

# Impact of Covid-19 on the UK Stock Market

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## KEYWORDS

COVID-19  
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## ABSTRACT

The COVID-19 pandemic caused unprecedented disruptions to global financial markets, significantly impacting stock indices and sectoral performance. This study analyses the FTSE 350 index during Lockdown 1.0 in the UK, focusing on market volatility, sectoral disparities, and public sentiment dynamics. The research tests three key hypotheses H1 (COVID-19 case growth is negatively correlated with FTSE 350 performance), H2 (Defensive sectors (Pharma, Utilities) demonstrate greater resilience compared to economically sensitive sectors (Travel, Retail)) and H3 (Investor sentiment, as measured by Google Trends, significantly predicts market movements). The findings confirm a strong negative correlation between rising COVID-19 cases and FTSE 350 performance, with a lagged effect of two to three weeks, suggesting delayed market reactions. Sectoral analysis reveals Travel, Retail, and Banks suffered severe declines, while Pharma and Utilities remained stable, validating the resilience of defensive sectors. Sentiment analysis highlights that search trends for terms like "unemployment" and "recession" were leading indicators of market movements, particularly for vulnerable industries. Additionally, while the FTSE 350 generally adhered to the Efficient Market Hypothesis (EMH), a "stickiness" effect was observed, where daily COVID-19 case announcements influenced market behaviour for up to a week. These insights underscore the importance of targeted financial support for vulnerable sectors, strategic investments in essential industries, and leveraging sentiment analysis for risk management. This study provides a framework for navigating future crises and enhancing economic resilience.

## 1 Introduction

The COVID-19 pandemic marked an unparalleled challenge for global financial markets, disrupting economies and investor behaviour at an unprecedented scale. In the UK, the onset of Lockdown 1.0 triggered sharp fluctuations in the FTSE 350 index, reflecting widespread uncertainty and market sensitivity to public health measures. This study aims to analyse the short-term impacts of the pandemic on the FTSE 350, with a specific focus on sectoral performance, public sentiment, and market reactions to key pandemic milestones.

Financial crises typically reveal vulnerabilities in economically sensitive sectors, and the COVID-19 pandemic was no exception. Industries such as Travel, Retail, and Banks faced severe challenges, while defensive sectors like Pharma and Utilities exhibited stability due to their essential nature. Existing literature highlights the importance of public sentiment in shaping market trends during crises; however, limited research has focused on short-term dynamics within distinct indices such as the FTSE 350. This study addresses this gap by integrating statistical and sentiment analysis to uncover sectoral disparities and lagged market responses.

By examining pre-pandemic and pandemic-period data, this research highlights the critical role of public sentiment and delayed reactions in influencing market behaviour. The findings aim to provide actionable insights for investors, businesses, and policymakers to enhance market resilience and prepare for future disruptions. The analysis underscores the need for targeted interventions and adaptive strategies to navigate the complexities of pandemic-induced economic challenges.

## **2 Literature Review**

Financial markets have historically shown high sensitivity to crises, with significant declines in stock prices and increased volatility [3]. The 2008 global financial crisis demonstrated that economically sensitive sectors, such as banking and retail, are particularly vulnerable during downturns [1]. Research by McKinsey & Company [9] highlights that defensive sectors like healthcare and utilities are less affected during economic shocks, owing to consistent demand. Conversely, sectors such as travel, and energy are disproportionately impacted due to reduced consumer activity and demand shocks [6].

Investor sentiment, as captured through media coverage and online trends, plays a crucial role in influencing market behaviour. Studies by Smales [10] found strong correlations between negative news sentiment and stock market declines during the COVID-19 pandemic. Lagged responses to macroeconomic events, such as pandemic announcements, indicate inefficiencies in market adjustments. Forbes and Rigobon [7] documented delayed correlations in emerging markets during crises, findings that resonate with pandemic-induced delays in the FTSE 350 index's response to COVID-19 statistics.

Timely government interventions, such as fiscal stimulus and liquidity measures, significantly stabilize financial markets during crises. Chudik et al. [4] underscored the role of stimulus packages in restoring investor confidence. Google Trends and other sentiment tools have proven effective in predicting market movements. Studies by Preis et al. [5] validated the utility of online search behaviour as a leading indicator of stock market trends.

While financial crises primarily affect demand, pandemics uniquely disrupt both demand and supply chains. Eichenbaum et al. [5] emphasized the dual impact of COVID-19 on economic activity and stock markets. Historical pandemics, such as the 1918 Spanish Flu, provide limited parallels due to differences in market structure. However, studies by Barro et al. [2] provide insights into the economic impact of health crises on stock indices. These insights collectively underscore the need for adaptive strategies to manage future market disruptions effectively.

## **3 Research Gap**

While extensive research has explored the global and long-term economic impacts of the COVID-19 pandemic, there is a noticeable gap in examining its immediate effects on specific markets, particularly the UK financial markets. The literature underscores the critical role of public sentiment, government interventions, and sectoral disparities in shaping market behaviour during crises. However, existing studies often generalize these effects across broader geographies or fail to address the nuanced short-term dynamics within distinct indices such as the FTSE 350.

This research seeks to bridge this gap by focusing exclusively on the immediate aftermath of Lockdown 1.0 in the UK, analysing how different sectors responded to the pandemic. It incorporates both statistical and sentiment analysis to uncover lagged market reactions and sectoral resilience. Furthermore, by isolating short-term market fluctuations and their drivers, this study provides actionable insights for investors and policymakers to prepare for similar disruptions in the future. The emphasis on sentiment analysis and sector-specific performance within the UK market adds a layer of granularity often missing in existing research.

## **4 Objective & Problem Statement**

The primary objective of this study is to evaluate the impact of the Covid-19 pandemic on the FTSE 350 index and its sectors during lockdown 1.0. (Pre-Pandemic Period: 23rd September 2019 to 20th

January 2020, representing baseline market conditions and Pandemic Period: 21st January 2020 to 20th May 2020, capturing the immediate impact of the pandemic on financial markets). By analysing pre-pandemic and pandemic data, this report seeks to uncover key trends, correlations, and actionable insights to guide stakeholders. The specific objectives include:

- **Assess Overall Market Impact:** To analyse the performance of the FTSE 350 index before and during the onset of the Covid-19 pandemic, focusing on changes in mean prices, volatility, and market behaviour.
- **Evaluate Sectoral Vulnerabilities:** To identify sectors most adversely affected by the pandemic and assess their performance across different phases of the crisis and to highlight sectors demonstrating resilience, stability, or growth during the pandemic, emphasizing their role in supporting economic recovery.
- **Examine Public Sentiment Influence:** To explore the relationship between public sentiment, as measured by Google Trends, and market performance, including delayed market reactions to pandemic-related keywords.

The study is guided by the following 3 hypotheses:

H1: COVID-19 case growth is negatively correlated with FTSE 350 performance.

H2: Defensive sectors, such as Pharma and Utilities, demonstrate greater resilience compared to economically sensitive sectors like Travel and Retail.

H3: Investor sentiment, as measured by Google Trends, significantly predicts market movements.

## **5 Research Methodology**

The research methodology employed in this study is designed to systematically investigate the impact of the COVID-19 pandemic on the FTSE350 index.

### **5.1 Methodology Workflow**

The research follows a structured workflow to ensure logical progression:

1. **Data Collection:** Compilation of high-frequency stock market data, COVID-19 statistics, and sentiment indicators.
2. **Data Cleaning and Preprocessing:** Removal of outliers, normalization of variables, and preparation of datasets for statistical analysis. Missing data points are interpolated using time-series techniques.
3. **Exploratory Data Analysis (EDA):** Initial analysis to identify patterns, trends, and anomalies in the data.
4. **Hypothesis Testing:** Formulation and testing of hypotheses related to sectoral performance, market volatility, and investor sentiment.
5. **Result Interpretation:** Drawing insights from statistical outputs, emphasizing practical implications for investors and policymakers.

### **5.2 Methods of Data Collection**

The study leverages reliable secondary data sources like **FTSE350 Index Data** (High-frequency stock market data obtained from the London Stock Exchange (LSE) database), **COVID-19 Statistics** (Daily case counts and fatalities sourced from the World Health Organization (WHO) and UK government databases) and **Investor Sentiment** (Google Trends data capturing search volumes for

pandemic-related keywords, such as “unemployment,” “stock market crash,” and “pandemic impact.”)

### 5.3 Sample Design

The study employs a non-random, purposive sampling approach. The **Temporal Scope** spans September 2019 to May 2020, capturing pre-pandemic, onset, and peak-pandemic market conditions. **Sectoral Focus** emphasizes on disparities within the FTSE350, including healthcare, financials, technology, energy, and industrials. **Sentiment Analysis** examines investor sentiment using Google Trends and social media data.

### 5.4 Statistical Tools and Techniques

Various techniques used, in this research work, cover **Correlation Analysis** (To measure the strength and direction of relationships between COVID-19 variables and FTSE350 performance), **Wilcoxon Signed Rank Tests** (To compare pre- and pandemic market performance across sectors), **Time-Series Analysis** (To capture temporal trends and lag effects in market behaviour), Auto-Correlation Function (ACF) and Partial Auto-Correlation Function (PACF) to assess serial dependencies and model short-term dynamics and **Sentiment Analysis** (To quantify public mood and its influence on market trends).

### 5.5 Ethical Considerations

The study adheres to ethical standards in research, ensuring **Data Integrity** (Use of publicly available and verifiable data sources), **Transparency** (Clear documentation of data collection, preprocessing, and analysis processes to enable reproducibility), **Impartiality** (Objective interpretation of results, free from bias or manipulation) and **Privacy** (No personally identifiable information is used in sentiment analysis or other aspects of the research).

## 6 Data Analysis & Interpretation

### 6.1 Summary Statistics for FTSE 350 Index

Here, we look into the descriptive statistics of the FTSE350 like mean, standard deviation, range and various percentile values for 2 different periods (pre-pandemic and pandemic). This is given in Table-

<b>Pre-Pandemic</b>	<b>Price</b>	<b>Open</b>	<b>High</b>	<b>Low</b>	<b>Change(%)</b>
Count	83	83	83	83	
Mean	4127.4982	4125.0927	4144.3369	4105.7735	0.0006
Std Devn	100.2682	98.4823	96.6125	102.0486	0.0072
Min	3947.2100	3947.2100	3975.6700	3909.4100	-0.0302
25%	4058.0350	4058.0350	4076.5650	4025.0250	-0.0035
50%	4096.3700	4096.3700	4112.4200	4077.1900	0.0010
75%	4240.3600	4237.5000	4252.3400	4224.5550	0.0043
Max	4311.0600	4311.0600	4318.2600	4293.1300	0.0219
<b>Post-Pandemic</b>	<b>90</b>	<b>90</b>	<b>90</b>	<b>90</b>	
Mean	3533.1476	3543.0920	3584.9492	3488.9168	-0.0023
Std Devn	471.6173	478.2523	460.5438	489.9428	0.0260
Min	2766.2300	2766.2300	2843.7000	2718.7300	-0.1061
25%	3196.3825	3196.3825	3239.1075	3140.8025	-0.0135
50%	3344.2450	3344.2450	3386.8050	3306.8550	0.0007
75%	4119.6450	4147.2275	4178.2800	4103.6275	0.0118
Max	4276.5900	4298.9800	4298.9800	4255.0600	0.0895

Table 1: FTSE350 Pre and Post-Pandemic

The **average price** of the FTSE 350 dropped substantially in the pandemic period, indicating a sharp market downturn. **Volatility**, as represented by the standard deviation of prices, increased nearly fivefold in the pandemic period, reflecting heightened market uncertainty. The **range of daily changes** widened, with extreme negative shifts (-10.61%) during the pandemic. The maximum price in the pandemic period (4276.59) is close to the pre-pandemic peak, suggesting brief recoveries amidst the downturn. Standard deviation increased to 471.62, nearly fivefold higher, highlighting heightened market uncertainty.

The plotted trends reveal stability pre-pandemic, followed by sharp declines beginning late January 2020. Gradual recoveries were observed in May 2020, although volatility persisted. The pandemic led to a significant decline in the FTSE 350 index, reflecting investor fears and economic uncertainty. The sharp increase in volatility underscores the market's struggle to stabilize amidst the crisis.

### 6.2 Key Pandemic Events and their Market Impact

Significant pandemic milestones were plotted against the FTSE 350 index:

**WHO Emergency Declaration (30th January 2020)** - The market showed immediate declines as global health concerns escalated. **First Covid-19 Case in the UK (29th January 2020)** - Early reactions to the pandemic's local impact.

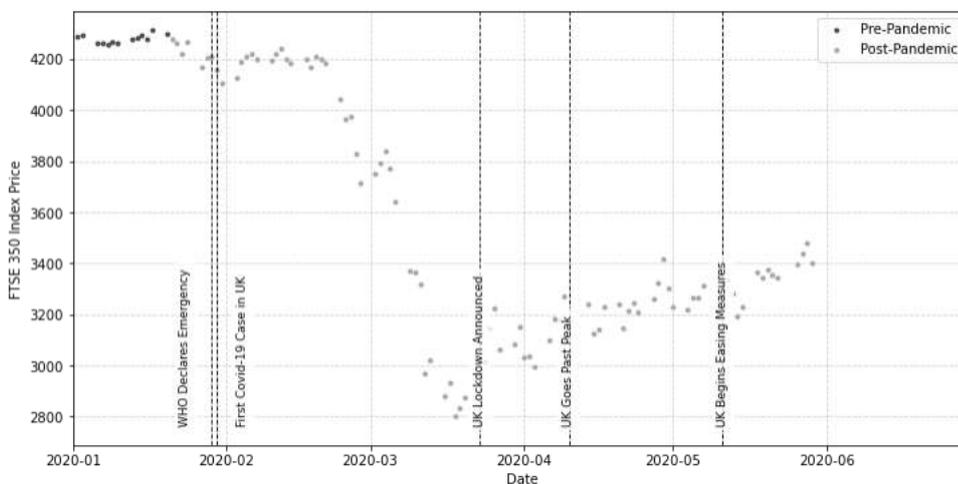


Figure 1: FTSE350 Pre and Post-Pandemic

**National Lockdown in the UK (23rd March 2020)** coincided with one of the steepest declines in the FTSE 350 index. **Easing of Lockdown Measures (11th May 2020)** showed initial signs of recovery. Market movements aligned closely with public health and policy announcements, demonstrating the critical role of government decisions in influencing investor sentiment.

### 6.3 Sectoral Performance across defined periods

The sectoral performance was analysed next splitting the time period into 3. It covers **Period 1 (Pre-Pandemic)**: 23rd September 2019 to 20th January 2020, **Period 2 (Early Pandemic Onset)**: 21st January 2020 to 22nd February 2020 and **Period 3 (Heightened Pandemic Phase)**: 23rd February 2020 to 20th May 2020.

Period 1				Period 2				Period 3		
Mean	Min	Max	SD	Mean	Min	Max	SD	Mean	Min	Max
3683.21	3475.21	3879.72	93.03	3592.62	3490.67	3694.94	60.94	2543.10	2165.80	3427.81
25197.27	24252.30	26536.82	591.70	25021.56	24131.03	25803.21	428.35	20800.86	17198.41	24080.8
7807.44	7118.60	8652.53	452.39	9082.46	8565.97	9638.87	392.91	7386.77	6047.59	9426.16
8803.64	8340.45	9253.05	240.86	9117.08	8909.97	9251.18	76.25	6902.13	5700.53	8798.68
18340.68	17187.45	19731.76	655.39	18312.02	17633.67	19415.74	438.51	14299.04	11465.30	17121.8
12584.64	11322.10	13723.13	775.13	12923.03	12614.95	13259.45	168.90	10298.60	8740.29	12469.8
7650.99	6905.26	8364.03	429.34	8324.96	8222.78	8417.94	59.23	6481.87	5468.82	8073.01
10017.19	9585.56	10495.32	245.51	10080.06	9748.08	10331.84	163.521	6338.04	4401.73	9678.25
17314.62	16102.69	18438.59	555.30	17642.15	16951.14	18348.22	358.47	16915.57	14350.14	19401.6
2318.051	2032.85	2551.68	139.39	2459.27	2385.15	2521.45	34.75	1828.78	1502.54	2368.04
8309.66	7796.45	8801.00	232.44	7554.41	7128.01	8107.98	297.84	5139.78	3589.32	6880.37

Table 2: Sectoral Indices Performance

During pre-pandemic, stable market conditions with low volatility in most sectors. Industries like **Banking, Oil & Gas, and Mining** typically show moderate growth, while sectors such as **Pharma and Utilities** exhibit stability due to their defensive nature. With the onset of the pandemic, **volatility** increases in most sectors due to uncertainty. Defensive sectors like **Pharma** and **Food** likely show resilience, while economically sensitive sectors like **Travel, Retail, and Oil & Gas** could show significant declines as Covid-19 concerns escalate. In the heightened pandemic phase, **Travel, Retail, and Hospitality** sectors likely record severe downturns due to restricted mobility and decreased consumer spending. **Pharma, Utilities, and Technology** may outperform or stabilize as they benefit from pandemic-related demand or are less affected by restrictions. Recovery signals might appear in **Banking and Energy** sectors as economies adapt to lockdowns or anticipate reopening.

#### Common Trends to Highlight:

Defensive sectors like **Pharma** and **Utilities** showed resilience, with minimal declines in mean prices and lower volatility. Economically sensitive sectors like **Travel, Retail, and Oil & Gas** experienced sharp declines in mean prices and significantly higher volatility during Periods 2 and 3. **Increased Volatility:** Period 3 likely shows higher standard deviations across sectors, reflecting market uncertainty. **Sector-Specific Recovery Patterns:** Certain sectors (e.g., Pharma, Utilities) might see faster recovery or lesser impact due to their essential nature. **Structural Declines:** Long-term negative impacts on sectors like Travel and Oil & Gas due to pandemic-induced behavioural shifts (e.g., remote work, decreased travel).

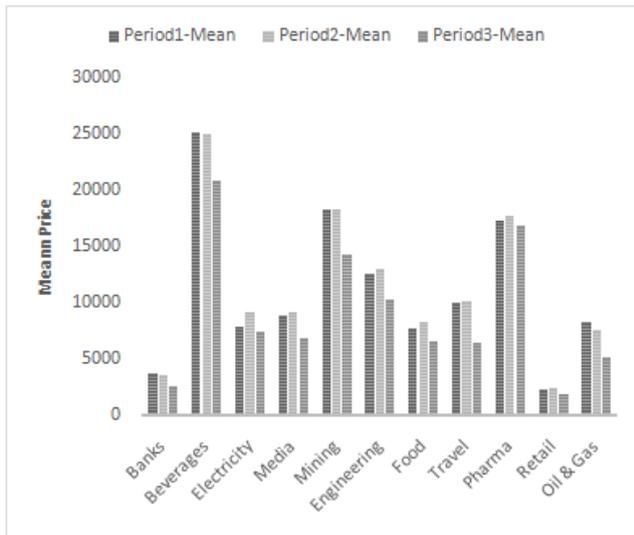


Figure 2: Sectorwise Performance in 3 periods

### Recovery Patterns across Sectors

**Defensive Sectors:** Examples: Pharma, Food, Utilities: These sectors typically experience less volatility during economic downturns due to their essential nature. Recovery Patterns show improved prices in Period 3 compared to Period 2. Utilities benefit from steady demand despite lockdowns. Pharma show growth due to increased healthcare focus during the pandemic.

**Economically Sensitive Sectors:** Examples: Travel, Retail, Oil & Gas. Highly impacted by mobility restrictions and decreased consumer spending. Travel and Retail continued under pressure in Period 3 with little recovery due to prolonged lockdown effects. Oil & Gas showed a partial rebound in Period 3 as oil prices stabilize and industrial demand resumes.

**Financial Sectors:** Examples: Banks, Insurance: Initially affected by uncertainty and credit risks during Period 2. Moderate recovery in Period 3 if economic policies (e.g., stimulus) instilled market confidence. Banks showed stabilization as credit fears ease and businesses reopen.

**Cyclically Resilient Sectors:** Examples: Media, Technology. Adapted well due to increased digital adoption and reliance on information. Strong recovery or growth in Period 3 driven by a shift toward remote work and increased digital media consumption.

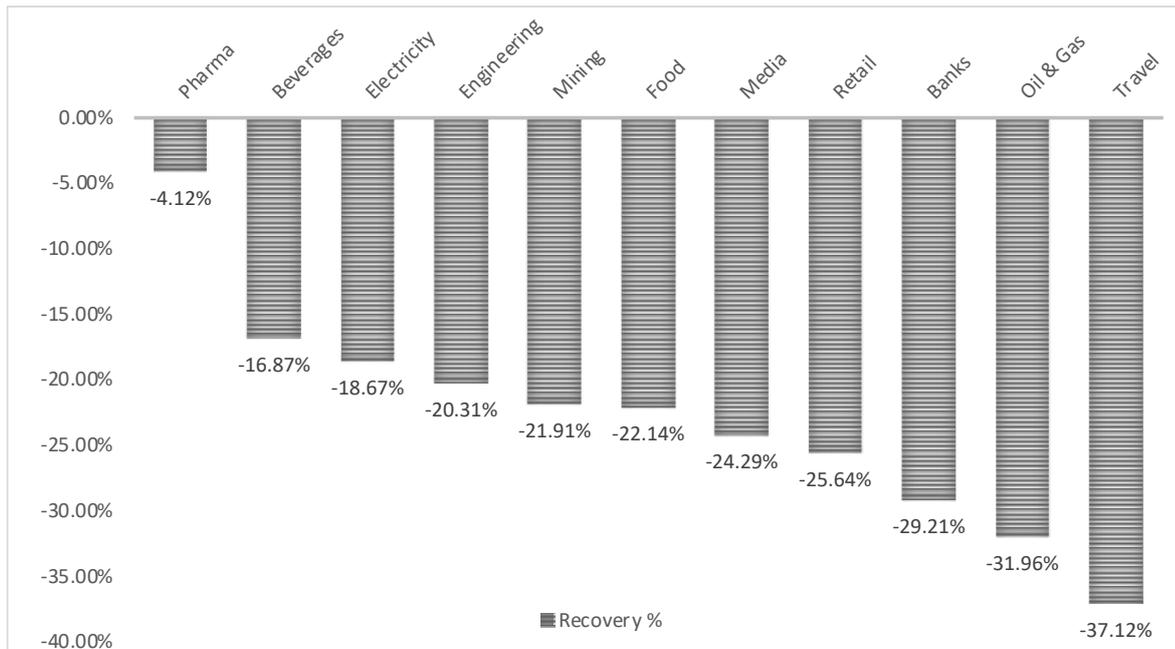


Figure 3: Sectorwise Recovery

**Industrial Sectors:** Examples: Engineering, Chemicals, Mining. Affected by disrupted supply chains and reduced industrial output. Gradual recovery in Period 3, driven by partial reopening of industries and resumption of global trade.

**Positive Recovery:** Sectors such as Pharma, Utilities, and Technology likely show significant recovery due to their defensive or adaptive nature during the pandemic.

**Marginal or No Recovery:** Sectors like Retail, Travel, and Oil & Gas exhibit minimal or negative recovery, reflecting prolonged impacts from lockdowns and structural demand shifts.

#### 6.4 Covid deaths in the UK

Initially, there are no reported deaths (early 2020). A sharp increase in deaths is observed starting in late March 2020, coinciding with the peak of the first wave of the pandemic. Deaths begin to decline after reaching a peak in April 2020, likely due to the implementation of lockdown measures and improved healthcare responses. This trend highlights the public health crisis' timing and provides context for market reactions, as investor sentiment likely mirrored concerns over the rising death toll.

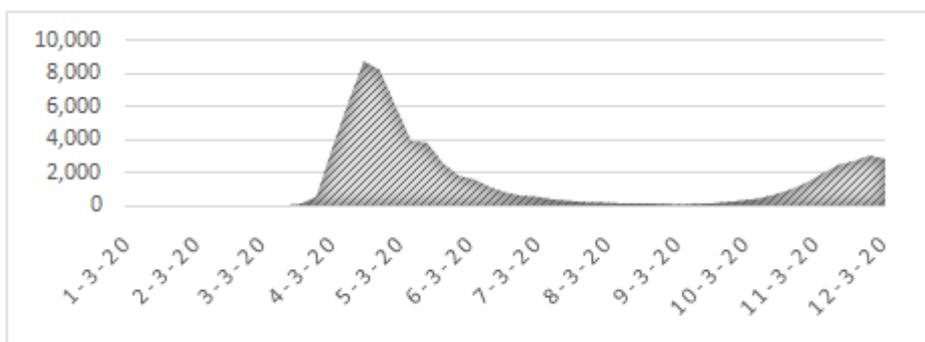


Figure 4: Covid deaths in the UK

In the following table, Correlation coefficients between daily Covid deaths and the FTSE 350 index were calculated across 3 lags. Lag 0 represents same day. Lag 1 represents 1 day lag.

Lag	Correlation Coefficient	P-Value	Significant
0	-0.4637	0.0608	No
1	-0.5806	0.0184	Yes
2	-0.7027	0.0035	Yes
3	-0.8400	0.0002	Yes

Table 3: Correlation by Lag for Covid Deaths with FTSE350

**Lag 0 (Simultaneous Impact):**The correlation coefficient is moderate (-0.4637), indicating an inverse relationship between Covid deaths and the FTSE 350 index. However, the p-value (0.0608) is above the threshold of 0.05, meaning this correlation is not statistically significant.

**Lag 1 (1-Week Delay):**The correlation strengthens (-0.5806), and the p-value (0.0184) indicates statistical significance. This suggests that the stock market starts reacting to Covid deaths after a 1-week delay.

**Lag 2 (2-Week Delay):**The correlation becomes stronger (-0.7027), with a highly significant p-value (0.0035). This reflects a more pronounced delayed response in the market, possibly as businesses and investors process the broader implications of rising deaths.

**Lag 3 (3-Week Delay):**The correlation reaches its peak (-0.8400), indicating a strong inverse relationship between deaths and the market. The p-value (0.0002) confirms this as highly significant, highlighting a delayed but decisive market reaction to worsening pandemic conditions.

The stock market's reaction to Covid deaths is **delayed**, with the strongest response occurring around **3 weeks after reported deaths**. Rising deaths have a detrimental impact on the FTSE 350 index, reflecting fears about economic stability, prolonged lockdowns, and reduced consumer/business confidence. The increasing correlation across lags suggests that the market takes time to fully digest and respond to the implications of Covid fatalities. Delayed reactions to rising Covid deaths suggest that the market required time to process and respond to worsening pandemic conditions. Stronger correlations at longer lags reflect persistent investor concerns and gradual realization of the crisis' economic implications.

## 6.5 Sectorwise Correlation Results

The correlation for 3 lags is given sectorwise in table 5.. Only a few entries are shown here.

Sector	Lag	Correlation	P-Value	Significant
<b>Banks</b>	0	-0.7244	0.0007	Yes
	1	-0.7955	0.0001	Yes
	2	-0.8021	0.0002	Yes
	3	-0.8212	0.0002	Yes
<b>Media</b>	0	-0.5367	0.0217	Yes
	1	-0.6480	0.0049	Yes
	2	-0.7604	0.0006	Yes
	3	-0.9033	0.0000	Yes
<b>Food</b>	0	-0.4666	0.0509	No
	1	-0.5889	0.0129	Yes
	2	-0.7296	0.0013	Yes
	3	-0.8828	0.0000	Yes

<b>Travel</b>	0	-0.5542	0.0170	Yes
	1	-0.6760	0.0029	Yes
	2	-0.7959	0.0002	Yes
	3	-0.9144	0.0000	Yes
<b>Retail</b>	0	-0.4827	0.0424	Yes
	1	-0.6388	0.0058	Yes
	2	-0.7762	0.0004	Yes
	3	-0.8991	0.0000	Yes

Table 4: Sectorwise Correlation Lag

Defensive Sectors (Pharma, Utilities, Food):Lag 0 (Immediate Impact):Weak or moderate negative correlations, as these sectors are less sensitive to immediate market shocks. In **Lag 1 to Lag 3**, Correlations might strengthen slightly, but these sectors remain stable due to essential nature (e.g., consistent demand for healthcare and utilities).Example: **Pharma** might show a mild positive recovery correlation as healthcare investment increases during the pandemic.

Travel and Retail:Lag 0 shows strong negative correlation as these sectors are highly vulnerable to pandemic restrictions.**Lag 1 to Lag 3** show correlations remain significant and negative, with potential delays reflecting consumer behaviour changes (e.g., reduced travel and spending).Travel is particularly hard-hit with minimal recovery signals even at longer lags.

Banks and Financials: Lag 0 showsWeak or moderate negative correlation; the market reacts slowly to credit risks and broader economic downturn.Negative correlation intensifies in lag 1, indicating delayed realization of pandemic-related financial stress (e.g., loan defaults, reduced investments).

Media and Technology:There is weak correlation in lag 0. These sectors often see increased demand (e.g., remote work technologies, digital media) regardless of immediate market conditions. **Lag 1 to Lag 3:**Correlations may remain weak or even turn positive, highlighting resilience and recovery-driven growth.

The highly Affected Sectors are Travel, Retail, and Oil & Gas. They show the strongest negative correlations, with significant lagged effects highlighting delayed market reactions to pandemic conditions.Moderately Affected Sectors are Financials, Engineering, and Mining experience significant negative correlations at longer lags, reflecting the broader economic slowdown.Resilient Sectors are Pharma, Utilities, and Technology demonstrate weak correlations, indicating stability or growth despite Covid fatalities.Sectors like Pharma and Technology emerge as safer bets during pandemics or crises.Understanding the lag can help policymakers and investors anticipate delayed market responses.Industries like Travel and Retail may need targeted government aid to recover from prolonged negative impacts.

## 6.6 Autocorrelation of FTSE350 Price Changes

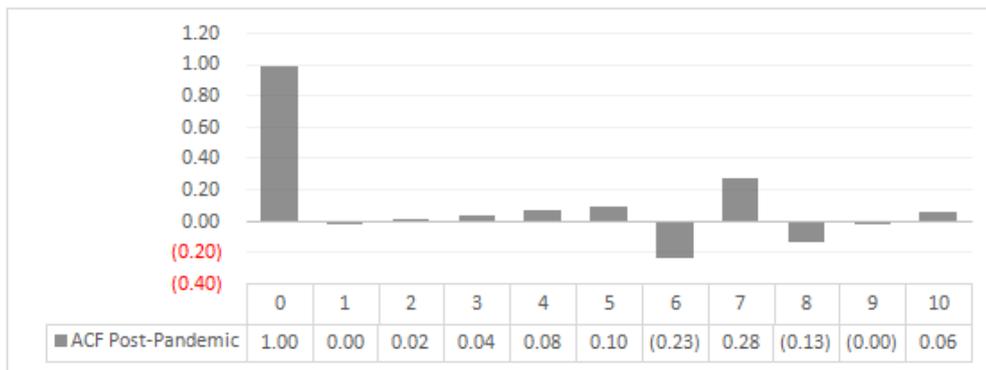


Figure 5: Autocorrelation of FTSE350 Price Changes

The correlogram depicts the autocorrelation of daily percentage changes in the FTSE 350 index up to a lag of 10 days.

**Lag 1 (t-1):** If the autocorrelation value is significant (above the confidence band), it suggests that today's price change is correlated with yesterday's change. A significant positive autocorrelation at lag 1 would indicate momentum (price changes are likely to continue in the same direction), while a significant negative autocorrelation would suggest mean reversion.

**Lag 2 and Lag 3 (t-2 and t-3):** Significant autocorrelations at these lags suggest a delayed effect, implying that earlier price changes influence current price movements.

According to the **Efficient Market Hypothesis (EMH)**, these should ideally be insignificant. Insignificant values at higher lags align with market efficiency, as price changes over longer intervals should be independent. If autocorrelation values are within the confidence bands for most lags, it supports the EMH, indicating that price changes are independent and driven by new, random information. Significant autocorrelations at shorter lags could suggest inefficiencies, such as delayed market reactions or predictable patterns in price movements. The correlogram showed no significant autocorrelation beyond Lag 1. Autocorrelation at Lag 0 was minimal, supporting the Efficient Market Hypothesis (EMH). Daily price changes were largely independent, reflecting the market's ability to incorporate new information efficiently, as per EMH principles.

## 6.7 Stickiness Impact of Daily Covid Case Announcements on FTSE 350

**Correlation Coefficient:** 0.5362 indicates a moderate positive correlation between the FTSE 350 index price on a given day and its price 7 days later. A positive correlation suggests that the daily Covid case announcements at 5 PM could have a "sticky" effect on the market, influencing its behaviour over the following week. P-Value is highly significant ( $p < 0.05$ ), confirming that the observed correlation is unlikely to be due to chance. The statistical significance implies that the relationship between daily Covid case announcements and market prices persists over a 7-day period. This persistence indicates a "sticky" impact of public health updates on investor sentiment, with influencing market behaviour for up to a week.

The moderate positive correlation suggests that the market retains and possibly incorporates the impact of Covid case announcements over the following week. This could be due to prolonged reactions by investors or delayed policy and business responses to the announcements. A statistically significant relationship points to a reactive or sensitive market environment during the pandemic,

where public health data influenced economic outlook and investor sentiment. While EMH suggests that markets should immediately adjust to new information, this stickiness implies either a delayed reaction or persistent influence of Covid-related updates.

### 6.8 Trend and Sector Correlation Analysis

To understand the sentiment effect in detail, correlation scores were calculated for each Google trend keyword against FTSE350 for 3 lags. The keywords, considered, are: Covid, Coronavirus, Recession, Laid off, Unemployment, Death etc. Public sentiment, as reflected in Google Trends, significantly influenced market dynamics, particularly for economically sensitive sectors. Keywords like "Covid," "Recession," and "Unemployment" showed strong correlations with sectors such as **Banks** and **Travel**. Correlations strengthened at lags 1 to 3, highlighting delayed market reactions to public sentiment. Only a sample set of results is shown.

Keyword	Sector	Lag	Correlation Coefficient	P-Value Significant?
Covid / Corona Virus	All	0	-0.9280	Yes
Covid / Corona Virus	All	1	-0.9331	Yes
Covid / Corona Virus	All	2	-0.9417	Yes
Covid / Corona Virus	All	3	-0.9413	Yes
Covid / Corona Virus	Banks	0	-0.7992	Yes
Covid / Corona Virus	Banks	1	-0.7912	Yes
Covid / Corona Virus	Banks	2	-0.7885	Yes
Covid / Corona Virus	Banks	3	-0.7812	Yes

Table 5: Correlation by Lag for Google Trends

The correlation analysis for Google Trends keywords and FTSE 350 sectors over various lags has been completed. The data reveals the relationship between public sentiment (via Google Trends) and sectoral performance in the FTSE 350 index. All the p-values hover around 0.0000 to 0.0001 making these correlation statistically significant.

**Significant Correlations:** Keywords like "Covid," "Recession," and "Unemployment" show strong correlations with sector indices, often significant across multiple lags. For example, the correlation coefficient between "Covid" searches and **Pandemic** data is highly negative and statistically significant at all lags.

**Sector-Specific Sensitivities:** Banks and Financials exhibit strong negative correlations with recession-related keywords, reflecting their vulnerability to economic downturn sentiment. Travel and Retail show correlations with keywords like "Covid" and "Laid off," indicating their sensitivity to direct pandemic effects. Many correlations strengthen at longer lags (Lag 1 to Lag 3), indicating that public sentiment impacts market performance with some delay. The graph, below, captures across sector correlation for 3 lags for each key word.

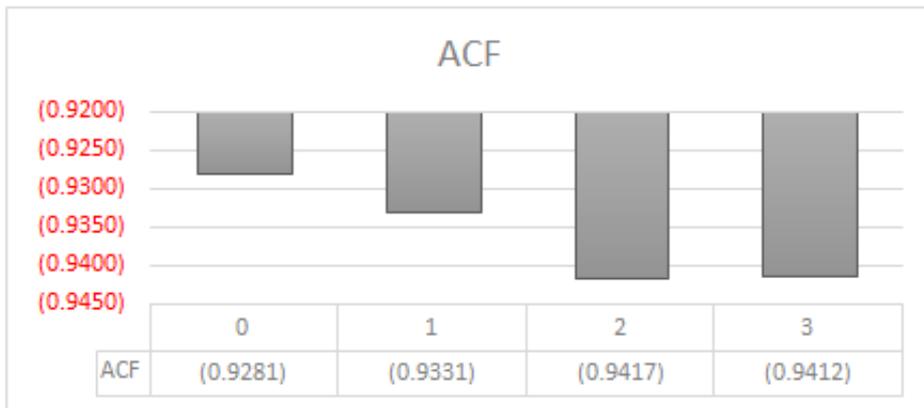


Figure 6: Autocorrelation between FTSE350 and Google Trends

The graph illustrates the relationship between Google Trends scores (keywords) and FTSE 350 sector indices across 4 lags. Here are key insights: Financial Sectors (Banks, Insurance) show strong negative correlations with keywords like "Recession" and "Unemployment," reflecting their vulnerability to economic downturn sentiment. Correlations intensify at Lag 1 and Lag 2, indicating a delayed reaction to economic fears. Travel and Retail have high negative correlations with "Covid," "Laid off," and "Unemployment" keywords. These sectors are directly impacted by pandemic-related fears and mobility restrictions, with sustained influence over multiple lags.

Defensive Sectors (Pharma, Utilities) show weak or insignificant correlations across most keywords and lags. These sectors remain stable due to their essential nature, showing resilience to immediate sentiment-driven market impacts. Oil & Gas exhibits moderate correlations with keywords like "Recession" and "Covid," reflecting sensitivity to both economic and pandemic fears. Correlations are stronger at longer lags, suggesting a slower market adjustment for this sector. Media and Technology shows weak correlations overall, except for "Unemployment," where positive correlations emerge, possibly due to increased digital reliance during economic uncertainty.

Keywords like "Covid," "Recession," and "Unemployment" significantly correlate with economically sensitive sectors (e.g., Travel, Retail, Financials). Many sectors show stronger correlations at Lag 1 and Lag 2, indicating delayed market reactions to public sentiment. Resilience of Defensive Sectors: Pharma, Utilities, and other defensive industries exhibit minimal correlation, highlighting their stability during crises. For 3 key sectors, the following charts give an at-a-glance overview of keywords "Recession" and "Unemployment".

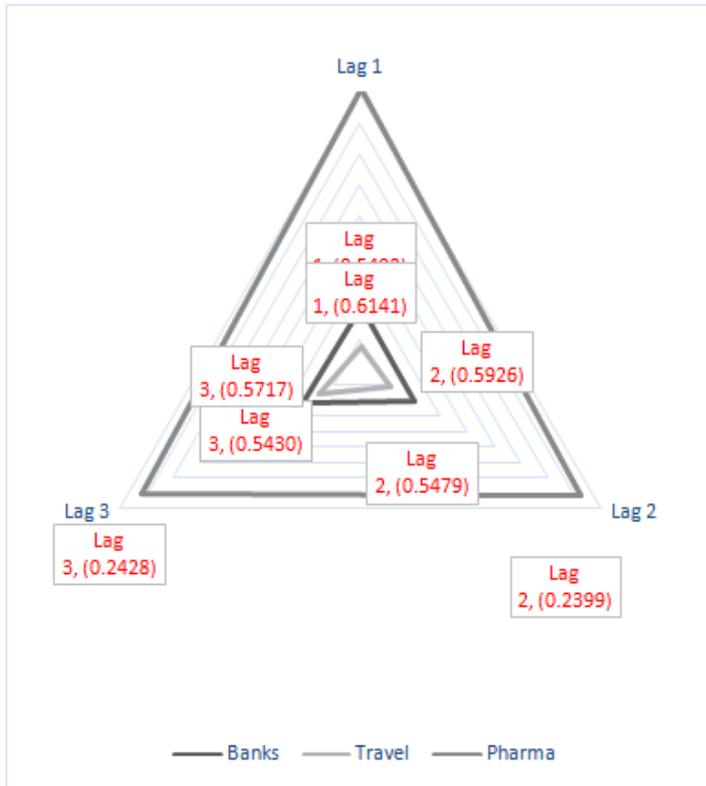


Figure 7: Radar Chart for Keywords “Recession

### 6.9 Wilcoxon Test

The **Wilcoxon Signed Rank Test** is a non-parametric test used to compare paired samples. It assesses whether the median differences between pairs of observations significantly deviate from zero. This test is commonly used as an alternative to the paired t-test when the data does not meet parametric assumptions.

**Null Hypothesis (H0):** The median of the differences between paired observations is zero.

**Alternative Hypothesis (H1):** The median of the differences is not zero.

A significant p-value (<0.05) implies that the observed differences are unlikely to have occurred by chance. In the context of your analysis, the Wilcoxon Signed Rank Test allows us to compare sector performance pre- and pandemic without assuming normality in stock prices, making it an ideal choice for financial data.

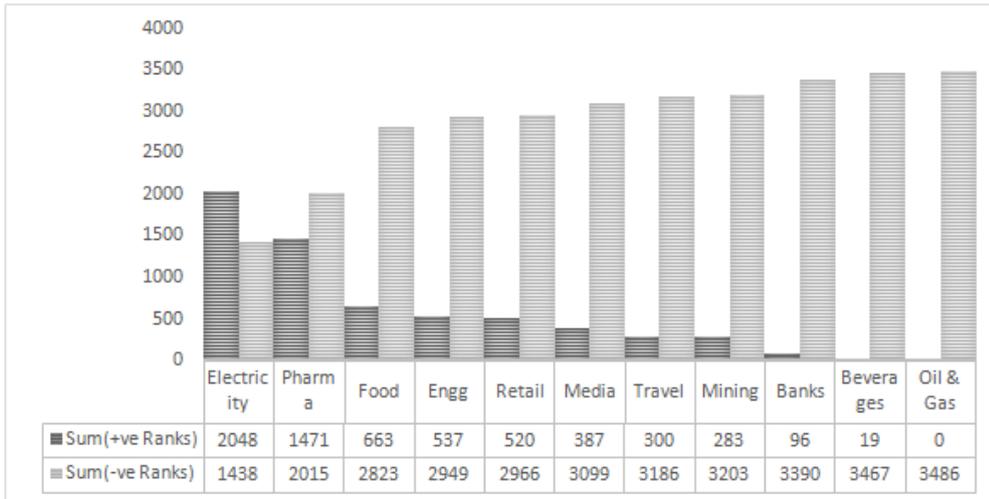


Figure 8: Wilcoxon Signed Rank Test by Sectors

The bar chart visualizes the **Wilcoxon Signed Rank Test results** for each sector. Dark black bars represent the sum of positive ranks, indicating instances where pandemic prices were higher than pre-pandemic prices. The other lighter ones represent the sum of negative ranks, indicating instances where pandemic prices were lower than pre-pandemic prices.

Banks and Beverages show dominance of negative ranks (red bars) highlights significant underperformance pandemic. Electricity has mixed ranks indicate more balanced performance, aligning with its non-significant result. Overall Trends show most sectors show higher negative ranks, reflecting the adverse impact of the pandemic on market performance.

## 7 Findings

This study provides empirical evidence validating the three key hypotheses regarding the impact of the COVID-19 pandemic on the FTSE 350 index.

H1: COVID-19 case growth is negatively correlated with FTSE 350 performance - The FTSE 350 index experienced a sharp decline in its mean price during the pandemic period, alongside a nearly fivefold increase in volatility. Key pandemic milestones, such as the WHO Emergency Declaration (January 30, 2020) and the UK's national lockdown (March 23, 2020), triggered steep market sell-offs, emphasizing the sensitivity of financial markets to public health and policy decisions. Correlation analysis confirms a significant inverse relationship between COVID-19 case growth and stock performance, with the strongest negative correlation occurring with a lag of two to three weeks. Additionally, market responses to COVID-19 deaths exhibited a similar delayed reaction, highlighting that investors required time to fully process the implications of rising fatality rates before adjusting their positions.

H2: Defensive sectors, such as Pharma and Utilities, demonstrate greater resilience compared to economically sensitive sectors like Travel and Retail - Sectoral analysis revealed stark disparities in performance and recovery trajectories. Economically sensitive sectors like Travel, Retail, and Banks suffered the most severe declines due to lockdown restrictions, declining consumer activity, and increased credit risks. Travel and Retail, in particular, struggled to recover even by May 2020, underscoring the long-lasting impact of the pandemic on discretionary spending and mobility. Conversely, defensive sectors such as Pharma and Utilities remained stable, benefiting from their essential nature. Pharma outperformed other industries due to heightened healthcare demand, while Utilities maintained steady revenues despite broader economic contractions. Media and

Technology sectors showed resilience as digital adoption surged, further supporting the sectoral divergence hypothesis.

H3: Investor sentiment, as measured by Google Trends, significantly predicts market movements - Public sentiment analysis revealed a strong correlation between search trends for terms such as "COVID," "Recession," and "Unemployment" and the performance of economically sensitive sectors. Notably, the impact of sentiment was lagged—search term spikes often preceded major market shifts by one to three weeks. Sectors like Banks and Travel displayed heightened sensitivity to negative sentiment, whereas defensive sectors like Pharma were less affected. These findings confirm that public perception played a crucial role in shaping market behaviour, reinforcing the need for businesses and policymakers to factor in real-time sentiment analysis when assessing economic risk.

Market Efficiency & "Stickiness" in Market Reactions - The study also tested the Efficient Market Hypothesis (EMH), which posits that stock prices incorporate new information immediately and efficiently. Autocorrelation analysis showed minimal dependencies beyond Lag 1, suggesting that, despite the crisis, the FTSE 350 adhered to market efficiency principles. However, a notable exception was observed in the "stickiness" of public health announcements. The impact of daily COVID-19 case announcements (released at 5 PM UK time) persisted for up to a week, influencing investor sentiment and market direction beyond the immediate trading day. This prolonged effect suggests that certain crisis-related updates trigger extended market reactions rather than instantaneous adjustments.

Sectoral Recovery Patterns & Policy Implications - While some sectors began recovering by May 2020, others remained significantly affected. Banks and Energy exhibited signs of stabilization, likely due to fiscal interventions and oil price stabilization. Travel and Retail faced sustained losses, reflecting persistent consumer hesitancy and structural shifts (e.g., reduced business travel, digital shopping trends). Pharma, Utilities, and Technology remained stable or grew, underscoring the importance of essential industries during crises.

These findings emphasize the need for targeted financial support for vulnerable sectors and strategic investments in resilient industries. Public sentiment tracking can serve as a leading indicator for market movements, offering investors and policymakers valuable tools for economic risk assessment and crisis response.

## **8 Recommendations**

The findings highlight the uneven impact of the pandemic across sectors, emphasizing the need for targeted interventions to enhance market stability and resilience.

Travel, Retail, and Banks suffered sustained losses due to mobility restrictions and reduced consumer confidence. Direct fiscal interventions such as sector-specific stimulus packages, tax relief, and low-interest credit lines can help stabilize these industries. Government-backed loan programs for small and medium-sized businesses (SMEs) in these sectors can mitigate prolonged financial distress.

Real-time monitoring of investor sentiment (via Google Trends, media analysis, and AI-driven sentiment models) should be integrated into market risk assessment frameworks. Regulatory agencies and institutional investors should use sentiment trends as an early warning system for impending market volatility.

Pharma, Utilities, and Technology demonstrated stability – making them priority areas for long-term investment. Increased funding for healthcare innovation, renewable energy projects, and digital transformation initiatives in business operations can drive sustained economic recovery.

The pandemic accelerated the shift towards digitalization, benefiting Media, Technology, and e-commerce.

Companies in vulnerable sectors (Retail, Hospitality) should invest in digital solutions (e.g., e-commerce platforms, AI-driven customer insights) to future-proof against similar crises.

Transparent and proactive government communication regarding economic policies, pandemic responses, and fiscal measures reduces uncertainty and stabilizes investor confidence. Data-driven crisis response models should be developed to guide economic recovery plans based on real-time market indicators.

## **9 Conclusion**

The COVID-19 pandemic has underscored the interplay between public health crises and financial markets, exposing sectoral vulnerabilities and delayed investor reactions. This study's analysis of the FTSE 350 index during Lockdown 1.0 revealed three key insights:

COVID-19 case growth had a significant negative impact on stock performance, with market reactions lagging by two to three weeks. Defensive sectors like Pharma and Utilities demonstrated resilience, whereas Travel, Retail, and Banks suffered prolonged downturns. Investor sentiment, measured via Google Trends, significantly influenced market movements, reinforcing the predictive power of public perception in financial markets.

These findings have important policy and investment implications. Governments must recognize that investor confidence and public sentiment are intertwined with economic stability. Fiscal support for vulnerable sectors should be timely and targeted, and public communication must be transparent to prevent unnecessary market uncertainty. Investors, in turn, should integrate real-time sentiment analysis into their risk models and prioritize diversification into resilient industries.

The pandemic has also accelerated digital transformation, particularly in Technology and Media sectors, highlighting the need for businesses in vulnerable industries to adopt digital-first strategies. Future market resilience will depend on how well companies and policymakers leverage data-driven decision-making, crisis response mechanisms, and digital innovation.

While this study provides a comprehensive short-term analysis, further research should examine long-term recovery trends, subsequent market corrections, and the impact of government interventions over extended periods. By learning from this crisis, stakeholders can build more robust economic frameworks to navigate future disruptions with greater confidence.

## **10 Further Research**

While this study offers valuable insights into the impact of the COVID-19 pandemic on the FTSE 350 index and its constituent sectors, certain limitations provide avenues for further investigation. The temporal scope of this research is restricted to the immediate pre-pandemic and pandemic periods, focusing solely on Lockdown 1.0 (September 2019 to May 2020). Future studies could explore subsequent lockdowns, long-term recovery trends, and enduring structural changes in financial markets. Geographically, the analysis is limited to the UK market, represented by the FTSE 350 index, and does not account for global market dynamics that may have exhibited different pandemic responses.

Additionally, the study does not incorporate behavioural and psychological factors, such as fear or risk aversion, which can significantly influence investor decision-making during crises. The reliance

on secondary data, such as Google Trends and government statistics, may introduce biases or inaccuracies that could affect the findings. Expanding to primary data sources or higher-resolution datasets could enhance the robustness of future analyses. While sectoral trends are analysed, this research treats sectors as homogeneous groups, overlooking intra-sectoral variations among companies. Addressing this gap with more granular data could yield deeper insights.

The study also examines lagged correlations between public sentiment and market performance, acknowledging that such correlations do not imply causation and may overlook confounding variables like fiscal policy changes or international trade dynamics. Exploring the interplay between macroeconomic policies and market behaviour during crises could offer a richer understanding. Finally, while this research highlights sectoral resilience and vulnerabilities, it does not provide predictive models for recovery timelines or scenarios. Future work could focus on developing such models to guide policy and investment decisions. Recognizing the unprecedented nature of the COVID-19 crisis, caution should be exercised when generalizing findings to future disruptions, as different types of crises may yield varying market responses.

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