Effat University
Effat College of Business
Master of Science in Finance

Impact of COVID-19 on Global Financial Stock Markets

Eman Faisal Hamza Alsayrafi

Thesis's Advisor: Dr. Rozina Shaheen

Spring 2021

Effat University

Jeddah, Saudi Arabia

Deanship of Graduate Studies and Research

This thesis, written by **Eman Faisal Alsayrafi** under the direction of his/her thesis supervisor and approved by his/her thesis committee, has been presented to and accepted by the Dean of Graduate Studies and Research on **Impact of COVID-19 on Global Financial Stock Markets,** in partial fulfillment of the requirements for the Master's Degree in Entrepreneurial Finance and Strategy.

Thesis Committee

Thesis Supervisor

Name:---Dr Rabiaa---

Signature:----------

Co-supervisor/member

Name:----------

Signature:----------

External Member

Name:----------

Title:----------

Signature:----------

Member

Name:----------

Title:----------

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ACKNOWLEDGEMENT

First and foremost, I wouldn’t have reached this point without Allah’s guidance and support.

I would like to express my deepest gratitude to my advisor, Dr. Rozina Shaheen, whose sincerity and encouragement I will never forget. Her guidance from the initial step in research enabled me to develop an understanding of the subject. I am thankful for the extraordinary experiences she arranged for me and for providing opportunities for me to grow professionally. It is an honor to learn from her.

I am extremely grateful for my father whom I lost at the beginning of this journey, which inspired me to use my grief to push myself to finish what I have started and make him proud. I have to express how honored I am to be his daughter. I am grateful for instilling me with a strong passion for learning and for doing everything possible to put me on the path to greatness. I will never forget the important values he has passed down to me—particularly perseverance, love and honesty. Words cannot describe how important he is to me. I will never let you down.

I am thankful for my mother, who’s my role model and always been an inspiration to me. She has been pillars of support, guidance, and love in my life since the day I was born. I owe my success to her. I want to thank her for always believing in me. I am who I am today because of her effort, guidance, and support (after Allah). I couldn't have done it without her.

Finally, my deepest gratitude to my siblings, who keep me grounded, wholeheartedly support me, and remind me of what is important in life, and are always supportive of my dreams and adventures.

DECLARATION OF AUTHENTICITY

I, **Eman Faisal Alsayrafi**, declare that all of the materials presented in this paper are my own work, or fully and specifically acknowledged wherever adapted from other sources. I understand that if at any time it is shown that I have significantly misrepresented material presented to Effat College of Business at Effat University, any degree or credits awarded to me on the basis of that material may be revoked.

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_____

College of Business Dean Signature:

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We hereby grant the approval of this dissertation report. The student has compiled the dissertation work as per the requirements of the university.

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Impact of COVID-19 on Global Financial Stock Markets

MFRS591- Thesis

Eman Faisal Hamza Alsayrafi

G19101418

Thesis's Advisor: Dr. Rozina Shaheen

Spring 2021

Abstract

The aim of this study is to empirically investigate the impact of COVID-19 on global financial stock markets. The main objectives are to examine the impact of COVID-19 on global stock market indices, along with the impact oil price change on the global stock market indices, and the impact of exchange rate changes on global stock market indices. This research specifies a model where stock market indices are expressed as a function of exchange rates, oil price shocks, and COVID-19 cases; and was tested using Autoregressive Distributed Lag (ARDL). The daily closing price of two major global stock indices, exchange rates, oil price, and COVID-19 patients' rate are obtained from January 2017 until March 2021. Findings reveal that the negative impact of pandemic on global stock markets has shown a significant effect two days after increments in the number of COVID-19 cases. Our findings contribute to the economic impact of the COVID-19 pandemic research by empirically demonstrating that the pandemic has a restrictive effect on stock market performance.

Chapter 1

Introduction

1.1 Background

1.1.1 COVID-19 Pandemic

Thanks to an unprecedented turn of events, the year 2020 is destined to be documented in history. The outbreak and the worldwide spread of novel coronavirus (COVID-19) disease has seriously impacted people's life and production. It has affected economies, environment, education, and a lot of other life's aspects. Severe challenges are being faced due to the COVID-19 outbreak. On January 30th, 2020, the World Health Organization issued its first global alert regarding COVID-19. On March 11th, 2020, as the number of confirmed cases rose worldwide, the WHO declared it as a pandemic. (WHO Emergencies Coronavirus Emergency Committee Second Meeting, 2020). Up to now, the countries with leading number of confirmed cases in the world include United States, India, Brazil, Russia, Colombia, Argentina, Spain and Peru. According to real-time statistical data released by Johns Hopkins University, as of October 8th, 2020, globally there have been 36,077,017 diagnosed cases of and 1,054,674 deaths from COVID-19 (COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU), 2020).

The disease appears to have arisen in the Wuhan seafood market, where wild animals are traded illegally, including dogs, birds, rabbits, bats and snakes. Coronaviruses are known to transfer from animals to humans, so it is believed that it was transmitted from contact with animals by the first people infected with the disease. The search of the main animal source of COVID-19 is yet unknown, although there are some strong candidates. The article "How coronavirus started and what happens next, explained" published by a team of virologists at the Wuhan Institute for Virology shows that the genetic makeup of the new coronaviruses is

96% similar to that of a coronavirus found in bats. Regardless of the fact that another publishes study argued that genetic sequence of the new coronaviruses is 88.5% to 92.4% similar to that of a coronavirus found in pangolins. However, some early cases of COVID-19 seem to have infected with no links to the Wuhan market at all, indicating that the initial infection might have been routed before the market cases (Reynolds & Weiss, 2020).

While coronavirus symptoms are often moderate, fever and dry cough are the most common symptoms. However, in some cases, they can lead to severe respiratory failure. In older patients, or people who have chronic health conditions, this may be especially dangerous. An analysis of 44,415 early Chinese COVID-19 patients showed that 81% of people with reported infections encountered only moderate symptoms. Furthermore, 14% suffered severe symptoms and around 5% of the cases were critical, suffering respiratory failure, or multiple organ failure. Nonetheless, as things in China were slowing down, the epidemic began to pick up in the rest of the world. Now, cases have been confirmed in at least 200 countries and territories. Although there is still a significant increase in the number of new infections, people are still recovering from the infection. 2,288,965 individuals have recovered from COVID-19 worldwide, which represents around 41% of all individuals with reported infections. Said that, a vaccination for COVID-19 will not be available anytime soon. It is a relatively slow process to get vaccines to the market and any new vaccine would have to undergo several phases of safety and effectiveness testing. Once the vaccine has proven its success, there will need to be a mass production in order to cover the world's requirements. It's expected to be completed in approximately 18 months (Reynolds & Weiss, 2020).

1.1.2 The Economy

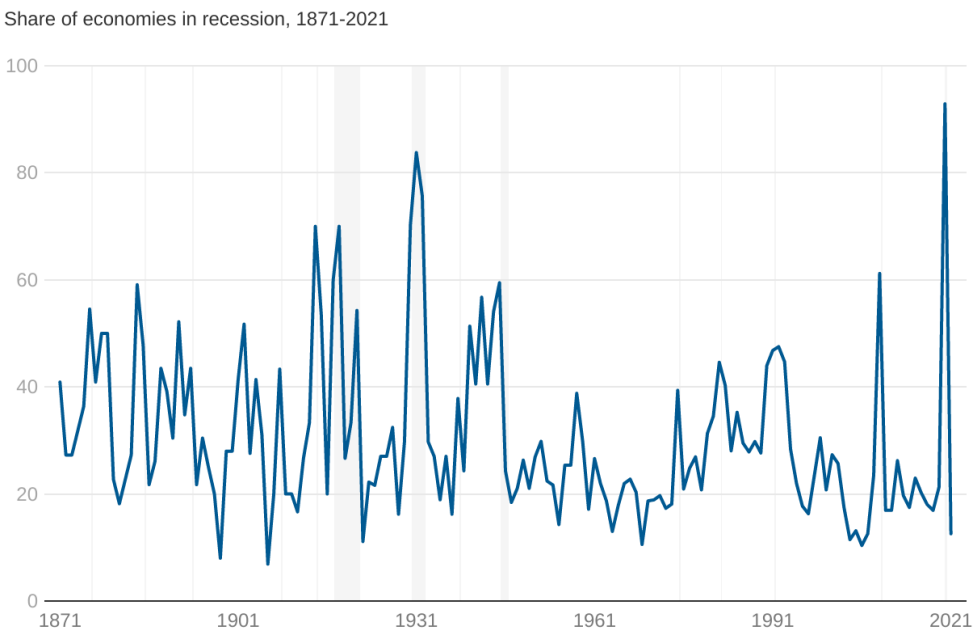
Global economic development was adversely impacted by the pandemic, much further than all that has been experienced in decades. As governments put tight restrictions on travel

to avoid the spread of the virus, the COVID-19 pandemic has spread with unprecedented intensity, infecting millions and bringing economic activity to a complete halt. While the magnitude of the direct effect is still uncertain, the pandemic has had a significant impact on real economic activity. The economic harm is already apparent as the health and human toll rises and reflects the greatest economic shock the world has witnessed in decades. The Global Economic Prospects for June 2020 outlines both the immediate and short-term viewpoint for the pandemic's effects and the long-term impairment it has caused to growth prospects. In 2020, the baseline forecast predicts a 5.2% decrease in global GDP, using market exchange rate weights— greatest global recession in decades, regardless of the exceptional efforts of governments to fight the recession with fiscal and monetary policy support. The deep recessions caused by the pandemic are projected to leave permanent scars over the long run through lower investment, the loss of human resources with lost jobs, and the disruption of global trade and supply chains. The outbreak highlights the need for immediate action to mitigate the health and economic effects of the pandemic, protect disadvantaged citizens and lay the foundations for a sustainable recovery (The Global Economic Outlook During the COVID-19 Pandemic: A Changed World, 2020).

In 2020, the pandemic is predicted to plunge most nations into recession, with per capita income decreasing since 1870 in the largest fraction of countries around the world. It is estimated that developed economies will shrink by 7%. That weakness will lead to a decrease in the emerging and developing economies which is projected to decline by 2.5% as they deal with their own domestic spreads of the virus. This will be the worst demonstration of this group of economies in at least 60 years (The Global Economic Outlook During the COVID-19 Pandemic: A Changed World, 2020).

Figure 1 shows the proportion of economies with an annual contraction in per capita GDP. Shaded areas refer to global recessions. Data for 2020-21 are forecasts.

Figure 1. The proportion of economies with an annual contraction in per capita GDP



Governments aim to reconcile sometimes conflicting policy objectives between tackling the public health crisis and economic issues that include, but aren't really limited to the following:

- Provide financial assistance to national health systems under pressure to develop vaccines, while at the same time financing to support and take care of infected people.
- Monetary and fiscal policies are being carried out to enhance credit market and maintain economic development, while also supporting companies in financial distress.

- Provide government-funded economic support to unemployed people or to people who were layoff from work due to the pandemic circumstances and help them maintain an income at least until this is over.

The rising list of economic figures makes it clear that the COVID-19 pandemic is having a negative impact on global economic growth in a sense that has not been seen since at least the 2008-2009 global financial crisis. A wide range of international economic and commercial activities are affected by COVID-19 from tourism and hospitality services, to medical supplies and other business models, electronic goods and financial markets, to energy, transport, food and a variety of social activities, to name a few. Predominantly, the health crisis is having a negative impact on developing countries' economies, which are restricted by scarce financial resources and where healthcare services have become increasingly overwhelmed. Correspondingly, there is high uncertainty of when this pandemic will be over, economic starts to recover and how fast it will be recovered. During the first three quarters of 2020, the forecasts were revised several times to integrate additional data, mainly reflecting the weakening predictions of global and national economic development, but also reflecting less adverse data in the third quarter. Interventions aimed at implementing social distancing to limit the spread of the virus are impacting the daily lives of people and it is contributing to the economic costs. The expanding of unemployment rates is increasing the possibilities of political instability in developed economies where lost stable income and health insurance are endangering their living standards. On the other hand, in developing economies, people are suffering to have bare necessities which contributes to an increasing level of poverty (Jackson, Weiss, Schwarzenberg, & Nelson, 2020).

The most critical and noticeable responsibility of the government is to protect the well-being of its citizens during emergencies such as the recent coronavirus outbreak. In October 2020, the International Monetary Fund (IMF) predicted that the economic damage from the pandemic could drive 100 million to 110 million people into acute poverty in Sub-Saharan Africa and South Asia, accelerating a decades-long trend. The IMF has suggested, however, that spending on social initiatives to mitigate the effect of the pandemic could reduce the number of people living in acute poverty to between 80 and 90 million. The forecasts are considered provisional since we still do not have a proper understanding on when will be the peak of the economic impacts. To aid countries suffering from the outbreak, the IMF has $50 billion available in fast-disbursing emergency funds. As Managing Director Kristalina Georgieva said, what we want is to ensure that, because of a lack of resources, people are not going to die (Gaspar & Mauro, 2020).

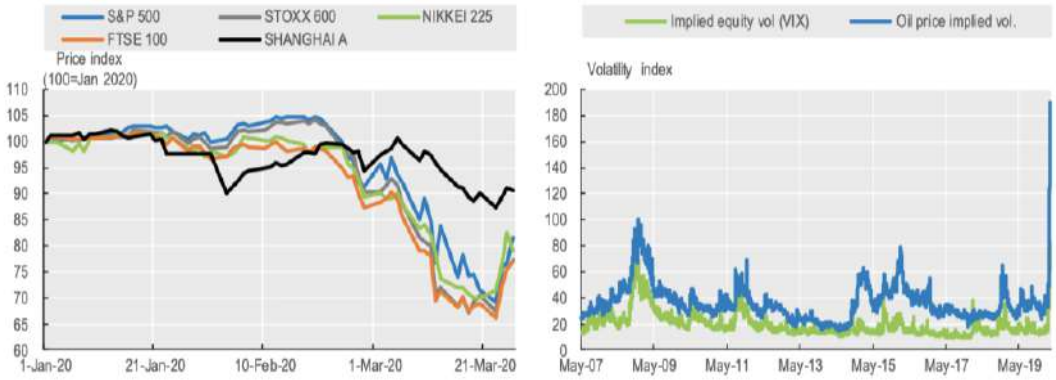
The harm has been significant already and has penetrated a surprising number of sectors. As previously stated, the markets reacted negatively to the sharp rise in cases outside China this week, with the Dow Jones Industrial Average dropping more than 1,000 points. Retail supply chains and others have been hit, factories have died down in China, and passenger air travel has been restricted. According to the London-based research firm Capital Economics, coronavirus-related economic instability is projected to deprive the world economy of productivity for the first time since 2009. “We assume the virus will be contained soon, and that lost output is made up in subsequent quarters, so that world GDP reaches the level it would have done had there been no outbreak by the middle of 2021,” the company said in a statement (Global uncertainty: The economic fallout from coronavirus, 2020).

1.1.3 Stock Markets

After the financial crisis of 2008, the rapid global spread of coronavirus and the economic effects of the epidemic have sparked the largest weekly stock market rout, wiping $6 trillion off global shares. Economists are ceaselessly reducing their predictions for business profits and economic growth with travel plans and conferences being cancelled, airlines grounded and even the Tokyo Olympic Games in question. Bond markets are definitely shouting recession alarms, with 10-year U.S. and German yields dropping 20 basis points a week, with the latter reaching record lows. As traders struggled to meet the margin calls triggered by the major stock market slide, even gold, the ultimate safe-haven, dropped. Nearly every single stock index in the world has spiraled down, but the majority was endured by developed markets. High-grade government bonds that benefited from the safety bidding and price rise projections were the winners of the week. Almost every stock market in the world has been negatively affected (Reuters, 2020).

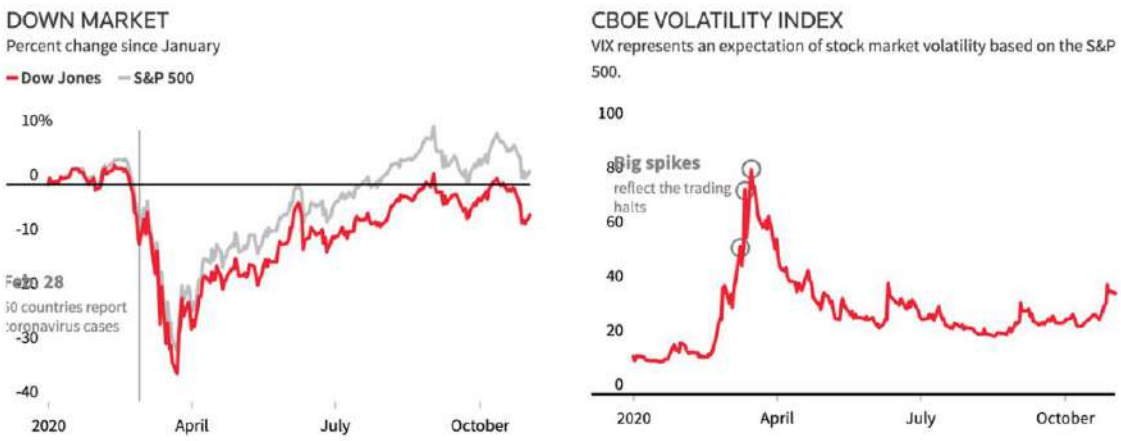
The economic effect of COVID-19 's global spread has raised investor risk appetite in ways that have not been seen since the global financial crisis. Stock markets have decreased by more than 30%; estimated equity and oil volatility has risen to recession levels; and treasury yields on non-investment-grade debt have increased dramatically as investors reduce disruption (shown in Figure 2 below). In spite of the significant and comprehensive economic regulation negotiated by the G20 financial authorities in the post-crisis period, this heightened instability in global financial markets is taking place. These problems are somewhat different from the previous financial crisis, too. It calls for a realistic evaluation of the evolving nature of global markets and financial intermediation in the post-crisis period to consider existing market fragility, and economic impacts (Global financial markets policy responses to COVID-19, 2020).

Figure 2. Equity prices of major benchmarks and selected implied volatility indices



Due to confusion around the global coronavirus pandemic, the Dow and S&P 500 have also seen declines, while the Chicago Board of Exchange Volatility Index has been increasing steadily since mid-February as the virus started spreading around the world. The pandemic has created such volatility around the world that the Dow Jones Industrial Average has seen two of the biggest single day declines since March 2020 (shown in Figure 3 below) (Funakoshi & Hartman, 2020).

Figure 3. Down Market and CBOE Volatility Index



In the face of the recession, the stock market is expected to remain resilient. And higher stock prices during recessions are not unusual: stocks have risen in seven of the last 12 recessions, with a median advance of 5.7%, according to LPL Financial, dating back to World War II. This year's rally has been fuelled by high-flying stocks such as Apple , Microsoft and Google parent Alphabet, far outpacing the rest of the market as investors speculated strongly that they will succeed in a stay-at - home economy. The first publicly traded firm to top a $2 trillion valuation was tech giant Apple. Big Tech makes up an outsized portion of the S&P 500, and it can have a significant negative impact on the index on the results of the largest stocks (Menton, 2020).

A detailed research on the economic effects of natural disasters, such as nuclear wars, climate change or national disasters, is presented in a recent longitudinal research, highlighting that the COVID-19 pandemic is causing unprecedented global economic distress.The pandemic could have a wide range of impacts on the financial sector, including stock markets, banking and insurance, and it is a potential opportunity for research (Ashraf, 2020).

It is essential to mitigate the responses of the individual to the pandemic. Not only in the healthcare sector, but also in the financial market, there was an epidemic. The relationships between COVID-19 outbreak and stock prices are discussed by several established studies. The tourism sector has faced the most extreme harm due to the fall in stock prices on the Stock Exchange during the epidemic time of the COVID-19. Furthermore, it was shown that investors overreacted to the spread of the corona virus in terms of the rapid fall in stock prices on the stock exchange. In certain recession periods, stock markets are more volatile on trading days than during non-crisis periods. The evidence produced by these empirical studies confirms that investors will respond to the outbreak of the corona virus by changing stock prices in the stock

markets of several countries. There was no prior outbreak of infectious disease, including the Spanish flu, has influenced the stock market as much as the COVID-19 pandemic. Actually, on the U.S. stock exchange, past pandemics left only mild residues. To establish these points with respect to significant daily stock market movements back in 1900 and with respect to overall stock market volatility back to 1985, they used text-based methods. Potential reasons for the unexpected stock market response to the COVID-19 pandemic were also evaluated. It has been suggested that the key reasons why the US stock market responded to COVID-19 so much more strongly than to previous pandemics in 1918-19, 1957-58 and 1968, is that there are government constraints on commercial activity, forcing social distancing and operating in a service-oriented economy with powerful consequences (Kotishwar , 2020).

1.2 Research Scope

The aim of this study is to empirically investigate the impact of COVID-19 on global financial stock markets, along with the changes in energy market and exchange rate, so our scope will be limited to the global stock markets and how they were financially behaving under the disease outbreak. It will also be an important contribution to the current studies that have been conducted in this area as there aren't much since the pandemic is relatively new.

1.3 Research Objectives

The main objectives of the study are to examine the impact of COVID-19 on global stock market indices, to estimate the impact of oil price change on the global stock market indices, and to investigate the impact of exchange rate changes on global stock market indices, which will be measured before and after the pandemic.

1.4 Research Questions

What is the impact of COVID-19 on global financial stock market?

What is the impact of oil price change on global financial stock market?

What is the impact of exchange rates on global financial stock market?

1.5 Problem Statement

Since the start of COVID-19 outbreak, world economies have been struggling to survive through this pandemic. Therefore, this research investigates the impact of COVID-19 on global financial stock market, along with the changes in energy market and exchange rate.

1.6 Research Hypothesis

H0: The COVID-19 has no impact on global financial stock market

H1: The COVID-19 has a negative impact on global financial stock market

1.7 Research Limitations

Since the pandemic is relatively new, and its effects are vague and cannot be precisely measured, we have faced limitation with the data availability and how much studies were written in the past about this matter. Also, we have done our research on two major global indices which provides a generic view of the outbreak impact. However, more specific results can be attained by examining certain type of markets or specific regions and inspect more variables that can measure the pandemic impact on stock markets. Additional research is required given the fact that this is still a new and evolving pandemic, no one can predict when it will end with certainty.

Chapter 2

Literature Review

Over the period from March 10th to April 30th, 2020, the main objective of Topcu and Gulal (2020) research was to investigate the impact of COVID-19 on emerging stock markets during that period. The results indicate that the negative effect of the pandemic on emerging stock markets has steadily decreased and started to diminish by mid-April. Regarding the regional distribution, the influence of the pandemic was the highest in emerging markets in Asia, while it was the lowest in European emerging markets. The size of the government's spending plan and the official reaction time to pandemic are significant in compensating for the impact of the pandemic.

"SutteARIMA: Short-term forecasting method, a case: Covid-19 and stock market in Spain" research paper intended to predict the instant use of the SutteARIMA method for reported cases of COVID-19 and IBEX stock market data in Spain. The collected data was obtained for the period from February 12th 2020 to April 9th 2020 (i.e. the date of reporting COVID-19 cases in Spain). Data from February 12th 2020 to April 2nd 2020 was used for data fitting with the period from April 2nd 2020 to April 9th 2020. The authors were trying to assess forecasting methods. In order to do so, mean absolute percentage error (MAPE) and forecasting accuracy measures were applied. As a result, it has been concluded the SutteARIMA method is better in determining the daily forecasts of confirmed cases of COVID-19 and IBEX in Spain. COVID-19 and IBEX Stock forecasting in Spain will lead to the policymaker's idea of making decisions for the future (Val & Ahmar, 2020).

"Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns" research paper was conducted to measure and investigate the degree of the

impact of infectious diseases on stock markets results. Panel data analysis have been utilized to evaluate the impact of COVID-19, which is considered as an infectious disease, on stock market of China. The study concluded that there is a noteworthy negative impact of COVID-19 total daily confirmed cases and the total death cases on stock proceeds of all companies (Al-Awadhi, Alsaifi, Al-Awadhi, & Alhammadi, 2020).

The relationship and connection between the effect of a pandemic and economic decisions was investigated by Eichenbaum, Rebelo, and Trabandt (2020) in a research paper. Their model suggested that as determined by total deaths, people's decision to cut back on consuming and employment decreases the intensity of the epidemic. Consequently, these decisions worsen the recession's magnitude resulted from the pandemic. The competitiveness is not socially desirable since the influence of the economic choices of infected individuals on the spread of the virus is not completely internalized by them. The findings of the research point out that the strongest clear containment strategy raises the recession's intensity but saves nearly half a million lives in the United States.

About 1.4 million confirmed cases and over 83,000 deaths worldwide have resulted from the COVID-19 pandemic. It has caused fears of potential financial crisis and recession. In all economic sectors, social distancing, quarantine, curfew and travel restrictions imposed a drop in the workforce and caused a lot of people to lose their jobs. There has been a decline in the demand for goods and manufacturing goods, besides schools have shut down completely. On the other hand, the demand for medical equipment has risen dramatically. Thanks to the buying mania and hoarding stocks of food products, the food industry has also seen a significant increase in the demand. Consequently, the authors summarized the socio-economic impact of COVID-19 on different aspects of the global economy, in response to this worldwide

pandemic. It was confirmed that in times like these, strong and robust leadership is required in business, healthcare, government and society. In order to re-balance and re-energize the economy, following this crisis period, medium and long-term future planning is required. It is wise for governments and financial institutions to regularly re-evaluate the political situation and ensure that they are doing whatever it takes to nourish the economy again (Nicola, et al., 2020).

Stock market response to the pandemic COVID-19, has stipulated new perception on how the company's value is impacted by financial policies and real shocks. Internationally focused firms especially those more related to trade with China, primarily performed poorly. As the pandemic spread to Europe and the United States, corporate debt and financial performance have appeared as significant value drivers. The results of the study show how the predicted real consequences of the health crisis, a rare catastrophe, have been compounded across financial markets (Ramelli & Wagner, 2020).

The exponential spread of COVID-19 has had a significant impact on the financial markets across the globe. It has generated an alarming degree of risk, resulting in a very short period of time for investors to incur substantial losses. This research paper studies the general patterns of country-specific risks and how it is represented with systemic risks in the global financial markets. Moreover, it examines possible outcomes of major policies, like the decision of the United States to apply a zero-percent interest rate, and at what degree these policies might cause additional uncertainties into financial markets around the world (Zhang, Hu, & Ji, 2020).

"The impact of COVID-19 on stock markets" research paper was conducted to assess the direct impact of spill-overs of COVID-19 on financial stock markets. The authors used Mann–Whitney tests and t -tests to conclusively analyze daily stock market returns in China, Italy, South Korea, France, Spain, Germany, Japan and the United States of America. The results have shown COVID-19 has a temporary negative effect on infected countries' stock markets. Furthermore, it was empirically shown that the impact of COVID-19 on financial stock markets has bidirectional spill-over effects between European, Asian and American countries. Nevertheless, it hasn't been shown that COVID-19 negatively impacts the selected countries' stock markets more than the average international stock markets. The findings showed that COVID-19 has spill-over implications on other countries' financial markets (Qing, Junyi, Sizhu, & Jishuang, 2020).

Timothy, Douglas, and Michael (2016) compared the responses to the terrorist attacks on September 11th, 2001 of the financial stock markets, financial prices, trading patterns. Six days later, when the market reopened, investors sold, and there were significant price falls, including in assets with net corporate purchases. Price reversals were significantly protected in the following two weeks and therefore not entirely due to strengthened systematic support.

Albulescu (2020) has investigated the correlation between the new cases of COVID-19 announcements and death ratio on the volatility of financial stock markets in United States. The global and US data of COVID-19 were analyzed and it has demonstrated that the health crisis increases the volatility faced by the S&P 500. The research's findings prove that if COVID-19 continues to be present, it is considered as a vital source of financial stock market volatility, questioning the undertakings of risk management.

Ashraf (2020) discussed and examined the reaction of the financial markets to the COVID-19 pandemic. Daily COVID-19 confirmed cases and deaths, along with the stock market data from 64 countries, during the period January 22nd, 2020 to April 7th, 2020, were used to conduct the study. The author has found that the financial market has responded negatively to the number of COVID-19 confirmed cases and deaths. Hence, as the number of COVID-19 confirmed cases rises, the returns of stock market decrease. However, it was noticed that it responded more preemptively to the increment of the number of confirmed cases, in contrast to the number of deaths. All in all, the research findings indicate that financial stock markets react rapidly to the COVID-19 pandemic, and based on the period of the epidemic, this reaction varies significantly.

There is no doubt that COVID-19 pandemic had a more acute impact on the economy that 2008 financial crises. Nonetheless, there haven't been much written on the impact of COVID-19 on financial stock market. "The Impact of the COVID - 19 on the Financial Markets: Evidence from China and USA" research paper studies the financial stock markets during the COVID-19 for 25 days from March 1st to March 25th 2020 in China and Unites States. The author used Simple regression model to conduct the study and measure the impact of COVID-19 on Chinese and American financial stock markets. The stocks that were assessed are the New York Dow Jones from United States and Shanghai Stock Exchange from China. The number of confirmed COVID-19 cases were considered as independent variables, whereas New York Dow Jones and Shanghai Stock Exchange were considered as dependent variables. The study proved that there is a positive noteworthy relationship between the COVID-19 confirmed cases and the chosen financial stock markets during the selected pandemic period (Sansa, 2020).

Chapter 3

Data and Methodology

3.1 Data

The Daily data on stock market indices, exchange rates, oil price, and infection rate is acquired for the period January 2017 to March 2021 (fifty months) for two indices from global stock markets. The two global stock markets that are used in the study are Dow Jones Global Titans 50 (DJGT) and S&P Global 1200 (SPGLOB)

COVID-19 cases are captured by infected population as a share of total population. To define oil prices, Brent crude oil prices in U.S. dollars per barrel are obtained from Yahoo Finance Database. Data on stock market indices are gathered from Bloomberg. Furthermore, exchange rate data of four major global currencies; Chinese Yuan (CHUS), Japanese Yen (JPUS), European Euro (USEU), and English Pound Sterling (USUK), are extracted from Federal Reserve Economic Data. Data on COVID-19 were obtained from Our World in Data "Coronavirus Source Data".

3.2 Model specification

The aim of this study is to empirically investigate the impact of COVID-19 on global financial stock markets. The main objectives are to examine the impact of COVID-19 on global stock market indices, to evaluate the impact of oil price change on the global stock market indices, and to analyze the impact of exchange rate changes on global stock market indices. This section represents the data and methodology that will be used to carryout this research. Stock market indices are given as a function of exchange rates, oil price shocks, and COVID-19 cases as follows:

$$sm_{it} = \alpha_0 + \alpha_1 exc_{it} + \alpha_2 oil_{it} + \alpha_3 covid_{it} + \varepsilon_{it}$$

sm_{it} is daily closing price of market indices

exc_{it} is exchange rates

oil_{it} is oil price

$covid_{it}$ is daily infection rate

t is the time period

α_0 is the constant term

ε_{it} is the random error term

The slope coefficients presented in the equation will be estimated using Autoregressive Distributed Lag (ARDL). An autoregressive distributed lag (ARDL) model is applicable for times series with mixed order of integration and non-stationary time series. In a general-to-specific modeling context, this model is used to capture the data generation process (Shresthaa & Bhattab, 2018).

Chapter 4

Results and Analysis

4.1 Descriptive Statistics

Before starting any regression analysis, it is essential to understand our dataset. In order to do so, we have applied descriptive statistics on our dataset. By doing this, we were able to understand what type of distribution the data has. Descriptive statistics basically involves summarizing and organizing the data so they can be easily understood. They are used to describe the basic features of the data in our study. Table 1 shows the descriptive statistics of our data.

Table 1.The Descriptive Statistics

	DJGT	SPGLOB	OIL	PATIENTS	CHUS	JPUS	USEU	USUK
Mean	328.3313	2391.144	58.53961	36654031	6.778834	109.3711	1.146266	1.300181
Median	317.1650	2364.930	60.25500	22157107	6.840900	109.4400	1.139300	1.298300
Maximum	464.6600	3133.250	86.29000	1.21E+08	7.178600	117.6800	1.248800	1.433200
Minimum	254.3000	1789.570	19.33000	557.0000	6.264900	102.5200	1.041600	1.149200
Std. Dev.	50.04099	249.7922	12.55829	38434000	0.228405	2.866518	0.046699	0.048683
Skewness	0.910961	0.889926	-0.506187	0.846929	-0.501536	-0.111139	0.127162	0.334118
Kurtosis	3.103843	3.872598	3.076017	2.322801	2.334980	2.316387	2.211100	3.020497
Jarque-Bera	151.5232	178.4558	46.63819	41.45827	65.60067	23.40378	31.11735	20.24358
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000008	0.000000	0.000040
Sum	358537.8	2606346.	63574.02	1.10E+10	7368.593	118886.4	1245.991	1413.297
Sum Sq. Dev.	2731973.	67949408	171115.9	4.40E+17	56.65556	8923.581	2.368331	2.573875
Observations	1092	1090	1086	299	1087	1087	1087	1087

The mean is the average of the data, which is calculated by dividing the total number of observations by the number of observations. Median is the value which divides the data in

two equal parts so it is the midpoint of the data set. This midpoint value represents the point where half of the observations are above the value and half are below the value. The maximum represents the largest data value and the minimum represents the smallest data value. The standard deviation is the measurement of average distance between each quantity and mean. That is how spread out the data are about the mean. Skewness is a measure of the asymmetry of the probability distribution of a real-valued random variable about its mean. Kurtosis is a measure of whether the data are heavy-tailed (profusion of outliers) or light-tailed (lack of outliers) relative to a normal distribution. While Skewness and Kurtosis quantify the amount of departure from normality, the Jarque–Bera measures if the departure is statistically significant (Narkhede, 2018).

The average (mean) value of the stock index "DJGT" variable is 328.33, and the median value is 317.16. Furthermore, the standard deviation is 50.04. This high standard deviation value indicates that the data points are spread out over a wider range of values in the dataset. The Jarque-Bera test value of 151.52 and its respected probability value is 0. The null hypothesis for Jarque-Bera is that the data is normally distributed, and based on the numbers presented in table 1, the null hypothesis is rejected in all cases at 1% significance level. Therefore, the DJGT data is not normally distributed.

The average (mean) value of the stock index "SPGLOB" variable is 2391.14, and the median value is 2364.93. Moreover, the standard deviation is 249.79. This high standard deviation value indicates that the data points are spread out over a wider range of values in the dataset. The Jarque-Bera test value of 178.45 and its respected probability value is 0. The null hypothesis for Jarque-Bera is that the data is normally distributed, and based on the numbers

presented in table 1, the null hypothesis is rejected in all cases at 1% significance level. Therefore, the SPGLOB data is not normally distributed.

The average (mean) value of the Brent crude oil prices "OIL" variable is 58.53961, and the median value is 60.26. Additionally, the standard deviation is 12.56. This high standard deviation value indicates that the data points are spread out over a wider range of values in the dataset. The Jarque-Bera test value of 46.64 and its respected probability value is 0. The null hypothesis for Jarque-Bera is that the data is normally distributed, and based on the numbers presented in table 1, the null hypothesis is rejected in all cases at 1% significance level. Therefore, the OIL data is not normally distributed.

The average (mean) value of the COVID-19 patients rate "PATIENTS" variable is 36,654,031, and the median value is 22,157,107. Furthermore, the standard deviation is 38,434,000. This high standard deviation value indicates that the data points are spread out over a wider range of values in the dataset. The Jarque-Bera test value of 41.46 and its respected probability value is 0. The null hypothesis for Jarque-Bera is that the data is normally distributed, and based on the numbers presented in table 1, the null hypothesis is rejected in all cases at 1% significance level. Therefore, the PATIENTS data is not normally distributed.

The average (mean) value of the exchange rates variables "CHUS", "JPUS", "USEU", "USUK" are 6.78, 109.37, 1.15 1.30, respectively. On the other hand, the median values are 6.84, 109.44, 1.14, 1.29. Furthermore, the standard deviation values are 0.22, 2.86, 0.04, 0.04. These low standard deviation values indicate that the data points tend to be close to the mean of the data set. The Jarque-Bera test values are 65.60, 23.40, 31.11, 20.24 and its respective probability values are zeros. The null hypothesis for Jarque-Bera is that the data is normally

distributed, and based on the numbers presented in table 1, the null hypothesis is rejected in all cases at 1% significance level. Therefore, the exchange rates variables data are not normally distributed.

4.2 Unit Root Test

In time series analysis, prior to estimation, we use the unit root test to check if the time series of the variables are stationary or not. Unit root test is an econometric approach that examines whether the mean and variance change over time, taking into account the autoregressive structure of the time series. We have used Augmented Dickey Fuller Test, which is a unit root test for stationarity. In the light of the test results reported in table 2, we do not reject the null hypothesis of unit root at 5% significance and find that all variables are non-stationary at Level. While the only variable of the time series at Level that is stationary is "JPUS" since its probability value is less than 5%. Hence, we reject the null hypothesis of unit root test at 5% significance for that variable.

On the other hand, after observing the probability values of the time series at first difference for all the variables, we conclude that all the variables are stationary and we reject the null hypothesis of unit root at 5% significance since the probability values are less than 5%. Whereas the only variable of the time series at first difference that is non-stationary is "PATIENTS" since its probability value is greater than 5%. Hence, we do not reject the null hypothesis of unit root test at 5% significance for that variable.

Table 2. Augmented Dickey Fuller Test

Variable	Level (trend and intercept)	1st Diff (trend and intercept)
DJGT	0.2747	0.0000

SPGLOB	0.3388	0.0000
OIL	0.7891	0.0000
PATIENTS	0.4006	0.9066
CHUS	0.9096	0.0000
JPUS	0.0015	0.0000
USEU	0.4738	0.0000
USUK	0.4078	0.0000

4.3 Estimation using Autoregressive Distributed Lag (ARDL)

The ARDL model was created in order to estimate both I(0) and I(1) variables at the same time. If all of the variables are stationary I(0), Ordinary Least Squares (OLS) is appropriate; if all of the variables are non-stationary I(1), Vector Error Correction model (VECM) is recommended. Conventional OLS is not suitable if at least one variable is I(1). Since non-stationary variables change over time, OLS estimates show inflated t values as a result of the common time factor. In econometrics, when the R square of the model exceeds the Durban Watson Statistic, it is referred to as spurious results. Therefore, ARDL is thought to be a solution to this problem since it can deal with I(1) variables.

ARDLs are standard least squares regressions that contain lags of both the dependent variable and independent variables as regressors. In a single-equation framework, autoregressive distributed lag (ARDL) models are frequently used to evaluate complex relationships with time series data. The current value of the dependent variable can be influenced by its own past realizations (autoregressive part) as well as the current and past values of additional explanatory variables (distributed lag part). The variables can be stationary, nonstationary, or a mixture of the two types. ARDL can be specified if the variables are integrated of different orders. That is, a model having a combination of variables with I(0)

and I(1) order of integration. The first essential step in the ARDL analysis, is the unit root analysis. It shows the degree of integration of each variable, and ascertain that no variable is integrated of order 2. Using ARDL model, this section addresses the key question whether the two chosen global stock indices can be influenced by the number of COVID-19 cases, exchange rates and oil prices (Greene, 2008).

We will apply the ARDL model on the selected two global stock indices; Dow Jones Global Titans 50, and S&P Global 1200 to measure the impact of COVID-19 on global stock market. We applied it on three different sample periods of time of our sample; pre COVID-19, post COVID-19 and the full sample. Accordingly, we interpreted the results.

4.3.1 Dow Jones Global Titans 50

I. Pre Covid-19 (January 2017 to January 2020)

Regression results are reported in Table 3. Since it is a sample period before the pandemic, patients' rate is not considered. We have observed that oil prices and exchange rates are statistically significant variables. However, the exchange rate of European Euro is the only exchange rate that is statistically insignificant variable. Furthermore, it is observed that the exchange rates of Chinese Yuan, English Pound Sterling and European Euro have a significant positive impact on the DJGT variable at level. Moreover, OIL has also a significant positive impact on DJGT variable at level.

Table 3. DJGT Pre COVID-19 Summary Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(DJGT(-1))	0.782562	0.027729	28.22138	0.0000
LOG(DJGT(-2))	0.215662	0.027762	7.768316	0.0000
LOG(CHUS)	-0.579157	0.127309	-4.549206	0.0000

LOG(CHUS(-1))	0.578005	0.125881	4.591676	0.0000
LOG(USUK)	0.262480	0.061478	4.269463	0.0000
LOG(USUK(-1))	-0.272770	0.061117	-4.463083	0.0000
LOG(USEU)	0.001642	0.016723	0.098214	0.9218
LOG(OIL)	0.125628	0.011645	10.78784	0.0000
LOG(OIL(-1))	-0.126437	0.011645	-10.85800	0.0000
C	0.018788	0.040863	0.459783	0.6458

R-squared	0.994838	Mean dependent var	5.782726
Adjusted R-squared	0.994794	S.D. dependent var	0.144577
S.E. of regression	0.010431	Akaike info criterion	-6.278746
Sum squared resid	0.115666	Schwarz criterion	-6.232351
Log likelihood	3378.547	Hannan-Quinn criter.	-6.261173
F-statistic	22763.11	Durbin-Watson stat	1.974168
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection

II. Post Covid-19 (January 2020 to March 2021)

Regression results are reported in Table 4. Results represent the sample period after the pandemic so the patients' rate is considered. We have observed that oil prices and exchange rate of English Pound Sterling are statistically significant variables. On the other hand, the exchange rates of European Euro and Chinese Yuan are statistically insignificant variables.

Additionally, it is observed that the exchange rate of Chinese Yuan, and European Euro have a significant negative impact on the DJGT variable at level. However, the exchange rate of English Pound Sterling has a significant positive impact on the DJGT variable at level. OIL has also a significant positive impact on the DJGT variable at level. Moreover, PATIENTS has a significant positive impact on DJGT variable at level and at one day lag. Yet, it has a significant negative impact on DJGT variable at two days lag.

Table 4. DJGT Post COVID-19 Summary Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(DJGT(-1))	0.596305	0.051419	11.59700	0.0000
LOG(DJGT(-2))	0.327988	0.051173	6.409435	0.0000
LOG(CHUS)	-0.922525	0.353384	-2.610542	0.0095
LOG(CHUS(-1))	0.920086	0.349795	2.630355	0.8090
LOG(USUK)	0.646575	0.155482	4.158505	0.0000
LOG(USUK(-1))	-0.638475	0.154470	-4.133338	0.0000
LOG(USEU)	-0.072316	0.065179	-1.109487	0.2682
LOG(OIL)	0.126339	0.021025	6.008948	0.0000
LOG(OIL(-1))	-0.106403	0.021522	-4.943861	0.0000
LOG(PATIENTS)	0.012328	0.012861	0.958553	0.3386
LOG(PATIENTS(-1))	0.025261	0.020350	1.241340	0.2155
LOG(PATIENTS(-2))	-0.033543	0.012171	-2.755864	0.0062
C	0.322584	0.179171	1.800431	0.0729

R-squared	0.984475	Mean dependent var	5.958569
Adjusted R-squared	0.983808	S.D. dependent var	0.117329
S.E. of regression	0.014930	Akaike info criterion	-5.527376
Sum squared resid	0.062191	Schwarz criterion	-5.363685
Log likelihood	819.9970	Hannan-Quinn criter.	-5.461808
F-statistic	1474.362	Durbin-Watson stat	1.982137
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection

III. Full Sample (January 2017 to March 2021)

Regression results are reported in Table 5. Results represent the sample period of the full sample so the patients' rate is considered. We have observed that oil prices and exchange rate of Chinese Yuan, English Pound Sterling and Japanese Yen are statistically significant variables. Nevertheless, the exchange rate of European Euro is the only exchange rate that is statistically insignificant variable.

Therefore, it is observed that the exchange rate of Chinese Yuan has a significant negative impact on the DJGT variable at level. However, the exchange rates of European Euro, English Pound Sterling and Japanese Yen have a significant positive impact on the DJGT variable at level. OIL has also a significant positive impact on the DJGT variable at level. Furthermore, PATIENTS has a significant positive impact on DJGT variable at level and at one day lag. Still, it has a significant negative impact on DJGT variable at two days lag.

Table 5. DJGT Full Sample Summary Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(DJGT(-1))	0.635102	0.092379	6.874926	0.0000
LOG(DJGT(-2))	0.281716	0.081853	3.441727	0.0007
LOG(USEU)	0.016401	0.086180	0.190310	0.8492
LOG(PATIENTS)	0.033788	0.018113	1.865434	0.0632
LOG(PATIENTS(-1))	0.005949	0.023123	0.257256	0.7972
LOG(PATIENTS(-2))	-0.027697	0.013811	-2.005475	0.0459
LOG(USUK)	0.706924	0.220040	3.212701	0.0015
LOG(USUK(-1))	-0.702910	0.226406	-3.104646	0.0021
LOG(JPUS)	0.976135	0.268960	3.629294	0.0003
LOG(JPUS(-1))	-1.232042	0.348558	-3.534677	0.0005
LOG(JPUS(-2))	0.557827	0.286576	1.946525	0.0526
LOG(CHUS)	-1.350840	0.467077	-2.892116	0.0041
LOG(CHUS(-1))	0.886313	0.452768	1.957545	0.0513
LOG(OIL)	0.101649	0.027022	3.761708	0.0002
LOG(OIL(-1))	-0.076545	0.028701	-2.666922	0.0081
C	0.037391	0.678773	0.055086	0.9561
@TREND	-0.000374	0.000149	-2.512990	0.0125

R-squared	0.986168	Mean dependent var	5.958569
Adjusted R-squared	0.985363	S.D. dependent var	0.117329
S.E. of regression	0.014195	Akaike info criterion	-5.615424
Sum squared resid	0.055411	Schwarz criterion	-5.401366
Log likelihood	836.8519	Hannan-Quinn criter.	-5.529681

F-statistic	1225.398	Durbin-Watson stat	1.992594
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection

4.3.2 S&P Global 1200

I. Pre Covid-19 (January 2017 to January 2020)

Regression results are reported in Table 6. Since it is a sample period before the pandemic, patients' rate is not considered. We have observed that oil prices and exchange rates are statistically significant variables. Furthermore, it is observed that the exchange rate of Chinese Yuan has a significant negative impact on the SPGLOB variable at level. On the other hand, the exchange rates of European Euro, English Pound Sterling and Japanese Yen have a significant positive impact on the SPGLOB variable at level. Moreover, OIL has also a significant positive impact on SPGLOB variable at level.

Table 6. SPGLOB Pre COVID-19 Summary Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(SPGLOB(-1))	0.982533	0.006806	144.3556	0.0000
LOG(CHUS)	-0.399282	0.083735	-4.768421	0.0000
LOG(CHUS(-1))	0.333882	0.112263	2.974117	0.0030
LOG(CHUS(-2))	0.068857	0.083854	0.821161	0.4118
LOG(USEU)	0.242802	0.065258	3.720672	0.0002
LOG(USEU(-1))	-0.212624	0.091192	-2.331601	0.0200
LOG(USEU(-2))	-0.038750	0.065604	-0.590676	0.5549
LOG(USUK)	0.121030	0.045801	2.642517	0.0084
LOG(USUK(-1))	-0.092555	0.062216	-1.487651	0.1373
LOG(USUK(-2))	-0.010183	0.046219	-0.220319	0.8257
LOG(JPUS)	0.473208	0.049676	9.525852	0.0000
LOG(JPUS(-1))	-0.414443	0.069485	-5.964473	0.0000
LOG(JPUS(-2))	-0.065602	0.049312	-1.330342	0.1838
LOG(OIL)	0.061642	0.011322	5.444557	0.0000
LOG(OIL(-1))	-0.058280	0.015418	-3.779937	0.0002
LOG(OIL(-2))	-0.003390	0.011374	-0.298010	0.7658

C	0.156030	0.076731	2.033477	0.0424
@TREND	4.12E-06	2.18E-06	1.889361	0.0592

R-squared	0.993075	Mean dependent var	7.740276
Adjusted R-squared	0.992919	S.D. dependent var	0.065758
S.E. of regression	0.005534	Akaike info criterion	-7.532980
Sum squared resid	0.023118	Schwarz criterion	-7.424694
Log likelihood	2929.497	Hannan-Quinn criter.	-7.491314
F-statistic	6368.647	Durbin-Watson stat	1.776939
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection

II. Post Covid-19 (January 2020 to March 2021)

Regression results are reported in Table 7. Results embody the sample period after the pandemic so the patients' rate is considered. We have observed that the exchange rates of European Euro and Chinese Yuan are statistically insignificant variables. However, the exchange rates of Japanese Yen and English Pound Sterling along with OIL price are statistically significant variables.

Furthermore, it is observed that the exchange rate of Chinese Yuan has a significant negative impact on the SPGLOB variable at level. However, the exchange rate of European Euro, English Pound Sterling, and Japanese Yen have a significant positive impact on the SPGLOB variable at level. OIL has also a significant positive impact on the SPGLOB variable at level. Additionally, PATIENTS has a significant positive impact on SPGLOB variable at level and at one day lag. Still, it has a significant negative impact on SPGLOB variable at two days lag.

Table 7. SPGLOB Post COVID-19 Summary Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(SPGLOB(-1))	0.908808	0.028363	32.04178	0.0000

LOG(CHUS)	-1.040067	0.335608	-3.099052	0.0021
LOG(CHUS(-1))	1.074687	0.435935	2.465247	0.0143
LOG(CHUS(-2))	-0.639381	0.329740	-1.939047	0.0535
LOG(USEU)	0.206315	0.236877	0.870978	0.3845
LOG(USEU(-1))	-0.209787	0.333885	-0.628320	0.5303
LOG(USEU(-2))	0.017814	0.231543	0.076936	0.9387
LOG(PATIENTS)	0.033785	0.012743	2.651300	0.0085
LOG(PATIENTS(-1))	0.002503	0.018370	0.136238	0.8917
LOG(PATIENTS(-2))	-0.023381	0.010918	-2.141536	0.0331
LOG(USUK)	0.686384	0.157526	4.357279	0.0000
LOG(USUK(-1))	-0.828078	0.206541	-4.009272	0.0001
LOG(USUK(-2))	0.143877	0.155844	0.923209	0.3567
LOG(JPUS)	1.083034	0.201317	5.379741	0.0000
LOG(JPUS(-1))	-1.479007	0.271722	-5.443083	0.0000
LOG(JPUS(-2))	0.789874	0.200674	3.936106	0.0001
LOG(OIL)	0.113408	0.019986	5.674335	0.0000
LOG(OIL(-1))	-0.106152	0.028540	-3.719465	0.0002
LOG(OIL(-2))	0.024267	0.020307	1.195016	0.2331
C	0.118503	0.543986	0.217842	0.8277
@TREND	-0.000434	0.000114	-3.822244	0.0002

R-squared	0.988985	Mean dependent var	7.862069
Adjusted R-squared	0.988159	S.D. dependent var	0.120196
S.E. of regression	0.013079	Akaike info criterion	-5.765478
Sum squared resid	0.045674	Schwarz criterion	-5.498387
Log likelihood	851.2289	Hannan-Quinn criter.	-5.658444
F-statistic	1198.583	Durbin-Watson stat	2.332891
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection

III. Full Sample (January 2017 to March 2021)

Regression results are reported in Table 8. Results represent the sample period of the full sample so the patients' rate is considered. We have observed that oil prices and exchange

rate of Chinese Yuan, English Pound Sterling and Japanese Yen are statistically significant variables. But, the exchange rate of European Euro is the only exchange rate that is statistically insignificant variable.

Consequently, it is observed that the exchange rate of Chinese Yuan has a significant negative impact on the SPGLOB variable at level. However, the exchange rates of European Euro, English Pound Sterling and Japanese Yen have a significant positive impact on the SPGLOB variable at level. OIL has also a significant positive impact on the SPGLOB variable at level. Likewise, PATIENTS has a significant positive impact on SPGLOB variable at level and at one day lag. On the other hand, it has a significant negative impact on SPGLOB variable at two days lag.

Table 8. SPGLOB Full Sample Summary Results

	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(SPGLOB(-1))	0.906426	0.028160	32.18824	0.0000
LOG(CHUS)	-1.146369	0.319197	-3.591412	0.0004
LOG(CHUS(-1))	1.281698	0.391256	3.275851	0.0012
LOG(CHUS(-2))	-0.746844	0.300515	-2.485211	0.0136
LOG(USEU)	0.016074	0.075170	0.213830	0.8308
LOG(USUK)	0.727710	0.149165	4.878559	0.0000
LOG(USUK(-1))	-0.738581	0.143550	-5.145108	0.0000
LOG(JPUS)	1.047885	0.194523	5.386935	0.0000
LOG(JPUS(-1))	-1.384025	0.254603	-5.436017	0.0000
LOG(JPUS(-2))	0.720427	0.176684	4.077492	0.0001
LOG(OIL)	0.114284	0.019775	5.779303	0.0000
LOG(OIL(-1))	-0.108578	0.027943	-3.885771	0.0001
LOG(OIL(-2))	0.027640	0.019602	1.410026	0.1597
LOG(PATIENTS)	0.033601	0.012656	2.654855	0.0084
LOG(PATIENTS(-1))	0.002055	0.018206	0.112896	0.9102
LOG(PATIENTS(-2))	-0.022785	0.010839	-2.102107	0.0365
C	0.192768	0.529825	0.363834	0.7163
@TREND	-0.000435	0.000113	-3.846258	0.0001

R-squared	0.988923	Mean dependent var	7.862069
Adjusted R-squared	0.988226	S.D. dependent var	0.120196
S.E. of regression	0.013042	Akaike info criterion	-5.780763
Sum squared resid	0.045928	Schwarz criterion	-5.551828
Log likelihood	850.4299	Hannan-Quinn criter.	-5.689020
F-statistic	1417.963	Durbin-Watson stat	2.322270
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection

Chapter 5

Conclusion

In this research, we examine the potential impact of the COVID-19, which originated in Wuhan, China and has since spread throughout the world, on global financial stock markets, along with the changes in energy market and exchange rate. In order to achieve our main objective, we empirically investigate two major global daily time series stock market indices and the impact of COVID-19 on it, we assess the impact of oil price change on the global stock market indices, and examine the impact of exchange rate changes on global stock market indices. We used the model that represents stock market indices given as a function of exchange rates, oil price shocks, and COVID-19 cases.

We have employed Autoregressive Distributed Lag (ARDL) to test our model and evaluate the relative impact of the COVID-19 on stock markets performance. The daily closing price of the two major global stock indices, exchange rates, oil price, and COVID-19 patients' rate was obtained from January 2017 until March 2021. Before estimating the model and getting the regression results, we have divided the sample data into three sample periods; the full sample, pre pandemic, and post pandemic.

Evidence from the selected global indices suggests that the COVID-19 pandemic has a significant negative impact on the stock markets. The findings drawn from the study is that there is a negative and statistically significant impact of COVID-19 confirmed cases on global stock markets when there is a lag of two days. This is due to the fact that the impact will be reflected two days after announcing the number of new COVID-19 cases, since the market is closed at the time of the announcement and the announced cases is (day-1) (which represents data as of yesterday). Therefore, we can conclude that the negative impact of COVID-19 on

global financial stock markets does not take place instantly. Based on the research findings, there is sufficient evidence to support our initial hypothesis that COVID-19 has a negative impact on global financial stock market.

Since the pandemic is relatively new, and its effects are ambiguous and cannot be precisely measured, we have faced limitation with the data availability and how much studies were written in the past about this matter. So, our research can be an important contribution to the current studies that have been conducted in this area. Also, we have done our research on two major global indices which provides a generic view of the outbreak impact. However, we suggest that future studies may take a broader approach to analyzing the pandemic's effect, for example, by examining a wider time span or including more countries, resulting in a more representative picture of the global impact. Furthermore, rather than using the market index as we did in this research, more analysis can be done to explore the market volatility. By displaying the volatility, it is possible to gain a better understanding of the different market swings and a clearer view of the whole situation.

References:

Al-Awadhi, A. M., Alsaifi, K., Al-Awadhi, A., & Alhammadi, S. (2020). Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns. *Journal of Behavioral and Experimental Finance, 27*.

Albulescu, C. T. (2020). COVID-19 and the United States financial markets' volatility. *Finance Research Letters* .

Ashraf, B. N. (2020). Stock markets' reaction to COVID-19: Cases or fatalities? *International Business and Finance*.

COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). (2020, October 8). Retrieved from Johns Hopkins University (JHU) corona virus resource center.

Eichenbaum, M. S., Rebelo, S., & Trabandt, M. (2020). The Macroeconomics of Epidemics. *National Bureau of Economic Research*.

Funakoshi, M., & Hartman, T. (2020, March 23). *Mad March: how the stock market is being hit by COVID-19*. Retrieved from World Economic Forum.

Gaspar, V., & Mauro, P. (2020, March 8). *How governments can soften the economic blow of Coronavirus*. Retrieved from World Economic Forum.

Global financial markets policy responses to COVID-19. (2020, March).

Global uncertainty: The economic fallout from coronavirus. (2020, February 28). Retrieved from World Economic Forum.

Greene, W. H. (2008). *The Econometric Approach to Efficiency Analysis.*

Jackson, J., Weiss, M., Schwarzenberg, A., & Nelson, R. (2020). *Global Economic Effects of COVID-19.* Congressional Research Service.

Kotishwar , A. (2020). IMPACT OF COVID-19 PANDEMIC ON STOCK MARKET WITH REFERENCE TO SELECT COUNTRIES – A STUDY. *Academy of Accounting and Financial Studies Journal, 24*(4).

Menton, J. (2020, August 19). *How did the stock market hit a record amid COVID-19 fueled recession? Here's what experts say about the rebound*. Retrieved from USA Today.

Narkhede, S. (2018, June 6). *Understanding Descriptive Statistics*. Retrieved from towards data science.

Nicola, M., Alsaf, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., . . . Agha, R. (2020). The Socio-Economic Implications of the Coronavirus and COVID-19 Pandemic: A Review. *International Journal of Surgery*.

Policy Responses to COVID-19. (2021, May 7). Retrieved from International Monetary Fund: https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19#U

Qing, H., Junyi, L., Sizhu, W., & Jishuang, Y. (2020). The impact of COVID-19 on stock markets. *Economic & Political Studies*.

Ramelli, S., & Wagner, A. F. (2020). Feverish Stock Price Reactions to COVID-19. *Swiss Finance Institute*.

Reuters. (2020, March 3). *6 charts showing the economic impact of Coronavirus*. Retrieved from World Economic Forum.

Reynolds, M., & Weiss, S. (2020, May 27). *How coronavirus started and what happens next, explained*.

Sansa, N. A. (2020). The Impact of the COVID - 19 on the Financial Markets: Evidence from China and USA. *Electronic Research Journal of Social Sciences and Humanities*.

Shresthaa, M. B., & Bhattab, G. R. (2018, June). Selecting appropriate methodological framework for time series data analysis. *The Journal of Finance and Data Science, 4*(2), 71-89.

The Global Economic Outlook During the COVID-19 Pandemic: A Changed World. (2020, June 8). Retrieved from The World Bank.

Timothy, B. R., Douglas, E. R., & Michael, F. E. (2016). Who Moves Markets in a Sudden Marketwide Crisis? Evidence from 9/11. *Journal of Financial & Quantitative Analysis*.

Topcu, M., & Gulal, O. S. (2020). The impact of COVID-19 on emerging stock markets. *Finance Research Letters*.

Val, E. B., & Ahmar, A. S. (2020). SutteARIMA: Short-term forecasting method, a case: Covid-19 and stock market in Spain. *Science of Total Environment*.

WHO Emergencies Coronavirus Emergency Committee Second Meeting. (2020, January 30). Retrieved from World Health Organization.

Zhang, D., Hu, M., & Ji, Q. (2020). Financial markets under the global pandemic of COVID-19. *Finance Research Letters*.

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إيمان فيصل حمزة الصيرفي

مشرف الرسالة: د. رُزينا شاهين

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