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Effects of public health restrictions during the pandemic on Kuwait's equity market: An ARDL bounds testing approach

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ABSTRACT

The objective of this study was to examine the effects of public health restrictions during the pandemic on the equity market in Kuwait by employing daily data collected over the period from January 23, 2020, to December 31, 2021. The study used the Autoregressive Distributed Lag (ARDL) model to evidence cointegration between the Kuwaiti equity market and public health restrictions (NPIs). The findings indicate that the long-term adverse impact of public health restrictions such as school closures, stay-at-home orders, and travel bans has resulted in worsening market performance. Conversely, the equity market reacts positively to restrictions on gatherings. The study also found a positive association between the S&P 500 and the Kuwaiti equity market, implying that the S&P 500 positively impacts the Kuwaiti market. This research contributes to understanding market behaviors and offers strategic insights for risk mitigation and market resilience during future crises. Future research could incorporate sentiment measures, nonlinear ARDL methods, or comparative studies across GCC financial markets to deepen understanding of policy–market interactions during systemic shocks. Expanding on this study enhances understanding of the impact of public health restrictions on emerging country financial markets under pandemic conditions, providing valuable insights for policymakers and investors in future crises.

Contribution/ Originality: This research provides insights into the reactions of emerging equity markets, such as Kuwait, during the pandemic through public health restrictions using the ARDL approach. As an oil-based economy, Kuwait offers practical implications for policymakers and investors managing financial stability during health crises.

1. INTRODUCTION

The COVID-19 pandemic originated in early 2020, unleashing an unprecedented global crisis that changed almost every aspect of human life (Gössling, Scott, & Hall, 2020). As the pandemic virus spread rapidly, NPIs were implemented by governments worldwide to reduce negative consequences and protect public health (González & Gallizo, 2021). On a national level, these precautions ranged from numerous preventative measures aimed at decreasing human contact and the potential for human transmission of the virus (World Health Organization, 2020). Lockdowns or stay-at-home orders were among the NPIs that governments implemented more frequently than other measures. These restrictions compelled individuals to stay at home, except for essential tasks such as acquiring food like groceries or seeking medical help (Madan, Bindal, & Gupta, 2021). Lockdowns were created to reduce the extent of social interactions and to stop large gatherings, which were believed to be the main causes of the virus's spread (De Haas, Faber, & Hamersma, 2020). Other than lockdowns, various nations have enacted travel restrictions and strengthened their borders to prevent disease spread. The measures grounded all foreign aircraft, shut down land borders, and established strict quarantine protocols for entrants, aiming to control the transmission of the disease effectively (Heller, 2021).

Travel restrictions were implemented to prevent the importation and exportation of cases and outbreaks that occur elsewhere. NPIs also included guidelines for social distancing (Arino, Bajeux, Portet, & Watmough, 2020). Different governments also demanded that individuals keep a safe distance from others and practice social distancing in crowded areas and hygiene, such as washing hands frequently (World Health Organization, 2022). These recommendations helped minimize contact between people, thereby delaying the spread of the disease. Moreover, in many regions, businesses and industries have been temporarily closed to prevent further outbreaks of the virus. This caused an enormous disruption in the regular economic order, leading to the shutdown of companies, restaurants, entertainment venues, and educational facilities. It resulted in significant monetary and non-monetary losses and created a great crisis for employees (Haleem, Javaid, & Vaishya, 2020). Although these NPIs were instrumental in controlling the spread of the coronavirus pandemic and preventing exhaustion of healthcare systems, they had severe consequences for global economies and financial markets (Latif et al., 2021). This, along with the uncertainty over the duration of the epidemic, led to the closing down of business activities, plunging equity markets, declining consumer confidence, and disrupting the global supply chain (Notteboom, Pallis, & Rodrigue, 2021). The affected businesses lost income, laid off employees, or closed permanently due to closures (Lakuma, Sunday, Sserunjogi, Kahunde, & Munyambonera, 2020). The millions of people who lost their jobs, leaving many to succumb to rising levels of unemployment, have dealt significant socio-economic challenges to governments worldwide (Buheji et al., 2020).

Moreover, financial markets have experienced substantial fluctuations; stock prices encountered sharp falls in the initial phase of this epidemic associated with COVID-19 (Bora & Basistha, 2021). At that time, the pandemic was in its infancy. Investor sentiment became very sensitive to news about the virus spread and government responses, causing declines in the stock price index (Khan et al., 2020). A number of studies have used OxCGRT databases to investigate equity market indices to determine the extent to which government actions affect the equity market and cause stock market fluctuations (Aharon & Siev, 2021; Baig, Butt, Haroon, & Rizvi, 2021; Bickley, Brumpton, Chan, Colthurst, & Torgler, 2021; Feng, Yang, Gong, & Chang, 2021). The Oxford COVID-19 Government Response Tracker (OxCGRT) has recently become a popular data source for monitoring and comparing government responses to COVID-19. Managed by the Blavatnik School of Government at Oxford University, it provides a standardized, regularly updated dataset on policies implemented by governments to address the pandemic (Hale et al., 2021). In response to an increasingly difficult coronavirus pandemic, Kuwait's government piloted a range of non-pharmaceutical interventions (NPIs) to protect public health and reduce the virus's harm to its people (Ge et al., 2021). The Kuwaiti government adopted NPIs such as lockdowns, social distancing mandates, travel restrictions, and business closures (Rahman & Thill, 2022). Such measures are designed to keep people as far apart as possible, reduce gatherings, and slow the virus's spread within a country (Tully et al., 2021). Just like meeting places for the young and old, restaurants, movie theaters, and schools were temporarily closed to reduce social contacts and prevent localized outbreaks (Nutsubidze & Schmidt, 2021).

These NPIs have a serious impact on the Kuwaiti economy (Alhammadi, 2022). Business and industrial enterprises were forced to temporarily suspend economic operations. However, companies had to stop work, resulting in financial losses and subsequent suffering (Zainal, Bani-Mustafa, Alameen, Toglaw, & Al Mazari, 2022). The policies also resulted in more than 100,000 jobs lost and poor unemployment rates. This placed additional pressure on the country's economy. Recently, the Kuwait Stock Exchange has become a key indicator of the nation's economic health, especially as the coronavirus pandemic has introduced new challenges to living conditions (Hassan, Rabbani, & Abdulla, 2021). Like equity markets worldwide, the Kuwait equity market (KEM) experienced unprecedented volatility during the pandemic, with investors closely monitoring reports of cases and the implementation of non-pharmaceutical policies, which influenced market movements significantly (Adekoya & Oliyide, 2021). The Kuwaiti equity market suffered due to its nature: there were sudden price falls followed by equally rapid recoveries. In this context, the market's performance during that era offers valuable insights into investor sentiment and attitudes toward Kuwait's economic revival (Kisswani, 2025).

The need to examine these issues prompted a study on non-pharmaceutical interventions and emerging financial markets. Prior research explores the link between government responses and financial markets; however, most focus on developed markets. It also addresses a neglected area by concentrating on non-pharmaceutical interventions and their impact on Kuwait's equity market. Essentially, the effects in emerging markets are quite different from those in advanced economies (Salomons & Grootveld, 2003).

The primary questions are: To what extent did public health restrictions during the pandemic affect the performance of Kuwait's equity market index (KEMI) from January 23, 2020, to December 31, 2021? To thoroughly analyze the effects of public health restrictions on Kuwait's equity market, we have developed the following sub-questions.

1. Does the school closure have a negative impact on KEMI?
2. Does the restriction on gatherings influence KEMI negatively or positively?
3. Do the stay-at-home requirements have a negative impact on the KEMI?
4. Does international travel have a negative impact on KEMI?

2. LITERATURE REVIEW

2.1. Empirical Studies

The COVID-19 pandemic has triggered an unprecedented shift toward non-pharmaceutical interventions, causing external institutional shocks to global financial markets (Gössling et al., 2020; Hale et al., 2021; Latif et al., 2021). While numerous studies have addressed the implications of these policy measures on financial markets, a significant gap exists in the literature. Existing studies largely rely on descriptive methodologies and exhibit a clear focus on developed market contexts (Aharon & Siev, 2021; Baig et al., 2021; Bakry, Kavalmthara, Saverimuttu, Liu, & Cyril, 2022; Zaremba, Kizys, Aharon, & Demir, 2020). This paper systematically addresses three key gaps identified in contemporary research: (1) the predominantly descriptive rather than synthetic approach to consolidating prior empirical findings (Alam, Alam, & Chavali, 2020; Bora & Basistha, 2021; Ibrahim, Kamaludin, & Sundarasen, 2020). (2) the lack of theoretically grounded conceptual models explicitly linking NPIs to equity market dynamics through an institutional economics perspective (Aharon & Siev, 2021; North, 1990, 1991; Pastor & Veronesi, 2012; Salomons & Grootveld, 2003).

Many papers exploring institutions have pointed out the downward effects of these interventions on equity markets, and only a small number of these studies consistently identify positive effects on the equity market Zaremba et al. (2020); Bakry et al. (2022); ALjawaheri, Ojah, Machi, and Almgtome (2021); Czech and Wielechowsk (2021); Ibrahim et al. (2020); Alam et al. (2020), and Onyele and Nwadike (2020). Zaremba et al. (2020) examined how strict policy responses to the new coronavirus pandemic are in 67 countries around the world. During this study, non-pharmaceutical treatments clearly show enhanced equity market volatility. Additionally, Zaremba et al. (2020) estimate the effect that different government policy responses will have on the liquidity of global equity markets. However, the authors offer evidence that the extent to which the interventions have an impact. In emerging markets, the closure of workplaces and schools leads to worse liquidity, while public health awareness campaigns on new viruses may lead to effects on trade.

On the other hand, Bakry et al. (2022) examined the connection among daily announcements declaring a coronavirus pandemic, government protective measures, and equity market volatility over one year. A measure of asymmetric volatility categorizes this research into emerging and developed markets. The authors compare the two markets: how investors respond to factors like new confirmed cases, lethality, recovery rates, and government protective measures in emerging economies versus developed ones; the results are notably different. ALjawaheri et al. (2021), since the COVID-19 pandemic and the subsequent lockdown have led to a decline in financial reporting, affecting both its value and significance. The authors' conclusions demonstrate that earnings manipulation harms investor behavior and damages the credibility of financial statements over extended periods. In a related study, Czech and Wielechowsk (2021) take up how the coronavirus pandemic has affected the energy commodities market, paying particular attention to the severity of the epidemic, government policies, and equity market volatility. Using a structural vector autoregressive model, the authors show that the price of energy commodities responds significantly and negatively to changes in equity market volatility. Additionally, the findings indicate that a jump in the Global Stringency Index causes the GSCI Energy Index to decline. The increase is much more pronounced on the third day following the impact and then levels off toward zero.

In addition, Ibrahim et al. (2020) analyze 11 developed Asian and emerging economies to observe the relationship between the coronavirus pandemic, government intervention, and equity market volatility. The study period was from February 15, 2020, to May 30, 2020. Continuous Wavelet Analysis (CWT) and GJR-GARCH plots were used to examine the impact on domestic equity market volatility. The CWT plots show that market volatility varies over time. For the studied nations, short-term volatility was very low, except for Japan. Vietnam, Malaysia, and Laos experienced medium-term instability. Conversely, China, Japan, South Korea, Malaysia, and the Philippines exhibited extreme long-term stability. The GJR-GARCH results indicate that domestic events, especially government interventions during the pandemic, influence market volatility. Most governments in the sample intervened to stabilize local equity markets, significantly reducing volatility. Fluctuations were also caused by global market events.

Alam et al. (2020) noted that the market responded differently during the lockdown. Specifically, the Average Abnormal Returns (AAR) data, which reflect market figures during this period, show that the market provided only positive indicators throughout the current lockdown period. The interpretation of this number is to depict the willingness of the market, in our case, positive concentration on strong policies taken by the government. Onyele and Nwadike (2020), the lockdown did see improvements in the level of order at stock exchanges such as New York, Shanghai, Toronto, London, and Bombay. Additionally, this study notes that international markets incurred massive losses during the coronavirus lockdown.

2.2. Theoretical Framework

From an institutional economics perspective (North, 1990, 1991), NPIs constitute sudden formal institutional shocks that simultaneously disrupt informal norms of social and economic interaction. These shocks propagate to equity markets through three primary channels: (i) an uncertainty channel that elevates political and economic risk (Pastor & Veronesi, 2012), (ii) a real-economy channel that contracts consumption, employment, and corporate earnings, and (iii) a behavioral channel. In institutionally fragile emerging markets, the first two channels tend to dominate, producing prolonged negative effects. However, when certain NPIs, such as gathering restrictions are perceived as targeted and effective, they can reduce perceived health risk faster than they damage economic activity, thereby generating positive market reactions. In addition, North (1990), North (1991), and Engelhart and Moughamian (1971) argued from a perspective of institutionalism to show that it is the social environment around the organization that governs its structure and behavior. Because of that, the power over an entire economy and its immunity is in the hands of this "economic infrastructure". These are the key factors determining economic growth.

Considering that in emerging markets there are always institutional gaps (Aharon & Siev, 2021), any intervention is likely to have a negative effect and even the possibility of conducting business in emerging capital markets. Furthermore, the response may be due to expectations, including dismal future economic prospects and an increase in political uncertainty (Pastor & Veronesi, 2012).

This study draws on a robust theoretical framework (North, 1990, 1991), which posits that equity market behavior is primarily shaped by official institutional shocks, such as non-pharmaceutical government interventions (NPIs). In the context of the emerging Kuwaiti market, school closures, stay-at-home orders, travel bans, and restrictions on gatherings constitute sudden policy shocks that paralyze economic activity, directly impacting political and economic uncertainty (Pastor & Veronesi, 2012). These measures exacerbate inherent institutional gaps in economies, producing disproportionate and often long-lasting negative effects on market performance. Institutional theory finds support in recent evidence from various countries. The difference in sensitivity of emerging markets to COVID-19-related policy shocks compared to developed markets can be explained by the exacerbation of institutional gaps and weak regulatory frameworks, which negatively impact capital market performance (Harjoto, Rossi, & Paglia, 2021). The findings from the ARDL model study indicate substantial long-term cointegration between these non-policy interventions and the Kuwait Stock Exchange index, thereby affirming that institutional design is a critical determinant of market volatility and resilience during the COVID-19 crisis.

3. METHODOLOGY

3.1. Modelling

To relate the equity market to non-pharmaceutical interventions, the study estimated the following simple model based on the literature reviewed (Al-Alawnh et al., 2025; Dreger & Gros, 2021; Habibullah, Lau, Din, Rahman, & Shah, 2022; Obiakor, Okere, Muoneke, & Nwaeze, 2022). This paper uses variables: sm_t, which represents the KEMI; NPI_t, referring to non-pharmaceutical interventions such as school closures, gathering restrictions, stay-at-home orders, and international travel measures; and Z_t, encompassing control variables such as the S&P500.

$$sm_t = \rho_0 + \rho_1 NPI_t + \rho_2 Z_t + \varepsilon_t \qquad (1)$$

3.2. Data Sources

The study sourced data from secondary resources, including the daily equity market for Kuwait from www.datastream.com. Data on public health restrictions or non-pharmaceutical interventions were collected from January 23, 2020, to December 31, 2021, and compiled through the OxCGRT website, enabling an investigation into the correlation between NPIs and equity market trends during this timeframe. Several control variables, such as the S&P 500 from Yahoo Finance, were incorporated into the study.

Following the approach outlined by Busse and Hefeker (2007), the initial analysis step involved employing a logarithmic transformation on the pertinent variables. This transformation utilized a predetermined mathematical formula, converting the original variables into their corresponding logarithmic forms using the equation $\log y_t = \log\left[y_t + \sqrt{(y_t^2 + 1)}\right]$.

Thus we have preserved the sign of y. The values of y change linearly in the small absolute values, and change logarithmically in the large values, i. According to Busse and Hefeker (2007), a specified transformation, such as the log-modulus transformation, is applied to data with a wide range of values, including zero. This transformation is a copy of the classical positive number transformation using the logarithmic transformation of order and is identical to it. Burbidge, Magee, and Robb (1988); Busse and Hefeker (2007), and Akhtaruzzaman, Hajzler, and Owen (2018) discuss that the change of linear is around zero, and hence it can effectively change zero values. Due to this, this transformation does not lose any points when applied.

Table 1 illustrates a range of non-pharmaceutical interventions (NPIs) implemented in Kuwait as strategies to curb the spread of the coronavirus pandemic.

Table 1. Descriptions of variables.

No	Variables	Abbreviation	Data source	Measurements of variables	Role
1	Kuwait Equity Index	(B_K)	www.datastream.com	Close price	Dependent
2	School closing	(SCLOS)	OxCGRT.com	0 - No measures 1- Recommend the closure 2 - Necessitate closing only specific levels 3- Require the closure of all levels	Independent
3	Restriction on gatherings	(ROGAT)	OxCGRT.com	0-No limitations 1- Restrictions on large-scale gatherings (exceeding 1,000 individuals) 2- Restrictions on gatherings involving 100 to 1,000 individuals 3- Restrictions on assemblies involving 10 to 100 individuals 4- Restrictions on assemblies involving fewer than 10 individuals	Independent
4	Stay at home requirements	(SAHREQ)	OxCGRT.com	0 - No measures 1 - Recommend against leaving the residence 2 - Require remaining at home, with exceptions for daily exercise, grocery procurement, and 'necessary' excursions. 3 - Require remaining home with few exceptions (e.g., permitted to exit only once every several days, or allowing just one individual to leave at a time, etc.)	Independent
5	International travel	(ITR)	OxCGRT.com	0 - No measures 1- Screening 2- Arrivals from high-risk areas are placed in quarantine. 3- Prohibition of high-risk areas 4- Complete border closure	Independent
6	Standard & Poor's 500	(S&P500)	Yahoo finance	Close price	Control

Note: Missing data were removed from the time series and the daily observations, which overlapped equity market holidays, were also removed.

3.3. ARDL Bound Test

In this study, ARDL-bound (Autoregressive Distributed Lag) cointegration analysis is conducted. The reason is that, compared with other cointegration techniques, the ARDL-bound method has the following advantages: (1) ARDL procedures are used to incorporate variables that are both stationary (I (0)) and non-stationary (I (1)). Stationary means the variable maintains a constant mean over time, while non-stationary does not. (2) Autoregressive Distributed Lag (ARDL) models, a statistical technique to estimate long-run relationships between variables, are used in this paper (Pesaran, Shin, & Smith, 2001). The ARDL model can be employed to estimate the long-run pattern of the stock index based on equation (1) and to study the links between non-pharmaceutical indicators and the (KEM) during both short- and long-term periods. (3) Collectively in empirical finance and economics, the ARDL approach can be used to analyze long-term relationships between variables. For this article to achieve its goal, both long-term and short-term estimations are necessary. Due to the strengths of the ARDL bound test and the sample data used in this study, the ARDL bound test is likely to improve the statistical properties of estimated parameters. Therefore, this paper uses this test to explore the dynamic links between the NPI and the stock market.

According to Pesaran et al. (2001), the short-run ARDL can be used to develop the long-run model in Equation 1, which offers important insights into the connections between the variables being studied. The equations are as follows:

$$sm_t = \kappa_0 + \sum_{i=1}^{n} \kappa_{1i}\, sm_{t-i} + \sum_{i=0}^{n} \kappa_{2i}\, NPI_{t-i} + \sum_{i=0}^{n} \kappa_{3i}\, Z_{t-i} + \omega_t \qquad (2)$$

Equation 1 for the long-run model can be obtained from Equation 2 when we have.

$$sm_t = \rho_0 + \rho_1\, NPI_{it} + \rho_2\, Z_{it} + \varepsilon_t \text{ with } \rho_0 = \frac{\kappa_0}{1-\sum \kappa_{1_i}},\ \rho_1 = \frac{\sum \kappa_{2_i}}{1-\sum \kappa_{1_i}},\ \rho_2 = \frac{\sum \kappa_{3_i}}{1-\sum \kappa_{1_i}} \text{ and } \varepsilon_t = \frac{\omega_t}{1-\sum \kappa_{1_i}} \qquad (3)$$

The presence of cointegration in the short-term error-correction model (ECM) by examining the residuals obtained from the long-term model, as detailed further below.

$$\Delta\, sm_t = \psi_0 + \sum_{i=1}^{m} \psi_{1i}\, \Delta sm_{t-i} + \sum_{i=0}^{m} \psi_{2i}\, \Delta\, NPI_{t-i} + \sum_{i=0}^{m} \psi_{4i}\, \Delta\, Z_{t-i} + \lambda\, ECT_{t-1} + \eta_t \qquad (4)$$

The short-run error-correction model (ECM) incorporates the residual (ECT_{t-1}) derived from the long-term model with a one-period lag, Equation 1 or Equation 3), which can be expressed as follows.

$$ECT_{t-1} = \varepsilon_{t-1} = sm_{t-1} - [\rho_0 + \rho_1 NPI_{t-1} + \rho_2\, Z_{t-1}] \qquad (5)$$

The error-correction model parameter lambda (λ) (ECT_{t-1}) can be used to measure how quickly the variables change to reach the long-run equilibrium. A relevant association is present if it is significant, negative, and typically falls between 0 and -2 (Samargandi, Fidrmuc, & Ghosh, 2015).

$$\Delta\, sm_t = \propto_0 + \sum_{i=1}^{p} \propto_i \Delta sm_{t-i} + \sum_{i=0}^{p} \propto_{2i} \Delta\, NPI_{t-i} + \sum_{i=0}^{p} \propto_{3i} \Delta\, Z_{t-i} + \beta_1\, sm_{t-1} + \beta_2\, NPI_{t-1} + \beta_3 Z_{t-1} + \mu_t \qquad (6)$$

Equation 6, which is, is H_0: $\beta_1 = \beta_2 = \beta_3 = 0$, while the alternative hypothesis posits H_1: $\beta_1 \neq \beta_2 \neq \beta_3 \neq 0$. The Bounds F-test is applied to examine whether there is cointegration among the variables in Equation 6, specifically testing the null hypothesis of no cointegration. Additionally, the cointegration test, as proposed by Banerjee, Dolado, and Mestre (1998) and building on earlier work by Banerjee, Dolado, Hendry, and Smith (1986) and Kremers, Ericsson, and Dolado (1992), uses the t-statistics of the lagged dependent variable coefficient of a conditional model that uses error correction ECT_{t-1}.

4. EMPIRICAL RESULTS AND DISCUSSION

4.1. Descriptive Statistics

The logarithmic values are shown daily in Table 2 with descriptive statistics. Several variables are being considered, had negative skewness. The result is inconsistent with the normal distribution postulated for return series in most financial models. Although this conclusion is similar to Agarwalla, Varma, and Virmani (2021), Malik, Sharma, and Kaur (2022), and Youssef, Mokni, and Ajmi (2021). It also means the data is unevenly distributed, with a long-left tail and most values on the right. The analysis found that kurtosis was greater than 3 for several of the variables under consideration to the right line (Bourghelle, Jawadi, & Rozin, 2021; Fakhfekh, Jeribi, & Ben Salem, 2023; Ftiti, Ameur, & Louhichi, 2021). It is based entirely on the absolute value of data and does not affect relative position. Leptokurtosis, which may be a kind of structural instability for the association or organization of variables, is the term used in this essay. In addition, the Jarque-Bera test should be used to confirm a variable's distribution. The test probability is zero. This series is not as natural as previous literature has approved by Curto and Serrasqueiro (2022), Malik et al. (2022), and Youssef et al. (2021). This discrepancy likely represents either errors or deviations in the data.

Table 2. Descriptive statistics.

Series	B_K	SCLOS	ROGAT	SAHREQ	ITR	S&P500
Mean	10.5527	1.6390	1.7766	0.7502	1.7344	8.9104
Median	10.5403	1.8184	2.0947	0.8814	1.8184	8.9283
Maximum	10.7894	1.8184	2.0947	1.8184	2.0947	9.1681
Minimum	10.2632	0.0000	0.0000	0.0000	0.0000	8.4062
Std. Dev.	0.1339	0.4492	0.5413	0.6278	0.4338	0.1667
Skewness	-0.0530	-2.6091	-2.3796	0.0130	-2.6918	-0.4334
Kurtosis	1.9710	8.9219	8.1391	1.6364	11.2894	2.3967
Jarque-Bera	15.5169	903.3207	711.3807	26.9719	1416.5960	16.1737
Probability	0.0004	0.0000	0.0000	0.0000	0.0000	0.0003

Note: All variables are in logarithms.

4.2. Result of Unit Root Tests

The Augmented Dickey-Fuller (ADF) test in Table 3, a statistical method for assessing the stationarity of time series data, extends the Dickey-Fuller test by including lagged differences and accounting for possible autocorrelation. This test indicates whether a time series has a unit root, suggesting it is non-stationary, or if it is stationary, with a constant mean and variance over time. Conversely, Kuwait's equity market, stay-at-home data, and S&P 500 in first difference, along with variables such as school closures and restrictions on gatherings, are stationary. The use of a diverse dataset makes the Autoregressive Distributed Lag (ARDL) methodology applicable. ARDL is a statistical approach commonly used in econometrics to analyze long-run and short-run relationships among variables. It is particularly suitable when the data includes a mix of stationary and non-stationary elements.

Table 3. Results of unit root test.

At Level							
		B_K	**SCLOS**	**ROGAT**	**SAHREQ**	**ITR**	**S&P_500**
With constant	t-Statistic	-0.6283	-3.8231	-3.7295 (2)	-2.1574 (0)	-4.0911 (0)	-0.6225 (4)
	Prob.	0.861	0.003	0.0041	0.2226	0.0011	0.8623
			***	***	-	***	-
With constant & trend	t-Statistic	-2.9912 (23)	-3.8397	-3.6488 (8)	-2.7306 (0)	-3.9663 (2)	-2.8528
	Prob.	0.1363	0.0156	0.0272	0.2249	0.0106	0.1796
		-	**	**	-	**	***
At first difference							
		ΔB_K	ΔSCLOS	ΔROGAT	ΔSAHREQ	ΔITR	ΔS_P_500
With constant	t-Statistic	-8.9192 (0)	-	-	-18.554 (0)	-	-9.0645 (2)
	Prob.	0.0000	-	-	0.0000	-	0.0000
		***	-	-	***	-	***
With constant & trend	t-Statistic	-9.0664 (0)	-	-	-18.537 (0)	-	-9.0787 (2)
	Prob.	0.0000	-	-	0.0000	-	0.0000
		***	-	-	***	-	***

Note: Asterisk *** and ** denotes statistically significant at the 1%, 5% levels, respectively.

4.3. Correlation Matrix

In Table 4, the correlation coefficient is a statistical measure designed to gauge the strength and direction of the linear association between two variables. A value close to 1 indicates a high positive correlation, meaning that as one variable increases, the other also increases. If the value is close to -1, it reveals a strong negative correlation, meaning that when one variable grows, the other shrinks. As this table indicates, the Kuwaiti equity market and NPI (school closures, gathering restrictions, stay-at-home orders, and prohibitions on international flights) tend to have a negative linear relationship. Additionally, the control variable shows a positive relationship with the Kuwaiti equity market.

Table 4. Correlation matrix.

Correlation	B_K	SCLOS	ROGAT	SAHREQ	ITR	S&P500
B_K	1.0000					
SCLOS	-0.4167***	1.0000				
ROGAT	-0.3045***	0.5975***	1.0000			
SAHREQ	-0.7278***	0.4383***	0.4138***	1.0000		
ITR	-0.3546***	0.6811***	0.7865***	0.3517***	1.0000	
S&P 500	0.9209***	-0.1485***	-0.0765	-0.5594***	-0.1476***	1.0000

Note: Asterisks *** denote statistically significant at the 1% level.

4.4. Results of Lag Length Selection Method

The Akaike Information Criterion (AIC) is an essential decision-making tool that helps identify the optimal lag length for capturing the dynamics and relationships within a dataset, specifically for the Autoregressive Distributed Lag (ARDL) model. The results of this lag length selection process are summarized in Table 5, which presents outcomes based on information criteria derived from the Vector Autoregression (VAR) model. The analysis indicates that the appropriate lag order for the variables is 2. This means the model includes one lagged value for the first variable and two lagged values for each of the remaining five variables. Such a lag structure is crucial for understanding the temporal dependencies and influences among variables over time. Using the AIC criteria to determine this lag length ensures the model has adequate explanatory power to accurately reflect how variables evolve. This careful selection process enhances the robustness of the statistical analysis and contributes to a clearer understanding of the study's findings. The optimal lag length identified in the study suggests that a lag of 2 periods is most suitable for modeling the relationships among the variables. This insight provides a solid foundation for interpreting the dynamics within the dataset and understanding how variables interact over time.

Table 5. VAR lag order selection criteria.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	255.4	NA	0.0000	-1.4417	-1.3750	-1.4151
1	2958.3	5296.5	0.0000	-16.8575	-16.3906	-16.6716
2	3072.1	219.0*	1.23e-15*	**-17.307***	**-16.440***	**-16.962***

Note: Table outlines the criteria used for selecting the lag order. '*' indicates the lag order selected by the criterion these criteria, including Log Likelihood (LogL), Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quinn Information Criterion (HQ), provide different measures to evaluate the optimal lag orders.

4.5. Results of Cointegration Tests

The outcome for Table 6 is revealed by the F-Bound test and attains a significant value of 7.4778 at the 1% level. This result means there does without doubt exist a positive association over the longer term between the variables. It means, in short, the variables are not independent of each other but form an integrated whole over time. Moreover, to confirm the integration relations, as alluded to in our findings above, Table 6 presents the Bounds t-statistic result of -6.7489. This finding is significant at the 1% level and provides dependable proof of the existence of long-term relationships among our variables.

Table 6. ARDL bound test results (F-Bounds test) and (T-Bounds test).

Conditional ECM bounds F-stat	
F-stat	7.4778***
K	5
ECM regression Bounds t-stat	
Bounds t-stat	-6.7489***

Note: Asterisks (***) indicate statistically significant levels of 1%. Cointegration is evaluated using the Bounds F-test, and a related Bound T-test, as proposed by Banerjee et al. (1998) focuses on long-term relationships based on lagged dependent variables.

4.6. Results of ARDL Model

R^2 for the ARDL model is 0.993, indicating a high degree of fit between the model and the data. Considering the number of variables and degrees of freedom, the adjusted R-squared is 0.995, further validating that this is a well-fitting model. The results of the diagnostic tests are listed in Table 7. Additionally, the Akaike Information Criterion, or AIC, was a crucial factor in determining the optimal lag length for the variables. As a result, ARDL (1,2,2,2,2,2) was selected. This notation provides significant insight into the lag structure of each variable in the analysis. Table 7 shows that the estimated error correction term in the short-run coefficient is -0.0969. This coefficient indicates the speed at which variables adjust to reach equilibrium in the long run. The error correction coefficient is a useful metric for assessing the market's responsiveness to deviations from its long-term equilibrium. It offers insights into the rate at which the market reverts to a stable state. These findings provide valuable information for investors and policymakers seeking to understand the dynamics of the Kuwaiti equity market, including its responsiveness to various non-pharmaceutical interventions and external factors such as the S&P 500 stock index.

More importantly, the study focuses more on the long-term effects of non-pharmaceutical interventions (NPIs). It is worth mentioning that school closures, stay-at-home orders, and travel bans have consistently had adverse effects on the performance of the Kuwaiti equity market. Interpreting the predicted long-run coefficients in economic terms will help to better understand the substantive implications of NPIs on market behavior. The school closure coefficient indicates that a one-level increase in these restrictions is associated with a 5.6 percent decline in the stock index, demonstrating investors' sensitivity to the long-term impacts of these restrictions on human capital formation and household economic activity. Stay-at-home orders also have a similar negative elasticity of 3.6 percent, as restrictions on mobility tend to hinder retail activity, business operations, and investor sentiment. International travel restrictions exhibit the highest negative elasticity, with a one-unit change reducing the index by an average of 9.9 percent, emphasizing that international mobility is central to Kuwait's trade-exposed and service-based economy. Conversely, limited gatherings show a positive long-term elasticity of approximately 9 percent. This finding, contrasting with the negative effects of other NPIs, suggests that containment efforts against large gatherings may be viewed as positive measures for epidemiological control without significantly reducing economic activities. The magnitude of this coefficient indicates that investors perceived such restrictions as stabilizing interventions that reduce uncertainty regarding future economic shocks.

Table 7. Short-run and Long-run relationship for NPI and equity market for Kuwait.

ARDL (1,2,2,2,2,2)				
Method for choosing a model: Akaike information criterion (AIC)				
Part-A.	Selected Model: (1,2,2,2,2,2)			
R^2 and Adj. R^2	[0.993] [0.995]			
Part-B.	Long-run cointegration models for NPI and stock market			
Variables	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
SCHOOL_CLOSING	-0.056	0.0211	-2.648	0.009
RESTRICTION_ON_GATHERINGS	0.092	0.035	2.660	0.008
STAY_AT_HOME_REQUIREMENTS	-0.036	0.015	-2.416	0.016
INTERNATIONAL_TRAVEL	-0.099	0.037	-2.672	0.008
S&P_500	0.700	0.051	13.518	0.000
Part-C.	Short-run ECM regression models for NPI and stock market			
ECM*	-0.097	0.014	-6.748	0.000
R^2	0.448			
Adjusted R^2	0.430			
S.E. of regression	0.011			

Note: R^2 and Adjusted R^2 measure model fit and S.E.R denote the standard error of regression. The (ECM*) denotes the error correction term that is obtained using the ARDL model. The negative and statistically significant coefficient of the ECM confirms the presence of the long-run equilibrium relationship of the variables and shows the rate of adjustment to the long-run equilibrium.

Besides that, the ongoing upward trend of the S&P 500 control variable of Kuwait's equity market is impressive. The S&P 500 is correlated with Kuwait's stock index, and the elasticity in the long run is 0.70, indicating that a 1 percent growth in the US benchmark translates to a 0.7 percent growth in the domestic stock. The large value of this coefficient further indicates strong financial integration and shows that global conditions significantly impact Kuwait's market performance. If such a positive relationship exists between these variables, it suggests interdependence among the markets. Discovering and utilizing this interdependence could have far-reaching effects on future crisis management, strategic policy directions for Kuwaiti equity markets, and offer useful solutions for risk mitigation in stock exchange markets. This, in turn, could lead to increased resilience against falling prices.

4.7. Diagnostics and Stability Tests

The outcome of diagnostic tests as indicated in Table 8 portrayed p-values above 5%. When the p-value is above 5 percent, it shows there is no statistically significant evidence that the data follows a serial correlation and heteroscedasticity behavior. In other words, there is no systematic trend of errors in the model over time or correlation. Such validation is necessary because it ensures that the statistical model applied in the analysis is reliable. As a result, we will be able to trust the output provided by the model and make sound interpretations and decisions based on the available information.

Table 8. Diagnostic tests.

Residual Diagnostic	
LM χ (1)	[0.6787]
LM χ (2)	[0.7944]
ARCH	[0.1355]

Note: LM χ (1), LM χ (2), examine serial correlation in ARDL equations. The ARCH test is employed to identify volatility or heteroscedasticity in the residuals.

The favorable indication on the restrictions of gathering, in contrast to other NPIs, needs theoretical contextualization. Institutionally, these limitations could indicate improved capacity to manage crises and coordinate the state, and increased confidence among investors in the government's ability to control the course of the pandemic. The Kuwait market, which has a high number of institutional and government-affiliated entities, might react more to perceived policy capability than to temporary shifts in consumer behavior. Additionally, they might have accumulated limitations at stages of medium epidemic pressure, enabling investors to view these as preventive rather than corrective, thus strengthening expectations of stabilization rather than decline. The sign heterogeneity of the coefficients aligns with institutional theory. Forced institutional policies, including school shutdowns, movement restrictions, and restrictions on international travel, directly limit economic transactions and adversely impact stock prices. These NPIs indicate a greater risk to the economy and a likelihood of future cash flow deterioration. These differing institutional arrangements explain why some NPIs suppress market prices while others increase them, and why Kuwait is sensitive to both economic and policy credibility indicators.

5. CONCLUSION

In conclusion, this paper used the Auto Regressive Distributed Lags (ARDL) model to investigate the impact of variables in both short-term and long-term contexts. The robustness of the ARDL model was confirmed through various statistical diagnostic tests. The findings indicate deeper-level causations of these variables over time. All forms of school closures, stay-at-home orders, and travel bans contributed to the impact on the performance of the Kuwaiti equity market. The longer these measures lasted, the more detrimental their effects became. Conversely, the statistics show a positive impact of the ban on meetings.

In addition, the Kuwaiti equity market was positively affected by the control variable, which was the S&P 500. The research study shows how the KEM reacts to various interventions and external influences. When branding a school closing, stay-at-home policies, and restrictions on overseas travel become part of individual investment decision-making, it is crucial to perceive the long-term effects of these measures.

5.1. Policy Implications and Recommendations

The empirical findings provide a basis for formulating targeted and evidence-driven policy recommendations. The negative elasticities associated with school closures, mobility restrictions, and international travel measures indicate that broad, economy-wide constraints impose substantial valuation losses on the Kuwaiti equity market. Policymakers should therefore prioritize graduated, time-bound, and sector-specific interventions, ensuring that essential business activity remains uninterrupted whenever possible. Moreover, the circumstances that limitations on collective gatherings positively influence. These chance finding patterns suggest investment opportunities in accordance with this pattern. Such research would be more useful to state officials to determine how the market would react to these interventions. Accordingly, policymakers should consider prioritizing interventions of this nature in future public health crises. The strong dependence of Kuwait's market on the S&P 500 underscores the importance of coordinated financial oversight, global market monitoring, and macroprudential preparedness. During periods of elevated global volatility, authorities may adopt countercyclical liquidity measures or forward-guidance communication to dampen market uncertainty. The relatively slow error-correction adjustment speed further suggests that markets recover gradually from shocks, highlighting the need for transparent communication strategies, frequent dissemination of policy intentions, and predictable intervention frameworks to accelerate stabilization. In sum, crisis-era policy design should account for the differentiated effects of NPIs. Measures that restrict essential economic functions should be minimized or applied cautiously, while targeted restrictions that enhance institutional legitimacy can be strategically deployed. These insights provide practical support for crafting policy responses that safeguard public health while preserving financial stability in future emergencies.

5.2. Limitations and Recommendations for Further Research

There are several limitations to the study. First, the analysis operates at the aggregate market level and does not capture sector-specific sensitivities that may differ markedly during a pandemic. Second, oil prices and other macroeconomic drivers were not included in the model, which may partially confound estimated effects. Methodologically, the ARDL approach assumes a unique long-run equilibrium and linear adjustment, which may overlook the asymmetry of crisis periods. Future research could incorporate sentiment measures, nonlinear ARDL methods, or comparative studies across GCC financial markets to deepen understanding of policy–market interactions during systemic shocks.

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