COVID-19 OUTBREAK AND STOCK MARKET REACTION: EVIDENCE FROM EMERGING AND ADVANCED ECONOMIES

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ABSTRACT

The present paper aims at examining the stock market reaction to Covid-19 confirmed cases, deaths and lockdown imposed by government in emerging and advanced economies by taking a sample of 34 countries over a period from 4th January 2020 to 30th September 2020. The result documents that the stock market reacts negatively to Covid-19 outbreak particularly daily confirmed cases and lockdown in both emerging and advanced economies. However, the impact of daily deaths is found to be asymmetric. Death has positive influence on stock market of emerging economies while it has negative impact on advanced economies. Furthermore the study also checked long-run relationship among variables by performing panel cointegration test and found an asymmetric behaviour in relation to level of economy. There is a long-run relationship among the variables of emerging economies while such relationship is absent in advanced economies. This paper contributes to the existing literature on the stock market performance in various ways. Firstly, unlike other studies being limited to a specific country, this paper depicts the effect of the Covid-19 pandemic on the stock market from a large sample of 34 countries. Secondly, it provides insights on the reactions of stock market on the outbreak of Covid-19 pandemic owing to level of economic development of the country, i.e., emerging and advanced economies. Thirdly, this is the first paper to assess the impact of the government stringent measure for Covid-19 i.e., lockdown on the stock market.

Keywords: Covid-19, Daily Confirmed Cases, Daily Deaths, Lockdown, Stock Market, Emerging Economies, Advanced Economies

INTRODUCTION

Life is uncertain and so is stock market fluctuation. One can't exactly predict what is going to happen in the next moment. It has been reminded to human race time and again in the form of various outbreaks, be it natural disasters, financial market crisis, epidemics or even pandemic like Covid-19.This novel corona virus was first detected in Wuhan city of China in the month of December, 2019 and from there it has reached almost every part of the world lead into a deadly form of pandemic, the living human race have ever came across during their lifetime. World Health Organisation (WHO) by seeing the destruction brought by Covid-19 announced it global corona virus pandemic on March 11, 2020 following the rapid increase in number of cases infected and death toll. As of April 17, 2020, the infected cases crossed 2 million mark with 1,39,000 deaths globally. As the cases continued to multiply, it compelled the countries to impose strict lockdown measures so as to curb the spread of this virus. The imposition of lockdown and social distancing norms encompassing suspension of domestic as well as international travel, tourism, export, import and more particularly restriction in the movement of people & goods, etc., have created a demand-supply mismatch and has disrupted the entire supply chain resulting in economic damage (Ceylan et al., 2020). The socio-cultural celebrations and their supporting events have been suspended amid Covid-19, further

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dampening the economic activities. Hence, this spiralling impact of Covid-19 has entered very rapidly into the economic sphere of individual as well as whole economy. As a result there is a paradigm shift in individuals earning source, spending habits, saving and investment pattern.

Though the world has witnessed many epidemics like the Ebola, Lassa fever, Plague, & Zika etc., the scale and growth speed of Covid-19 makes it unique among them. This virus has not only made the world standstill but also created havoc in the world economy. By the end of March 2020, full or partial lockdown had been imposed by more than 100 countries and about 70-90 percent air and inter-city travels connecting the major cities were cut down, affecting billions of people (Dunford et al., 2020). This has hit the real economy in extreme adverse ways. All mass gatherings, cultural events were cancelled as allowing them would have resulted in wider spread of the virus. Government, regulators, and big analyst firms across the globe become confused about their right action plan as there are no appropriate models both in the economic as well as the medical front, no definite rule book or policy prescription are available which will help to mitigate such unprecedented situation (Phan & Narayan, 2020). So, at this juncture, it is believed that this low frequency and high impact pandemic has created not only the health crisis but also an economic and social crisis across the globe and has left the stock market in a turmoil situation.

Al-awadhi, et al., (2020) advocated that the stock market is most sensitive to any economic event. Such sensitiveness of the stock market is mainly influenced by the investor's reaction to any event. This interaction between investor & stock market is well documented in the investor under-reaction and over-reaction theories (Daniel et al., 1998; Hong & Stein, 1999; Hong et al., 2007).Further, the efficient market hypothesis of Fama (1970) indicates that that stock market is efficient enough to capture all the information available in the market and reflect such information it in the stock prices. In line with this, Firoj & Khanom (2018); Makovský (2014); Wickremasinghe (2008); Frenkel (1981) suggest that the stock market behaviour is sensitive to available information that determines the efficiency of the market. Furthermore, Markowitz (1952) in the modern portfolio theory recommends that an investor can diversify the risk and maximise the return by constructing an optimal portfolio basing upon the efficient frontier. Such efficient frontier is built by considering available information from which expected return and risk is calculated. In line with this McKinnon (1969) in his portfolio balance theory suggest that information plays a pivotal role in balancing an optimal portfolios in long-run. In this regard, it can be inferred that any structural break (like Covid-19 in our case) happening in the economy has a direct impact on the asset's return which induces the investors to make their portfolio revision so as to main the optimal portfolio. Thus, the information on the Covid-19 infection and government intervention in terms of the shutdown, lockdown, etc., across the ecomomies influence the investor's expectations regarding economic activities, which in turn can affect the stock market. Prior literatures have also given evidence of several events where the stock market responded significantly like, sports events (Buhagiar et al., 2018), political events (Bash & Alsaifi, 2019; Shanaev & Ghimire, 2019), environmental issues (Alsaifi et al., 2020; Guo et al., 2020), financial crises 2009 (Rapach & Strauss, 2014), and various natural disasters (Kowalewski & Śpiewanowski, 2020). The stock market also responded to major epidemics in the past, such as SARS (Severe Acute Respiratory Syndrome) (Chen et al., 2007, 2009), H7N9 influenza virus (Jiang et al., 2017), and Ebola Virus (Ichev & Marinč, 2018) etc.

As the novel corona virus is found to be the most severe disaster in the last 100 years and declared as a pandemic by WHO (World Health Organisation), it is presumed to have significant impact on the stock market. But at what degree and in which direction, it is affecting the stock market is worth researching. Ramelli & Wagner (2020) document that stock market reaction is time-varying and such variation is also triggered by level of economies. So far, this Covid-19 pandemic is concerned it has demonstrated an asymmetric growth owing to the level of the economy. It was first detected in one of the emerging economies but spread very rapidly in developed economies during its beginning period, and later on, it spread over emerging economies. This difference in the spread of the pandemic was accentuated through differences

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in the economic fundamental of the countries. Such differences can be witnessed in the form of population density, economic growth, industrialization, ease of doing business, technological advancement, the standard of living, infrastructure, the balance of payment, growth of GDP, fiscal discipline, consumer market, financial system (Awan & Khan, 2015), unemployment rate, public debt (IMF, 2010), demographic dividend (Hagemann & Nicoletti, 1988), health care system and life expectancy (Minois, 1989), etc. So there is a logical stand to believe that there is an asymmetric effect of the pandemic on stock market of both emerging and advanced economies. However, there is scant in available literature on stock market reaction to Covid-19 in the context of level of economy (emerging and advanced). Most of the studies are in country specific for instance in USA context (Albulescu, 2020; Mazur, Dang & Vega, 2021; Baker, Bloom, Davis, Kost, Sammon & Viratyosin, 2020), Chinese context (Apergis & Apergis, 2020; He, Sun, Zhang & Li, 2020; Yan & Qian, 2020; Liu, Huynh & Dai, 2021; Sun et al., 2021), Japanese context (Narayan et al., 2020; Takahashi & Yamada, 2021). A very few number of studies have made only comparative study like between USA and China (Gao et al., 2021), among USA, China and Japan (Naseem et al., 2021). Further, such studies mostly confined to daily confirmed cases and death, and a very limited attention has been given to stock market reaction to government preventive measures for Covid-19 like lockdown. In this regard, to bridge such gap, the present paper has made a novel attempt to identify the stock market reaction to Covid-19 daily cases, daily deaths and lock down measures in the context of both emerging and advanced economies.

The remainder of the paper organized in the following manner: the second section deals with the literature review, the third section describes the empirical methodology, the fourth section depicts the empirical results, and the final section concludes the study.

REVIEW OF LITERATURE

Impact of Disasters, Epidemics on the Stock Market

Past studies done on different epidemics and its impact on stock market reveal that the investor's pessimistic nature and concern about the future income due to the epidemic make the market highly volatile and bring the significant loss to the market and the economy (Jiang et al., 2017; Liu et al., 2020; Fan et al., 2018). Jiang, et al., (2017) has documented a negative association between H7N9 influenza virus spread and China stock market. The Ebola virus outbreak significantly affected the stock prices of the firms situated nearby the birth place of the virus. The impact was strongest for the companies whose operations located to the West African Countries and the associated firms. The volatility increases after the Ebola outbreak due to the elevated perceived risk factor. However, the outbreak positively impacts the stock prices of health care industry, pharmaceutical companies and food and beverage sector (Ichev & Marinč, 2018). Conversely to the above findings, study done on globally dangerous diseases and its impact on wall street, author found that news related to such diseases affect the sentiments of a group of people such as stock market traders in a positive manner and lead to significantly positive performance (Donadelli et al., 2016). Similarly studies (Gangopadhyay et al., 2010; Beccheti & Ciciretti, 2011; Kowalewski & Spiewanowski, 2020) concerning various natural disaster and financial crisis like hurricane Katrina in 2005, financial crisis 2007-09 and mining disasters over 1986-2019 found that stock market reacted negatively to such disasters. Particularly, the market values of affected mining firms decreased by 1.12% on the first two days of happening of the disaster. The current and future stock prices of the competitive firms also get affected by the same (Kowalewski & Śpiewanowski, 2020). Major environmental and non-environmental accident has led to significant decline in the stock prices of the affected industry within the initial days of announcement of the disaster (Carpentier & Suret, 2015).The above discussion concerning disasters & epidemics provides a detailed understanding on how such adversities give a shock to the stock market. As the Covid-19 growth and coverage is comparatively higher than earlier hazards, it can be hypothesised that it has a very significant

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influence on the stock market. For a detailed overview, the following sub-section highlighted some recent evidences on stock market reaction on Covid-19 pandemic.

Impact of Covid-19 Pandemic on the Stock Market

Though Covid-19 pandemic has created health and financial crisis but in a positive note it has enriched the literature on disasters by attracting the attention of researchers around the globe. Within a short span researchers across the globe have explored various effects of Covid-19 on business and economy, like employment (Montenovo et al., 2020; Yu et al., 2020), household consumption (Binder, 2020; Liu et al., 2020), innovation ability (Han & Qian, 2020), global supply chains (Bonadio et al., 2020; Qin et al., 2020), industrial production (Altig et al., 2020; Appiah-Otoo & Issac, 2020)and government intervention on economic activities during Covid-19 (Feng et al., 2021; Ertuğrul et al., 2020; Haldar & Sethi, 2020; Phan & Narayan, 2020; Song et al., 2020). Out of many effects, the effect of Covid-19 on stock market is thrust of this paper.

The market has not only been hit hard during the pandemic but even before there was a negative growth in trade, transport and tourism industry. Due to this pandemic there is shortages in local supplies which also which made the situation even worst (Albulescu, 2020). Rapach & Strauss (2014) argued that the consequence of the global financial crisis in 2009 was so severe that it led to massive structural changes in the financial and commodity market, causing an asymmetric effect on portfolio allocation, market efficiency, and volatility While Nwosa (2021) documents that Covid-19 has a more adverse effect on the market than the 2009 global recession. Stock market recorded the highest volatility during the present pandemic among all infectious diseases including Spanish Flu of 1918 (Baker et al., 2020; Hoshikawa & Yoshimi, 2021; Ashraf, 2020; Iyke, 2020b; Lan et al., 2020; Liu et al., 2020; Mishra et al., 2020; Narayan, 2020; Prabheesh, 2020; Salisu & Sikiru, 2020; Yan & Qian, 2020), oil prices (Nwosa, 2021). Countries like USA, UK and South Korea have experienced an increase in the stock market's average volatility rate during the present Covid-19 period when it shifts from epidemic to pandemic stage (Ali et al., 2020). The value of equity market in USA has been declined in context of Covid-19 pandemic (Alfaro et al., 2020).Chicago Board Option Exchange's VIX (Volatility Index), touched all-time high. Studies on China and outside China reports that new confirmed cases of covid-19 has somehow mixed impact on financial volatility but news on deaths outside China have more powerful impact on stock market volatility (Albulescu, 2020). Covid-19 has direct impact on stock market return (Al-Awadhi et al., 2020). Increase in number of confirmed cases leads to negative stock market return (Ashraf, 2020). There exist a fractal contagion impact of corona virus pandemic on the stock market which eventually fizzles out in long run leaving less impact on stock market return and financial volatility (Okorie & Lin, 2020).

Huge losses have been incurred by various stock markets around the world due to Covid-19 pandemic related news updates. Further, it is found that stock market represents asymmetric dependency on Covid-19 information updates such as contagion, fake news (Cepoi, 2020). Government interventions in terms of stringent policies introduced to contain the covid-19 spread has also lead to increase in the stock market volatility. The above study further confirms that covid-19 related information and cancellation of public events are the major contributor in increasing the volatility of stock market (Zaremba et al., 2020).The present pandemic has also wide range of impact on other financial markets which includes banking sector and insurance sector (Goodell, 2020).Studies on emerging stock market revealed that the impact of covid-19 on stock market volatility is negative and statistically significant during the starting month of pandemic but gradually started fading and became insignificant during mid of April, 2020. However, Asian emerging stock market is found to be hit hard due to the pandemic whereas the European stock market showed moderate impact (Topcu & Gulal, 2020). Hence, from the above discussion it can be hypothesised that Covid-19 has an asymmetric impact on the stock market. But it raises some pertinent question like whether such asymmetric impact

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varies significantly due to level of economies? Whether government intervention (in terms of lock down, shut down etc.) in different economies have different bearing on stock market? This study is an attempt to answer such questions which is ignored by earlier studies.

METHODOLOGY

Data and Sample

We constructed the sample by compiling data on number of daily Covid-19 confirmed cases and death cases from the website of world health organisation. The data on government response stringency index (degree of lockdown) are collected from the data base of Our World in Data[1]. We included this index to capture the effect of government response to mitigate the spread of pandemic in terms of number and strictness of government policy resulted into closure of workplace, school, ban on travel, cancellation of public events, ban on gatherings, close public transport, public information campaigns, stay at home, restrictions on internal movement, international travel controls, testing policy, contract tracing, face coverings etc. The data set ranges from 4th January 2020 to 30th September 2020. Further, we collected data on daily stock market indices from www.investing.com database for the same period.

We adopted several criteria to filter the data. We remove those countries for which daily Covid-19 confirmed cases, death cases, lockdown stringent index data and stock indices data are not available. Lastly, we gathered country level control variables such as Goss Domestic Product (GDP) and globalization index. The data on GDP are collected from World Development Indicator (WDI) of World Bank and that serves as a control for level of economic development of each country. The data on level of Globalization are collected from KOF index of Globalization published by KOF Swiss Economic Institute and it counts for cross country difference in the level of economic, social and political integration with rest of the world. After applying the filter criteria, we ended up with a sample of 34 countries out of which 20 countries are emerging economies and 14 countries are advanced economies. Such classification of emerging and advanced economy is based on International Monetary Fund (IMF) economy classification definition. Further, we removed days with missing figures because though Covid-19 confirmed and death cases data are available for each day, but stock market data are not available for weekend and holidays. Finally, our dataset consists of 34 countries with 4,092 observations during 4th January 2020 to 30th September 2020. Table1 in the appendix highlights the sample countries, their major stock indices, and date of first Covid-19 confirmed case.

Model Specification

To study the stock market reaction to covid-19 confirmed cases, death cases and lockdown, we perform a panel data analysis. We resort to panel data analysis technique over event study technique as: First, the spread of Covid-19 is not a one point happening rather it spreads over a period of days in a country. Second, panel data has the edge of capturing the time varying effect of independent variable on dependent variable. Third, panel data considers the variation in variables arising due to difference in cross sectional unit and time period and it minimizes multicollinearity, hetroscedasticity and estimation bias (Baltagi, 2008; Wooldridge, 2010). By using the panel data analysis we specify our baseline empirical model as follows:

$$Stock\_Market_{ct} = \alpha + \beta_1 Confirmed\_Cases_{ct-1} + \beta_2\ Deaths_{\ ct-1} + \beta_3 Lockdown_{ct} + \beta_4 Control\_Variables_{ct} + \gamma_t + \varepsilon_{ct}$$

All the variables taken in the models are the same as described in the above. In addition, a time dummy $\boldsymbol{\gamma_t}$ has been introduced to control daily international events. Such dummy variables effectively control systematic risk due to international elements. The subscript "c" represents country and "t" represents time *i.e.,* each day. Daily confirmed cases and deaths are taken at its previous lag. The logic behind taking previous lag is based on the assumption that daily confirmed cases and death data are updated at the end of the day, which is generally used

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by investor in the next day's investment decision.

Panel Unit Root Test

Before proceeding to test long-term relationship (cointegration test) among variables of panel dataset it is necessary to check their stationary level. There are number of panel unit root tests have been highlighted in the literature like Maddala & Wu (1999); Breitung (2000); Hadri (2000); Choi (2001); Levin, et al., (2002); Im, et al., (2003). Each test has their pros and cons, like Levin, et al., (2002) generalized the individual stationary test to panels with individual deterministic trends, fixed effects and heterogeneous serially correlated errors. But, the main lacuna of Levin, et al., (2002) proposition is that, in the alternative hypothesis there is a necessity of homogeneous autoregressive root. However, such lacuna is minimised in the proposition of Im, et al., (2003) where it allows for a heterogeneous autoregressive coefficient in the alternative hypothesis. Similarly Fisher type panel unit root test proposed by Maddala & Wu (1999) has wide advantages as it is applicable in both balanced and unbalanced panel and does not requires identical lag lengths in the individual regression. Hence, considering the wide adaptability and comprehensiveness we have used Im, Pesaran & Shin W-statistic and Augmented Dickey–Fuller (ADF) test statistics of Fisher for checking panel unit root. The maximum number of lags is set to be eight for emerging economy dataset and seven in case of advanced economy dataset. Akaike Information Criterion (AIC) is used to select the lag length.

Panel Cointegration Test

Panel cointegration test is used for checking long-run relationship among the variables. In this study we have used the Pedroni (1999, 2004)'s heterogeneous panel cointegration test. The reason being choosing Pedroni's panel cointegration test is due to the fact that it allows for individual-specific fixed effects and deterministic trends. Pedroni (1999, 2004) suggests seven statistics to test the null hypothesis of no cointegration in heterogeneous panels. These tests broadly categorised into two types *i.e.*, within-dimension and between-dimension. The within dimension tests comprise of 4 statistics, such as, panel v-statistic, panel rho-statistic, panel PP-statistic and panel ADF-statistic. The Between dimension also consists of 3 statistics such as group rho-statistic, group PP-statistic and group ADF-statistic.

EMPIRICAL RESULTS

Table 1
SUMMARY STATISTICS

	Mean	Minimum	Maximum	Std. Dev.
Emerging Economy				
Stock Price	14700	783.87	107224.22	22228
Daily Confirmed Cases	3704.8	0.000	97894	11012
Daily Death	97.559	0.000	3876.0	243.80
Lockdown	65.682	0.000	100.00	23.341
Log GDP	26.869	23.375	30.294	1.5770
Globalization Index	71.157	55.950	85.600	7.5628
Advanced Economy				
Stock Price	6801.2	228.77	24041	6666.4
Daily Confirmed Cases	2974.0	0.000	69641	9870.0
Daily Death	93.733	0.000	6409.0	333.12
Lockdown	51.773	0.000	96.300	22.916
Log GDP	27.749	26.056	30.693	01.339
Globalization Index	84.394	76.820	91.190	04.562

Source: Authors' own calculation.

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Table 1 represents the summary statistics. The mean value of stock price shows that on an average the stock price stands at 14,700 for emerging economies and 6,801.2 for advanced economies for the sample indices. The minimum value stand at 783.87 and 228.77 while the maximum is at 107224.22 and 24041for emerging and advanced economies respectively. The average daily confirmed cases stands at 3,704with minimum 0 cases, maximum 97894 cases and standard deviation of 11,012 for emerging economies while the advanced economies have comparatively lower average value of daily confirmed cases *i.e.,* 2974 with a minimum value of 0, maximum value of 69,641 cases and standard deviation of 9,870.0. Similarly, the average daily deaths stand at 97 with minimum 0 deaths, maximum 3,876 deaths and standard deviation of 243.80 for emerging economies which is also higher than advanced economies. The average lockdown index score stands at 65.682 and 51.773 with minimum 0.000 and 0.000, maximum 100.00, 96.300 and standard deviation of 23.341 and 22.916 for the emerging and advanced economies respectively. The above statistics shows that emerging economies are more affected by Covid-19 outbreak than advanced economies in the parameter of cases, deaths and lockdown.

Table 2
CORRELATION MATRIX

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Emerging Economy						
(1)Stock Return	1					
(2)Daily Confirmed Cases	-0.142	1				
(3)Daily Death	-0.119	0.689	1			
(4) Lockdown	-0.252	0.213	0.234	1		
(5)Log GDP	0.322	0.572	0.503	-0.023	1	
(6)Globalization Index	-0.312	-0.102	-0.035	0.061	-0.111	1
Advanced Economy						
(1)Stock Return	1					
(2)Daily Confirmed Cases	0.477	1				
(3)Daily Death	0.615	0.795	1			
(4) Lockdown	0.091	0.161	0.185	1		
(5)Log GDP	0.264	0.243	0.265	0.033	1	
(6)Globalization Index	-0.375	-0.288	-0.292	-0.288	-0.037	1

Source: Authors' own calculation.

From the above table 2, we can see that the correlation coefficient ranges from 0.023 to 0.689 for emerging economies and from 0.033 to 0.795 for advanced economies which signifies the absence of collinearity among the variables (Gujarati, 2004). Further, we check multicollinearity by using Variance Inflation Factor (VIF). The highest VIF is 2.815 which states that muticollinearity issue is not present among the variables (Chatterjee & Hadi, 1977; O'Brien, 2007).

Table 3
PANEL UNIT ROOT TEST RESULTS

		Level		First Difference	
Emerging Economy		**Im, Pesaran and Shin**	**ADF - Fisher**	**Im, Pesaran and Shin**	**ADF - Fisher**
Daily Cases	No Trend	-0.396	49.543	-10.547***	234.825***
	Trend	1.886	29.322	-8.826***	186.208***
Daily Death	No Trend	-1.294*	52.392	-21.799***	473.767***
	Trend	0.477	44.369	-21.964***	372.888***
Lockdown	No Trend	-9.238***	234.596***	-13.053***	286.241***
	Trend	-10.792***	237.065***	-11.079***	211.468***
Stock Price	No Trend	-2.548	71.851***	-14.035***	308.291***
	Trend	-3.352***	75.927***	-12.617***	251.847***
Advance Economy					

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Daily Cases	No Trend	-2.618***	40.760*	-9.207***	147.728***
	Trend	-1.479*	34.960	-7.504***	109.281***
Daily Death	No Trend	-1.958*	35.109*	-10.971***	189.977***
	Trend	-1.081	28.609	-9.503***	148.988***
Lockdown	No Trend	-4.139	56.859***	-7.192***	103.375***
	Trend	-3.849***	74.523***	-6.156***	82.657***
Stock Price	No Trend	-2.699	42.833**	-10.496***	170.451***
	Trend	-5.768***	91.448***	-9.064***	130.141***
*, ** and *** indicate statistical level of significance at 10%, 5% and 1% respectively.					

Source: Author's own Calculation

Table 3 highlight the results of panel unit root tests in both levels as well as in first differences for the main variables of the study. We run each test including an intercept, and including an intercept and a linear trend. The tests (both Im, Pesaran & Shinand ADF – Fisher) unanimously reports that almost all the variables are non-stationary in their levels but become stationary in their first difference. Hence, it can be inferred that the variables are integrated of the same order and it satisfies the prerequisites to check the long-run relationship among the variables.

Table 4 reports the result of the regression measuring the reaction of stock market to confirmed cases, deaths and lockdown measures in both emerging and advanced economies.

Table 4
REGRESSION RESULTS

Dependent Variable: Daily Stock Price				
	Emerging Economy		**Advanced Economy**	
Independent Variables	**Coefficient**	**t-Ratio**	**Coefficient**	**t-Ratio**
Daily Confirmed Cases$_{t-1}$	−0.125**	−2.497	−0.253***	−12.36
Daily Death $_{t-1}$	56.640***	24.45	−3.182***	−5.473
Lockdown	−159.211***	−7.067	−103.406***	−10.89
Log GDP	1735.83***	7.498	2915.50***	23.38
Globalization Index	−776.371	−15.60	−431.785***	−14.71
Daily fixed-effects	Yes		Yes	
Intercept	16906.4	1.222	−32681.4***	−6.207
Observations	2,593		1708	
Adjusted R^2	0.433		0.368	
*, ** and *** indicate statistical level of significance at 10%, 5% and 1% respectively.				

Source: Author's own Calculation.

The above results evidence that stock market reacts negatively to Covid-19 outbreak in terms of daily confirmed cases and lockdown imposed by Government to prevent spread of virus in both emerging and advanced economies. However, stock market has an asymmetric reaction towards daily death between emerging and advanced economies. Death has positive impact in emerging economies while it remains negative in advanced economies. Since, death is a subsequent event of confirmed case and occurs after several days one gets confirmation regarding Covid-19 infection, investors of emerging economies move to stock market further with an optimistic attitude while investors of advanced economies remain pessimistic attitude towards market as expected in the early confirmed cases. The average death as a percentage of average confirmed cases is more in advanced economies (*i.e.,* 3%) than emerging economies (*i.e.,* 2%) which signals that the fatality rate in advance economies is comparatively high which creates a negative investors psychology and stock value remain downward.

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Further, we have employed panel cointegration test to check whether there is long-run relationship among the variables and such long-run relationship varies due to level of economies. The results are reported in table 4.

Table 5
PEDRONI PANEL COINTEGRATION TESTS RESULTS

Emerging Economy								
	No Trend				**Trend**			
			Weighted Statistic				**Weighted Statistic**	
Within-dimension								
Panel v	0.545		-0.328		1.177		1.924	**
Panel rho	-21.123	***	-7.580	***	-9.883	***	-3.604	***
Panel PP	-15.813	***	-7.152	***	-9.858	***	-4.405	***
Panel ADF	0.441		3.820		4.498		0.682	
Between-dimension								
Group rho	-6.354	***			-3.482	***		
Group PP	-6.333	***			-5.194	***		
Group ADF	2.452				0.667			
Advanced Economy								
	No Trend				**Trend**			
			Weighted Statistic				**Weighted Statistic**	
Within-dimension								
Panel v	-0.120		-0.706		0.454		-0.065	
Panel rho	0.894		0.401		-0.809		-0.597	
Panel PP	0.883		0.186		-1.331	*	-1.390	*
Panel ADF	1.599		1.539		0.275		0.499	
Between-dimension								
Group rho	1.530				-0.873			
Group PP	0.969				-2.033	**		
Group ADF	2.439				0.327			

*, ** and *** indicate statistical level of significance at 10%, 5% and 1% respectively.

Source: Author's own Calculation

Table 5 indicate the results of the Pedroni (2004) panel cointegration tests for both emerging and advanced economies. In case of emerging economies it is found that majority of the statistics (six out of eleven in without trend and nine out of eleven with trend) indicate that null hypothesis is rejected. While in case of advance economy majority of the statics failed to reject the null hypothesis as only three statistics out of eleven have rejected the null hypothesis. So, we can infer that there is an asymmetry in long-run relationship among variables due to level of economies.

CONCLUSION

The paper investigates the stock market reaction towards Covid-19 pandemic by taking daily confirmed cases, deaths and Government lockdown measures for 34 countries over a period from 4th January 2020 to 30th September 2020. The study confirms that stock market reacts adversely to the daily confirmed cases and lockdown as shutdown of business houses along with transport restriction, supply shock and demand fall have been occurred during the pandemic Covid-19 leading to huge economic losses to the individual and business houses. However, in case of daily death, stock market reaction of emerging economies and advanced

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economies vary oppositely. Stock market of emerging economies positively responds to daily death while it remains negative in advanced economies. In the context of long-run relationship the study identified long-run relationship among the variables of emerging economies while such relationship is absent in case of advanced economies. Hence, the government and regulators of emerging economies need to be more alert and frame various strategies in order nullify the negative consequence of such long-run relationship on the economy. This study will help stock market regulators, portfolio managers, retail investors as well as government of various economies to take various precautionary measures and frame various policies to mitigate adverse impact of Covid-19 pandemic.

LIMITATION AND FUTURE SCOPE OF STUDY

The present study lacks in addressing the long term impact of Covid-19 on stock market as the outbreak is new and has manifold effects which are yet to be explored. The present data set has only taken for 34 countries due to missing or unavailability of data but future study can be undertaken by extending sample countries. Further, this study considers quantitative aspects of stock market but qualitative aspects like investor's and portfolio manager's perception can be studied which can give more insight on the stock market dynamics.

END NOTES

1: https://ourworldindata.org/grapher/covid-stringency-index. Data published by Thomas Hale, Sam Webster, Anna Petherick, Toby Phillips, and Beatriz Kira (2020). Oxford COVID-19 Government Response Tracker, Blavatnik School of Government. This is a composite measure based on nine response indicators including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest). If policies vary at the sub-national level, the index is shown as the response level of the strictest sub-region.

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