abnormal positive returns from the Federal Research stimulus.

Also in the developed nations of U.S., UK, Germany, France, Spain and Italy Cepoi (2020) examined the Covid-19 pandemic effects, using panel quantile regressions for the period from February 3, 2020 to April 17, 2020. The findings revealed that fake news negatively influenced lower-middle quantiles throughout returns distribution, and returns throughout middle-upper quantiles were decreased by the media coverage. As a consequence, this study hypothesized the following;

H_4: Stock market returns are negatively related to the announcements of government containment and health policies over the study periods.

Data was gathered from 77 countries dated from January 22 to April 17, 2020 by Ashraf (2020) for the examination of the government actions' effect on stock market returns. Based on the findings, government announcements of social distancing measures negatively affected stock market returns, whereas reduced Covid-19 confirmed cases had a positive influence on stock market returns. Moreover, the findings also indicated that public awareness programs and economic support announcements had a positive effect on market returns. Hence, based on the above discussions of theory and extant theories, this study hypothesizes that;

H_5: Stock market returns are negatively related to the government announcements of social distancing measures over the study period.

The study has contributions to literature dedicated to the effect of government intervention and Covid-19 on stock markets among Middle Eastern countries. The study assumes that Covid-19 pandemic and government interventions affect stock market returns in the Middle Eastern countries context for the period beginning from April 1, 2020 to September 20, 2020.

3 Data Collection

In the present study, data was gathered from three major sources, namely Daily Stock Market Returns from www.investing.com, one major stock market from each country, daily Covid-19 data for each country reported by the Johns Hopkins University, Coronavirus Resources Center (JHU-CRC), and Government Accountability Indicator data obtained from the OxCGRT website. Data collected was dated from April 1 2020 to September 20, 2020 – owing to the fact that this period is characterized by the Covid-19 validated cases and each country's government response to control and manage it. The sample was purified using two filters, the first of which is countries that have no stock return data were not included from Covid-19 approved items or government response indicators, and second daily observations missing values necessitated the omission of variables. The sample comprised of 820 observations gathered from the sample countries, including Saudi Arabia, UAE, Bahrain, Egypt, Jordan, Oman and Qatar for the period from April 1 to September 20, 2020. The fundamental information of the sample distribution is presented and tabulated in Table 1.

4 Methodology

The influence of government intervention during the Covid-19 pandemic on the stock market returns of Middle Eastern countries was determined through the use of panel data regression. In the panel data models, the concern is mostly placed simultaneously on time and cases, with other models opting instead to express the heterogeneities across units or throughout time. Such models also consider the composition of heterogeneity of cross-sectional units and time dimensions, which leads to minimizing estimation bias and the multicollinearity occurrence (Baltagi, 2008; Gujarati, 2003; Wooldridge, 2010). Moreover, because of Covid-19 pandemic spread evolves over time, studies opted to use panel data method over other approaches as exemplified by Al-Awadhi et al. (2020) and Ashraf (2020), with the combined regression being the simplest estimation method and regression measurement used. A single equation is used to estimate the data altogether and it is represented by Brooks (2008) as;

$$y_{it} = \alpha + \beta x_{it} + u_{it} ....(1)$$

In the above equation, *y* represents the dependent variable, *i* represents the unit, *t* represents time, *x* represents the independent variable, and *u* the random error limit.

Generally speaking, a panel data research uses two major approaches, which are fixed effects model and random effects model to analyze the time series and cross-sectional data (Gujarati, 2003). Each group's intercepts varies at different times, with the coefficients representing the fixed effects model assumption remaining constant. This shows that it connects to the error component through explanatory variables. On the other hand, random effects model enables the changing over time of explanatory variables throughout different groups (Verbeek, 2012). Hausman (1978) showed that the results of Hausman-test to choose the model fit is useful;

$$y_{it} = \alpha + \beta x_{it} + u_i + v_{it} ....(2)$$

More specifically, the Hausman-test is useful in selecting the model according to the Chi-Square value – in that the fixed model is suitable to be used if the Chi-Square value is lower than 5%, otherwise the random model is more suitable for use. Accordingly, this study found the random effects model to be more suitable for the panel data based on the test, as the chi-square value is higher than 5%;

$$y^*_{it} = \alpha^* + \beta x^*_{it} + \gamma \hat{x}_{it} + u^*_{it} ....(3)$$

$\mu_{i,t}$ denotes the error term, that is represented by the following equation;

$$\mu_{i,t} = u_i + \gamma_t + \epsilon_{i,t} \qquad ... ... (4)$$

In the above equation (Equation 4), the panel model's error term can be considered to be classified into pure disturbance term ($\epsilon_{i,t}$) and error term brought on by other factors – such factors are denoted by μ_i, which are unobservable individuals effects, while unobservable time effects are denoted by γ_t. In the equation, in case μ_i and γ_t equals zero, the use of OLS method is preferred, otherwise, depending on statistical tests regarding the presence of individual or/and time specific effects, a fixed effect or random effect specification of the panel model is chosen.

In the present paper, the Hausman-test results, the panel data model utilized to shed light on the effects of government interventions and Covid-19 on the stock market returns of Middle Eastern countries for the period from April 1, 2020 to September 20, 2020 is as follows;

$$SMR_{i,t} = \alpha_0 + \alpha_1 GOVINT_{i,t-1} + \sum_k^k = 1\beta_k X^k_{i,t-1} + u_{it} .... (5)$$

$$SMR_{i,t} = \alpha_0 + \alpha_1 COVID - 19_{i,t-1} + \sum_k^k = 1\beta_k X^k_{i,t-1} + u_{it} .... (6)$$

The model in Equation 4 shows that $SMR_{i.t}$ is the dependent variable, indicating that stock market return in country i on day t, gauged as the change in major stock market index on a daily basis, while α_0 is the constant term. The government interventions effect on stock market returns is obtained by measuring government reactions ($GOVINT_{i,t-1}$) using four major indices, namely stringency index, containment and health index, and economic support index. Moreover, $COVID - 19_{i.t-1}$ represents the daily measured confirmed cases of Covid-19, $X^k_{i,t-1}$ represents the vector of control variable, with the control variable being the variation in percentage of the S&P500 volatility index (VIX). VIX stands for the 30-day estimated U.S. stock market volatility, obtained from real-time, mid-quote S&P500 mid-quote prices Index call and put options (Chicago Board Options Exchange). According to Liu et al. (2020), VIX is a proxy for instrument investor's risk, with the entire Covid-19 and control variable covered under their lagged values.

5 Empirical Analysis

This study primarily examines the direct effect of government interventions on the Middle Eastern countries stock market returns during Covid-19 pandemic, and the effect of the latter on the stock market returns in the same context, for the period from April 1, 2020 to September 20, 2020, using the panel data model. Prior to running the regression analysis, a stability test had to be conducted for the model's independent variables and for this, the Augmented Dickey-Fuller test and the Phillips-Perron test were both employed. This step ensures the time series data is stable for the period of study, as instability could result in inaccurate results of regression analysis.

Table 1, Summary of Statistics

Variable	Mean	Maximum	Minimum	Std. Dev.	Observations
RE	0.000955	0.046022	-0.074136	0.008944	820
RES	74.24555	87.50000	35.12000	9.751652	820
CH	77.49854	92.36000	36.81000	9.749763	820
STR	80.04920	100.0000	30.56000	12.00247	820
SUP	54.73301	87.50000	0.000000	21.75684	820
CFC	21325.50	201801.0	153.0000	36.75204	820
DE	53.52816	318.0000	1.000000	84.08873	820
VIX	-0.000723	0.479500	-0.1317	0.081402	820

The above table contains the descriptive statistics of the main variables. From the table, stock returns are gauged as the change in each country's (Saudi Arabia, UAE, Bahrain, Egypt, Jodan, Oman and Qatar) major stock indices daily, and government response index reflects the way government responses increase/decrease during the pandemic. Moreover, inclusion and health index is a combination of lockdown and lockdown restrictions with measures (e.g., short-term investments in healthcare and vaccines, contact tracing and testing policy). Added to the above, the stringency index is the austerity of lockdown policies that basically limits the behavior of people (e.g., universities, offices and community places closure, domestic and international travel restrictions), whereas economic support index gauges' measures like income support program and debt relief. As for the Covid-19 certified items, they were measured as the number of certified items in a country on a daily basis, while the number of Covid-19 fatalities was measured as the death due to Covid-19 on a daily basis. The variation in percentage of the S&P500 volatility index (VIX) is the control variable, VIX being referred to as 30-day estimated volatility of the U.S. stock market, obtained from real-time S&P500 index mid-quote prices call and put options (Chicago Board Options Exchange).

Table 2, Correlation Matrix

	RE	RES	CH	STR	SUP	CFC	DE	VIX
RE	1							
RES	0.0258933	1						
CH	0.0210817	0.9526529	1					
STR	-0.0276028	0.7099229	0.8340870	1				
SUP	0.0246839	0.5759084	0.3000678	-0.015538	1			
CFC	0.0844743	0.1398329	0.0948248	-0.1487823	0.1839805	1		
DE	0.04542491	0.1032978	0.1100331	-0.1979956	0.0284598	0.2890258	1	
VIX	0.08312529	0.0115938	0.0023674	-0.0058360	0.0300512	0.0270347	0.0233585	1

In the above table (Table 2), the correlation matrix results show no strong correlation and they show the independent-dependent variables relationship and the relationships among the independent variables. It reveals a double correlation between two variables and the correlation coefficient between more than two variables. The table specifically shows the relationship between government response index, containment and health index, stringency index, economic support index and the S&P500 volatility index (model 1), as the independent variables, and confirmed cases of Covid-19, number of deaths of Covid-19, and the S&P500 volatility index (mode 2) – the relationship is devoid of multicollinearity issues and no autocorrelation exists between the dependent and independent variables.

Table 3, Unit Root Test Results (Dickie Fuller & Phillips Peron)

Variable		ADF	PP	Results
RE	Level	81.7550***	365.511***	Non-stationary
	First difference	315.403***	253.481***	Stationary
RES	Level	10.0074	10.3270	Non-stationary
	First difference	97.9116***	442.930***	Stationary
CH	Level	11.0854	10.9802	Non-stationary
	First difference	99.8710***	450.313***	Stationary
STR	Level	8.35392	8.93157	Non-stationary
	First difference	100.130***	444.644***	Stationary
SUP	Level	8.77291	8.05485	Non-stationary
	First difference	104.949***	440.118***	Stationary
CFC	Level	7.58633	7.15326	Non-stationary
	First difference	69.7857***	358.987***	Stationary
DE	Level	8.99306	8.71113	Non-stationary
	First difference	82.5459***	414.369***	Stationary
VIX	Level	103.127***	551.647***	Non-stationary
	First difference	283.998***	128.945***	Stationary

The Dicky Fuller and Phillips-Perron test was used to confirm the stability of the time series for the study variables and the stability for the study period, steering clear of instability that could lead to inaccurate results of regression analysis. Accordingly, two tests were conducted at the level of the study variables. Table 3 tabulates the results and it indicates the instability of all variables the level and thus, the null hypothesis that states the instability of the time series was accepted. Thus the entire variables first differences was obtained and retested after the first differences was obtained by the tests, with significant value lower than 5% for the tests. The alternative hypothesis was accepted, stating that the time series of study variables has become stable. More specifically, the Phillips-Perron test considers the random errors and encompasses the Dickey Fuller test, indicating that the temporary shock effects will eventually diminish through time, particularly through long periods.

The appropriate panel models to be used in estimating the direct impact of government interventions and Covid-19 pandemic on stock market returns of the examined countries in the Middle East have to be determined. The decision involves selecting between fixed or random effects model, and for this the Hausman test was conducted, after which the random effects model was found to be suitable.

Table 4, Model 1 (Covid-19) Panel Data Random Effects Model Results

Variable	Coefficient	t-Statistic	Prob.
C	-0.00143	-2.60656	0.0093
CFC	3.35E-08	2.077731	0.038
DE	9.77E-06	1.40124	0.1615
VIX	-0.01147	-2.75778	0.0059
R-squared	0.421625		
F-statistic	6.011918	Durbin-Watson stat 1.776	
Prob(F-statistic)	0.000472		
Hausman test			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	4.94162	3	0.1761

In the above table, the random effect panel data regression findings of Model 1 are tabulated, and it covers the daily confirmed cases (CFC) and confirmed deaths (DE) representing Covid-19 pandemic effect measures on the Middle Eastern Countries' stock market returns. The table shows that VIX as proxy of instrument investors' risk, while standard errors were used to address the heteroskedasticity issue for the regression variables. The F-test p-values were less than the 5% significance level, indicating data-model fit. Moreover, the random effect results of Model 1 shows the CFC to be statistically significant in its influence on stock market returns, which indicates that daily total confirmed cases do influence the Middle Eastern countries' stock market returns in the examined period (April 1, 2020 – September 20, 2020). Additionally, indirect positive effect was found on stock market returns in the face of decreased Covid-19 confirmed cases.

A negative relationship was revealed between the stock market returns of the examined Middle Eastern countries and S&P500 volatility index (VIX) during the studied period. In other words, oil volatility and investors' concerns gauged through VIX and OVX negative relate to stock market returns in the Middle Eastern countries during the pandemic. These results are aligned with prior studies that found stock markets to fall in the face of increased changes in volatility indices (e.g., Bahrini & Filfilan, 2020; Alqahtani & Chevallier, 2020; Liu et al., 2020; Smales, 2017).

Table 5, Model 2 - (Covid-19) Panel Data Random Effect Model Results

Variable	Coefficient	t-Statistic	Prob.
C	-0.00424	-4.08936	0.0000
RES	-0.48894	-3.3593	0.0008
CH	0.419032	3.359625	0.0008
STR	0.000101	1.16466	0.2445
SUP	0.069866	3.359538	0.0008
VIX	-0.0086	-2.06613	0.0391
R-squared	0.452133		
F-statistic	8.61043	Durbin-Watson stat 1.83115	
Prob(F-statistic)	0.0000		
Hausman test			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	3.549717	5	0.6159

The above table presents the effect of independent variables, namely government response index, stringency index, containment and health index, and economic support index actions on stock market returns in the examined countries during the Covid-19 pandemic. From the table, instrument investors' risk is proxied by VIX, which is the control variable.

Model 2 results revealed that government response index significantly and negatively affected the stock market returns of the countries during the pandemic due to heightened government actions in social distancing measures like the closure of universities, schools, industrial workplaces and community places, and limitations in national and international travel and movement. Corporate valuations on average decreased owing to the government inducements of social distancing and their negative influence.

Added to the above result, containment and health response had a significant impact, which means government actions pertaining to public awareness campaigns and testing and quarantining policy result in positive market response, increasing the confidence of investors and decreasing the adverse effects on the economy brought on by the pandemic.

Moving on to stringency index, no statistical significant influence was found on the stock market returns of the Middle Eastern nations examined, meaning to say the government announcements of social distancing measures like colleges closure, workplace closure, public events cancellations, limited meeting size, public transport curtailing, stay at home mandates, limiting domestic movement and international travel have no significant effect on stock market returns.

As for economic support index, the government income support and debt/contract relief of household's programs had statistical significantly effects on the overall stock markets, indicating positive returns in response to the government interventions.

6 Conclusion

This study investigated the economic impact of government interventions and Covid-19 on the stock market returns of selected 9 Middle Eastern Countries. The study considered the government policy actions implementations and illustrated the effect of government interventions like social distancing measures, lockdown constraints and closure of entities, along with measures like testing policy and contact tracing, closure of educational facilities and workplaces, and limited domestic and international travel during the Covid-19 pandemic on the stock market returns of the examined Middle Eastern countries. In the empirical analysis, the study made use of stock market returns data, Covid-19 confirmed cases and announcements relating to government policies from the countries from April 1, 2020 to September 20, 2020. According to the obtained results, the stock markets of the 9 Middle Eastern countries responded in a positive and significant way to the decreased number of Covid-19 confirmed cases, while the social distancing measures announcements had a negative effect on the stock market returns because of the estimated negative effect on the economic activities. With regards to government announcements of containment and health of public awareness programs, positive market returns were observed owing to the decreased Covid-19 confirmed cases. Lastly, income support programs culminated in positive market returns in all 9 Middle Eastern countries examined.

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