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La réaction des marchés boursiers à la propagation du COVID-19 : Cas du Maroc

Stock market reactions to COVID-19: Evidence from Morocco

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Résumé

La pandémie COVID-19 a affaibli l'économie mondiale, interrompant de nombreuses activités économiques et provoquant une chute rapide et brutale de la demande et de l'emploi. Par conséquent, les cours boursiers mondiaux ont connu leur pire baisse depuis la crise financière de 2008. Au Maroc, la Bourse de Casablanca a démarré l'année 2020 dans l'allégresse mais a été durement touchée par la pandémie. Ses deux principaux indices, le Masi et le Madex, sont retombés en dessous de la barre de 10 000 à 9 704,85 et 7 876,80 points respectivement, enregistrant des baisses de 20,85% et 21,26% respectivement. Cette étude examine en détail l'impact de la pandémie de COVID-19 sur la bourse des valeurs de Casablanca en utilisant des données quotidiennes et la méthode d'étude des événements. Les résultats indiquent des rendements anormaux pour 13 industries dont deux ont réagi positivement et 11 ont répondu négativement. Le secteur bancaire est le secteur le plus durement touché avec une réduction de 20,79% à la date de l'événement, suivi du secteur des matériaux, logiciels et services informatiques. En revanche, le secteur des télécommunications a enregistré une hausse de 4,38%.

Mots clés : COVID-19 ; Coronavirus ; marchés boursiers ; pandémie ; La méthodologie des études d'événement.

Abstract

The COVID-19 pandemic weakened the global economy, halting many economic activities and causing a rapid and sharp drop in demand and employment. Consequently, global stock market prices experienced their worst drop since the 2008 financial crisis. In Morocco, the Casablanca Stock Exchange (CSE) started the year 2020 in good shape but was severely affected by the pandemic in March with its two main indices Masi and Madex plunging by 20.85% and 21.26% to 9,704.85 and 7,876.80 points respectively. This study examines in detail the impact of the COVID-19 pandemic on CSE using daily data and the event study method. The results indicate abnormal returns for 13 industries of which two reacted positively and 11 responded negatively. The Banking industry is found to be the hardest hit sector with a 20.79% reduction during the event date followed by the Materials, Software and Computer Services sector. In contrast, shares of the Telecommunication industry realized a surge of 4.38%. The variables and parameters contributing to these reactions are explained.

Keywords: Covid-19; Coronavirus; Stock Markets; Pandemic; Event study method.

Introduction

Although the stock market is not the same as the economy, it is a sentiment indicator that gauges public confidence in a country's economic conditions (Gregoriou et al., 2009; Gurley & Shaw, 1967; Schwert, 1989) . Therefore, an analysis of the changes in the stock market during "black swan" events can provide an insight into the current and near-future economy of a country (see, e.g., the economic implications of SARS (Chou et al., 2004; Fan, 2003; Hai, W., Z. Zhao, et al., 2004; Lee & McKibbin, 2004) and Ebola (Maphanga, 2019; Obukohwo, 2015; World Bank, 2014)).

On January 30, 2020, the WHO declared the COVID-19 outbreak a public health emergency of international concern (WHO, 2020b). As of May 10, 2020, COVID-19 has created a historic pandemic invading the world with a total of 3,855,788 laboratory-confirmed cases and 265,862 deaths worldwide (WHO Report 112, 2020). Countries around the world started to implement different interventions to mitigate the spread of the disease including border closures. These interventions have collectively disrupted trades and the supply chain. Recent estimates indicate a global GDP loss ranging between 283 USD bn and 2,230 USD bn (McKibbin & Fernando, 2020), an over 40% deflation in China's economy in the first quarter of 2020, and 14% shrinkage in the US economy in the next quarter of the same year (WEF, 2020a) due to COVID-19.

Since the announcement of its first case of the novel coronavirus on March 2, 2020, Morocco has administered different interventions such as suspending the maritime links with Spain and France and international flights, conferences, meetings, sporting, and cultural events, among others (MapNews, 2020a). The country declared a "state of health emergency" on March 19 after observing an increasing number of COVID-19-related morbidities and mortalities. The ongoing health crisis has had a significant adverse impact on Morocco's economy and in turn its stock market, the Casablanca Stock Exchange (CSE). CSE responded immediately to the pandemic with high and worrying volatility and experienced an unprecedented plummet due to the reaction of investors to the reports of new cases in America, Europe, and Morocco.

This study was designed and carried out to reply to the question: How does Casablanca Stock exchange react to the spread of COVID-19 ? Using the event study method, we tested the semi-strong form efficient market theory and identified the hard-hit sectors.

In this study, we present a literature review about the impact of COVID-19 on global stock markets in Section 1. The second section is dedicated to data collection and the methods used. The results and discussion are presented in Section 3.

1. Literature review

The impact of COVID-19 on economics in general and on stock markets in particular has been the subject of extensive research. For instance, Baker et al. (2020) evaluated the unprecedented impact that the US stock market sustained from the COVID-19 pandemic than to previous pandemics in 1918–1919, 1957–1958, and 1968. The results indicated that government restrictions on commercial activities and voluntary social distancing were the main reasons for such a forceful impact on the service-oriented economy of the US that was reflected in its stock market. In the same vein, Onali (2020) investigated the impact of COVID-19 cases and related deaths on the US stock market and concluded that changes in the number of cases and deaths in the US and six other countries significantly affected by the pandemic crisis did not have an impact on the US stock market returns. Khan et al. (2020) studied the impact of the pandemic on the stock markets of 16 countries and found a negative association between the growth rate of weekly new cases of COVID-19 with average stock market returns. Despite the research devoted to understanding the economic impacts of the COVID-19 pandemic on the global economy and stock markets, this subject in Morocco had remained largely unexplored, providing the impetus for this study.

2. Methods and Data

2.1 The event study method

Fama (1970) introduced a technique named the event study method (ESM) to verify the semi-strong form of efficient market hypothesis and study the evidence on how stock prices respond to the newly available information. This method allows for assessing the impact of an event on the value of a stock price in so-called abnormal return (AR) or excess return. AR is the difference between the actual return of a stock after the event and its normal return, which is the returns that would have been realized had the event not taken place. For “good news,” the abnormal return is expected to be positive, while “bad news” tends to result in negative ARs.

In this study, we used ESM to assess the reaction of investors in CSE to the COVID-19 outbreak in five steps:

Step 1: identifying the event date

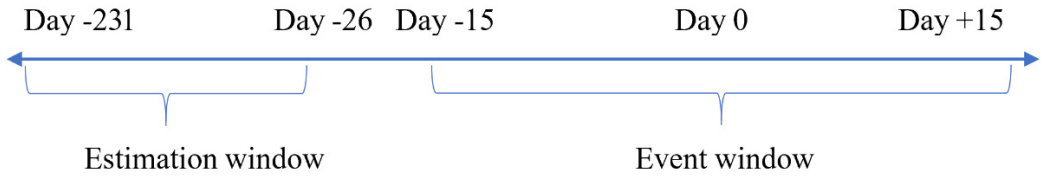
The first task in ESM is to define the event and identify the event day, which is the date on which the event occurred or the information was released and is the same for all firms. For our study, the event date was Monday, March 09, 2020, considered as the date when people

became aware of the seriousness of the disease after a range of measures had been taken in the preceding weekend in Morocco and also when the global stock market prices experienced their worst drop since the 2008 financial crisis (Partington & Wearden, 2020).

Step 2: defining the event window

The event window is the period in which the response of the market prices to the event is tested, spanning the first day of the "under-period" to the last day of the "post-period." In this study, the event window ranged from 15 days pre- and 15 post-event working days to exclude the quarterly and annual issuance of the financial statements of the companies which take place in February and April, respectively (Figure 1).

Figure 1: The event and estimation windows



Source: The author

Step 3: estimation window

The estimation windows allow for making estimations of the parameters to predict the expected returns during the event period with a regression analysis that regresses stock returns on market returns over the estimation. In our study, we needed the alpha (y-intercept) and beta (slope) of the prices computed over an estimation window ranging between day -236 (April 1, 2019) and day -26 (January 31, 2020) to neutralize the effect of financial statement publication that could otherwise skew the results.

Step 4: Estimation of abnormal returns

Calculating ARs require calculating the expected returns of the values listed in CSE assuming the event had not taken place. For that, we used the market model developed by (Fama et al., 1969):

$$R_{it} = \alpha i + \beta i\, R_{mt} + \varepsilon_{it} \quad (1)$$

where R_{it} is the expected return of stock i on day t; αi is the rate of return of stock i when the market return is equal to zero. This regressor is estimated based on the estimation window and it is called intercept; βi is a measure of the sensitivity of the stock's return to the market return. This regressor is estimated based on the estimation window and it is called the slope;

R_{mt} is the market rate of return during the period t, based on the market index; ε_{it} is the Error term; and

$$R_{it} = \ln\left(\rho_{it}/\rho_{it-1}\right) \quad (2)$$

where ρ_{it} is the closing price of a stock i on day t and ρ_{it} is the closing price of a stock i on day $t-1$.

After estimating the regressors α and β, we calculated the AR of the event window which is the error term or residual of the market model (εi).

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

and

$$ER_{it} = \bar{\alpha} + \bar{\beta}\ R_{mt} \quad (4)$$

where $\bar{\alpha}$ and $\bar{\beta}$ as the estimators obtained from the ordinary least squares regression formula, and AR_{it} is the abnormal return of stock i on day t.

Step 5: Standardizing abnormal returns

To assess the statistical significance of the ARs, testing a hypothesis is necessary. In our analysis, we tested the null hypothesis, H0, against the alternative hypothesis, H1, as:

H0: an absence of abnormal returns

H1: a presence of abnormal returns

Analyzing the significance of ARs during the outbreak requires calculating standardized abnormal returns (SARs) (Dodd & Warner, 1983):

$$SAR_{it} = AR_{it} / \sigma AR_{it} \quad (5)$$

where σ is the standard error of the AR of the stock i in day t:

$$\sigma\ AR_{it} = \left(\sigma^2 AR\left[1 + \frac{1}{T} + \frac{(Rmt - \bar{R}m)^2}{\sum_{i=1}^{T}((Rmt - \bar{R}m)^2}\right]\right)^{1/2} \quad (6)$$

and

$$\sigma^2 AR_{it} = [\sum_{t=1}^{T}(\varepsilon it - u_i)^2]/(T-1) \quad (7)$$

where $\sigma^2 AR_{it}$ is the term error variance for stock i from the market model regression; T is the number of days in the estimation period; R_{mt} is the market return for day t of the event period; $\bar{R}m$ is the mean market return during the estimation period; $\bar{R}m$ is the mean market return during the estimation period; ε_{it} is the Error term and u_i is the mean.

It is necessary to examine the standardized cumulative abnormal returns (CAR). To this end, we aggregated the SAR_i over the event period adjusted for the number of days m within the window period:

$$CAR_i = \frac{1}{\sqrt{m}} \sum_{t=-t1}^{t2} SAR_t \quad (8)$$

Finally, we tested the statistical significance of the cumulative abnormal returns. If the cumulative abnormal return is statistically different from zero, we can say that the outbreak significantly influences stock prices.

$$t - statistic = 1/\sqrt{n} \sum_{i=1}^{n} CAR_i \quad (9)$$

2.2 Data

Individual stock return data and stock market returns were obtained through the CSE website (CSE, 2020). We collected data on the daily prices and total returns of 73 stocks representing 24 sectors of the economy and the market index MASI (Morocco All Shares Index), which considers the performance of all companies listed in CSE (Table 1).

Table 1: List of CSE industries

Industry	Number of stocks
Insurance	5
Food producers & Processors	7
Banks	6
Construction & Building Materials	7
Chemicals	2
Distributors	7
Mining	4
Real estate participation and promotion	3
Oil & Gas	2
Investment Companies & Other Finance	4
Telecommunications	1
Materials, Software & Computer Services	7
Beverages	2
Leisure and Hotels	1
Engineering & Equipment Industrial Goods	2
Electricity	1
Electrical & Electronic Equipment	1
Pharmaceutical Industry	2

Transport	2
Real estate investment companies	2
Holding Companies	2
Utilities	1
Forestry & Paper	1
Transportation Services	1
Total	73

Source : Casablanca Stock Exchange

3. Results and Discussion

Our results (Table 2) showed that the CAR level was more pronounced during the event day than the post-period with a withdrawal of the CAR of some sectors. In total, 13 of 24 industries witnessed CARs. This observation can be explained by the reaction of the investors during a crisis, as previously shown in the literature (Chen et al., 2007; Funck & Gutierrez, 2016). Whatever investor's profile, risk-averse, risk-neutral, or risk-seeker, they all dislike uncertainty. Pandemics and uncertainties associated with their duration and the ability of governments to contain them create uncertainty in how global economies will recover from their partial paralysis and the power of central banks to counter economic consequences. Consequently, investors respond by anticipating that the listed companies' performance will drop proceeding to sell the negatively affected stocks and causing negative ARs. Our results are compliant with the semi-strong form efficient market theory.

Table 2: Abnormal returns of Casablanca Stock Exchange industries (%) in ascending order by AR on Day 0

Industry	[-15 – 0]	t-statistic	Day 0	t-statistic	[0 – 15]	t-statistic
Banks	-9.55	-3.90	-20.79	-8.49	-11.22	-4.58
Materials, Software & Computer Services	-7.96	-3.01	-18.27	-6.90	-7.98	-3.02
Construction & Building Materials	-3.26	-1.23	-8.81	-3.33	-7.64	-2.89
Utilities	-0.44	-0.44	-5.86	-5.86	-4.00	-4.00
Mining	-2.59	-1.30	-4.80	-2.40	-6.88	-3.44
Food Producers & Processors	0.19	0.07	-4.53	-1.71	-3.73	-1.41
Real estate participation and promotion	-1.66	-0.96	-4.53	-2.61	-0.37	-0.21
Transportation Services	-3.73	-3.73	-3.83	-3.83	-0.95	-0.95
Investment Companies & Other Finance	-1.26	-0.63	-3.75	-1.87	-2.88	-1.44
Beverages	-1.45	-1.02	-3.66	-2.59	-4.13	-2.92
Transport	-0.54	-0.38	-3.51	-2.49	-2.99	-2.12
Distributors	-1.81	-0.68	-3.40	-1.29	-5.36	-2.02
Real Estate Investment Companies	-0.19	-0.13	-3.06	-2.16	-1.33	-0.94

Holding Companies	1.06	0.75	-2.39	-1.69	-2.39	-1.69
Electrical & Electronic Equipment	-1.05	-1.05	-2.30	-2.30	-0.96	-0.96
Leisures and Hotels	-0.48	-0.48	-0.72	-0.72	-3.88	-3.88
Forestry & Paper	-0.37	-0.37	0.12	0.12	0.89	0.89
Electricity	-0.52	-0.52	0.16	0.16	-0.65	-0.65
Pharmaceutical Industry	0.40	0.28	0.18	0.13	0.97	0.68
Engineering & Equipment Industrial Goods	-0.82	-0.58	0.37	0.26	1.72	1.21
Oil & Gas	0.50	0.35	1.53	1.08	0.24	0.17
Insurance	-0.40	-0.18	2.97	1.33	-2.16	-0.97
Telecommunications	4.01	4.01	4.38	4.38	4.20	4.20
Chemicals	2.82	1.99	4.52	3.20	2.70	1.91

Source : The author

The Banking industry was the hardest hit sector with a 20.79% reduction during the event date (see Figure 2). This reduction was narrowed over the next 15 days until CAR reached -11.22%. The investors' reaction can be explained by three assumptions: i) the COVID-19 spread in Morocco would spawn a surge in bankruptcy by firms in other sectors like tourism, hotels, and restaurants, in turn posing an increased risk to banks and resulting in financial losses, ii) the measures of the central bank of Morocco, Bank Al-Maghrib, to support economy against COVID-19 like deferring loan payments with no late fees would reduce the banks' yields, and iii) the revenue of the banks would decline due to the decreased business volume of affected companies (Sikich, 2005).

The second most affected industry in CSE was Materials, Software, and Computer Services. This industry witnessed an immediate plummet of 18.27% and a CAR of -7.98% 15 days later. This reduction could be due to a decreased demand caused by business closures during the quarantine period starting on March 20 and also the quarantine measures in China, the main provider of technological materials.

The Construction & Building Materials industry stocks experienced an immediate plunge of 8.81%. This depression could be explained by the investors' anticipation that construction activities would be halted/reduced over the outbreak. Similar observations were made by (Chen et al., 2007) for the impact of the SARS outbreak on the Taiwanese hotel stock performance (-6% during the 15 days following the event day). The reduction in the shares of the Construction industry rippled through others such as Electrical & Electronic Equipment, which displayed an immediate fall of 2.30%.

The Utilities industry, represented by one company, was the next most significantly affected industry (-5.86% on day 0, and -4.00% after 15 days) due to the consumption fall related to the affected companies and to fear over small companies filing bankruptcy.

These impacts on the four sectors discussed above are consistent with our recent findings that Gross Domestic Product, interest rate, and trading volume are the main determinants of the performance of CSE (Janndi & Moussamir, 2020).

The mining industry was also affected by COVID-19 with an immediate decline of -4.80% and a CAR of 6.88%. This decrease could be the result of investor's worry about restrictions and social distancing leading to slow mining projects or put on hold until further notice.

A less severely affected sector is Real Estate Participation and Promotion that realized a decrease of 4.53% during the event date supposedly due to a decrease of visitors and real

estate buyers thanks to the quarantine measures, halted constructions, and increased unemployment that in turn reduced income and demand on the real estate market.

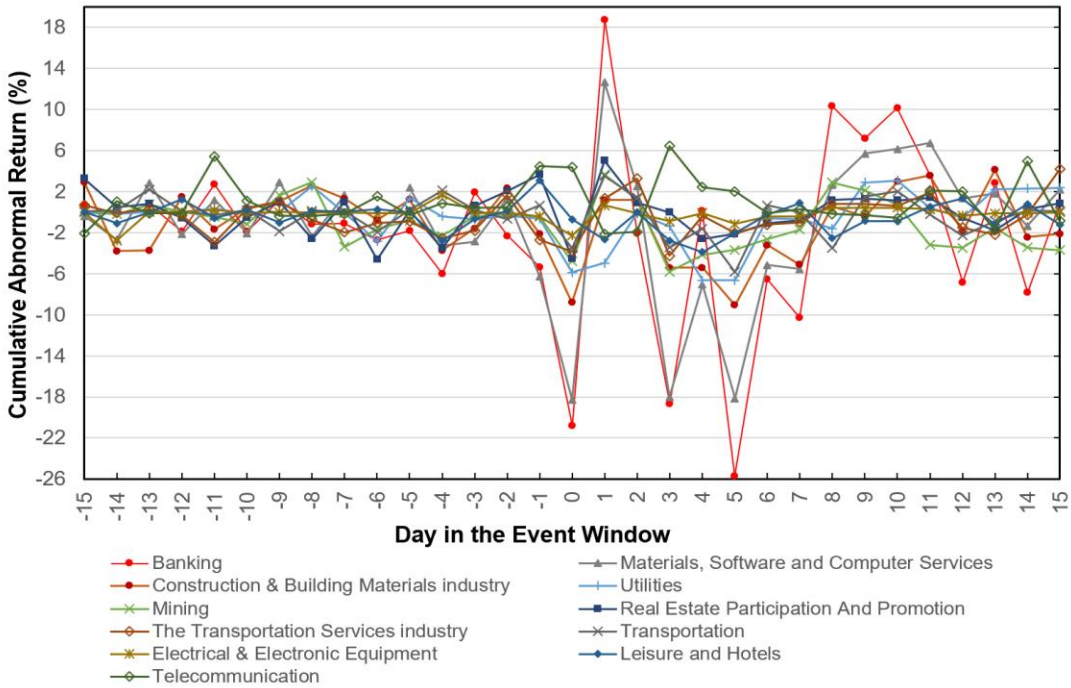
The Transportation Services industry also realized a decrease of 3.83% during the event day, expressing the investors' anticipation that the closure and quarantine measures would impact freight transportation. However, the government's assertion for the goods' upkeep reassured the investors in the subsequent days, rebounding the stocks to show their normal prices.

The Transportation industry stocks underwent a decrease of 3.51% on the event day which could be explained by the anticipation of a precipitous drop in ridership and shipping, and flight restrictions, as shown by (Sikich, 2005) in an earlier study.

While most sectors suffered steep declines, a few others enjoyed a tailwind. Shares of the Telecommunication industry, in particular, realized an immediate surge of 4.38%, which can be attributed to the increased demand for internet, voice services, distance learning, remote working, and online shopping (Sikich, 2005)

In an interesting contrast to the findings of (Chen et al., 2007), the share of Leisure and Hotels did not witness a sizeable AR and failed to meet any statistical test on the event day. It, however, decreased by 3.88% in the post-period as the country prohibited domestic tourism seven days after the event day.

Figure 2: Cumulative abnormal returns over the event window



Source: The author

Conclusion

COVID-19 has been rapidly spreading around the world since December 2019. This outbreak has caused stock markets to experience the sharpest fall since the financial crisis of 2007–08, and the Moroccan stock market was not immune. In this paper, we examined the reaction of the Casablanca Stock Exchange to the COVID-19 outbreak. We found that the Banking industry was most hardly impacted followed by the Materials, Software and Computer Services sector. We observed an increase in the shares of the Telecommunication industry.

Our focus was on an event window encompassing the days leading to and past the time WHO declared that the global spread of COVID-19 was a pandemic. Our findings provided insight into the consequences of such major events for economies similar to that of Morocco. As the pandemic continues to disrupt the supply chain and shatter the world economy and global trade with the trajectory of the recovery difficult to forecast, our findings can help investors and policymakers understand the behavior of stock markets during such catastrophic events and develop appropriate risk management and business continuity strategies.

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