Journal of Ecohumanism
2025
Volume: 4, No: 4, pp. 518– 525
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i4.6757

COVID-19, Stock Market Crisis and Investor Sentiment: French and USA Case

Dalenda Ben AHMED[1], Jamel Eddine HENCHIRI[2],

Abstract

Purpose: This work is part of the behavioral literature, whose objective is to evaluate the capacity of investor sentiment to predict the Covid-19 crisis on the French and American stock markets. Design/methodology/approach: Our study is based on all companies listed in the CAC40 index for France and the Dow Jones index for the US during the first half of 2020, when the Covid19 pandemic started. The statistical methods "Time Series" model used to test our hypothesis on the contribution of investor sentiment, the interest rate and the inflation rate to development of stock market crises. Findings: The results show that the Covid-19 crisis is positively and significantly explained by investor sentiment. While,the interest rate and inflation negatively influence the probability of a stock market crisis. The results also show that the inclusion of psychological factors improves the explanatory power of our alert model and proves to be effective in predicting stock market crises. Originality: This work can be considered as the first one to evaluate the cointegration between the Covid-19 crisis and the investor's sentiment.

Keywords: *Covid-19 - stock market crisis - investor sentiment - cointgration.*

Introduction

The challenge to the efficiency of financial markets has resulted in the inadequacy of financial theories and models. Investors are not always rational and markets are not efficient. Stock market crises have accentuated this challenge, and are characterized by a rapid and sharp fall in prices and strong growth. The crash of October 1987 remains unexplained by researchers, as the market observed the sharpest drop in the American stock market (-22.6%) without it being possible to associate it with any economic event that could justify it (Black, 1988; Fama, 1989; Shiller, 1989). The price of a share only reflects the way in which agents represent the market's opinion and its future evolution. As a result, financial professionals recognise the importance of psychology in equity markets (Black, 1986 et DeLong et al. 1990). Therefore, psychological factors seem to have an important role in the formation of stock prices.

The Psychologists have shown that the behavior of financial market actors cannot be explained by economic hypothesis alone. These actors in their forecasts are not objective and their choices are influenced by external factors. For a long time, several researchers have considered that psychology has an important role to predict stock prices in quiet or aggregate periods (DeLong & Shleifer, 1991; Shiller, 2000). These studies have aimed to directly link sentiment indicators to stock market crises. Indeed, the fluctuations in investor sentiment are often cited as a factor that can explain stock market crises (White 1990; De Long & Shleifer, 1991; Shiller, 2000).

The most common idea in this field is that the study of psychology and other social sciences can help to understand many phenomena, such as stock market anomalies, market bubbles and crashes. Hence the emergence of behavioural finance, which is a link between market behaviour and human psychology.

The literature in behavioural finance treats psychology as an explanatory factor for irrational investor behaviour. Indeed, behavioural theory considers that investors may make their choices not rationally but through their judgements, because they are unable to process information. Shiller (1989) is one of the pioneers who introduced efficiency anomalies into his studies. He assumes that these anomalies depend on

[1] Assistant, RED-ISGG, Gabès U. Tunisia. E-mail dalenda3@yahoo.fr. https://red-laboratory.net/
[2] Professor, RED-ISGG, Gabes U., Tunisia. E-mail jamel.Henchiri@gmail.com. https://red-laboratory.net/

Journal of Ecohumanism
2025
Volume: 4, No: 4, pp. 518– 525
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i4.6757

the psychology of the investor. As a result, behavioural finance refers to the irrationality of human behaviour, such as: overconfidence, heuristics, mimicry, emotions, anchoring, risk aversion...

Several studies have examined the effects of Covid-19 on stock market returns (Akhtaruzzaman et al., 2021; Zhang et al., 2020). In fact, the current global health crisis of Covid-19 has increased the co-movements of share prices in the stock market. Based on the behavioural literature, the higher the investor sentiment, the higher the probability of a stock market crisis occurring.

More broadly, this work is part of the behavioural literature, whose objective is to evaluate the capacity of investor sentiment to predict the stock market crisis in the French and American markets following the Covid-19 pandemic. We will answer the following question: What is the relationship between stock market crises and investor sentiment?

Three parts are proposed to analysis this issue. The first part will be devoted to a synthesis of the previous literature review and the development of the research hypothesis. The second part describes the sample, the variables selected and their measures and presents the statistical methods used. Finally, the last part discusses the empirical results obtained in order to conclude the validation of our hypothesis.

Literature Review

Several studies have examined the effects of Covid-19 on stock market returns (Mazur et al., 2021; Sharif, 2020; Topcu and Gulal, 2020). These studies do not give importance to psychological factors. Therefore, the link between investor sentiment and financial asset pricing has long been the subject of much debate in finance. Hence the existence of a sentiment risk that is valued in the financial markets. Indeed, sentiment represents investors' expectations that are not justified by fundamentals. In other words, to define sentiment is to identify an investor who is optimist (pessimist) without having good (bad) economic reasons for being so.

The American Association of Individual Investors presents a weekly report, in the form of a questionnaire, to investors who range from 125 to 500 members. This questionnaire focuses on the US investor's opinion and market trend for a six-month period. Many researchers have tried to model the role of investor sentiment in financial markets such as: Black (1986), De Long et al. (1990) and Barberis et al (1998), Zouaoui et al. (2011). Overall, the results show that investor sentiment has an important role in stock market crisis transmission. As a result, we can see that the Covid-19 stock market crisis is positively associated with investor sentiment.

Besides investor sentiment, there are other traditional variables that can affect the stock market crisis. Indeed, the evolution of interest rates is often cited as an excellent indicator of financial crises. These rates tend to fall significantly before the crash of stock markets (Zouaoui et al., 2011). The latter concluded in their international study on a sample of 15 European countries and the United States that the interest rate is negatively correlated with the stock market crisis.

On the other hand, several studies show that stock prices are negatively correlated with inflation. In periods of inflation, the study by Fama & Schwartz (1977) shows a reduction in stock market performance. This result is confirmed by the study of Bordo & Wheelock (1998), which focuses on the financial history of the United States, they concluded that the most important financial crises are developed by a strong instability of inflation. Zouaoui et al, (2011) managed to show, in their applied study on 15 European countries and the United States, that inflation rates are negatively correlated with the stock market index.

In practice, the correlation between the interest rate and the inflation rate is almost total, they tend to move in the same direction, because interest rates are used to manage inflation. To fight inflation, central banks raise their interest rates. Higher interest rates cannot stop inflation quickly, but they significantly reduce consumption, business investment and increase unemployment. There is a great risk that the European and American economies will go into recession.

Journal of Ecohumanism
2025
Volume: 4, No: 4, pp. 518– 525
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i4.6757

This work is part of the behavioral literature, which sheds light on the role and contribution of investor sentiment to the development of stock market crises.

Methodology

This work states that market behaviour is explained by human psychology. This step consists to link the theoretical concepts to data, translating the theoretical conceptual definition into one or more empirical elements that illustrate this definition or dimension.

Sample definition:

Our study is based on all companies listed in the CAC40 index for France and the Dow Jones index for the US during the first half of 2020, when the Covid19 pandemic started. Our study is weekly. The information is collected from the stock exchange website "boursorama.com".

Definition of the study variables:

This section allows us to summarise the statistical methods used to test our hypothesis on the contribution of investor sentiment, the interest rate and the inflation rate to the development of stock market crises. The general regression model is a "Time Series" model.

Model 1: $SMI_t = \alpha + \beta 1 SENT1_t + \beta 2 IR_t + \beta 3 IFR_t + \varepsilon_t$

Model 2: $SMI_t = \alpha + \beta 1 SENT2_t + \beta 2 IR_t + \beta 3 IFR_t + \varepsilon_t$

With: SMI: Stock Market Index; IR: Interest Rate; IFR: Inflation Rate and SENT: Investor Sentiment.

The dependent variable :

The stock market index: For France we used the "CAC40" index and for the USA the "Dow Jones" index. To identify the stock market crisis, we divide the current value of the stock market index by its maximum variable over this window:

$$CMAX_{i/t} = \frac{P_{i,t}}{\max(P_{i,t-25} \ldots, P_{i,t})}$$

Where: Pi,t is the level of the stock market index at time t. The moving window is set at 25 weeks.

The Independent variables

We have retained as variables to explain the stock market crisis: investor sentiment and other traditional variables (control variables) used in the literature such as interest rates and inflation rates.

The Sentiment Variable

There is no single or universal measure of investor sentiment. Indeed, many proxies have been proposed in the literature to measure investor sentiment. There are two types of measures: direct and indirect. Direct measures are based on surveys and questionnaires. Indirect measures are financial indicators that can be interpreted as upward or downward trends. In this work, we will use indirect indicators to measure investor sentiment. These indicators offer a better reflection of the strength and performance of the market and thus the intensity of investor optimism or pessimism. Brown and Cliff (2004) have presented a large list of indirect indicators of sentiment. Overall, our study was based on two proxies that are used in the literature: the SENT1 and SENT2 index.

Journal of Ecohumanism
2025
Volume: 4, No: 4, pp. 518– 525
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i4.6757

SENT1: This ratio is equal to the number of shares with a price increase divided by the number of shares with a price decrease in year (n).

$$sent1 = \frac{ADVt}{DECt}$$

With: ADVt; the number of shares that with a price increase at date t and DECt; the number of shares with a price decrease at date t.

SENT2: The interest of this indicator is to study the potential for change in the market trend. It is used as a sentiment indicator by Brown and Cliff (2004).

$$sent2 = \frac{HI}{LO}$$

With : HI; The number of new increases and LO; The number of new decreases.

- Traditional variables :

In contrast to banking and exchange crises, the financial literature offers very few empirical studies on the determinants of stock market crises. The monetary indicators used are the real interest rate (IR) and the inflation rate (IFR).

Results Interpretation

Before proceeding to the analysis of the relationship between the stock market crisis and the investor's sentiment, we will verify that there is a long term relationship between these two variables, for that we will use the Johanson cointegration test. There is cointegration when the variables are non-stationary. The first step of this study, then, consists to evaluate the non-stationarity (or presence of a unit root) of the variables by using the "Augmented Dickey and Fuller" (ADF) test.

- Stationarity test (or unit root test):

Before answering the question of the existence or not of such a cointegration relationship, it is necessary to test the non-stationarity of the series studied. There are a large number of unit root tests, the pioneering work being that of Dickey and Fuller (1979, 1981). The Dickey-Fuller tests are the most widely used because of their simplicity, but they suffer from a number of criticisms.

Test procedure: This procedure consists of testing the following hypotheses:

H^o: the level series is non-stationary.

H^1: the level series is stationary.

The decision rule is defined as follows:

- If t-statistic is higher than the critical value, the hypothesis H^o of non-stationarity is accepted and H^1 is rejected.
- If the t-statistic is lower than the critical value, the hypothesis H^1 of stationarity is accepted and H^o is rejected.

Table no I: Augmented Dickey-Fuller Unit Root Test

Variables	French	USA

Journal of Ecohumanism
2025
Volume: 4, No: 4, pp. 518– 525
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i4.6757

	t-Statistic	critical values	t-Statistic	critical values
SMI	-1.721075	-3.752946	-2.332121	-3.788030
		-2.998064		-3.012363
		-2.638752		-2.646119
IR	-0.350929	-3.737853	-0.828475	-3.737853
		-2.991878		-2.991878
		-2.635542		-2.635542
IFR	-1.728804	-3.808546	-1.269451	-3.737853
		-3.020686		-2.991878
		-2.650413		-2.635542
SENT1	-0.386313	-3.920350	-3.373101	-3.737853
		-3.065585		-2.991878
		-2.673459		-2.635542
SENT2	-1.265206	-3.737853	-3.188280	-3.737853
		-2.991878		-2.991878
		-2.635542		-2.635542

With: SMI: Stock Market Index; IR: Interest Rate; IFR: Inflation Rate and SENT: Investor Sentiment.

The table summarizes the t-statistics and critical values for the different series (SMI, IR, IFR and SENT). We notice that the values of the t-statistics issued for all the variables are higher than the critical values, this explains the presence of a unit root between the variables, in other words, their movements do not stop in time, they can be random or permanent. These results allow us to accept the Hº of non-stationary of the series and to reject the H¹ hypothesis of stationary.

Cointegration test

The starting point of the cointegration theory is the fact that many macroeconomic and financial series are non-stationary. Indeed, the first step allowed to assess the non-stationary of the series, while the second step allows to verify that there is a long term relationship between the variables to apply the Johanson (1988) cointegration test. This test is based on the eigenvalues of a matrix resulting from the estimation of the parameters by maximum likelihood by calculating the following Johanson statistic:

Tace = -T $\sum_{i=r+1}^{n} \log(1 - \lambda i)$

With : T: The number of observations and λ: The largest eigenvalue.

The hypotheses of the test are:

Hº: Presence of at least one cointegrating relationship;

H¹: No cointegrating relationship between the series.

The decision rule is defined as follows: If λ the trace is less than the critical value given the chosen threshold, we accept Hº by showing the existence of at least one cointegrating relationship between the series studied.

Table no II: Johanson Cointegration test SENT1

French Series: SMI IR IFR SENT1				
Hypothesized		Trace	5 Percent	1 Percent
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None **	0.738075	60.15803	47.21	54.46
At most 1	0.510866	29.34499	29.68	35.65

Journal of Ecohumanism
2025
Volume: 4, No: 4, pp. 518– 525
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i4.6757

At most 2	0.354954	12.89728	15.41	20.04
At most 3	0.115133	**2.813309**	**3.76**	6.65
*(**) denotes rejection of the hypothesis at the 5%(1%) level				
Trace test indicates 1 cointegrating equation(s) at both 5% and 1% levels				

USA Series: SMI IR IFR SENT1				
Hypothesized		Trace	5 Percent	1 Percent
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None *	0.677108	47.39056	47.21	54.46
At most 1	0.430090	21.39047	29.68	35.65
At most 2	0.205320	8.458121	15.41	20.04
At most 3	0.128839	**3.172361**	**3.76**	6.65
*(**) denotes rejection of the hypothesis at the 5%(1%) level				
Trace test indicates 1 cointegrating equation(s) at the 5% level				

With: SMI: Stock Market Index; IR: Interest Rate; IFR: Inflation Rate and SENT: Investor Sentiment.

Table no III: Johanson Cointegration test SENT2

French Series: SMI IR IFR SENT2				
Hypothesized		Trace	5 Percent	1 Percent
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None **	0.731125	61.70686	47.21	54.46
At most 1 *	0.618964	31.49619	29.68	35.65
At most 2	0.260159	9.304387	15.41	20.04
At most 3	0.098070	**2.374019**	**3.76**	6.65
*(**) denotes rejection of the hypothesis at the 5%(1%) level				
Trace test indicates 2 cointegrating equation(s) at the 5% level				
Trace test indicates 1 cointegrating equation(s) at the 1% level				
USA Series: SMI IR IFR SENT2				
Hypothesized		Trace	5 Percent	1 Percent
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None *	0.739901	50.96123	47.21	54.46
At most 1	0.394580	19.98732	29.68	35.65
At most 2	0.191543	8.445165	15.41	20.04
At most 3	0.143202	**3.554728**	**3.76**	6.65
*(**) denotes rejection of the hypothesis at the 5%(1%) level				
Trace test indicates 1 cointegrating equation(s) at the 5% level				

With: SMI: Stock Market Index; IR: Interest Rate; IFR: Inflation Rate and SENT: Investor Sentiment.

The tables above gather the trace tests and the critical values for the series to be studied (SMI IR, IFR, SENT1 and SENT2). We notice that the trace λ is lower than the given critical value (λ < 3.76), we accept Hº, and hence the existence of at least a cointegration relationship between the different variables, this verifies that there is a long term relationship, especially, between the investor sentiment and the Covid-19 crisis.

Table no IV: The results of the study

	France			USA		
Variables	Model 1	Model2	Model3	Model1	Model2	Model3
IR	-0.562038***	-0.431876**	-0.423766**	-0.174868*	-0.225700**	-0.204554**

Journal of Ecohumanism
2025
Volume: 4, No: 4, pp. 518– 525
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i4.6757

	(-3.211745)	(-2.380378)	(-2.470584)	(-1.677494)	(-2.299334)	(-2.030391)
IFR	-0.258649***	-0.25417***	-0.22977***	-0.183014**	-0.20042***	-0.189922**
	(-8.549399)	(-8.793596)	(-7.534816)	(-2.383306)	(-2.985416)	(-2.738918)
C	0.822446***	0.769905**	0.823669***	0.775912***	0.761090***	0.760448***
	(17.54184)	(14.46235)	(19.16370)	(31.13763)	(34.10551)	(32.56819)
SENT1	-	0.002239*	-	-	0.005041***	-
		(1.810602)			(2.833230)	
SENT2	-		0.006446**	-	-	0.005817**
			(2.276481)			(2.454454)
R-squared	0.800990	0.827863	0.840381	0.474324	0.619695	0.591510
F-statistic	44.27374	33.66519	36.85446	9.925454	11.40628	10.13626
Prob(F-statistic)	0.000000	0.000000	0.000000	0.000847	0.000119	0.000248

(…) t-Statistic
*, **, *** significant at the 10%, 5%, 1% level respectively

With: SMI: Stock Market Index; IR: Interest Rate; IFR: Inflation Rate and SENT: Investor Sentiment.

The results show that the different models studied are globally significant for both countries (F-Statistic is significant at the 1% level for the different models). Overall, TI, TIF, SENT1 and SENT2 explain a significant share of stock market crisis development.

The real interest rate is statistically significant and negatively influences the probability of stock market crises. This result confirms the fact that market regulators adjust interest rates downwards in order to limit the consequences of bursting financial bubbles on economic activity. The inflation rate, on the other hand, is statistically significant and negatively influences the probability of a stock market crisis. This means that monetary stability increases the probability of a stock market crisis occurring.

The results of the estimation of the second and third models show that the sentiment variable is statistically significant and displays an expected positive sign. These results seem to be interesting, as they tend to confirm our basic hypothesis, according to which the higher the investor's sentiment, the higher the probability of a stock market crisis occurring. The introduction of the behavioral variable improves the statistical quality of the basic model. The "R-squared" statistic increases following the addition of the sentiment factor, which brings a gain in explanation of the order of 2% and 4% for French and 14% and 11% for the USA. The complete models show very satisfies results in terms of regression quality.

In conclusion, the variable representing investor sentiment provides incremental predictive power over the other explanatory variables used in the literature.

Conclusion

This work can be considered a pioneer study that analyses the link between the Covid-19 crisis and investor sentiment. Covid-19 pandemics affect companies, governments and essentially all financial market participants and individual investors. Our study was based on all companies belonging to the CAC40 and Down Jones index. The results show that taking psychological factors into consideration improves the explanatory and discriminating power of our warning model and proves to be effective in predicting stock market crises. Hence the importance of investor sentiment in the development of the Covid-19 stock market crisis. These results confirm that the Covid-19 crisis is positively and significantly explained by investor sentiment. The higher the investor sentiment, the higher the probability of the Covid-19 stock market crisis occurring. On the other hand, the interest rate and the inflation rate negatively influence the probability of a stock market crisis. Our study was applied to a limited sample and a short period of time, but the results obtained lead to new research directions.

Journal of Ecohumanism
2025
Volume: 4, No: 4, pp. 518– 525
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i4.6757

References

Akhtaruzzaman.M, Abdel-Qader.W, Hammami.H, Shams.S, 2021a, « Is China a source of financial contagion? » Finance Res. Lett. 38, https://doi.org/10.1016/j. frl.2019.101393, 101393.

Barberis.N, Shleifer.A and Vishny.R (1998), « A model of investor sentiment », Journal of Financial Economics 49, 307-343.

Black.F, 1986, « Noise », Journal of Finance 41, 529-543

Black.F, 1988, « An equilibrium Model of the Crash », NBER Macroeconomics Annual, 3, 269-275.

Bordo.M.D & Wheelock.D.C, 1998, « Price Stability and Financial Stability: The Historical Record », Federal Reserve Bank of St.Louis Review Sep/Oct., 41-62.

Brown. G.W & Cliff.M.T, 2004, « Investor sentiment and the near-term stock market », Journal of Empirical Finance 11, 1-27.

DeLong.J.B, Shleifer.A, SummersL.H and Waldmann.R.J, 1990, « Noise trader risk in financial markets », Journal of Political Economy 98, 703-738.

DeLong.J.B & Shleifer.A, 1991, « The stock market bubble of 1929: Evidence from closed end mutual funds », Journal of Economic History 51, 675-687.

Dickey.D.A & Fuller.W.A, 1979, « Distribution of the estimators for autoregressive time series with a unit root ». J. Am. Statist. Assoc 74, 427-31.

Dickey.D & Fuller.W.A, 1981, « Likelihood ratio statistics for autoregressive time series with a unit root ». Econometrica 49, 1057-7.

Fama.E.F & Schwartz.G.W, 1977, « Asset Returns and Inflation », Journal of Financial Economics 5, 115-146.

Fama.E.F, 1989, « Perspectives on octobre 1989 Or What did we learn from the crash? », Black Mondy and the Future of Financial Market 71-82.

Johanson.S, 1988. Statistical analysis of cointegration vectors. J. Econ. Dyn. Control. North-Holland 12 (2–3), 231–254, https://doi.org/10.1016/0165-1889(88) 90041-3 https://doi.org/

Mazur.M, Dang.M, Vega.M, 2021. «COVID-19 and the March 2020 stock market crash. Evidence from S&P1500». Finance Res. Lett. 38, 101690, https://doi.org/10.1016/j.frl.2020.101690.

Sharif.A, Aloui.C, Yarovaya.L, 2020, «COVID-19 pandemic, oil prices, stock market, geopolitical risk and policy uncertainty nexus in the US economy: Fresh evidence from the waveletbased approach», international review of financial analysis, 70, https://doi.org/10.1016/j.irfa.2020.101496.

Shiller.R.J, 1989, « Market Volatility », Cambridge, Mass MIT Press.

Shiller.R.J, 2000, « Irrational Exuberance », Broadway Books.

White.E.N, 1990, « The Stock Market Boom and Crash of 1929 Revisited », Journal of Economic Perspectives 4, 67-83

Zhang.D.Hu.M.Ji.Q, 2020, « Financial markets under the global pandemic of COVID-19». Finance Res. Lett. 36, 101528, https://doi.org/10.1016/j.frl.2020.101528.

Zouaoui.M, Nouyrigat.G et Francisca.B, 2011, « L'Apport du sebtiment de l'investisseur dans l'explication des crises boursière : Une analyse en données de panel », Management & Avenir, 1 n° 41 | pages 351 à 368.