis, Casablanca Stock Exchange

Table 2 shows the mean returns and standard deviation for the selected Moroccan ESG-compliant companies during the estimation window from 24 September 2019 and 13 March 2020 (120 trading days) and during the selected event window covering from 16 March 2020 to 27 March 2020 (10 trading days). The table also presents the mean return and standard deviation of the market proxied by the daily MASI returns during the estimation window and the event window.

The results show that 9 out of 10 sample companies experienced a significant drop in their mean daily return and that all the sample companies present a significant increase in their stocks' volatility after the COVID-19 stock market crash, volatility being proxied by standard deviation. The most impacted companies are MNG, BCI and ATW with a negative mean return variation of -2.427%, -1.706% and -1.134% respectively between the pre-event and the

event period. Furthermore, these stocks as well as LHM, BCP, and SMI have shown a lower performance than the market index MASI by showing a higher drop in mean return than the market.

Following the COVID-19 outbreak, the Moroccan stock market has increased in volatility as can be observed in the increase of the MASI index standard deviation. It can as well be observed in table 2 that a significant portion of the sample companies have had a higher volatility during the event window than the MASI index.

Furthermore, it is of interest to notice that the daily return of 8 out of 10 ESG compliant companies has dropped less than the minimum market return of -9.23% performed by the MASI index during the event window. These results support the observations of a significant higher volatility of stocks worldwide during the crisis period and do not present any evidence of CESG10 Index stocks outperforming the market.

4.2. Regression results

Table 3: **Regression results for each stock return model**

Stock	Number of trading days	Slope	Intercept	Standard Error	R^2
ATW	120	110.31171%	0.00016%	0.67289%	78%
LYD	120	122.27573%	-0.22049%	2.06738%	32%
BOA	120	109.71169%	-0.06891%	1.23563%	51%
IAM	120	92.55043%	0.03647%	0.88648%	59%
MNG	120	131.68758%	-0.04549%	2.27957%	31%
BCP	120	111.14029%	-0.01797%	0.69369%	77%
BCI	120	68.11866%	0.13728%	2.06039%	13%
LHM	120	126.24284%	-0.01322%	1.13848%	62%
SID	120	75.35314%	-0.13000%	2.78564%	9%
SMI	120	19.14391%	-0.01868%	2.27140%	1%

Source: Authors' analysis

Table 3 shows the results of regressing daily stock returns on market returns over the estimation period spawning from September 24, 2019 to March 13, 2020 and covering 120 trading days. We use each model's slope intercept and standard error parameters to predict the normal performance during the event window by calculating expected returns during the event period and deducing abnormal returns by calculating the variation between actual returns observed in the market for each stock and predicted returns. This is detailed in formula (3) presented above.

4.3. Abnormal returns

Tables 4 and 5 focus on the abnormal returns of the sample stocks during the event day and one day after the event day, respectively. The t-test statistics and p-value are also given in tables 4 and 5 based on the parameters of each stock return model.

Table 4: **Abnormal returns in the event day**

Stock	Abnormal returns	t-test	p-Value
Event day - 16/03/2020			
ATW	-0.33952%	-0.50457	0.61479
LYD	11.50859%	5.56676	0.00000
BOA	-0.23608%	-0.19106	0.84880
IAM	-1.57691%	-1.77884	0.07782
MNG	1.80349%	0.79115	0.43043
BCP	-0.23483%	-0.33852	0.73557
BCI	-4.37693%	-2.12432	0.03571
LHM	1.27954%	1.12390	0.26332
SID	-3.42324%	-1.22889	0.22154
SMI	1.78598%	0.78629	0.43326

Source**: Authors' analysis, Casablanca Stock Exchange**

Table 5: **Abnormal returns one day after the event day**

Stock	Abnormal returns	t-test	p-Value
One day after event day - 17/03/2020			
ATW	-0.60822%	-0.90389	0.36788
LYD	4.07082%	1.96908	0.05127
BOA	3.48935%	2.82394	0.00556
IAM	-1.09176%	-1.23156	0.22054
MNG	0.17418%	0.07641	0.93922
BCP	-0.54430%	-0.78464	0.43423
BCI	-2.05934%	-0.99949	0.31959
LHM	-0.08756%	-0.07691	0.93882
SID	-1.57280%	-0.56461	0.57340
SMI	-1.85541%	-0.81686	0.41564

Source**: Authors' analysis, Casablanca Stock Exchange**

The results indicate that on the event day, 6 out of 10 companies of the CESG10 Index, i.e. ATW, BOA, IAM, BCP, BCI, and SID react most rapidly with negative abnormal returns

with the IAM and BCI returns being statistically significant. It is of interest to note that 3 out of these 6 stocks belong to key Moroccan actors operating in the financials sector as shown in table 4. The results of abnormal returns one day after the event day further confirm the abnormal returns of ATW, IAM, BCP, BCI, LHM, SID, SMI being negative with a recovery of BOA and a drop of SMI abnormal return between these two days.

The LYD and MNG abnormal returns remained positive during these two days with the LYD abnormal return being statistically significant at 5% in the event day and 10% one day after the event day. However, it is of interest to mention that LYD stock was not traded (0% return) during the event day and that only a small volume was traded one day after the event day which explains a significantly high abnormal return during the two studied crisis days in the above tables.

Figure 3 gives the abnormal returns of CESG10 stocks on a 30-day range covering from 16 March 2020 to 24 April 2020, i.e. 30 trading days after the event day. The results show that the MNG, BCI, LHM, BOA, ATW and BCP stocks of the CESG10 showed higher number of negative abnormal returns 30 days after the crash occurs.

Figure 3: **Abnormal returns of CESG10 index stocks 30 days after the event day**
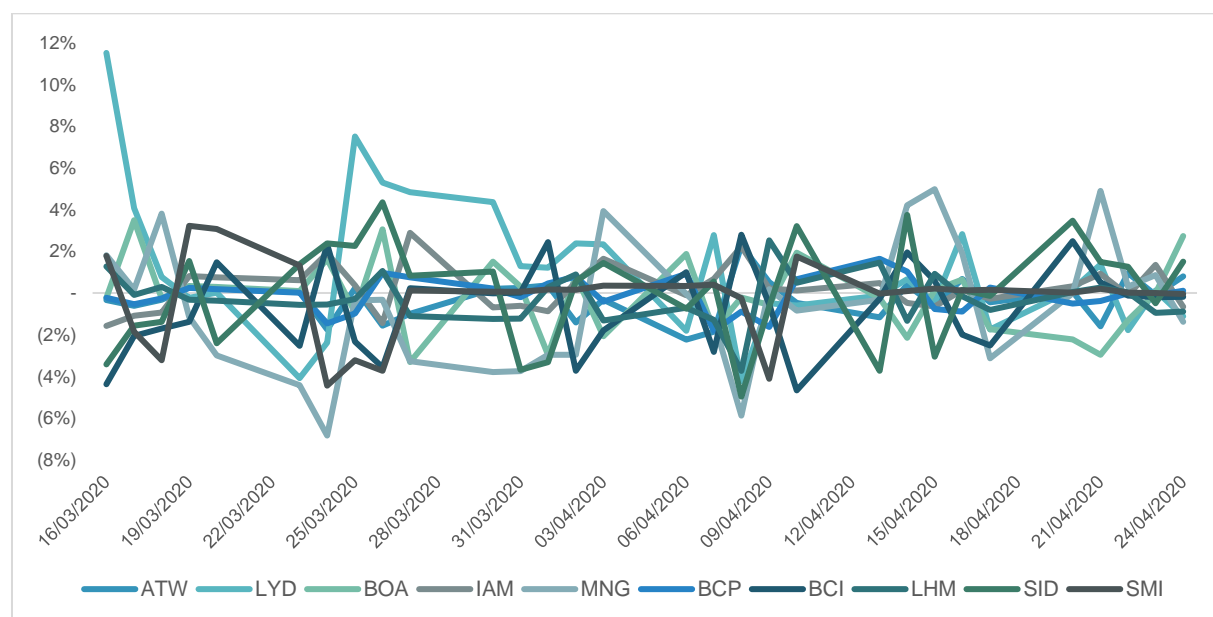
Source**: Authors' analysis**

The figure results also indicate that 8 out of the 10 companies of the CESG10 index showed negative abnormal returns on the 17 April 2020. This date matches the appearance of new clusters in the kingdom and the recording of the highest number of cases since the beginning of the pandemic at that time. In other words, 8 out of the 10 stocks comprised in the CESG10 index have not outperformed the market during another key date in the crisis period. These

observations tend to support the assumption that ESG factors have not played a significant role in mitigating the effect of the Moroccan stock market crash on public companies' stock performance during the COVID-19 crisis period.

4.4. Cumulative abnormal returns

Table 6: **Cumulative abnormal returns over 10, 20, and 30-days post event periods**

Stock	[0,10]	[0,20]	[0,30]
ATW	-4.84997%	-7.54041%	-8.58263%
LYD	27.26986%	34.47862%	34.38751%
BOA	4.14152%	2.95390%	-4.15761%
IAM	2.25765%	5.38724%	6.43226%
MNG	-13.56424%	-31.05374%	-18.75779%
BCP	-1.33258%	-3.23774%	-2.86591%
BCI	-13.91695%	-21.24535%	-21.01151%
LHM	-0.67848%	-6.02807%	-7.47255%
SID	3.93623%	-2.64256%	1.56042%
SMI	-6.95622%	-8.03411%	-7.31193%

Source**: Authors' analysis, Casablanca Stock Exchange**

Table 6 presents cumulative abnormal returns for ESG10 stocks over post-event periods of 10, 20 and 30 trading days. The table illustrates that, unsurprisingly, most ESG10 stocks show negative cumulative abnormal returns over the 3 periods. Furthermore, we can not see any significant recovery effect when switching from the 10 days period to the 20 days period. In fact, 8 companies show a negative variation of their cumulative abnormal return which suggests an extended effect of the crisis over these companies lasting more than 10 trading days. These negative variations between the two 10 and 20 days periods may be explained by the 17 of April falling in the 20 days period which matches another day when the stock market has significantly plunged as we have discussed earlier. However, it is of interest to see that IAM, MNG, BCI, SID and SMI have shown signs of recovery with a cumulative abnormal return showing a positive variation between the 20 days period and the 30 days period. Most of the companies, however, still show a negative cumulative abnormal return in the 3 post-event periods.

Overall, 7 out of 10 ESG10 stocks still show negative cumulative abnormal returns over a period of 30 trading days post-event day. These findings suggest an extended effect of the outbreak on most stocks no matter whether they were listed in the ESG10 index or not.

5. Conclusion

The evidence presented above tends to indicate that regardless of being listed in the CESG10 index, the 10 sample companies analyzed in this study have demonstrated a poor performance during the financial crisis caused by the COVID-19 outbreak. The results also show that CESG10 shares have presented higher volatility than the market during the outbreak period. These results are in contrast with the findings of (Mousa et al., 2021) who demonstrated using a cross-country Arab ESG index that ESG shares presented significantly less volatility and therefore less risks during the outbreak period. As opposed to our findings, their results suggest that ESG shares have been impacted by the outbreak for a much lesser period of time. Another study computed by (Pisani & Russo, 2021) on a sample of developed countries seems to be in line with the assumptions of a positive effect of ESG on daily returns and volatility. Despite the plentiful number of studies indicating a positive effect of ESG on corporate financial performance, our results indicate the opposite in the Moroccan context and go in the same direction of several studies conducted in the context of developing countries (Duque-Grisales & Aguilera-Caracuel, 2021; Garcia et al., 2017; Garcia & Orsato, 2020). It is of interest to note the predominance of studies around the relationship between ESG and corporate financial performance show a positive link between ESG and performance in normal times.

This study demonstrates that CESG10 shares have shown lower performance than the market during the Moroccan financial market crisis caused by the COVID-19 outbreak by demonstrating negative abnormal returns and higher volatility for most of the 10 companies listed in the index as of January 2022. Hence, it is appropriate to state that our results have shed light on the difficulty of automatically extrapolating the positive effect of ESG factors on resilience in times of crisis on Moroccan companies and has opened the debate on the subject which, in the authors' opinion, still requires further investigation by researchers.

Our results may be explained by several factors in the context of the Moroccan financial market. First, ESG compliance is still a new subject for investors in Morocco. Given that most of these investors and actors are still not fully aware of the different facets of this new emerging concept, it may be perceived as an additional shade area in a context of crisis thus pushing to a higher risk perception, strengthened by the lack of ESG transparency by companies. Second, it is substantial to the context of our study to mention that ESG initiatives are still perceived by a large part of the Moroccan financial scene as marketing actions taken out by companies to enhance their image in front of the public opinion. Investors in Morocco therefore have a higher chance of perceiving ESG initiatives during a financial crisis as

unnecessary practices than in normal times. This implies higher care from investors in the context of a crisis and a reliance on normal companies rather than ESG companies who can be perceived in the eyes of investors as "wasting money" during times of financial distress. Hence, our findings have implications for policymakers and regulatory bodies in their role of strengthening ESG disclosure and promoting its benefits in terms of resilience, sustainability and its potential in opening patterns for sustainable economic growth serving each stakeholder's best interests.

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