Mina Sami*

French Firms and COVID-19: Do the Debt Status, Crisis Management System, and Monetary Policy Play a Role?

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Abstract: This study has two main objectives: first, it assesses the effect of outbreak pandemic diseases on the French firms' stock returns by considering the sector of activity as the main center of analysis. Second, it investigates the role of the crisis management system, firm debt strategy, and monetary policy in dealing with the adverse shocks of the major outbreak of the COVID-19. The study results can be summarized as follows: (1) the daily growth in COVID-19 cases and deaths are associated with lower stock returns of the listed firms, especially for the firms operating in the energy, industrial and health care sectors. In contrast, telecommunication and consumer sectors are not significantly affected. (2) The pandemic's adverse effect is much more tolerant with the French firms with an efficient crisis management system and low long-term debt commitments than the firms that do not have such a system and engaged with long term debts. (3) Euribor rates and monetary policy are still playing an essential role during the pandemic period.

Keywords: stock returns, COVID-19, pandemic, debt status, crisis management systems

JEL-Classification: C3, D22, E5, H12

1 Introduction

The broad literature that concerns the capital markets reveals that the stock market returns are responsive to various major events. Historically, such returns are always affected by environmental circumstances (Degiannakis et al. 2013; Limkriangkrai et al. 2016), political events (Charfeddine and Al Refai 2019) and disasters (Capelle-Blancard 2010; Kowalewski and Śpiewanowski 2020).

The spread of worldwide pandemics such as H1N1, SARS, EVD, and COVID-19 is one of this century's main features. Therefore, several studies appeared to assess

*Corresponding author: Mina Sami, Assistant Professor, Department of Economics, The American University in Cairo, New Cairo, Egypt, E-mail: mina_sami@aucegypt.edu

these events' impact on the stock market returns (Sharif et al. 2020). However, this research area is still in progress, mostly if we focus on the firms' sector of activity, crisis management system, and debt status after the spread of COVID-19. Compared to the studies currently in progress, this study aims to examine four main questions: How does the COVID-19 affect the listed firms' stock market returns in France? Which sectors are the most vulnerable to respond negatively to pandemics? How does the pandemic impact the firms that are more committed to long a debt status relative to the firms with a short-term debt status? Does the crisis management system play a significant role in reducing the pandemic's adverse effect on the stock returns?

On January 24, 2020, the first case of coronavirus in Europe was detected in Bordeaux, France, with Chinese tourists (Bernard-Stoecklin 2020). On February 14, Paris city recorded the first death outside Asia and Europe (France Info 2020). By March 17, the government announced quarantine, borders were closed, and economic activity diminished. By the first quarter of the year, France suffered from a recession (INSEE 2020). Since May 11, the country's lockdown has been relaxed, and economic activity has started to catch-up. However, the COVID-19 outbreak has adversely affected investments and business activity in France.

This study assumes three central hypotheses: First, COVID-19 has precise results on the sector of activity in which it operates. Some sectors are expected to be less affected such as the telecommunication sector. In contrast, others are expected to be substantially affected, such as the industrial and energy sectors. According to Bloom et al. (2018), different sectors are likely to respond disproportionately to unexpected major events, including the outbreak of pandemics. Second, the adverse pandemic effect is much more tolerant with the firms with less long-term debt commitments.

Furthermore, capital structure literature suggests that debts are an essential source of finance; however, it may significantly impact the firm's financial obligations (D'Amato 2019; Sami et al. 2020). During a pandemic, the profitability indicators are very likely to change, and sometimes the firm may face a period of loss. If we consider the expected loss and the burden of the firms' debt commitments, the situation is expected to be more complicated. When the long-term debt commitments are low, the pandemic's negative effect on the stock returns is expected to be much more tolerant. Third, crisis management plays a vital role in reducing pandemics' negative impact on the listed firms' stock returns. Crisis management allows firms to adopt various strategies that guarantee the best management practices implementation such as scenario planning, efficient communication from managers to employees, identifying the market gaps that help to reposition the firms in the market (World Bank 2020).

This study's originality is to assess pandemics' impact, especially COVID-19, on the listed firms' stock market returns in France. In particular, this assessment (1) distinguishes the effect across the different sectors in the economy (2) investigates the role of the debt status and crisis management in reducing the adverse impact of the pandemic on the stock returns (3) explores the role of Euribor rates and monetary policy during pandemic periods.

The rest of the paper is organized as follows. The next section presents the related Literature Review. Section 3 provides data and descriptive statistics. The fourth section presents the methodology and empirical results. Robustness Checks are presented in section 6, followed by the conclusion.

2 Literature Review

The Stock market is considered as one of the most responsive markets for major unexpected events (He et al. 2020). The existing research papers on the impact of major events on the economy and financial markets has consistently focused on political and security affairs, natural disasters and financial crises (Al-Awdahi et al. 2020; Capelle-Blancard 2010; Charfeddine and Al Refai 2019; Kowalewski and Śpiewanowski 2020; Zhang et al. 2020).

However, there exists a limited number of research papers that focus on unexpected health events. Some studies focus on the regional/specific country effects, for example, Chen et al. (2018) showed that SARS harms the financial markets in the Asian region. Using a panel of 48 countries, Barro et al. (2020) found that the coronavirus and the Great Influenza pandemic negatively affected the stock returns, especially the government bills. Akhtaruzzaman et al. (2020) examine the impact of the COVID-19 outbreak on the financial correlation between China and G7 countries, where they found a dynamic correlation in the financial markets in this region (Al-Awadhi et al. 2020).

While other studies focus on some industries, Sobieralski (2020) focused on the airline industry and demonstrated the critical losses for the airline labor in the United States after the COVID-19. The study of Ayati et al. (2020), concerned with the pharmaceutical sector, showed what the industry has suffered from a slow-down in growth due to COVID-19.

Furthermore, the sector is expected to assist significant shifts in the long run due to the lessons learned from this pandemic. Qin et al. (2020) focused on the Oil industry sector, which showed that this sector is one of the top sectors that assisted substantial adverse shocks due to COVID-19.

This paper extends the previous literature review by (1) considering France, which has been somehow overlooked by the current studies, as the center of the

study (2) studying the impact of the pandemic on the different sectors of the economy (3) investigating the role of the crisis management system and debt status during the major pandemic shocks.

3 Data and Descriptive Statistics

Data has been exported from the Eikon Reuters Database (2020) on listed firms in France,¹ covering the period from January 23, 2020, to October 30, 2020. The data already includes information for each French firm daily, such as stock market returns, market value and employees. Other firm-level invariant time variables were used, such as the sector of activity, long term debt to market capitalization and crisis management practices. This latest data has been compiled with daily data on COVID-19 exported from www.ourworldindata.org (Roser et al. 2020) for the same period. Finally, daily Euribor rates have been implemented to show the response of stock market returns to changes in the borrow funds rate. Euribor rates data were obtained weekly from the European Banking Federation Internet page at www.euribor.org. Hence, Table 1 presents a summary of sources and the exact definition and measurement of each variable.

Figures in Appendix present the firm variables' variation within the firm's average and over time (Figures A1, A2, and A3). In contrast, the other figures demonstrate the change of the variables over time (Figures A4, A5, and A6). The firm variables have been widely affected over time, especially for March 2020 and May 2020, which includes a significant increase in the new deaths due to COVID-19 (Figure A6).

For the other variables, the monetary policy variable shows that Euribor and the stringency index rates have been changing throughout the COVID-19 period (Figure A4). It is clear that the government adopted changes in rules according to the new cases/deaths during the pandemic crisis, and we note that the stock returns started to decrease significantly, starting from March.

Table 2 presents the data's statistics excluding the top and least 1% stock returns that showed extreme change. It shows that the stock market returns are highly volatile, reaching a peak of 16% and a trough of -12.28. However, the other variables, which are on the firm-level, are dynamically changing, such as the market value variable. In contrast, the employee's variable is considered the least dynamic variable. As a result, having a closer look at Euribor rates, it is evident that the rates were changing during this period, where the change rate decreased to -8.88% (from the last week of March to the first week of April). The growth in

¹ A sample of the 587 firms used in the study is included in Appendix. See Table A.1.

Table 1: Definition of the variables.

Variable	Source	Definition
Stock return	Eikon Reuters Database	This variable reflects the daily change in stock prices in percentage.
Market value	Eikon Reuters Database	The variable describes the worth of an asset in the market. The variable reflects the change daily in percentage.
Employees	Eikon Reuters Database	Employee's variable is calculated as a change daily in percentage. It reflects that the firm's size matters and whether a firm downsizes its activities during the COVID-19 period (Montout and Sami 2016; Sami and Eldomiaty 2019).
Euribor	European Banking Federation page www.euribor.org	Euribor rates reflect the monetary policy that was adopted for the COVID-19 period. It shows how the monetary policy changed during this period. The variable is reflecting the weekly change in percentage points.
Stringency index	www.ourworldindata.org (Roser et al. 2020)	The index ranges from 0 to 100, reflecting the government's strictness to take measures (e.g., lockdown) to stop the spread of COVID-19.
New cases	www.ourworldindata.org (Roser et al. 2020)	Daily growth in new cases per million in percentage.
Death cases	www.ourworldindata.org (Roser et al. 2020)	Daily growth in new deaths per million in percentage.

new cases reached 1640.91% (from May 28 to May 29) and a minimum of −326.63% (from June 2 to June 3). As a result, the same variation is valid for the growth in death cases ranging from −100 up to 1800%. Consequently, Table A.2 in Appendix provides the correlation between the variables used in the study.

Table 2: Descriptive statistics.

	Stock return	Market value	Employees	Euribor	Stringency index	New cases	New deaths
Mean	−0.02	−2.51	0.00	0.06	52.02	37.08	71.13
SD	3.04	2.52	0.11	1.10	23.84	168.12	236.51
Min	−12.28	−10.82	−27.20	−8.88	2.78	−326.63	−100.00
Max	16.00	5.39	8.69	9.75	87.96	1640.91	1800.00
Skewness	0.54	0.46	−191.73	1.07	0.12	6.70	4.81
Kurtosis	7.51	3.06	50332.90	24.32	2.10	62.66	31.24

Source: Authors' calculations using the Eikon Reuters Database (2020).

4 Methodology and Empirical Results

4.1 Methodology

Following So Im et al. (1999) and Baltagi et al. (2009), the authors adopted panel data regression to control heterogeneity across firms and identify time-varying relationships between the stock returns and all regressors. The pandemic reached a peak gradually, which persisted for several days. In formal terms, the panel regression model is given by:

$$SR_{i,d} = \alpha + \beta Covid_{i,d} + \lambda Z_d + \Phi X_{i,d} + \phi_i + \gamma_t + \mu_{id} \quad (1)$$

where $SR_{i,d}$ is the stock return of the firm i at day d . While $Covid_{i,d}$ is a matrix that identifies the impact of COVID-19 cases measured by (growth of COVID-19 cases and growth of death cases) on the stock returns, $X_{i,d}$ is a matrix of regressions that includes the daily firm observables, market value and employee growth. Z_d is a vector that includes the European money market measured by daily Euribor rates. Here ϕ_i is the firm fixed effects, γ_t is the month fixed effects, and μ_{id} is the error term that is assumed to be independently identically distributed (IID). The author adopts clustered standard errors (by firm) throughout all the regressions to address heteroskedasticity and autocorrelation problems.

4.2 Empirical Results

Table 3 reports the panel data regression results. On the one hand, the market value growth has consistent positive effects on French firms' stock returns. On the other hand, the change in the number of employees, which serves as a proxy for the firm size and cost commitments, shows a negative effect on the stock returns. Job losses are negatively affecting the firms operating in the market; in particular, each 1% growth in employees is associated with a reduction in the stock returns by 0.29%.

Regarding the monetary policy effects, the results show that the higher the Euribor rates, the lower the stock returns become. During a pandemic crisis, monetary policy is still playing an essential role in the financial markets (Sami et al. 2020). Each one percentage point change in Euribor rates is associated with a 0.08% decrease in the stock returns. Additionally, the stringency index, which reflects the government actions, plays a vital role in alleviating the stock returns' adverse effects. Conspicuously, more restrictive measures are expected to reduce the number of new cases/deaths, saving the stock market from substantial losses.

Table 3: Panel regression.

Dependent variable: stock return	(1) All Firms	(2) All Firms	(3) All Firms
Market value	0.9283*** (0.1013)	1.0496*** (0.1042)	1.0862*** (0.1185)
Employees	−0.2954*** (0.0851)	−0.2964*** (0.0885)	−0.3236*** (0.0711)
Euribor	−0.0835*** (0.0118)	−0.0867*** (0.0120)	−0.0884*** (0.0121)
Stringency index	0.0350*** (0.0016)	0.0373*** (0.0017)	0.0377*** (0.0019)
New cases		−0.0004*** (0.0001)	
New deaths			−0.0003*** (0.0000)
Constant	1.3930*** (0.1930)	1.1126*** (0.2150)	−0.9490*** (0.2754)
Observations	84,392	71,362	67,025
R-squared	0.0145	0.0230	0.0221
Firm FE	Yes	Yes	Yes
Month FE	Yes	Yes	Yes

The table includes all the French Firms from January 23, 2020, to October 30, 2020. Clustered standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The results show that COVID-19 adverse effects on the stock market returns. The French firms' stock market has consistently suffered from losses during the COVID-19 outbreak; for instance, for each 10% growth in the daily new cases, the stock market returns decrease by 0.004%.

5 Empirical Analysis Based on Sectors, Long Debt Status, and Crisis Management

5.1 Classification of Listed Firms Based on the Sector of Activity

Table 4 provides the results of the effects of COVID-19 on the stock returns of listed firms in France on the sectoral level. Panel (A) presents the regression results of daily COVID-19 cases, while panel (B) shows the daily growth rate of death cases. The table shows that the pandemic's effect on the stock returns is different across sectors on the firm level, where the sectors do not respond in the same manner to

Table 4: Panel regression per sector on the firm level.

Panel (A)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	Basic materials	Consumer goods	Consumer services	Health care	Industrials	Telecommunication	Energy & utilities
stock return							
Market value	0.9687** (0.3758)	0.9089*** (0.2140)	2.5041*** (0.5811)	0.9867*** (0.1915)	1.280*** (0.401)	0.163 (0.552)	0.748** (0.262)
Employees	-	0.0534 (0.1165)	9.8105*** (0.4076)	-0.5714*** (0.0746)	0.010 (0.110)	-0.367*** (0.026)	-
Euribor	-0.0948 (0.0594)	-0.1119*** (0.0256)	-0.0638 (0.0424)	-0.0450 (0.0446)	-0.125*** (0.030)	0.117 (0.097)	-0.185** (0.076)
Stringency index	0.0317*** (0.0087)	0.0351*** (0.0035)	0.0265*** (0.0062)	0.0576*** (0.0054)	0.039*** (0.005)	0.044*** (0.008)	0.058*** (0.014)
New cases	0.0000 (0.0004)	-0.0004** (0.0002)	-0.0004 (0.0002)	-0.0004** (0.0002)	-0.001*** (0.000)	-0.001 (0.001)	-0.002*** (0.001)
Constant	1.4880 (0.9680)	1.3232** (0.5254)	4.6770*** (1.0404)	0.4493 (0.4913)	0.577 (0.510)	-1.448 (1.789)	-0.374 (0.501)
Observations	3,336	14,570	4,247	8,958	9,373	1,540	1,687
R-squared	0.0194	0.0219	0.0275	0.0349	0.031	0.028	0.046
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 4: (continued)

Panel (B)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable: stock returns	Basic materials	Consumer goods	Consumer services	Health care	Industrials	Telecommunication	Energy & utilities
Market value	0.9480* (0.4961)	0.9134*** (0.2298)	2.8839*** (0.6456)	1.0762*** (0.2240)	1.356*** (0.457)	0.008 (0.587)	0.832** (0.308)
Employees	–	0.0667 (0.1151)	9.7438*** (0.4492)	–0.5435*** (0.0740)	–2.411 (2.231)	–0.356*** (0.027)	–
Euribor	–0.0946 (0.0594)	–0.1137*** (0.0258)	–0.0652 (0.0425)	–0.0474 (0.0446)	–0.128*** (0.031)	0.116 (0.098)	–0.194** (0.076)
Stringency index	0.0284*** (0.0097)	0.0348*** (0.0038)	0.0285*** (0.0067)	0.0588*** (0.0062)	0.041*** (0.006)	0.039*** (0.011)	0.057*** (0.014)
New deaths	–0.0008*** (0.0002)	–0.0002** (0.0001)	–0.0001 (0.0001)	–0.0003** (0.0001)	–0.000*** (0.000)	0.000 (0.001)	–0.001*** (0.000)
Constant	–0.0080 (1.3457)	–0.2480 (0.6119)	2.7059** (1.2930)	–2.3448*** (0.6631)	–1.865*** (0.673)	–3.148 (2.352)	–3.897*** (0.982)
Observations	3141	13,679	3988	8411	8803	1445	1586
R-squared	0.0221	0.0197	0.0321	0.0347	0.032	0.024	0.043
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel (A) presents the regression results with daily COVID-19 growth cases. While Panel (B) shows the results of the daily growth rate of death cases. Clustered standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

COVID-19. The employee's variable is omitted from basic material and energy sectors as there is no variability over time in those sectors. Thus, the results show that the market value plays a vital role for all sectors except telecommunication and consumer services. Moreover, the consumer service sector is the top responsive sector to the market value variable. Each 1% increase in the market value is associated with a 2.5% increase in the firms' stock returns operating in the sector. Unsurprisingly, reducing the number of employees in the telecommunication and health care sectors is associated with a significant decrease in the stock market returns. Additionally, by looking at the monetary policy variable, the results show that Euribor rates are mainly affecting three sectors in the French economy: energy, industrials, and consumer goods; accordingly, the stringency index plays a significant role across all the sectors.

According to Panel (A) and Panel (B), energy and utilities, industrial, and health care are considered the most responsive pandemic sectors. In particular, each 10% increase in the new cases is associated with a 0.02% reduction in the stock returns of the firms operating in the energy sector. The stock returns decrease by 0.01% for each 10% increase in the new COVID-19 cases for the industrial sector. On the other hand, the stock returns in health care services decrease by 0.004% for each 10% increase in the new COVID-19 cases. However, telecommunication is the least affected, which describes why this sector is mainly affected by reducing employees' number. Telecommunication and consumer services sectors were the most important for the French people as they were always operating during the crisis.

5.2 Classification Based on the Debt Status

Firms are classified into two main new panels. Panel (A) includes the firms with the lowest long-term debt as a percentage of market capitalization in the year preceding the pandemic disease (mainly at least 25% of firms). While Panel (B) has all the firms with long-term debt status as a percentage of market capitalization (mostly top 25%). The findings show that the market value is still playing an important role, especially for high debt firms. Additionally, monetary policy is more effective with high debt firms; in particular, each one percentage point change in Euribor rates is associated with a 0.088% decrease in the stock returns. Regressions (1) and (2) show that monetary policy is inefficient during the pandemic period with low debt firms. Moreover, the stringency index positively affects the stock market returns for low and high debt firms. However, firms with high debt are operating much worse than those with low long-term debt commitments.; thus, this finding goes in parallel with the study (Fungáčová et al. 2020). The firms' revenue is negatively affected by

pandemic diseases, causing the weight of debt and its solvability to be questioned for high debt firms (Table 5).

5.3 Classification of Listed Firms Based on the Crisis Management System

Table 6 reports the results by distinguishing two firms' panels to understand the crisis management system's importance. Panel (A) does not have a crisis management system, while Panel (B) has a crisis Management system. The firm is reported to have this system if it has a contingency plan to resume business with minimum downtime while ensuring that companies can remain operational through any unexpected event. The author notes that the observations are much lower than the previous results as the data's information is missing for an actual number of firms. Having a closer look at the table below, the firms with a crisis management system are less responsive to monetary policy than firms with a crisis

Table 5: Panel regression on the firm level: debt status.

Dependent variable: Stock returns	(1) Panel (A)	(2) Panel (A)	(3) Panel (B)	(4) Panel (B)
Market value	0.4858*** (0.1582)	0.3978** (0.1889)	1.0610*** (0.1768)	1.0907*** (0.1920)
Employees	-0.3270*** (0.0589)	-0.3184*** (0.0600)	0.3230 (0.5354)	0.3353 (0.5299)
Euribor	-0.0013 (0.0281)	-0.0016 (0.0283)	-0.0855*** (0.0193)	-0.0878*** (0.0195)
Stringency index	0.0335*** (0.0040)	0.0339*** (0.0047)	0.0353*** (0.0028)	0.0347*** (0.0029)
New cases	-0.0001 (0.0002)		-0.0005*** (0.0001)	
New deaths		-0.0001 (0.0001)		-0.0003*** (0.0001)
Constant	0.7119 (0.5925)	-1.6256** (0.7267)	1.3024*** (0.3706)	-0.4484 (0.4489)
Observations	13,795	12,952	25,945	24,367
R-squared	0.0148	0.0147	0.0224	0.0209
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes

Panel (A) includes the firms with low long-term debt as a percentage of market capitalization in the year preceding the pandemic (the least 25%). While Panel (B) includes the firms with high long-term debt as a percentage of market capitalization in the year preceding the pandemic (top 25%). Clustered standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

management system. The effect of the stringency index is the same across all panels. Conspicuously, all the firms are negatively affected by the pandemic crisis. However, those that have a crisis management system perform better than the firms that do not have such a system (Singh and LaBrosse 2012).

6 Robustness Checks

As a robustness check, the author uses daily new cases per 100,000 population instead of growth in daily new cases.² An interaction term between stringency index and new death cases per 100,000 population variables is constructed to identify government policies' effect given the pandemic's spread in France.

Table 7 presents the main results using the number of new cases per 100,000 and demonstrates government policies' effect by interacting this variable with the

Table 6: Panel regression on the firm level: crisis management system.

Dependent variable: Stock returns	(1) Panel (A)	(2) Panel (A)	(3) Panel (B)	(4) Panel (B)
Market value	2.2637*** (0.7831)	2.3017*** (0.7199)	2.1734*** (0.6515)	2.1014*** (0.6024)
Euribor	−0.2123*** (0.0507)	−0.2078*** (0.0500)	−0.1012** (0.0435)	−0.0981** (0.0434)
Stringency index	0.0677*** (0.0065)	0.0668*** (0.0061)	0.0578*** (0.0084)	0.0558*** (0.0072)
New cases	−0.0006*** (0.0001)		−0.0005*** (0.0001)	
New deaths		−0.0008** (0.0003)		−0.0005* (0.0002)
Constant	−4.6904*** (0.4587)	−3.4333*** (0.4941)	−8.0840*** (1.3787)	−4.8170*** (1.0941)
Observations	2581	2747	2952	3144
R-squared	0.0564	0.0611	0.0547	0.0495
Firm FE	YES	YES	YES	YES
Month FE	YES	YES	YES	YES

Panel (A) includes all firms that confirmed that they do not have a crisis management system. While Panel (B) includes all firms that announced having a crisis management system. Clustered standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

² The new cases per 100,000 on a daily basis (smoothed) is used as per the definition of Our World in Data.

Table 7: Panel regression.

Variables	(1) All firms	(2) All firms	(3) All firms
Market value	0.9283*** (0.1013)	0.9265*** (0.1012)	0.7942*** (0.0951)
Employees	-0.2954*** (0.0851)	-0.2964*** (0.0852)	-0.3072*** (0.0838)
Euribor	-0.0835*** (0.0118)	-0.0782*** (0.0118)	-0.0977*** (0.0122)
Stringency index	0.0350*** (0.0016)	0.0360*** (0.0017)	
Number of cases		-0.0145*** (0.0032)	
Number of deaths × stringency index			0.0083*** (0.0009)
Constant	1.3930*** (0.1930)	1.3775*** (0.1932)	1.5400*** (0.1834)
Observations	84,392	84,392	84,392
R-squared	0.0145	0.0147	0.0071
Firm FE	YES	YES	YES
Month FE	YES	YES	YES

The table includes all the French Firms from January 23, 2020, to October 30, 2020. Clustered standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

number of deaths one. The results in column (2) show that for each 100,000 increase in new cases, the stock market returns decrease by 0.014%. Moreover, the stringency index's government policies are still efficient during the COVID-19 period (column 3). Conspicuously, the strict policies (e.g., stay at home) by the government can positively affect the stock market returns given the increase of the pandemic's effect in France.

Table 8 reaches the same results provided by Table 4, where Panel (A) shows that the health care, industrial and energy sectors are the sectors that are the most adversely affected by the spread of the pandemic. Everything held constant, for every 100,000 new cases: (1) the stock returns of the energy sector decreases by 0.055% (2) the stock returns of the industrial sector decreases by 0.014% (3) the stock returns of the health care sector decreases by 0.023%. On the other hand, Euribor rates still play an essential role in determining the stock market returns of the companies operating in consumer goods, industrial, and energy sectors.

Having a closer look at Panel (B), although the pandemic has considerably spread, the stringency index shows that it is positively affecting the stock returns of the consumer goods, health care, and the industrial sectors. On the other hand, the

Table 8: Panel regression per sector on the firm level.

Panel (A)	(1) Basic materials	(2) Consumer goods	(3) Consumer services	(4) Health care	(5) Industrials	(6) Telecommunication	(7) Energy & utilities
Market value	0.6642 (0.4604)	0.8724*** (0.2007)	2.0329*** (0.4346)	0.8428*** (0.1610)	1.270*** (0.360)	0.052 (0.595)	0.783** (0.265)
Employees	–	0.0631 (0.1109)	9.5679*** (0.3436)	–0.5389*** (0.0698)	–0.067 (0.109)	–0.369*** (0.027)	–
Euribor	–0.0819 (0.0591)	–0.1100*** (0.0248)	–0.0589 (0.0411)	–0.0294 (0.0438)	–0.117*** (0.029)	0.135 (0.098)	–0.170** (0.073)
Stringency index	0.0307*** (0.0081)	0.0329*** (0.0034)	0.0249*** (0.0054)	0.0569*** (0.0052)	0.038*** (0.005)	0.044*** (0.010)	0.059*** (0.013)
New cases	–0.0180 (0.0160)	–0.0044 (0.0077)	–0.0202* (0.0111)	–0.0237*** (0.0103)	–0.014*** (0.007)	–0.023 (0.027)	–0.055* (0.026)
Constant	1.0802 (1.0181)	1.5444*** (0.4701)	3.6428*** (0.8045)	1.2354*** (0.3676)	1.258*** (0.434)	–0.479 (1.473)	0.362 (0.326)
Observations	3,952	17,245	5,019	10,599	11,084	1,820	1,996
R-squared	0.0123	0.0145	0.0209	0.0220	0.022	0.020	0.033
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 8: (continued)

Panel (B)	(1) Basic materials	(2) Consumer goods	(3) Consumer services	(4) Health care	(5) Industrials	(6) Telecommunication	(7) Energy & utilities
Market value	0.5939 (0.4314)	0.7445*** (0.1891)	1.8559*** (0.3736)	0.7081*** (0.1531)	1.062*** (0.292)	-0.042 (0.577)	0.622*** (0.202)
Employees	-	0.0232 (0.1047)	10.2842*** (0.3207)	-0.3378*** (0.0622)	-0.063 (0.116)	-0.388*** (0.026)	-
Euribor	-0.1049* (0.0612)	-0.1301*** (0.0261)	-0.0851* (0.0425)	-0.0576 (0.0461)	-0.135*** (0.030)	0.102 (0.101)	-0.244** (0.080)
Number of deaths × stringency index	0.0040 (0.0028)	0.0054*** (0.0018)	0.0014 (0.0029)	0.0156*** (0.0029)	0.010*** (0.002)	0.006 (0.007)	-0.002 (0.007)
Constant	1.2629 (0.9471)	1.6277*** (0.4474)	3.5903*** (0.7084)	1.6008*** (0.3534)	1.439*** (0.369)	-0.188 (1.422)	0.879*** (0.280)
Observations	3,952	17,245	5,019	10,599	11,084	1,820	1,996
R-squared	0.0066	0.0073	0.0155	0.0094	0.012	0.010	0.014
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel (A) presents the regression results with COVID-19 daily growth cases. While Panel (B) shows the interaction term Number of Deaths per 100,000 population and stringency index. Clustered standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

pandemic's effect turns to be insignificant for the basic materials, consumer services, telecommunication and energy sectors.

Table 9 provides the same results offered by Table 5. Panel (A) includes the firms with the lowest long-term debt as a percentage of market capitalization in the year preceding the pandemic disease (mainly the least 25% of firms). In comparison, Panel (B) has all the firms with long-term debt status as a percentage of market capitalization (mainly the top 25%). The results show that the more committed firms to long-term debt are adversely affected by the pandemic's effect (columns 3 and 4), while the less committed firms to long-term debt are less affected (columns 1 and 2). On the other hand, the stringency index plays an essential role in reducing low and high debt firms' adverse effects.

Table 10 provides the results of the crisis management system during the pandemic crisis. Panel (A) provides the consequences related to the firms that do not have a crisis management system, while Panel (B) reports the results of the firms who have this system. As previously noted, the number of observations is

Table 9: Panel regression on the firm level: debt status.

Variables	(1) Panel (A)	(2) Panel (A)	(3) Panel (B)	(4) Panel (B)
Market value	0.3593** (0.1752)	0.2722 (0.1661)	0.9361*** (0.1590)	0.8046*** (0.1483)
Employees	-0.3287*** (0.0601)	-0.3399*** (0.0575)	-0.1001 (0.0793)	-0.1704* (0.0994)
Euribor	-0.0000 (0.0278)	-0.0123 (0.0281)	-0.0758*** (0.0191)	-0.0969*** (0.0197)
Stringency index	0.0321*** (0.0040)		0.0338*** (0.0027)	
New cases	-0.0032 (0.0085)		-0.0163*** (0.0056)	
Number of deaths × stringency index		0.0086*** (0.0020)		0.0069*** (0.0013)
Constant	0.7581 (0.5642)	0.8525 (0.5378)	1.5074*** (0.3247)	1.6318*** (0.3071)
Observations	16,312	16,312	30,681	30,681
R-squared	0.0091	0.0037	0.0139	0.0066
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes

Panel (A) includes the firms with low long-term debt as a percentage of market capitalization in the year preceding the pandemic (the least 25% of firms). While Panel (B) includes the firms with high long-term debt as a percentage of market capitalization in the year preceding the pandemic (Top 25%). Clustered standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 10: Panel regression on the firm level: crisis management system.

Variables	(1) Panel (A)	(2) Panel (A)	(3) Panel (B)	(4) Panel (B)
Market value	2.2230*** (0.5748)	1.5789*** (0.3476)	1.9432*** (0.4768)	1.5125*** (0.4019)
Euribor	−0.1958*** (0.0479)	−0.2076*** (0.0551)	−0.0902** (0.0400)	−0.1048** (0.0437)
Stringency index	0.0630*** (0.0063)		0.0525*** (0.0068)	
New cases	−0.0044 (0.0164)		−0.0167 (0.0141)	
Number of deaths × stringency index		0.0208*** (0.0057)		0.0167*** (0.0038)
Constant	−2.2270*** (0.3745)	−1.0992*** (0.2413)	−3.5750*** (0.8615)	−2.2136*** (0.7005)
Observations	3,249	3,249	3,718	3,718
R-squared	0.0464	0.0262	0.0351	0.0173
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes

Panel (A) includes all firms that confirmed that they do not have a crisis management system. While Panel (B) includes all firms announced to have a crisis management system. Clustered standard errors in parentheses
 *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

limited for this variable, and results should be interpreted with precautions. Columns (1) and (3) show insignificant coefficients for the two panels. Column (2) and Column (4) show that the stringency index during the spread of a pandemic is vital for the two panels of firms. However, this variable's effect is much more critical for firms without a crisis management system. The firms with this system are already facing higher losses from the pandemic than the firms that do not have a crisis management system. Therefore, any government action may alleviate the pandemic's adverse impact on the group of firms that do not have a crisis management system relative to the group who have this system.

7 Conclusion

This study provides three main results: (1) The COVID-19 has adversely affected the stock market returns for the listed firms in France. However, the sectors of the

economy did not respond in the same manner. The results show that the energy, industrials, and health care sectors are the most negatively affected, while the telecommunication and consumer services sector were not affected. This finding goes in parallel with the first hypothesis of the study. (2) The firms that were less committed to long-term debts performed better than the firms with many long-term commitments (Hypothesis 2 of the study). (3) The crisis management system plays an essential role in reducing the pandemic's adverse shocks on the stock returns. In particular, the results show that the firms that have a crisis management system are performing better than the firms that do not have such a system (Hypothesis 3 of the study). (4) Monetary policy in Europe is still an essential resort during pandemics to face the negative consequences, especially for the energy, industrials and consumer goods sectors.

This study suggests that all economic system players should adopt several policy implications to reduce the pandemic's adverse effect on the economy and the financial market. The management should consistently guarantee an efficient crisis management system to face unexpected major events on the firm level. In addition to this, knowledge management within firms is essential to provide plans to support the firm against the crisis (Sami and El Bedawy 2019). Thus, different strategies should be adopted to face debt commitments when the firm experiences a period of shock.

On the macro level, results suggest that the government can still play two major roles through the monetary policy and the stringency of applying rules to reduce the pandemic's spread. The monetary policy is mainly affecting three strategic sectors: energy, industrials and consumer goods. On the other hand, the government's stringency is vital to save the market and the firms from collapsing. Furthermore, the most negatively affected sectors require prompt support from the government.

Further research should focus on the pandemic's impact by considering other firm indicators such as total factor productivity, marketing strategy and innovation. Some studies assume that the firms may reposition themselves after this pandemic period (Ayati 2020); therefore, more research on the market shifts and structural changes before and after the COVID-19 pandemic is necessary. It is also essential to study alternative investments that can be adopted during and after this period, such as Bitcoin usage (Sami and Abdallah 2020a, b). Finally, more studies should be done to reflect the impact of COVID-19 on individuals; for example, introducing the linkage between these crises and remittances is a critical question (Ayad and Abd El Aziz 2018).

Appendix

Table A.1: Sample of listed firms in the data.

Audience Labs	Courtois	Saint Gobain
Gerard Perrier	Veolia	CNP Assurance
Avenir Telecom	Électricité de France	Thales
1000 Mercis	Tipiak	Rexel
Amundi	Pernod	Valeo
Bouygues	Gaumont	AccorHotels
Courbet	Hotels de Paris	Total S. A.

Source: Exported from the Eikon Reuters Database (2020).

Table A.2: Correlation matrix.

	Market value	Employees	Euribor	Stringency index	New cases	New deaths
Market value	1.00					
Employees	0.01	1.00				
Euribor	0.00	0.00	1.00			
Stringency index	−0.02	−0.01	−0.05	1.00		
New cases	0.00	0.00	0.03	0.05	1.00	
New deaths	0.00	0.00	−0.01	−0.11	−0.11	1.00

Source: Authors’ calculations using the Eikon Reuters Database (2020).

Figure A.1: Stock returns (average) variable of listed firms in France.
Source: Authors’ construction using the Eikon Reuters Database (2020). The figure shows the average stock returns of the listed French Firms over the period January 23, 2020, to October 30, 2020.

Figure A.2: Market value (average) variable of listed firms in France.
Source: Authors' construction using the Eikon Reuters Database (2020). The figure shows the average Market Value growth of the listed French Firms from January 23, 2020, to October 30, 2020.

Figure A.3: Employees (average) variable of listed firms in France.
Source: Authors' construction using the Eikon Reuters Database (2020). The figure shows the average growth in the number of employees of the listed French Firms over the period January 23, 2020, to October 30, 2020.

Figure A.4: Euribor rates variable during COVID-19 period.
Source: Authors' construction using the European Banking Federation page www.euribor.org. The figure shows the average Market Value growth of the listed French Firms from January 23, 2020, to October 30, 2020.

Figure A.5: Stringency index variable during COVID-19 period.
Source: Authors' construction using www.ourworldindata.org (Roser et al. 2020). The Stringency index shows the strictness of the government actions in dealing with COVID-19.

Figure A.6: New cases/deaths during COVID-19 period.

Source: Authors' construction using www.ourworldindata.org (Roser et al. 2020). The figures show the growth in new cases and deaths in France over January 23, 2020, to October 30, 2020.

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