The Impact of the Israel-Palestine conflict on the GCC-Israel and the leading global stock market indices

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Abstract

Utilizing high-frequency intraday data with 15-minute intervals covering the period from September 7, 2023, 9:45 AM, to November 2, 2023, 8:45 PM, and employing a Time-Varying Parameter Vector Autoregressive (TVP-VAR) connectedness approach, this research examines the contagion effects of the Israel-Palestine conflict on Global Cooperation Council (GCC)-Israel and leading global stock market indices. The investigation reveals a robust interconnectedness of 82.58% among MSCI ACWI, MSCI World, MSCI Emerging Markets, Israel Index, S&P GCC Composite, and Dow Jones Global Index in the full sample. In contrast, the sub-sample analysis indicates a 69.07% connectedness post-conflict and a 73.62% connectedness pre-conflict. Moreover, the study identifies MSCI ACWI, MSCI World, and Dow Jones Global Index as primary shock transmitters, while S&P GCC Composite emerges as the prime shock receiver, followed by Israel and MSCI Emerging Markets. Notably, the impact weakens in the post-conflict sub-sample, with receivers of spillovers exhibiting diminished strength, such as 13.13% for Israel, 13.54% for S&P GCC Composite, and 5.73% for MSCI Emerging Markets. The research underscores the altered dynamics of stock market movements influenced by the Israel-Palestine conflict, urging investor caution in Israel, GCC, and emerging markets. Additionally, the study offers implications for firm managers, portfolio managers, and policymakers engaging in investments in GCC and emerging markets.

Keywords: Israel-Palestine conflict, Intraday, TVP-VAR connectedness

1. Introduction

International events—especially tensions in geopolitics—have a significant impact on the direction of the stock market. The complex network of global interdependencies is brought to the forefront of investors by the present crises between Israel and Gaza (Palestine). Businesses generally detest the degree of uncertainty that war frequently brings. A significant stock sell-off may occur in response to the start of a conflict or its anticipation. Investors may also shift their focus to conventionally safer investments like gold, bonds, or currencies that are seen as safe havens (D'Souza,2023). Certain countries may have volatile stock markets, particularly those that are heavily reliant on oil imports or have close relations with countries in conflict and certain countries exposed to the Middle East. Concerns about the effects of this conflict are plaguing investors worldwide, especially given the already dire outlook for the world's economy.

Shareholders are concerned about the volatility in international markets following the heightening of hostilities between Israel and Palestine, and most are curious about the possible effects on global equity markets. It is evident that the past tensions between Israel and Palestine, namely, the second Intifada: 2000-2005, Lebanon War: 2006, Gaza War (Operation Cast Lead): 2008-2009, Operation Pillar of Defense: 2012, Israel-Gaza Conflict: 2014 affected the uncertainty in the Middle East. The occurrence of these events led to the Middle East's uncertainties, thereby causing turbulence in the world markets (Srivastava, 2023).

With the murder and kidnapping of over 1,300 Israeli civilians by Hamas from Gaza on October 7, Israel's main stock index dropped 4.9% on the very Sunday, the largest loss in almost three years, raising the possibility that the crisis may escalate relations throughout the Middle East (Mizen, 2023). Similarly, the S&P 500 temporarily fell on the very first trading day after the horrific events that sparked the most recent conflict between Israel and Palestinian militants (D'Souza,2023). Markets in the region were severely impacted by the turmoil in the Middle East, but western stock markets were largely unaffected. For instance, in the initial wake of the attacks, indexes of stocks in the middle east region saw notable drops (Brooks, 2023). Traders are moving towards safe-haven assets as a result of the Israel-Hamas conflict, which has rattled equity markets worldwide. With risk-off sentiment plaguing the market, investors continue to be alert and wary of global developments. While Asian markets saw a dip and the safe-haven gold prices have increased (Gohel, 2023).

There's a possibility that a conflict that extends beyond Israel and Hamas will affect world stock markets. The engagement of other significant regional powers will determine how the

most recent Israel-Hamas war affects international financial markets. The stock market will keep an eye out for any indications of escalation in the confrontation between Israel and Hamas (Bianchi, 2023).

This study explores the impact of the Israeli-Palestinian conflict on the global financial markets. Our research addresses several gaps in the existing literature by expanding it in various dimensions. To the best of our knowledge, we are the first to provide evidence on these issues using an empirical approach that allows for the inference of causal effects across a diverse set of six equity markets. Additionally, we investigate variations in the financial market's responsiveness to the Israeli-Palestinian conflict between global and regional indices. Assessing the genuine extent of spillover impacts arising from the Israeli-Palestinian conflict is of paramount importance. This study has the following principal objectives. Initially, has the current conflict (2023) influenced the interplay among leading global and regional securities markets. Secondly, does the market's role undergo modifications during turbulent periods, transitioning from acting as a spillover transmitter to becoming a spillover receiver, and vice versa.

The current research adds to the body of knowledge in the following ways: (i) our investigation delves into the interconnections across a diverse array of stock market indices employing the TVP-VAR connectedness approach; (ii) we endeavour on the implications of the Israel-Palestine dispute by examining spillovers between stock market indices and (iii) by considering the short-term (high frequency) we explore the influence of the Israeli-Palestinian conflict on various stock market indices. Consequently, we offer the first measurement of this kind of risk in the current conflict. This comprehensive analysis is valuable as it shall assists investors, traders, risk managers, and arbitragers in making more prudent decisions by enhancing their understanding of data transmission across different asset classes. Our results clearly show strong connection (82.58%) among global indices, including MSCI ACWI, MSCI World, MSCI Emerging Markets, Israel, S&P GCC Composite, and Dow Jones Global Index. In post-conflict, the connectedness decreases to 69.07%, and in pre-conflict, it is 73.62%. MSCI ACWI, MSCI World, and Dow Jones Global Index are main shock transmitters, while S&P GCC Composite is the primary receiver, followed by Israel Index and MSCI Emerging Markets. Interestingly, pre-conflict receivers show stronger spillovers (29.00%, 21.17%, 12.57%) as compared to post-conflict (13.13%, 13.54%, 5.73%). The study concludes that the Israel-Palestine conflict significantly impacts stock market movements.

The rest of the research is structured as follows. The pertinent literature is reviewed in Section 2. Section 3 outlines the empirical strategy that was used. In Section 4, the descriptive statistics

and data are presented. The primary findings are reported and discussed in Section 5. The conclusion and pertinent policy implications are presented in Section 6.

2. Literature review

The literature provides an appealing presentation of empirical tests for the dynamic linkages between financial assets and wars. Given the magnitude and significance of the second world war, numerous investigations have evaluated the effects of the conflict on stock exchanges, consistently indicating predominantly negative outcomes (Choudhry, 2010; Hudson and Urquhart, 2022).

Niederhoffer (1971) is credited as the pioneer in analysing the influence of global events on market prices. His work asserts that worldwide events significantly contribute to volatility in equity markets. Building upon this perspective, Benos and Jochec (2013) as well as Bradford and Robison (1997) delve into the examination of equity returns and observed risk fluctuations in the shipping industry during the period of the Iraqi invasion of Kuwait.

Specific research investigates the impact of US military actions on the stock market. Leigh, Wolfers, and Zitzewitz (2003) assessed the economic consequences of the Iraq War through stock market data, revealing that economies importing more oil than they export are particularly vulnerable to the conflict. In a similar context, Rigobon and Sack (2005) identified a correlation between war risk and declines in T-bond yields and stock prices, specifically concerning Iraq. Amihud and Wohl (2004) observed a correlation between rising stock prices and the Iraq War. Wisniewski (2016) empirically establishes that financial markets experience decline as a consequence of warfare. Berkman, Jacobsen, and Lee (2011) examine multiple global political issues covering wars also and assert that the absence of these events would have resulted in a 3.6% increase in annual returns on the international stock market. Analysing the impact of World War II on the British financial system, Hudson and Urquhart (2015) find that a single major wartime incident led to a structural rupture.

Parallel studies underscore the adverse impacts of war. Fernandez (2007) explores the consequences of Middle East conflicts, while Guyot (2011) scrutinizes the influence of geopolitics on Islamic market indexes. Zaremba et al. (2022) delve into the effects of geopolitical risks on developing market indexes. Alshwawra and Almuhtady (2020) examine how regional disputes affect Jordan, while Ruiz Estrada et al. (2020) investigate the repercussions of a hypothetical US-Iran confrontation.

Unquestionably, the global spotlight has been drawn to the Israeli-Palestinian issue, which has been marked by political conflict and violent acts for years. The following set of studies

advance our knowledge of the ways in which the Israeli-Palestinian conflict—affect financial markets. Zussman et al. (2008) utilized stock market data originating from both Israel and the Palestinian Authority (PA) to delineate pivotal epochs in the Israeli-Palestinian conflict dating back to the late 1980s. The research reports a substantial decline in asset values in both Israel and the Palestinian Authority subsequent to pronounced escalations in violence. Furthermore, an intriguing revelation is that financial markets exhibit favorable responses to the accomplishments of leaders advocating for a peaceful resolution to the enduring dispute. Kollias et al. (2010) investigate the impact of armed conflicts on the financial system, focusing specifically on the Israeli military campaign in the Gaza region from 2008 to 2009. The research explores the repercussions of the conflict on the return and volatilities of the sovereign bond index, as well as the primary index of the Tel Aviv Securities Exchange (TASE).

Drakos and Kutan (2003) assess the direct and indirect ramifications of terrorism on market shares, drawing upon data from three Mediterranean nations—Greece, Israel, and Turkey—from 1991 to 2000. The results are of particular significance, indicating a substantial spillover effect of terrorism on market shares. Eckstein and Tsiddon (2004) undertake an analysis of the economic impact of terrorism, revealing that heightened occurrences of terrorist attacks lead to a reduction in investment, subsequently culminating in diminished income and consumption levels. According to the computations presented in the study, the economic repercussions of terrorism are substantial. Specifically, the research suggests that Israel's GDP per capita could have been approximately 10% higher, had the nation not experienced terrorist attacks in the preceding years. Fielding (2004) investigates the dynamic causal relationships between capital flight and the intensity of the Israeli-Palestinian dispute through the analysis of time-series data from Israel. The study establishes that, depending on prevailing economic conditions, a robust association exists between capital flight and the intensity of the Israeli-Palestinian dispute, utilizing quarterly time-series data. This observed correlation is attributed to a bidirectional causal link: heightened conflict contributes to increased capital flight.

Choudhry (2004) investigates the anticipated financial returns and volatility spillover within the financial markets of politically affiliated and adversarial nations. The selection of potential enemies and allies is based on the political landscape over the past decade, with Israel-Jordan, India-Pakistan, and Greece-Turkey forming the three test pairs. The findings indicate bidirectional mean and volatility spillover among pairs of nations characterized by strained relations. Schneider and Troeger (2006) investigate the impact of political developments in three conflict zones on global financial markets (FTSE, CAC, and Dow Jones) during the period from 1990 to 2000. Their time-series analysis considers the repercussions of conflicts

in Ex-Yugoslavia, the initial U.S.-led alliance's confrontation in Iraq, and the Israeli-Palestinian conflict. The study demonstrates that these conflicts had an adverse effect on the interactions within the financial domain of Western nations, as evidenced by daily stock data. Bouri (2014) focuses whether conflicts, such as those between Israel and Hezbollah, and the global economic crisis have heightened stock market interconnections. The research provides compelling evidence that shocks from both war and the economic crisis negatively impact the majority of markets in the Middle East and North Africa. The study underscores that conflicts and the global economic crisis are pivotal factors contributing to weakened stock correlations across various markets. Eldor et al. (2012) examine the impact of terrorism on securities markets in the Palestinian-Israeli conflict using advanced econometric techniques and distinct data collection. The study reveals that both countries suffered during the intifada period and severe terror attacks had a larger negative impact on both markets. Franck and Krausz (2009) explore the influence of political events, conflicts, and institutional changes on the risk profile of the Israeli equity market for nearly two decades. The findings reveal that the anticipation of hostilities had no discernible impact, whereas the resolution of conflicts elevated financial market risk. Additionally, regional political unrest further heightened market risk. Fernandez (2007) investigates the impact of current political disputes in Southeast Asia on global stock exchanges, focusing on the long-term volatility influenced by political unrest, particularly arising from the Iraq War. Results indicate that emerging Asian and Middle Eastern equity markets, including Turkey, Egypt, Morocco, Pakistan, and Indonesia, are notably affected by ongoing regional disputes. Hassouneh et al. (2018) investigate the daily impact of the Israeli-Palestinian dispute on financial markets in Palestine, Israel, and Jordan, along with the interconnections among these markets. Using a VECM-MGARCH approach, the study constructs a violence index as an exogenous variable. The findings suggest that no direct effect on the equity exchanges in Israel or Jordan, but a surge in conflict has short-term adverse effects on the Palestinian securities market.

Despite the fact that multiple set of studies has enhanced this body of work, there has never before been an investigation of the spillover impact of the Israel-Palestine conflict on the GCC-Israel and the leading global stock market indices covering intraday data. Moreover, as far as we know, no prior research has examined how the current Israel-Palestine conflict (2023) affects the spread of risk among the global leading stock market indices. In order to achieve this, we investigate how the leading six stock indices are affected by conflicts like the Israel-Palestine conflict.

3. Methodology

3.1Data Description

This research investigates the contagion effects of the Israel-Palestine conflict on Global Cooperation Council (GCC)-Israel and leading global stock market indices. The six leading indices are MSCI ACWI, MSCI World, MSCI Emerging Markets, Israel Index, S&P GCC Composite, and Dow Jones Global Index with the data sets spanning intraday data with 15-minute intervals covering the period from September 7, 2023, 9:45 AM, to November 2, 2023, 8:45 PM. The dataset was acquired through utilization of the Bloomberg terminal. Table 1 provides an enumeration and description of the variables under consideration within the study.

Table 1
Description of variables used in the study

Name	Description
MSCI ACWI	The MSCI ACWI index provides an extensive representation of big and mid-cap companies in 24 Emerging Markets (EM) and 23 Developed Markets (DM) nations. With 2,948 components, this index covers around 85% of the global pool of investable stock opportunities.
MSCI World	A significant and mid-cap equities representative from 23 Developed Markets (DM) nations is consistently included in the MSCI World Index. With 1,511 components, this index represents approximately 85% of each nation's free float-adjusted market value.
MSCI Emerging Markets	The large and mid-cap divisions across 24 Emerging Markets (EM) economies are fully reflected in the MSCI Emerging Markets Index. With 1,437 components, this index covers about 85% of the market capitalization within every nation that is adjusted for free float.
MSCI Israel Index	The MSCI Israel Index is formulated to assess the performance of the large and mid-cap sectors within the Israeli equity market. Comprising 14 constituents, this index encompasses approximately 85% of the free float-adjusted market capitalization in Israel.
S&P GCC Composite	S&P GCC Composite index is an indicator that includes stocks from all six of the Gulf Cooperation Council's (GCC) member markets. This index reflects free float as defined by restrictions on foreign investment that apply to GCC residents.
Dow Jones Global Index	The goal of the Dow Jones worldwide Index is to encompass 95% of the worldwide stock market

by market value, covering both established as well as emerging economies.

Note: The variables were obtained from the Bloomberg database.

3.2 TVP-VAR model

In order to accomplish the purpose of our research, we have implemented the TVP VAR model proposed by Antonakakis and Gabauer (2017). This model builds upon the work of Diebold and Yilmaz (2009, 2014). Numerous benefits distinguish this approach from alternative methodologies. To begin with, resistant to outliers. Furthermore, the utilization of the Kalman filter method to determine the variance and covariance matrices ensures that no observations vanish when accounting for the control for compressed parameters estimation in which random window size selection is lacking, and this innovative estimation technique has the capability of examining high frequency data, including day to day data (Antonakakis et al., 2020).

This model is described by the following equations. Let A_t be a vector with n components, where each component corresponds to a sector. Therefore, we can express the TVP-VAR model as:

$$A_t = Y_t A_{t-1} + \varepsilon_t \qquad where \quad \epsilon_t \sim n\,(0, P_t) \qquad (1)$$

$$Y_t = Y_{t-1} + \theta_t \qquad where \quad \theta_t \sim n\,(0, Q_t) \qquad (2)$$

In the equations, A_{t-1} signifies the dependent variable's lag, Y_t is the time-dependent (n x n) component coefficient matrix, and ϵ_t and θt are noise vectors (n x n and n2 x n). Alternatively, Pt and Qt are (n×n) and (n2×n2) matrices, correspondingly, expressing the time-sensitive variance and covariance of noise factors ϵ_t and θt. This study applied the World representation theorem to convert the TVP VAR model into TVP VMA using generalized forecast error and variance decomposition (GFEVD), which can be transformed by moving average. The H step-ahead forecast also splits variable error variation into system shocks. The following equation is created:

$$A_t = \sum_{i=1}^{p} Y_{it} A_{t-i} + \varepsilon_t = \sum_{i=0}^{\infty} \varphi_{jt} + \varepsilon_{t-j} \qquad (3)$$

The GFEVD technique allows us to design four connectivity procedures: total connection TO others, total connectedness FROM others, net connectedness, and average connectedness. In the equations below, $\sum_{i=1, i\neq j}^{N} \omega_{ij,t}^{g}\,(h)$ indicates spillover impact from i to j, and the reverse is true for $\sum_{i=1, i\neq j}^{N} \omega_{ji,t}^{g}\,(h)$.

$$To_{jt}; C^{g}_{i\rightarrow j,t}(h) = \sum_{i=1,i\neq j}^{N} \omega^{g}_{ij,t}(h) \quad (4)$$

$$From_{jt}; C^{g}_{i\leftarrow j,t}(h) = \sum_{i=1,i\neq j}^{N} \omega^{g}_{ji,t}(h) \quad (5)$$

$$Net; To_{jt} - From_{jt}; = \sum_{i=1,i\neq j}^{N} \omega^{g}_{ij,t}(h) - \sum_{i=1,i\neq j}^{N} \omega^{g}_{ji,t}(h) \quad (6)$$

$$Avgc_{t}; = N^{-1} \sum_{j=1}^{N} To_{jt} = N^{-1} \sum_{j=1}^{N} From_{jt} \quad (7)$$

The functional connectedness tables are also graphically shown, with the related indices representing nodes and arrows showing pairwise connections.

4 Result and Discussion

We estimate the TVP-VAR model, given in Eq. (1), using the return series. Various measures of connectivity are calculated, such as net total directional connectedness (NET), total directional connectedness from others (FROM), total directional connectedness to others (TO), and total connectedness index (TCI).

Descriptive statistics and unit root tests are provided for the MSCI ACWI, MSCI World, MSCI Emerging Markets, Israel Index, S&P GCC Composite, and Dow Jones Global Index in Table 2. The nature of the data suggests that each chosen index in the system has a positive average daily return. The MSCI World and MSCI Emerging Markets indices have the greatest returns, averaging 2864.065 and 946.739, respectively. The Dow Jones Global Index, on the other hand, has the lowest returns, averaging 136. 541.Similarly, the MSCI World (4672.173) has the highest total standard deviation, with the MSCI Emerging Markets (451.573) coming in second. This implies a general tendency for extreme volatility in global markets due to several geopolitical conflicts, such as the Israel-Palestine War and the Russian-Ukraine Conflict. The Jarque–Bera (JB) normalcy test reveals the series' non-normal distribution. The Elliot-Rothenberg-Stock unit root (ERS) test also demonstrates statistical significance within the sample period.

Table 2
Descriptive statistics

	MSCI ACWI	MSCI World	MSCI Emerging Markets	Israel Index	S&P_GCC Composite	Dow_Jones Global Index
Mean	658.601	2864.065	946.739	174.271	136.541	498.433
Variance	242.341	4672.173	451.573	101.893	13.124	145.745
Skewness	0.031	0.017	0.054	-0.350***	-0.375***	0.038
	-0.649	-0.803	-0.422	0	0	-0.57
Ex.Kurtosis	-1.124***	-1.101***	-1.183***	-1.501***	-1.160***	-1.120***
JB	69.160***	66.257***	77.041***	149.775***	104.197***	68.838***
ERS	-0.236***	-0.3***	-0.117***	0.04***	-0.156***	-0.173***
	-0.814	-0.764	-0.907	-0.968	-0.876	-0.863
Q(10)	7121.242***	7115.821***	7087.233***	7171.691***	7132.295***	7125.414***
Q2(10)	7121.407***	7116.078***	7087.394***	7170.002***	7132.405***	7125.486***

Full sample

Table 3 Averaged dynamic connectedness

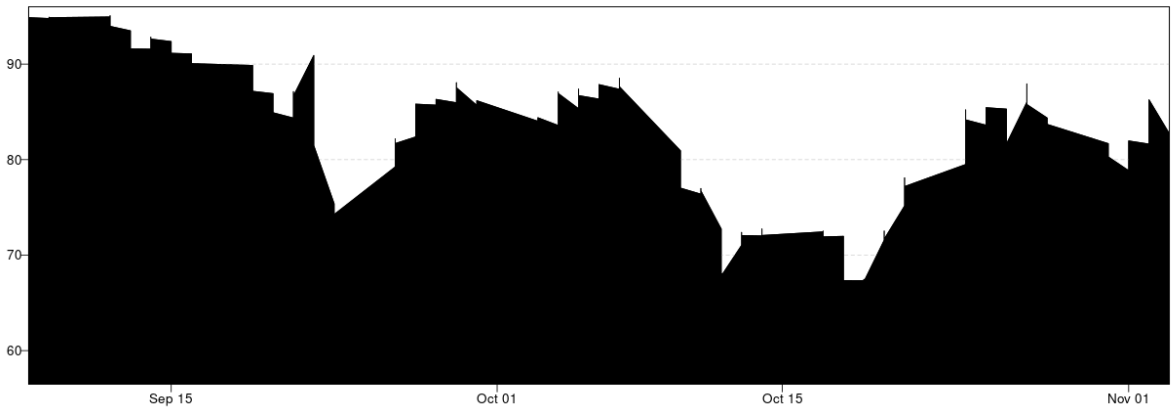
	MSCI ACWI	World	Emerging	Israel	GCC	DJ Global	FROM
MSCI ACWI	26.59	26.74	10.57	6.92	4.87	24.31	73.41
World	26.91	27.4	9.44	6.86	4.91	24.48	72.6
Emerging	20.05	16.96	31.26	8.22	3.98	19.53	68.74
Israel	16.36	15.54	12.68	36.14	4.23	15.06	63.86
GCC	13.45	13.17	8.87	9.97	41.09	13.45	58.91
DJ Global	26.1	26.08	11.02	7.2	5	24.61	75.39
TO	102.87	98.48	52.57	39.17	23	96.83	412.91
Inc.Own	129.46	125.88	83.82	75.31	64.09	121.44	cTCI/TCI
NET	29.46	25.88	-16.18	-24.69	-35.91	21.44	82.58/68.82
NPT	5	4	2	1	0	3	

Additionally, based on the whole sample, table 3 pertaining to average connectivity shows that the S&P GCC Composite index (58.91) is the index least impacted by other indices. In contrast, the MSCI ACWI index (102.87) influences other indices most. The data shows an overall strong connection (82.58%) between these indexes. Furthermore, it is shown that the MSCI Emerging Markets, Israel, and S&P GCC Composite indices are the largest receivers of spillovers from other indexes (-16.18, -24.69, and -35.91, respectively), indicating that they are the most impacted by external influences. Conversely, it was discovered that MSCI ACWI, MSCI World, and Dow Jones Global Index (29.46, 25.88, and 21.44, respectively) are net transmitters of spillovers. The GCC index has the greatest connectedness (35.91) with other

indexes, followed by MSCI ACWI (29.46). The MSCI Emerging Markets connectedness with other indexes is also the lowest (16.18).

Tracking the development of these indices and how the Israel Index influences these indices is also the one of main objectives of this study. It is revealed that the Israel index (7.2) had the least effect on the Dow Jones Global Index, with the MSCI World index following closely behind (6.86). Additionally, the (9.97) GCC index was most affected by the spillovers from the Israel index. Moreover, we individually analyze each index based on the most and least connectivity with other indices. MSCI ACWI is most connected to the MSCI World index (26.74) and least to the GCC index (4.87). Then, the MSCI World index has the highest connectivity with the MSCI ACWI index (26.91) and the lowest with the GCC index (4.91). Similar trends can be observed in the situations of Emerging Markets, Israel, GCC, DJ. Global, where the connections to the MSCI ACWI index were highest (20.05, 16.36, 13.45, and 26.1, respectively) and lowest with the GCC index (emerging= 3.98, Israel= 4.23, DJ Global=5). By our findings, the GCC index is most impacted by the Israel index. Given their near closeness, the results make intuitive sense.

Figure 1: Dynamic total connectedness

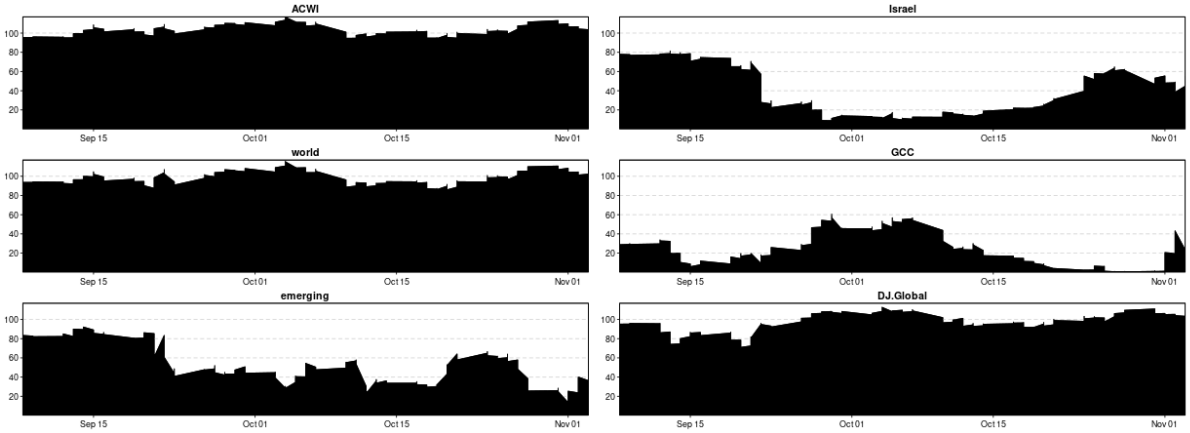


The total connectivity index (TCI) in Figure 1 represents the specified global indices (MSCI ACWI, World, Emerging, Israel, GCC, DJ. Global). Our research shows that the TCI varies during our observations. In general, the TCI varies between around 68% and 98%. TCI peaked earlier in September and then began to fall in that month. Furthermore, the Israel -Palestine conflict began on October 7th. Therefore, there was an abrupt spike in TCI with a continuous drop in TCI in the immediate period. Following the initial impact, there is a renewed upward trend in total connection with gradual fluctuations.

This study computes the overall directional connection in greater detail to better understand how directional return spillovers between these indices change over time. Figure 3 depicts the

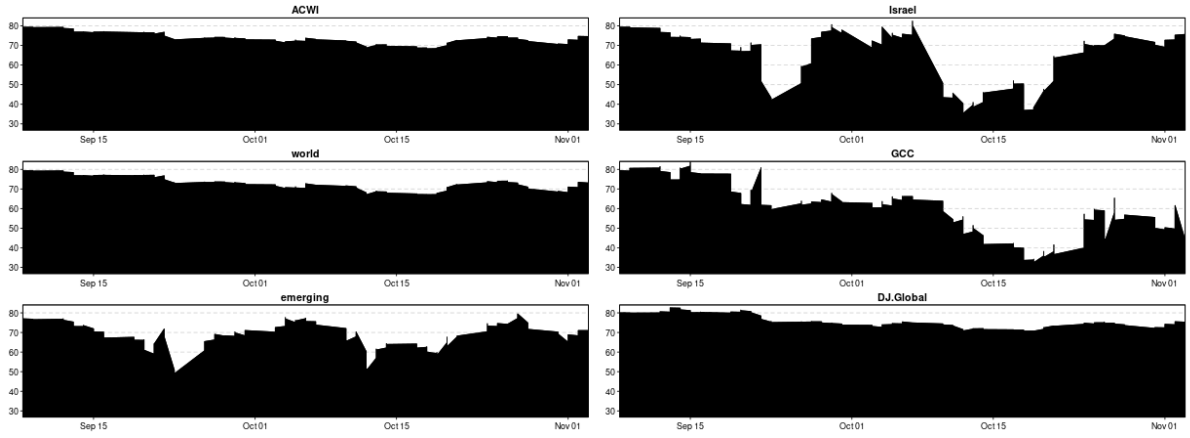
dynamic connectivity of each of the indices in all directions to others, whereas Figure 4 demonstrates the dynamic connectivity of individual indices in all directions from others. These graphs show the evolution of total directional connection over time in the major markets.

Figure 2: To Others



The following three indices—MSCI ACWI, World, and DJ. Global—have demonstrated a significant degree of connectedness **TO OTHER** indices during the study period, as seen in Figure 2, Although less interconnectedness or spillovers to other markets can be observed here in emerging, Israel and GCC indexes. Specifically, in the case of Israel, the TCI fluctuates from 80% to 100% here. The peak connectedness to other indices was observed in September, followed by a steady fall over the next few months, coinciding with Israel-Palestine conflict.

Figure 3: From Others



The entire directional connection patterns **FROM OTHERS** indices are shown in Figure 3. Similar strong spillover/connectivity patterns from other indices, ranging from 75% to 90%, have been observed in the MSCI ACWI, MSCI World, and DJ Global indexes. However, compared to the indices previously discussed, the spillovers from Emerging Markets, Israel

and the GCC are comparatively smaller. The connection intensity is larger than in the TO OTHERS spillover scenario. Now, in the case of Israel, the connectedness ranges from 40% to 80%, with the lowest connectivity occurring during the early stages of the conflict between Israel and Palestine.

Sub-sample (Pre-conflict)

Table 4

Averaged dynamic connectedness

	MSCI ACWI	world	emerging	Israel	GCC	D J Global	FROM
MSCI ACWI	27.71	27.55	9.98	6.03	2.05	26.68	72.29
world	28.24	28.52	8.44	5.89	1.88	27.03	71.48
emerging	17.54	13.84	38.67	6.57	5.09	18.3	61.33
Israel	15.85	15.3	7.96	44.03	1.57	15.29	55.97
GCC	6.73	5.83	11.89	2.5	66.15	6.9	33.85
D J Global	27.45	27.16	10.49	5.98	2.1	26.83	73.17
TO	95.81	89.68	48.77	26.97	12.69	94.19	368.1
Inc.Own	123.52	118.2	87.43	71	78.83	121.02	cTCI/TCI
NET	23.52	18.2	-12.57	-29	-21.17	21.02	73.62/61.35
NPT	5	4	2	1	0	3	

We employed all of the sample data for the analysis in the first step. We will now analyze this part using subsample data or pre-conflict data. In Table 4, the S&P GCC Composite (33.85) is again the index that is least affected by other indices before the war, according to Table 4 average connectivity, which is consistent with all data analysis. The MSCI ACWI index has the greatest influence on other indices, but its intensity of influence is now lower (Full Sample = 102,87, Pre-conflict = 95.81). Overall, there is a modest connection between these indexes in the data, which is once again less than in the entire sample (TCI = 82.58 Pre-TCI = 73.62). Additionally, in line with previous comprehensive findings, it is demonstrated that the Emerging, Israel, and GCC indices (-12.57, -29, and -21.17, respectively) garner the greatest number of spillovers from other indexes, suggesting that they are most affected by outside factors. The MSCI ACWI, World, and DJ Global indexes (23.53, 18.2, and 21.02, respectively) were shown to be net transmitters of spillovers. On the other hand, the Israel index (29) and the MSCI ACWI (23.52) have the highest degree of connectivity with other indices. Furthermore, the Emerging Markets index has the lowest connectivity (18.2) with other indices.

Overall, our analysis based on pre-sample data dictates similar patterns but now the intensity of the given connection is lower than the initial analysis.

Figure 4: Dynamic total connectedness

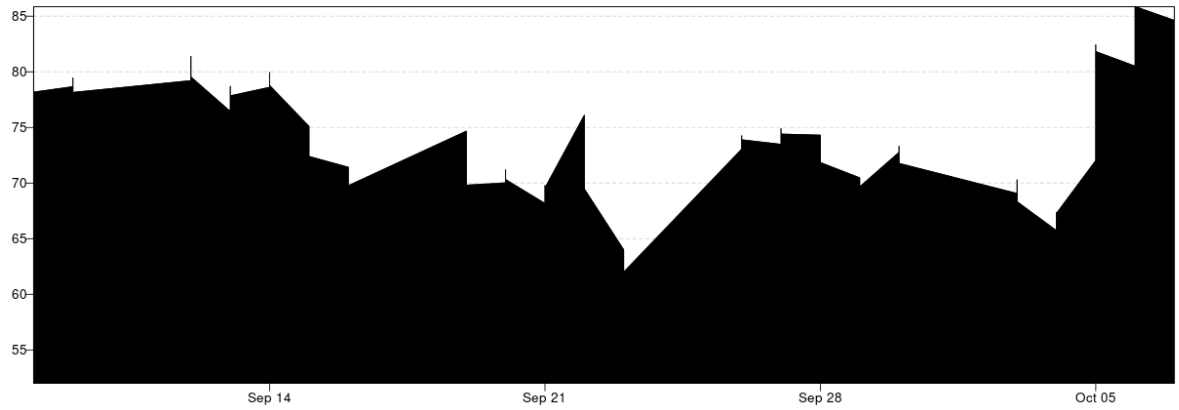


Figure 4 depicts the global indices (MSCI ACWI, World, Emerging, Israel, GCC, DJ. worldwide) as a total connectivity index (TCI). Our results indicate that the TCI varies but does so at a lesser intensity than previously in the Pre-conflict sample, ranging from 62% to 85%. Moreover, just before the conflict began on October 7, TCI peaked.

Sub-sample (post-conflict)

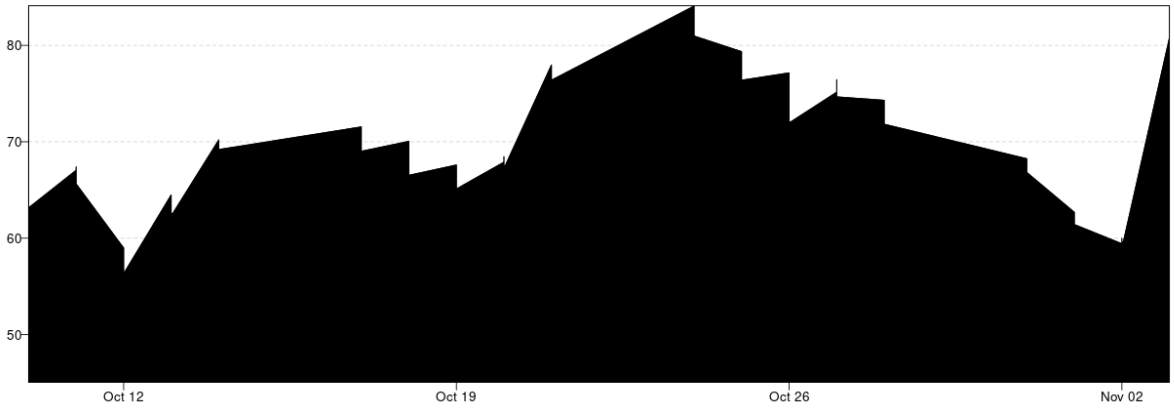
In the second step of the study, we employed pre-conflict data. We will now utilize post-conflict data to analyze this section. Table 5 shows that the GCC index (32.63) is the least impacted by other indices as in the pre-analysis. However, the strength of this spillover has now dropped to a very low level (pre-conflict = 33.85, complete data = 58.91, and post-conflict = 32.63). The largest effect on other indices is evident in the Dow Jones Global index (86.29). The results show a moderate correlation between these indices, again lower than in the Pre and whole sample (TCI = 82.58, Pre-TCI = 73.62, Post-TCI = 69.07). Additionally, it is shown that the Emerging, Israel, and GCC indices (-5.73, -13.11, and -13.54, respectively) receive the apex of spillovers from other indexes, indicating that they are most affected by external factors, albeit to a much lesser extent. These results are consistent with earlier comprehensive findings. Conversely, at lower intensities, it was discovered that the MSCI ACWI, World, and DJ Global indices (12.52, 5.66, and 14.19, respectively) were net transmitters of spillovers. Conversely, in contrast to the pre-conflict study, the DJ. Global (14.19) and GCC index (13.54) had the highest level of connectedness with other indexes. In addition, the world index is the least connected to the other indexes.

Overall, the patterns found in our analysis based on post-sample data are comparable to those found in the pre-and complete analysis; however, the intensity of the given connections is now lower than in the previous analysis. At times, certain indices have been replaced with others. For example, before the conflict, the Israel index had the highest connectedness with other indices, but after the conflict, DJ. Global replaced it.

Table 5
Averaged dynamic connectedness

	MSCI ACWI	world	emerging	Israel	GCC	DJ Global	FROM
MSCI ACWI	27.95	27.54	8.28	6.56	2.01	27.66	72.05
World	28.69	29.06	6.13	6.33	1.62	28.18	70.94
emerging	12.87	8.71	48.68	6.94	8.74	14.07	51.32
Israel	11.32	10.45	7.86	53.71	4.7	11.97	46.29
GCC	4.26	3.07	14.4	6.5	67.37	4.41	32.63
DJ Global	27.44	26.83	8.92	6.87	2.04	27.9	72.1
TO	84.57	76.6	45.59	33.19	19.09	86.29	345.33
Inc.Own	112.5	105.66	94.27	86.89	86.46	114.19	cTCI/TCI
NET	12.52	5.66	-5.73	-13.11	-13.54	14.19	69.07/57.56
NPT	4	3	2	1	0	5	

Figure 5: Dynamic total connectedness



The global indices—MSCI ACWI, World, Emerging, Israel, GCC, and DJ global—are shown as a total connectivity index (TCI) in Figure 5. According to our results, the TCI fluctuates from 57% to 83%, but it does so less sharply than in the pre-conflict and full sample. Moreover, after the initial conflict phase, the TCI started gaining overall momentum with continuous fluctuations owing to the ongoing war.

5. Conclusion

In this study we have investigated the spillover impact of the current Israel-Palestine conflict (2023) on the GCC-Israel and the leading global stock market indices, employing a TVP-VAR connectedness approach. Using high-frequency (15 minutes) intraday data spanning from 9/7/2023 9:45:00 AM to 11/2/2023 8:45:00 PM, our results reveals a strong connection (82.58%) among global indices, MSCI ACWI, MSCI World, MSCI Emerging Markets, Israel Index, S&P GCC Composite, and Dow Jones Global Index. In post-conflict, the connectedness decreases to 69.07%, and in pre-conflict, it is 73.62%. MSCI ACWI, MSCI World, and Dow Jones Global Index are main shock transmitters, while S&P GCC Composite is the primary receiver, followed by Israel Index and MSCI Emerging Markets. Interestingly, pre-conflict receivers show stronger spillovers (29.00%, 21.17%, 12.57%) compared to post-conflict (13.13%, 13.54%, 5.73%). The study concludes that the Israel-Palestine conflict significantly impacts stock market movements.

This research holds significant implications for investors, traders, and policymakers. The pronounced spillovers among diverse asset classes, coupled with the rapid assimilation of relevant information by the market, can lead to a sharp escalation of systemic financial risk to potentially catastrophic levels in the aftermath of exceptional events. Early detection and effective risk management become imperative in such scenarios. Shareholders need to remain vigilant about adverse occurrences and their potential negative impacts, particularly during periods of heightened geopolitical tensions. Governments, drawing on our study and its findings, can gain insights into how financial network spillover effects may manifest during a crisis, contributing to proactive measures to mitigate the impact and prevent unforeseen losses in the future.

Declaration of Competing Interest
The authors declare that they have no known competing financial interests

Data availability
Data will be made available on request.

References

Antonakakis, N., & Gabauer, D. (2017). Refined measures of dynamic connectedness based on TVP-VAR.

Antonakakis, N., Chatziantoniou, I., & Gabauer, D. (2020). Refined measures of dynamic connectedness based on time-varying parameter vector autoregressions. *Journal of Risk and Financial Management*, *13*(4), 84.

Alshwawra, A., & Almuhtady, A. (2020). Impact of regional conflicts on energy security in Jordan. *International Journal of Energy Economics and Policy*, *10*(3), 45-50.

Amihud, Y., & Wohl, A. (2004). Political news and stock prices: The case of Saddam Hussein contracts. *Journal of banking & Finance*, *28*(5), 1185-1200.

Benos, E., & Jochec, M. (2013). Patriotic name bias and stock returns. *Journal of Financial Markets*, *16*(3), 550-570.

Berkman, H., Jacobsen, B., & Lee, J. B. (2011). Time-varying rare disaster risk and stock returns. *Journal of Financial Economics*, *101*(2), 313-332.

Bianchi, Daniele (2023) How the Israel-Hamas war could affect the world economy and worsen global trade tensions. (2023, October 23). Queen Mary University of London. https://www.qmul.ac.uk/media/news/2023/hss/how-the-israel-hamas-war-could-affect-the-world-economy-and-worsen-global-trade-tensions.html

Bouri, E. I. (2014). Israeli-Hezbollah war and global financial crisis in the Middle East and North African equity markets. Journal of Economic Integration, 1-19.

Bradford, B. M., & Robison, H. D. (1997). Abnormal returns, risk, and financial statement data: The case of the Iraqi invasion of Kuwait. *Journal of Economics and Business*, *49*(2), 193-204.

Brooks, K. (2023, October 10). How the Israeli-Hamas conflict could impact your investments. Hargreaves Lansdown.https://www.hl.co.uk/news/articles/how-the-israeli-hamas-conflict-could-impact-your-investments

Choudhry, T. (2004). International transmission of stock returns and volatility: Empirical comparison between friends and foes. Emerging Markets Finance and Trade, 40(4), 33-52.

Choudhry, T. (2010). World War II events and the Dow Jones industrial index. *Journal of Banking & Finance*, *34*(5), 1022-1031.

Diebold, F. X., & Yilmaz, K. (2009). Measuring financial asset return and volatility spillovers, with application to global equity markets. *The Economic Journal*, *119*(534), 158-171.

Diebold, F. X., & Yılmaz, K. (2014). On the network topology of variance decompositions: Measuring the connectedness of financial firms. *Journal of econometrics*, *182*(1), 119-134.

D'Souza, D. (2023) How war affects the modern stock market, Investopedia. Available at:https://www.investopedia.com/solving-the-war-puzzle-4780889 (Accessed:17 November 2023).

Drakos, K., & Kutan, A. M. (2003). Regional effects of terrorism on tourism in three Mediterranean countries. Journal of Conflict Resolution, 47(5), 621-641.

Eckstein, Zvi, and Daniel Tsiddon. (2004)"Macroeconomic consequences of terror: theory and the case of Israel." *Journal of monetary economics* 51.5: 971-1002.

Eldor, R. R., Hauser, S., Kroll, Y., & Shoukair, S. (2012). Financial markets and terrorism: The perspective of the two sides of the conflict. Journal of Business Administration Research, 1, 18-29.

Estrada, M. A. R., Park, D., Tahir, M., & Khan, A. (2020). Simulations of US-Iran war and its impact on global oil price behavior. *Borsa Istanbul Review*, *20*(1), 1-12.

Fernandez, V. (2007). Stock market turmoil: worldwide effects of Middle East conflicts. Emerging Markets Finance and Trade, 43(3), 58-102.

Fielding, D. (2004). How does violent conflict affect investment location decisions? Evidence from Israel during the Intifada. Journal of Peace Research, 41(4), 465-484.

Franck, R., & Krausz, M. (2009). Institutional changes, wars and stock market risk in an emerging economy: evidence from the Israeli stock exchange, 1945–1960. *Cliometrica*, *3*, 141-164.

Gohel, A. (2023, October 9). Israel-Palestine War: Impact on global economy, India-Israel trade, financial markets | Mint. Mint. https://www.livemint.com/economy/israelpalestine-war-impact-on-global-economy-india-israel-trade-financial-markets-11696837346161.html

Guyot, A. (2011). Efficiency and dynamics of Islamic investment: evidence of geopolitical effects on Dow Jones Islamic market indexes. *Emerging Markets Finance and Trade*, *47*(6), 24-45.

Hassouneh, I., Couleau, A., Serra, T., & Al-Sharif, I. (2018). The effect of conflict on Palestine, Israel, and Jordan stock markets. International Review of Economics & Finance, 56, 258-266.

Hudson, R., & Urquhart, A. (2015). War and stock markets: The effect of World War Two on the British stock market. *International Review of Financial Analysis*, *40*, 166-177.

Hudson, R., & Urquhart, A. (2022). Naval disasters, world war two and the British stock market. *Research in International Business and Finance*, *59*, 101556.https://www.afr.com/markets/equity-markets/investors-brace-for-fallout-from-long-and-difficult-war-20231006-p5eaea

Kollias, C., Papadamou, S., & Stagiannis, A. (2010). Armed conflicts and capital markets: the case of the Israeli military offensive in the Gaza Strip. Defence and Peace Economics, 21(4), 357-365.

Leigh, A., Wolfers, J., & Zitzewitz, E. (2003). What do financial markets think of war in Iraq?

Mizen, J. T. R. (2023, October 8). Investors brace for fallout from 'long and difficult' war. Australian Financial Review. https://www.afr.com/markets/equity-markets/investors-brace-for-fallout-from-long-and-difficult-war-20231006-p5eaea

Niederhoffer, V. (1971). The analysis of world events and stock prices. *The Journal of Business*, *44*(2), 193-219.

Rigobon, R., & Sack, B. (2005). The effects of war risk on US financial markets. *Journal of banking & finance*, *29*(7), 1769-1789.

Schneider, G., & Troeger, V. E. (2006). War and the world economy: Stock market reactions to international conflicts. Journal of conflict resolution, 50(5), 623-645.

Srivastava, S. (2023, October 12). How will the Israel-Palestine war impact financial markets? Is there any historical reference to this? The Economic Times.

Wisniewski, T. P. (2016). Is there a link between politics and stock returns? A literature survey. *International Review of Financial Analysis*, *47*, 15-23.

Zaremba, A., Cakici, N., Demir, E., & Long, H. (2022). When bad news is good news: Geopolitical risk and the cross-section of emerging market stock returns. *Journal of Financial Stability*, *58*, 100964.

Zussman, A., Zussman, N., & Nielsen, M. Ø. (2008). Asset market perspectives on the Israeli–Palestinian conflict. Economica, 75(297), 84-115.