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Global Economic Impact in Stock and Commodity Markets during Covid-19 pandemic

Arhan Sheth[1] · Tulasi Sushra[2] · Ameya Kshirsagar[3] · Manan Shah[4]

Abstract

The outbreak of the novel coronavirus led everyone globally to face various set-backs. Such a sector that oversaw several shocks worldwide was the financial sector, namely the stock and the commodity markets. Both the markets had different and unprecedented reactions in the different corners of the world. This was due to several reasons like government intervention, welfare policies, investor behaviour etc. This paper discusses that topic in further detail, with examples and studies from all around the planet. The main objective is to expand the pre-existing knowledge on how different regions had different reactions to the pandemic and the policies that it brought along. The stock market, in general, faced an adverse shock that led to low investments and careful foreign investment. The commodity market saw the prices of all commodities on an upward trend except for gold which observed a downward trend. Moreover, this paper also discusses the future scope and the challenges that might be faced by the markets further down the line.

✉ Manan Shah
  manan.shah@spt.pdpu.ac.in

1 Anand Niketan School, Ahmedabad, Gujarat, India

2 Department of Business Administration, School of Liberal Studies, Pandit Deendayal Energy University, Gandhinagar, Gujarat, India

3 Department of Information Technology, Symbiosis Institute of Technology, Pune, Maharashtra, India

4 Department of Chemical Engineering, School of Technology, Pandit Deendayal Energy University, 382426 Gandhinagar, Gujarat, India

1 Introduction

Data science is an interdisciplinary field that uses scientific methods, procedures, algorithms, and systems to extract information and insights from noisy, structured, and unstructured data and then applies that knowledge and actionable insights across a wide range of application areas. Data analytics is the process of inspecting and modelling data to obtain helpful information; one interconnected area is the Stock Market. Almost everything right from stock market predictions to the various impacts and challenges is directly or indirectly related to data analysis. However, there have been a few instances when the results of the data analysis did not paint the whole picture of the impacts that had befallen the global stock market. One such recent instance has been the COVID-19 pandemic that has created an imbalance. While we have experienced various challenges before, today, many more nations contribute significantly to the world's financial developments, makings the developed anti countries developing nations much more vulnerable to external shocks [1]. Although humankind has significantly benefited from the technological advancements that have been made, it has also made us dependent on technologies. That has been made clear by how the COVID-19 pandemic has impacted the financial world of the modern era.

Stock Markets enable companies to be publicly traded to raise capital securely. As and when the money increases the company can use those funds to expand businesses, create job opportunities, and produce more output, which further benefits the economy of that particular nation. Moreover, from a consumer's point of view, the trading of stocks in a company promotes investment and ownership. A well-developed financial system guarantees economic growth by encouraging investment and the efficient use of resources and capital [2]. And the process of development of such a kind of financial system is made quicker, easier, and in a much more free-flowing state by the Stock Market.

The changes in the prices of stocks in a stock market and a nation's economy are correlated. The work of [3] says that the economic growth is directly related to the stock market's progress and that the type of stock market even reflects the kind of the power of the nation in question. With an increase in the number of economies on the rise, the research involving economic growth has shifted its focus onto one of the dictating factors, i.e., the relationship between the country's GDP and the development of its Stock Market [4]. While been works such as that of [5–8] that support the view that the stock market has a positive effect on economic growth. There a have also been contrasting views on the topic. However, none can deny the impact that the stock market has had on the economic structures of nations [9].

The outbreak of the novel coronavirus has had a significant shock on economic activities all around the globe. The commodity market was one of the most adversely affected markets in the financial sector. The uncertainty around the pandemic and its effects led investors to not invest in the markets, leading to a shortage of demand. This, in turn, disrupted the supply chain. Moreover, daily commodities like oil were upward and reached all-time highs [10]. In contrast, commodities like gold benefited from the pandemic. Moreover, while this already showcased the uncertainty about the reaction of the commodity market to the pandemic, the effects were seen in the changes of agricultural commodity markets and natural gas markets cannot be even

related directly to the pandemic is what made reaction the market unprecedented [11]. However, government policies and intervention did help the market to stabilize. The lack of knowledge about the duration of the pandemic and volatile nature of the market has further complicated the situation from an investor's point of view.

Prior to CVOID-19 when the stock market predictions were at a higher horizon. Even after worse returns from period to period, the market showed more promise every other year. After a nightmare of a start to the year, the stocks rose astronomically in 2016, as reported by Business Insider India (2016). 2017 was when Indian equities gained double-digit returns, and the forecast for the next 12 months after that was looking to boost the already high momentum. The 2018 forecast showed high economic growth and yet another year for double-digit returns for Indian Equities, as Outlook Money (2018) reported. The foreign stock investment also had enjoyed a stellar year in 2017 and was in for yet another year of high returns as predicted during the year's start. Moreover, it is safe to say, 2018 delivered on its promise. Although the stock returns might not have been as astronomical as in 2017, it was a great year altogether for investors all around the globe. In 2019, the first prediction of a slowdown was made in reports by [12]. The same report stated that the post-2008 debt due to the Global Financial Crisis was one of the reasons for a synchronized global slowdown, especially after such high returns for over three back to back years. The predictions for the market of 2020 added to the momentum of decent returns as several reports such as that of The [13] had reported earlier in the year. The predictions had included the ingredients of no recession, unchanged interest rates and a positive year overall for the stock market. Furthermore, whilst investors had their eyes laid on the forthcoming financial year 2020, noupward the storm brewing in the form of the co onavirus that changed stock markets and economies.

The COVID-19 pandemic has had unprecedented effects all over the world. Moreover, one of the factors that it has affected the most is the economic conditions of several nations. Economies have fallen, stock markets have had an unpredictable turn of events, the future scope and predictions have become blurred in nature, and the stocks as a whole have taken a considerable blow. The pandemic showed us the resilience of us humans, animals, nature, and economies. The stock market specifically had recovered by unprecedented amounts. The returns during the mid of 2020 painted a picture of devastation, but the end of 2020 told us something entirely different. There was an unpredictable and surprising surge in the returns that investors observed. This surprising reaction of the stock market to the pandemic had only happened once in recent memory, i.e. in 1987, and even then, the speed of the stock market's resurgence was almost miraculous Forbes Advisor. Whilst the pandemic hit every part of the world, each nation had its response, and each country's stock market had its reaction to the pandemic, which is discussed further in this paper.

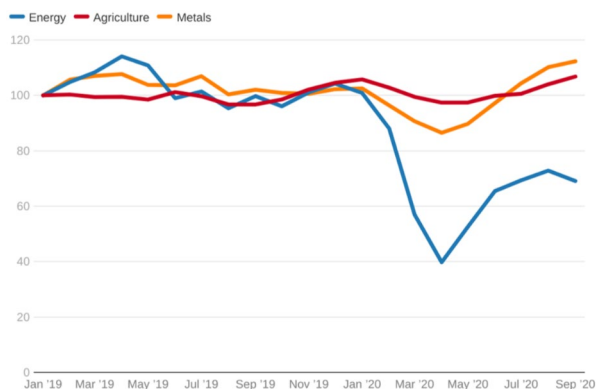## 2 Impact of COVID-19 on the commodity market

The sudden outbreak of the COVID-19 pandemic brought significant declines in the demand and supply of commodities [14]. Markets of commodities such as oil, energy, agricultural commodities etc., have been severely affected. The global market has

experienced a shock like none other, as shown in Fig. 1. The dramatic shift in the market dynamics, owing mainly to the COVID-19 pandemic, has not yet shown any signs of slowing down. As it appears to be, the severity depends on the spread and the duration of the pandemic. Moreover, whilst some markets are coming back to reach their levels in the pre-pandemic era, reports from [15] indicate that the adversely affected energy market is yet to stabilize and match even its pre-pandemic levels. Moreover, the unprecedented reaction of different markets to the pandemic saw gold reach record highs and oil reach record lows.

[16] analyses the impact of the pandemic on the pandemic on Stock and Commodity market performance and sustainability in South Asian countries using several tests to achieve the set objective. The main aim of the research done by the group was to assess the impact of the pandemic on the markets. The study results show an overall negative impact of the pandemic on the market due to pandemic. However, there is positive change during the later pandemic wave mainly due to the level of uncertainty decreasing with time. The study also says that the demand for gold increased due to investors' point of view that gold exchange is the safest form of exchange in times of uncertainty. This led the result of the study to be that whilst the oil market had observed a negative impact due to the stagnation of the travel resulting in a fall in demand for oil, the gold market reached record high levels due to the low economic value attached to it.

The impact of COVID-19 on agricultural markets is assessed in the paper by [17]. The paper considers the wholesale prices, trades, market trends and reforms, government policies, and the pandemic's impact on the market whilst aiming to evaluate the change in the agricultural market due to the global widespread of the COVID-19 disease. The results tell us that there was no significant price change for wheat until Unlock-1, in June in India, when the prices started to decline due to the decline in the demand. This might be because of the government decision to provide a fixed amount of free ration to certain people. In the case of Tomato, whilst the prices did not fall significantly earlier, a decline was observed in May. Moreover, onion prices had little to no significant change. The study also says that the market reforms by each state also played their part in affecting the price of the commodities. The study concludes

Fig. 1 The commodity price trends from January 2019 to September 2020 [14]

that the Indian agricultural markets were resilient in facing the COVID-19 shock that has left other markets worldwide struggling to be stable.

In their paper, [18] write about the impact of the outbreak of the pandemic on the Canadian Commodity Market. They aim to assess that impact through various relationships along with the data from the Bank of Canada. The research that they do uses data collection, data analysis and measurement index of the study, tell us that the Total Deaths per million have a particular impact on the price index of energy, both of which influence the total commodity price index. This also matches the data provided to them by the Bank of Canada. Furthermore, they also discuss that one of the approaches of the EBA was too restrictive. Hence, they conclude that whilst their paper was an early attempt at examining the pandemic's impact on Canada's commodity market, the pandemic is still spreading and is still leading to several changes in the Global Market, which shall be taken into consideration in future studies.

[19] Discusses the commodity market of the United States; the paper's objective is how the U.S commodity market has been affected due to the COVID-19 pandemic. Destin uses data from January 2 to November 16, 2020, to quantify his research using the Federal Reserve Economic Database (FRED) and Our World in Data. His study reveals that when using the leader EBA approach, Foreign Exchange and Stringency Index are the only two determinants of the change in the commodity market whilst several other determinants work at lower levels to affect specific markets. While using several graphs and tables in his research, he proves that the result informs the reader of the main factors that affected the pandemic and how they affect the overall commodity market.

[20] Aims to particularly examine the epidemic status, the government anti-COVID-19 policies, stock market volatility and hence the response of the energy commodity market to the pandemic. Ever since the oil crisis of 1973, oil prices have been more volatile than any other form of commodities [20–22]. Similarly energy market has been volatile ever since the energy crisis of 2008-09 [20]. This is reflected in the results of the study conducted in this paper. According to the paper, the response of the energy commodity market to the COVID-19 pandemic has been the most substantial among all other commodity markets. Thus the authors of the papers conclude that the sudden outbreak of the pandemic has led to vast amounts of uncertainty, which, when added to the volatility of energy markets, has led to a considerable change in the supply as well as the demand side of the market-leading to massive changes overall in the price dynamics of the market.

[23] Discuss the Indian Commodity Market and its reaction to the outbreak of the COVID-19 pandemic. The paper's main aim is how a mere disease that got a few people sick brought down the financial world and its markets. The results of the study were pretty self-explanatory. The commodity market had observed an enormous shock in terms of volatility and hence the price dynamics. Considering the commodity markets of oil, wheat, energy, gold, agricultural commodities, etc., each market had a different reaction to the pandemic. Whilst oil prices slumped down, gold rose and recorded new heights. Moreover, to conclude, the authors say that whilst there can and have been many more reasons for the shock that the commodity market has gone through, COVID-19 has had a considerable role in it continues to do so as long as the virus continues to spread rapidly across the planet.

[24] Talk about the volatility of the international commodity prices during the COVID-19 era. It assesses the effect that the oil supply and the demand shock have on metals and agriculture's specific commodity market. Using the SVAR model, the study results show that the changes in the oil supply and demand shock have an apparent effect on the price volatility of the aforementioned markets. The uncertainty due to the pandemic has also affected the global markets in a certain way by adding to the already massive changes that the markets have observed. As a result, commodity prices have notably declined as the virus continues to spread further and disrupt the economies of several nations.

[25] Talk about the impact of COVID-19 on agricultural commodity markets, with spot prices of wheat on NCDEX as the one in focus along with its future. They do this by considering the Indian subcontinent and the detrimental effects that the economy of that country has observed. Using two data sets known as "Pre-Corona Period" and "During Corona Period" over the period from 1st July 2019 to 30th April 2020 and using several mathematical operations (One-way ANOVA and paired t-test), they arrived at the result with a high confidence level that the pandemic has had a significant effect on the spot prices of wheat on the NCDEX. The authors conclude by informing the writer of the significant impact that the sudden outbreak of the virus has had on the price volatility of global markets by taking wheat as an example. They also note that slowly and steadily, markets are back on the rise and might reach levels of the "pre-corona period".

Authors [26] tell us how the Russian economy has been impacted significantly due to the pandemic's impact on the global energy market. Russia is one of the three largest producers of oil, the second-largest net exporter of oil, and the largest exporter of gas. However, COVID-19 completely changed how the Russian economy saw these positions, and the examination of that is what the authors aim to do. According to the studies conducted, the fall of GDP in Russia was more significant because of its reliance on the aforementioned commodities. Concluding their work, the authors go ahead on the earlier statement and say that unless the Russian economy learns from past trembles and falls and lessen its dependence on the energy commodities, it would be highly vulnerable to any such kind of shock that affects not only Russia but every nation on the global level.

As COVID-19 has affected the commodity market, it has affected the prices of the commodities and the exporters. The pandemic has also struck the suppliers of those commodities. This is what is discussed by [27] in their article. They aim to determine how the commodity-exporting economies have been hit differently from other economies by taking the specific case of Ghana. Ghana is the largest gold producer in Africa and the second largest cocoa bean supplier globally. The majority of the economy of Ghana depends on those commodities, especially cocoa beans. The decline in commodity prices has affected the cocoa bean detrimentally producing population. Moreover, even the disruption of the supply chain has affected the Ghanian producers. It is likely to have a long-lasting impact on the future revenue of the Ghanian government, as per the authors. Although it is not one of the worst-hit countries globally, it is the worst-hit country in the African continent. To conclude, the price slump and the high volatility of the market added to the supply chain disrup-

tion are draining even the present revenues from the nation that is dependent mainly on the export of commodities.

The work done by [28] informs the reader about the reaction of equity and commodity markets to the COVID-19 pandemic. They aim to explain to readers the observations of the unprecedented reaction of the market to the shock caused by the pandemic. The authors make use of two complementary co-movement measures in order to examine this reaction. Using the measures, the authors find significant data; spillover index, market volatility and deaths per million, etc. They have used to conclude the commodity and the financial market. They reveal that the results of their studies paint the picture of a significant impact of the pandemic on the market stability. Moreover, they also inform the reader that as long as the pandemic contin-

Table 1 Impact of COVID-19 on the commodity market in different regions and the commodity's reaction to the outbreak

Country	Affected Region	Impact	Data Source	Reference
US, Japan, Germany	Crude Oil	Return Spillover occurs Short-term, Volatility spillover occurs long-term	Economic Policy Uncertainty Index	[29]
South Asian Countries	Oil	Negative impact as oil prices show a decreasing trend	Multi Commodity Exchange (MCX)	[16]
South Asian Countries	Gold	Positive impact as gold prices increase	Multi Commodity Exchange (MCX)	[16]
Latin American commodity producing countries	Commodity Export	Fall in commodity prices and reversal of capital flow	-	[30]
Global	Edible Commodity price movements	All edible commodities have observed an upward trend with increase in prices	Mintec Analytics	[31]
India	Oil	The oil market oversaw a negative impact as prices fell	Multi Commodity Exchange (MCX)	[32]
India	Gold	Gold gained a safe haven status as it became the economy driver	Multi Commodity Exchange (MCX)	[32]
Global	Commodity prices	Weaker demand and Supply Chain Disruption	Global Price Index Producer Price Index Export and Import Price Index	[33]
Global	Commodity Prices	Disruption to Industrial Manufacture and peak of financial volatility	Money Control	[34]
Global	Oil	Collapse of oil market due to worldwide imposed lockdown	Crude Oil WTI Futures	[35]
India	Crude Oil	There is a presence of asymmetric price volatility in Crude oil.	Multi Commodity Exchange (MCX)	[36]
India	Natural Gas	No leverage effect of COVID-19 on the price volatility of Natural Gas can be seen	Multi Commodity Exchange (MCX)	[36]

ues spreading and affecting the lives of millions all over the globe, it shall continue to play a part in market stabilization.

Concluding the topic about the pandemic's impact on the global commodity market, it is a common viewpoint that while the markets of some commodities like gold have benefited from the pandemic with the price observing an upward trend. On the other hand, the overall global commodity market has been hit hard due to the outbreak of COVID-19. Prices of commodities like oil and natural gas have increased all over the globe. Moreover, the commodity market volatility had peaked. Although the market is slowly and steadily stabilizing and recovering, the global commodity market shall not fully stabilize as long as the virus is not eradicated. In Table 1, we have concisely covered more studies considering the primacy and novelty of the studies.

3 Impact of COVID-19 on the Stock Market

The economic activities around the globe and the global stock market have taken a massive hit with the outbreak of the novel coronavirus. The pandemic's impacts on the global markets have been catastrophic. Countries present in the North American and the European region have been said to have hit the worst whilst the countries around China, the origin place of the virus, have also been affected adversely. In order to control the outbreak of the virus, many countries had imposed lockdowns which made that specific nation go into the 'resting' phase. During this phase, the financial market dynamics were turned on their heads. Returns fell by huge figures; the stock market predictions for that ear seemed like a haven for economists. More than one-third of the planet faced a financial crisis, the worst ever since the Great Depression in the 1930s [37]. The focus of world leaders shifted from global politics to make their country and its people safe.

The paper by [38] talks about the Australian Stock Market. They inform the reader about the Herding behavior observed in the stock markets of Australia. The authors using cross-sectional absolute deviation model and tabular data from 10 June 2008 to

Fig. 2 The impact of COVID-19 on the stock market returns of FTSE (yellow), Dow Jones (red), and Nikkei (blue) [38]
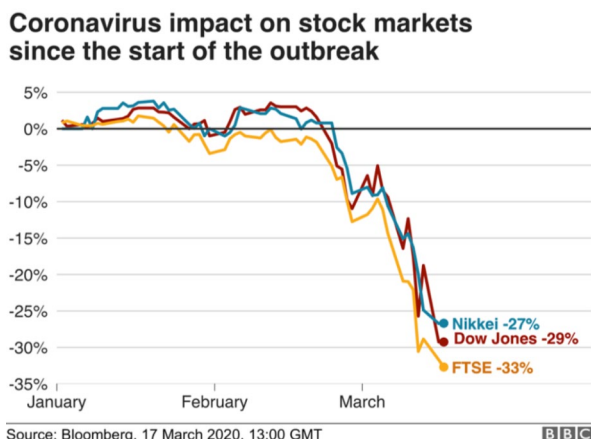
19 June 2020 to prove their objective that herding behavior can be very well seen in the Australian Stock Market. They reveal that the pandemic has caused a significant drop in the Australian market and other too, as shown in Fig. 2. The sample work done by Espinosa-Mendez and Arias proves that the market, as a result, due to the COVID-19 pandemic, has mainly become volatile. Their work shows that investors initially refrain from investing during a health crisis. This method results in agents that use this opportunity to 'referee' the market.

One of the largest populated countries and one of the most emerging markets of recent times, India, has been hit badly due to the outbreak of the pandemic. Being a direct neighbor of China, the introduction of the virus into Indian territories seemed inevitable. However, the nature of the virus caused it to spread widely throughout the nation, which adversely affected the nation's economy. The work of [39] assesses the impact of the COVID-19 pandemic on the Indian stock market using empirical pieces of evidence on stock market responses. The author analyses the stock returns before and after the pandemic and uses unit root tests to avoid false estimations. The study results found strong evidence of a negative correlation between Mondays and Tuesdays, whereas other days seem insignificant for all indexes.

Travelling a little towards the east, we come to South Korea, where [40] work examines the effect of the virus on the South Korean stock market and its exchange rates. According to their article, as the pandemic broke out, investors withdrew their capital from emerging markets which further led to high stock market volatility and the depreciation of the currencies of these specific economies. The authors used empirical analysis to study how COVID-19 affected the stock market variables and exchange rates. They also reveal that as and when the number of cases and deaths increased in South Korea, the market volatility increased, resulting in the South Korean Won depreciation.

The impact of the pandemic on the Saudi Arabian stock market is discussed in the article by [41]. Their paper aims to investigate how COVID-19 has affected the stock market in KSA (Kingdom of Saudi Arabia). They assess how the natural logarithm of COVID-19 cases affects the natural logarithm of trading activities. The authors present their assessment results in a tabular and graphical way where they find correlations between several aspects of the comparison they did between the natural logarithms. In order to conclude, their paper mainly focuses on building a model of the stock market spill over using an ARDL (Autoregressive Distributed Lag) estimation approach. The writers of the paper find out that there is a negative relationship and that long term national responses are needed to prevent a stock market crash in the KSA.

The article by [42] talks about the influence that the COVID-19 pandemic has had on the Indonesian Stock exchange as we move to Indonesia to continue our country-based approach. The paper's main aim is to check whether COVID-19 impacts the existing sectors and how that affects the Indonesian stock exchange. They use an OLS (Ordinary Least Square) regression method in their study. The results of their study are that investors were worried about investing due to the pandemic outbreak in Indonesia, which has led to negative sentiment in the stock market returns. Concluding their article, the authors say that the pandemic outbreak has had a significant impact on various sectors of the Indonesian Stock Exchange (IDX). The significant

impact was due to the decline of exports, production and economic activities accompanied by a high uncertainty in the investors' minds.

Pakistan is one of the emerging markets of the South East Asian countries. Being so close to China, the outbreak of the virus was predictable yet surprising in how it affected the nation. The paper by writers [43] focuses on the Karachi Stock Exchange. It talks about the impact that COVID-19 has had on the Stock Market in Pakistan. The paper's primary purpose is to evaluate the global pandemic's impact on its stock exchange. They use the quantile on quantile estimation approach using secondary and predicted data to achieve their results which speak out that the stock market has reported mixed evidence with COVID-19. The downfall of the KSE-100 index reportedly reached its historic lowest point mainly because the foreign investment was being drawn out due to the prevalence of uncertainty. However, the market later observed an increment. The main reason for this observation was that the government decided to help people and small businesses to support the nation's economy. To reiterate, even though the Karachi Stock Exchange recorded the lowest point in history in the KSE-100 index, government intervention was instrumental in preventing an utter disruption in the stock market.

Moving towards the Malaysian stock market, the paper written by [44] studies the impact of the Malaysian stock market due to the coronavirus outbreak. Using data from multiple sources (Kuala Lumpur Composite Index (KLCI) and 13 other sectorial indices) and applying them to the stock market returns of the Malaysian Stock Exchange along with a few mathematical operations (like, mean, minimum value, maximum value, median, standard deviation, coefficient of variation and correlation analysis), the writers were able to find a few results from their study. Their studies found that the energy markets, consumer and property indices fluctuated highly during the periods in which the authors took the sample. To conclude, the authors' report that the number of COVID-19 cases consistently negatively impacts several stock market indices of the Malaysian Stock Exchange. Moreover, high market volatility due to the high levels of uncertainty amongst investors also led to challenges that the stock market will face as and when the pandemic continues to spread and affect everyone on this planet.

The paper by [45] discusses the initial impact that the COVID-19 sentiment has had on the US stock market. He does this by making use of big data [46, 47]. The results of the author's analysis lead to the result that US stock investors are more sensitive to daily economic news, specifically in the financial, energy and industrial sectors. Moreover, specific correlations obtained from the study conducted by the author say that the COVID-19 sentiment impacts daily economic activities and investments. Concluding the paper, Lee informs the reader that the stock market has suffered an unprecedented shock and that anytime such a shock is observed in the stock market, investors usually tend to hold off their investments which then can destabilize the market.

Taking a more comprehensive look at the stock market response towards the coronavirus outbreak, the paper by [48] assesses COVID-19 and the associated market risk for the G-20 nations. The G-20 nations consist of Mexico, Brazil, Indonesia, India, South Africa, Saudi Arabia, South Korea, Argentina, Australia, China, Japan, France, Germany, Italy, United States, Turkey, Russia, Canada, United Kingdom, and

Spain. The paper's main objective is to assess the impact of COVID-19 in this specific group of nations at a time when the global economy is growing at -3% in 2020, which is the worst since the global financial crisis of 2009. The pandemic is not only affecting the economy of the specific nation but also of those who are linked to that economy. The results show that the market risk is the highest in Russia, whilst Australia boasts the least market risk amongst the G-20 nations. One shocking revelation from the studies conducted was that China had the least market risk. In contrast, all other markets proved to be at a critical standpoint when estimated the risk factor. The authors also say that whilst the result of this study is short-term generated, the long-term picture can only be viewed after overcoming the crisis, which has proved to be uncertain in almost every possible way.

[49] Discusses the extent to which the pandemic drives stock market volatility. It tries to achieve its aim by comparing the US and China. The authors use the quantile by quantile method to compare the stock market volatility for both nations. Moreover, safe to say the result is just like COVID-19 itself, surprising. According to the paper, the growth of new COVID-19 cases in the US, which has continued for months, has made the US stock market indifferent to COVID-19, whilst the pandemic is also the main reason for the fluctuations in the market dynamics. However, COVID-19 affecting the market dynamics is the only common link between China and the US. China has ensured robust pandemic control regulations, which, although it has safeguarded its citizens, has led the market to be highly sensitive to even small dynamic changes. The US government has also applied an extreme monetary policy that has suppressed stock market volatility to a large extent. Such is not the case in China; small daily growth in COVID-19 cases and the effective epidemic control have led to high market volatility, which has affected the nation's economy on a large scale [50].

Taking a look at yet another group of nations, the article by [51] discusses the COVID-19 impact and government intervention in the Stock Markets of the OECD countries. The OECD countries consist of Australia, Austria, Belgium, Canada, Chile, Columbia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, South Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, and the United States. After studying the COVID-19 impact in all these 38 countries, the results showed that with an increase in the number of confirmed COVID-19 cases, there was a significant negative impact on the Stock Market in each of these countries. According to the paper, with the increase of COVID-19 cases, there was an increase in uncertainty, leading to a decrease in investor confidence in the market. However, several policies implemented by the government, like social distancing, self-isolation, testing drives, etc., positively impacted the stock market [52, 53]. Finally, one more result from the study conducted by the authors tells us that the government's economic policies did not have a significant impact compared to the observations mentioned above.

In the Indian subcontinent, the adversity due to the COVID-19 pandemic, specifically during the lockdown period, is discussed exclusively in the paper by [54]. The paper's objective is to assess the extent to which the lockdown period in India influenced the stock market by taking a 35-day sample (24th February to 17th April

2020) which were the initial days of the lockdown period in the nation. The results of the study conducted were unforeseen. According to the paper, the market dynamics reacted positively during the lockdown period because investors supposedly predicted a lockdown coming into effect and pre-planned their investments accordingly. However, the studies also show that the market observed a negative impact in the pre-lockdown period because the sudden outbreak of the pandemic in the subcontinent constructed a situation of panic, uncertainty, and chaos. The study concludes by saying that the market's positive response to the lockdown has led investors to believe that shall the virus be eradicated from the country, the stock market will recover.

Assessing the global impact of COVID-19, the study done by [55] examines whether the pandemic affected the Nigerian stock market or not. The study examines the market returns and market inflation relationship explicitly in order to achieve its aim. The study results tell us that COVID-19 increases market volatility and disrupts the existing positive relationship between market returns and market inflation. Furthermore, the study also observes a significant negative impact of the pandemic on stock market returns. The author adds to the results procured by saying that distortion of the market returns and market inflation relationship may not end as long as the virus has been eradicated. Concluding their study, the authors also provide the readers with the information that the increasing number of cases has led to high market volatility in the Nigerian stock market.

In their study, [56] talk about the impact of COVID-19 on the stock market crash risk in China. They used generalized autoregressive conditional heteroscedasticity with skewness model (GARCH-S) and used graphs relating to the Shanghai stock exchange as a basis for their study. They also estimated the conditional skewness of the return distribution as an essential factor for their results. The study results tell the reader that the estimated conditional skewness has a negative response to the daily growth in total COVID-19 cases. This observation proves that the pandemic does increase stock market crash risk. The article also goes on to say that another factor adding to the market crash risk is the factor of fear, the fear of losing the investments made. Moreover, the fear in people may also add to the already negative impact on the pandemic's market. The article concludes by reminding the reader that while factors like the pandemic outbreak are straight to the eye reason for the negative impact, other factors such as uncertainty and fear may also add to that impact. Hence, even solving the panic amongst people can go a long way in lowering the market crash risk.

In conclusion, the impact of COVID-19 on the global stock markets is safe to say that economies around the world have been adversely affected. The market volatility has reached all-time highs, and overall, the stock market has observed shocks that have had a negative impact on its dynamics. Emerging countries and developing countries have been challenged the most as they already observed a shock in the value of their currency without the pandemic even hitting them with full force. Although the financial heavyweights like China and the United States have had their markets recover and stabilize up to a certain point due to government intervention, one cannot discard the effect that the coronavirus outbreak has had on the global economic level. Economic activities have decreased, and investors have invested less in shared due to the high level of uncertainty that persists. Moreover, with no clarity

on eradicating the virus, very little can be said about the long term future. To cover more novel and elucidating studies, we have succinctly in a tabular format for ease of understanding in Table 2.

Table 2 Assessment of the impact of COVID-19 on the stock markets globally

Country	Affected Region	Impact	Data Source	Reference
China	Value Chains	Stock market listed firms observe a negative and locally bound shock due to the value chains.	Shanghai and Shenzhen Stock Exchanges, CSMAR	[57]
United Kingdom	Share Prices	Industries have been hit hard as the shares show a sharp decline after the announcement - Of the lockdown.	London Stock Exchange	[58]
United States	Stock Market	Outbreak of the pandemic and the government policies to protect against the virus have drastically curtailed economic activities.	Stock Market Jumps	[59]
Global	World Major Markets	Growth Rate of weekly new cases negatively predicts the stock market returns. But several markets do stabilize up to a point after the government takes actions to contain the virus.	DJIA, Shanghai Composite Index, Nikkei 225, KOSPI Composite Index, IBEX 35, FTSE MIB, DAX Performance Index, CAC 40, FTSE 100, S&P/TSX, BFX 20, OMX 20, AEX Index, OSEBX, OMX 30 Stockholm Index, SSMI	[60]
India	Volatility of Stock Prices	BSE Sensex becomes volatile during the pandemic period. NSE Nifty however, does not experience a significant impact. Stock returns are negative and the market observes losses during the pandemic period.	Daily closing prices of stock indices, Nifty and Sensex	[61]
Japan	Japanese Stock Market	Although the number of infections in Japan was lower than in China and the US, the Japanese stock market dropped by the same degree as the US Stock Market.	Tokyo Stock Exchange, Bank of Japan	[62]
Global	Financial markets, sectors and centers	The actual impact of the pandemic on financial market, sector and centers is highly uneven. Developing economies have been challenged the most.	S&P Global, Yahoo Finance	[63]
Tunisia	Volatility dynamics of Tunisian Stock Market	Building construction materials, construction and food and beverage sector return volatilities have an asymmetric effect whilst consumer service, financials and distribution, industrials, basic materials and bank sector return have high positive and significant symmetric effect.	TUNINDEX20 listen in TSE	[64]

4 Future scope

2020 was full of shocks and surprises for the global market, but that was the past. As of now, in 2021, the markets are back on the rise, and there are clear positive signs of growth and investment, which makes up the hopeful present. However, what do we know about the future? It is still vague to discern the challenges faced by the stock market once the effects of this pandemic gradually wear off.

The first question relating to the stock market would most definitely be that would the stock market crash again in 2021? According to the Senior Vice President of Master Capital Services, Palka Chopra, Equity markets will correct in the near term but, the volatility is predicted to continue for some more time. She says that there is a much larger possibility of the market correcting itself rather than going to even higher levels than the ones observed recently, as reported by Business Today. The article also says that investors should be planning long term and should not be worried by the temporary blips due to the pandemic that has now stretched for over a year. The article by.

The Indian Express (2021) talks specifically about the state of the Indian Stock Market. It asserts that the absence of nationwide lockdown and considering that the lockdown announced individually by the states were limited in their impact, the levels of anxiety have reduced as a whole in the investor population. Moreover, there is a sense of optimism amongst the population about the vaccine drives done by the government. People also believe that there would be better economic activities around the subcontinent mainly due to the trust of people thrust upon the vaccination drives. Experts also say that whilst existing investment should not be halted, more investments that relate to long term goals should undoubtedly be made shall there be a correction in the market.

Further expanding onto the Indian stock market, the article by [65] discusses market capitalization in the post-COVID-19 period. It says that the drop observed by the BSE sensitive index is temporary and that investors should use the. The opportunity of these drops to invest and get high returns, especially those who plan for a long term benefit. The article also concludes; from previous pandemics and crises faced by the stock market. After alleviation of the pandemic, there is a certainty of a faster rise in the stock market than the fall. The work of [66] informs the reader about the risk contagion of the global stock market. The authors use extensive statistical equations and data from several countries to conclude that the stock market of various countries has experienced the risk contagion of the pandemic. The authors mention that Germany, Italy, Brazil and Australia are emerging as the new market for the risk contagion to make Ann impact.

So far, the COVID-19 era has the commodity market into splits. While the overall reaction of the commodity market is similar to the stock market, some commodities like gold have benefited from the outbreak of the pandemic, and some commodities whose market performance cannot be directly related to the impact of COVID-19. Amidst all this, perhaps taking a look at the future and the challenges to be faced by the global commodity market can lend us some valuable insights into what to expect going further.

An article by [67] talks about the impact that COVID-19 has had on the commodity market and discuss the further implications of the research. According to the article, the disruption of the supply chain can cause dislocations in the commodity market. However, the actual impact of the pandemic can only be known by its severity, duration and steps taken to mitigate it. However, if we were to make predictions regarding the long-term challenges that we might have to face due to the pandemic's impact on the market so far. The increase in transport costs being one of the leading reasons. The rise in prices has led to disruption in supply-demand, thereby destabilizing the trade flow. This can cause an increase in the prices that one might have to incur when considering the taxes and other duties that could be applied to the traded items. This has led to a domino effect — a cumulative effect produced when one event sets off a series of similar events, each with an implication over the next — all over the market. The increase in travel costs has led to an 'unwinding' of supply chains. Meaning that producers and suppliers, considering the increase in prices, have shifted their production back 'home' or somewhere close to where the exports have to be delivered to save costs. This, in turn, has led to substitutions among the commodities, meaning that normal cost domestic products might be preferred more than the high-cost imports. If the exact domestic product is not available, material substitution may occur where a different material to build the same product is used to save costs.

The aforementioned reports states that 2021 will be a bull run for all commodities in general before tapering down in 2022. However, according to the World Bank Commodity Outlook, gold will be an exception which will slow down the market. The article also reports that the overall commodity prices will increase in 2021 and then again in 2022, whereas the predicted prices for gold are downward. As a result, the general predictions for the commodity market seem to be that all general commodities except for gold will be on an upward trend in prices and on a downward trend for gold. All in all, the predictions for the rest of 2021 and 2022 paint the apparent picture that the changes that will be observed in the markets will be an extension of the observation so far into 2021. However, the outcomes of the predictions may not even match the final situation as there is still an aura of uncertainty around the duration and severity of the pandemic.

5 Conclusions

This paper analyses the impact that COVID-19 has had on markets around the globe. It talks about the unprecedented reaction of both the stock and the commodity market towards the pandemic outbreak. Moreover, it also informs the reader of how different markets from different regions from different corners of the world have had varied reactions when it comes to market shocks. The volatility has been more uncertain of stocks and commodities since the pandemic outbreak. Talking about the commodity market, commodities such as oil have experienced a negative impact, whereas commodities such as gold have experienced a positive impact. Some commodities like agricultural commodities, natural gas have reactions that cannot be directly drawn from the impact due to COVID-19.

Furthermore, the supply chain disruption has led to mass losses in countries like Nigeria, which is dependent on the export of commodities. In general, commodities that include edible items have experienced an upward trend when it comes to price. The stock market, in terms of financial and economic activity, has faced huge losses. The uncertainty has resulted in fearful investor behaviour, which has led to fewer domestic and foreign investments. Countries like Pakistan were able to save their economies from completely crashing due to the government's intervention. Emerging markets like India, Mexico, Ireland etc., have been challenged the most in terms of economic conditions. Japan, an interesting case study, has observed the same loss rate compared to the likes of the United States and China. However, the confirmed cases in Japan are much less than in China and the United States. Share prices in the United Kingdom observed a steep decline in prices once the lockdown was imposed. In a similar case, almost all the nations around the world observed declines after announcements about lockdowns. While government intervention and policies have come a long way from saving several economies from completely crashing, the uncertainty of the pandemic has led to vague predictions, showcasing similar trends what has been so far into the year 2021. The market dynamics are once again expected to change in 2022; that thread still dangles loosely as even a slight resurgence of the virus or its variants can lead to huge setbacks in predictions and development in nations' economies. Firms, researchers, enthusiasts and students can further use this study for knowledge purposes or to further analyses the trends and impacts of COVID-19 on the stock and commodity market.

Availability of data and material All relevant data and material are presented in the main paper.

Conflict of interest The authors declare that they have no competing interests.

Ethics approval and consent to participate Not applicable.

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