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Full Length Article

The GCC's regional roller coaster: Do regional factors affect stock market dynamics in the GCC Region? Evidence from non-parametric quantile regression

Amal Essayem [a], Sakir Gormus [b,*], Murat Guven [c]

[a] Sakarya University, Social Sciences Institute, Research Center for Islamic Economics and Finance, Turkiye
[b] Marmara University, Institute of Islamic Economics and Finance, Turkiye
[c] Sakarya University, Faculty of Science, Department of Statistics, Turkiye

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Abstract

This paper investigates the impact of regional factors on Islamic and conventional stock returns in the member countries of the Gulf Cooperation Council (GCC) from April 2011 to April 2021. This paper employs the quantile regression method to determine the effect of regional factors on GCC markets during different market states, enabling a more detailed investigation of the structure and degree of dependence. Regional stock market returns and regional political risk are used to study the effect of regional factors. The findings of this study reveal that the reaction of market returns to regional factors is heterogeneous across the conditional distribution of the GCC's stock returns. More specifically, the results demonstrate that changes in regional factors, with respect to Islamic and conventional markets, have asymmetric effects on stock returns in the majority of the GCC markets. Except in Qatar, the regional geopolitical risk negatively affects the GCC's Islamic stock returns during bearish markets. Results for conventional stock returns have the same negative effect, yet only in extreme market states. As for the impact of the regional stock market, we find that the regional Islamic index has a positive impact across almost all quantiles with a stronger effect during bullish markets, except in Bahrain and Oman. As for conventional markets, we observe the same impact throughout the GCC except for in Saudi Arabia. Islamic and conventional markets' responses to changes in regional factors have similar behavior. Therefore, we conclude that, despite fundamental differences, Islamic and conventional stock markets in the GCC perform comparably, implying that a potential portfolio diversification benefit is not achieved except in limited cases.

JEL classification: C21; C58; F36; F51; G10; H56

Keywords: Geopolitical risk; GCC; Quantile regression; Regional factors; Stock return

1. Introduction

Because of increasing global and regional integration, scholars have long been interested in the impact of regional and global factors on stock market dynamics. Many seminal works focus on the effect of global, regional, and industry-level factors on stock market performance.[1] Specifically, the spotlight is on global factors because of the globalization of financial markets and the resulting interconnectedness among markets. Few studies, however, argue that increased regional economic cooperation and financial interaction among economies in the

* Corresponding author. Marmara University, Islamic Economics and Finance Institute, Turkey.
E-mail addresses: amal.essayem@ogr.sakarya.edu.tr (A. Essayem), sakir.gormus@marmara.edu.tr (S. Gormus), muratguven@sakarya.edu.tr (M. Guven).
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[1] See Beck & Stanek, 2019; Beckers, Connor, & Curds, 1996; Drummen & Zimmermann, 1992; Grinold, Rudd, & Stefek, 1989; Jones & Kaul, 1996; Hammoudeh et al., 2016; Lehkonen & Heimonen, 2015; Mensi et al., 2015; Sadorsky, 1999.

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same region, such as the Association of Southeast Asian Nations (ASEAN), the Gulf Cooperation Council (GCC), and the European Union (EU), could lead to financial market connectivity that is not only global but also regional (Alotaibi & Mishra, 2015; Al-Qahtani, Hammoudeh, & Selmi, 2020; Liu & Chen, 2017). As a result of this increased regional economic cooperation and financial integration, regional factors are as important as global factors (Alotaibi & Mishra, 2015). In this regard, the study of regional factors is critical for a concise explanation of stock market dynamics, to understand regional market risks, and to identify potential diversification benefits for better asset allocation and sound portfolio management.

Previous studies focus on the context of developed countries and some emerging countries, but omit some of the world's most influential countries, such as the GCC countries. Despite the international weight of GCC investment, stock markets in these oil-rich countries have been overlooked received less attention than other regions. In this regard, the GCC is a promising emerging market that differs from other emerging markets because of its oversensitivity to regional factors, specifically regional market changes, political uncertainty, and critical political events (Alotaibi & Mishra, 2015; El-Gamal & Jaffe, 2010; Naifar, Shahzad, & Hammoudeh, 2020).

Despite growth in the literature on the GCC market, few papers investigate the impact of regional and global markets on GCC market dynamics, and the impact of regional factors is underresearched (Alotaibi & Mishra, 2015; Assaf, 2003; Hammoudeh & Aleisa, 2004; Mensi, Hammoudeh, Yoon, & Balcilar, 2017; Selmi, Bouoiyour, & Hammoudeh, 2020). Moreover, these papers study the GCC regional market from the perspective of volatility but overlook return dynamics, therefore, they provide little information on stock market performance.

Although these studies are valuable, they do not take into consideration the potential differences between Islamic and conventional stock markets and, therefore, offer a limited perspective on alternative investment and potential diversification benefits in the GCC. The majority of previous studies focus mainly on financial market linkages in either Islamic or conventional markets without comparing them.

Moreover, insufficient attention has been paid to different impacts of fundamental or economic and non-economic factors and thus an absence of analysis. This means they focus on either fundamental factors, such as financial indicators (Alotaibi & Mishra, 2015), or non-economic factors as geopolitical risk (Alqahtani & Klein, 2021; Ben Cheikh, Ben Naceur, Kanaan, & Rault, 2021), thus the implications of both economic and non-economic factors deserve to be explained further.

Furthermore, the major methodological limitation of most previous studies that study GCC stock markets is that they study the region as a single bloc, instead of undertaking a country-specific analysis. In fact, some papers reveal evidence of disengagement between the GCC's various markets. In particular, Saudi Arabia, Qatar, and the United Arab Emirates (UAE) appear to be moving toward greater integration, whereas the other GCC countries display regional and global segmentation. This heterogeneity across the markets within this region mean that international investors will not be able to treat these countries as a single bloc. Thus, despite their similarities, GCC stock markets can be affected differently by regional factors (Charfeddine & Al Refai, 2019; McMillan et al., 2021). The GCC decoupling pattern contains critical information for regional and global investors. This characterization of individual markets offers improvements in investment choices and market portfolios for investors (McMillan et al., 2021).

Therefore, this paper extends the literature on the GCC region by studying the impact of regional factors—fundamental or economic and non-economic—on the GCC's local stock markets separately, which can offer a new perspective on issues related to asset valuation. Furthermore, we reveal the differences between the Islamic and conventional stock markets across the region to identify potential portfolio diversification benefits. To do so, we employ a quantile regression model in order to study the changes in regional factors across different market states and look for potential asymmetric effects. We are particularly interested in examining the differences in the dependence structure in different market states to understand the role of regional factors in explaining the returns' dynamic in local GCC markets, looking at each country separately.

This study is important on several levels. First, based on the quantile method, this paper offers better insights for policy makers and investors by explaining the reactions in GCC stock markets across different market states. Second, comparing the performance of Islamic and conventional markets across different market states is crucial for capital allocation and portfolio management strategies. Unlike previous studies that investigate only one of these markets, this study of both markets can provide more comprehensive information for market participants seeking potential diversification benefits and policy makers who want to make better investment decisions. Third, a better understanding of the impact of the regional geopolitical risk—an undiversified risk—on stock market performance can help policy makers to put preventive market regulations and sounder national economic strategies.

The paper is organized as follows: Section 2 provides the literature review, and Section 3 presents the descriptions and descriptive statistics for the six GCC stock markets. Then, Section 4 illustrates the methodology, Section 5 presents the results and discussion, and Section 6 provides a robustness check. Lastly, Section 7 gives our conclusions and recommendations.

2. Literature review

The literature indicates that the main objective of capital market liberalization is to globally integrate local markets and achieve higher market efficiency. However, market liberalization cannot be achieved unless a certain degree of integration is attained between the local market and its regional periphery. It has been proved empirically that increasing market liberalization and integration expanded the impact of global and regional factors on stock market returns. Consequently, empirical studies have focused on the impact of global and regional factors on the stock market returns.

2.1. The regional factors and GCC stock markets

At the regional level, determining the degree of financial integration is essential for identifying the efficiency of risk diversification and capital allocation. It plays a strategic role in boosting trade and firm cooperation within a geographic area (Boubakri & Guillaumin, 2015). However, the majority of empirical studies on financial integration focus mainly on developed or emerging markets (Bekaert & Harvey, 1995; Bekaert, Hodrick, & Zhang, 2009; Carrieri, Errunza, & Hogan, 2007). Another strand of the literature focuses on the regional level—for example, Adler and Qi (2003) on North America, Hardouvelis, Malliaropulos, and Priestley (2006) on the euro area, and Park and Lee (2011), Boubakri and Guillaumin (2015), and Lee and Jeong (2016) on East Asia. In their study on the Americas, Asia, and Europe, Brooks and Del Negro (2005) find regional factors significant for explaining equity returns. They contend that regional effects account for more than half the observed country influence on stock returns and that regional diversification can result in greater risk reduction than global diversification. Guesmi and Nguyen (2011) find similar results and claim that regional effects may be more significant than country and global factors, highlighting their importance in portfolio investment strategies, asset allocation decisions, and regional economic development policies.

With respect to the GCC region, recent studies focus on the impact of GCC global integration on their local stock market and overlook regional integration (Bahloul & Ben Amor, 2021; Jouini, 2013; Sadouni, Mazeri, & Boudjemil, 2020). In fact, the GCC countries have tried to achieve economic and financial integration since the 1980s. The region has made important progress toward economic integration and has achieved the convergence criteria on almost all fronts (Alkholifey & Alreshan, 2010). Market comovement is frequent in the GCC countries, because their economic structure has standard characteristics, such as a peg to the US dollar (except for Kuwait, whose currency is pegged to a basket of currencies that includes the US dollar), a predominant hydrocarbon sector, and a heavy dependence on imported labor. Despite the pivotal role of regional integration in understanding GCC market dynamics, especially after the recent political and regional shifts, few studies focus on the impact of the GCC regional stock market on their local markets.

Only a few papers focus on the relationship between the regional stock market and the GCC's local stock markets. For instance, Al-Khazali, Darrat, and Saad (2007) investigate the presence of regional integration and its degree among GCC markets using weekly stock market data from October 1994 to December 2003. The results from the cointegration test show that equity markets in Saudi Arabia, Kuwait, Bahrain, and Oman are bound together over the long run. Espinoza, Prasad, and Williams (2011) also study the degree of regional financial integration in the GCC market using monthly data from 1993 to 2009. Their results from a threshold AR model indicate that GCC stock markets are more integrated than those in other emerging market regions. Furthermore, employing a VAR model, Daly & Fayyad (2011) demonstrate that regional factors contribute remarkably to the variance in the Bahrain, UAE, and Qatar stock markets. Finally, Alotaibi and Mishra (2015) focus on regional and global volatility spillovers on the GCC market from June 2005 to May 2013, applying various bivariate GARCH models. Their results show that the regional spillover effects to the United Arab Emirates (UAE) and Qatar are greater than the global spillover effects to these markets.

Although these studies are valuable, they solely study the impact of regional stock markets without integrating other factors of fundamental importance for the GCC countries, such as geopolitical risk.

Seminal papers on political instability and stock markets dynamics show that war, terrorism, political tensions, and international conflicts negatively affect the stock market (Arin, Ciferri, & Spagnolo, 2008; Frey & Kucher, 2000; Nikkinen, Omran, Sahlström, & Äijö, 2008; Schneider & Troeger, 2006 among others). A considerable strand of the literature confirms the sensitivity of stock prices to geopolitical risk (e.g., Antonakakis, Gupta, Kollias, & Papadamou, 2017; Balcilar, Bonato, Demirer, & Gupta, 2018; Bouri, Demirer, Gupta, & Marfatia, 2019). The reason for the negative impact of geopolitical risk on financial markets is that it exposes portfolios, including assets that are typically sensitive to conflict—such as energy sector stocks—to an abrupt and severe increase in risk, geopolitical risk, which is undiversified. Extreme events lead to a drop in investor demand for risky funds as well as in aggregate equity fund flows (Bouri et al., 2019; Wang & Young, 2020). Thus, they spark large waves of flight-to-quality, as investors engage in panic selling, searching for safer alternative assets, commonly known as safe-haven assets, such as Islamic financial instruments and gold (Alqahtani & Klein, 2021; Delle Foglie & Panetta, 2020).

The literature on the GCC region indicates the region's high sensitivity to regional political events (Abdel-Latif & El-Gamal, 2018; El-Gamal & Jaffe, 2010). This sensitivity can be explained by the fact that companies in the GCC, notably oil and gas companies, are particularly vulnerable to geopolitical tensions, making geopolitical risk a systemic risk element that can inherently mold economic activity in GCC stock markets. This sensitivity increased over the past decade, considering the instability and violence in 2011 after the Arab spring and the recent political tensions in the GCC region (Selmi & Bouoiyour, 2020).

A narrow strand of the literature focuses on the impact of geopolitical events on stock market performance in the GCC (Al-Maadid, Maria Caporale, Spagnolo, & Spagnolo, 2021; Alqahtani, Bouri, & Vo, 2020; Alqahtani & Klein, 2021; Ben Cheikh et al., 2021; Bouri et al., 2019; McMillan, Ziadat, & Herbst, 2021; Selmi et al., 2020; Umar, Trabelsi, & Zaremba, 2021). However, none of them examine how regional geopolitical risk affects both conventional and Islamic markets and variations in its effect, depending on the state of the market.

Among the few papers relevant to our study, Al-Maadid et al. (2021) employ a GARCH model to examine the impact of political tensions on stock markets in the GCC using weekly data from October 2010 to May 2018. The returns on the GCC

stock markets decreased due to the Qatar blockade that started in June 2017. Alqahtani and Klein (2021) study the long-term effect of local and global geopolitical risks, oil prices, and price uncertainty on GCC equity markets employing an ARDL model from May 2007 to August 10, 2018. The GCC stock markets are resilient to global geopolitical risk in the long run, except for Qatar. However, they find that regional geopolitical risk has a negative, highly significant impact on GCC countries. Furthermore, Ben Cheikh et al. (2021) investigate the asymmetric relationship between oil price movements and GCC stock markets, considering the geopolitical risk of Saudi Arabia GPR KSA - representing the regional geopolitical risk- to capture the impact of political instability in the region. They apply nonlinear vector smooth transition regression models on monthly data from January 2005 to December 2019 and conclude that a rising GPR KSA negatively affects the stock markets in the GCC region.

Moreover, Selmi et al. (2020) study the dynamic relationships between global and GPR KSA and GCC stock markets, applying a DCCGARCH model on monthly data from July 2005 to August 2019. The results show a negative relationship between the time-varying conditional correlation between GCC stock returns and the GPR KSA. Finally, Bouri et al. (2019) study the impact of GPR on the volatility and return dynamics of Islamic equities and bonds employing a nonparametric causality-in-quantiles test on daily data for the period January 2, 1996, to March 31, 2017. They find that in general Islamic assets are affected by geopolitical uncertainty.

2.2. Diversification benefit: conventional versus Islamic equities

GCC stock markets provide a plethora of investment opportunities because of their weak exposure to global markets (Alotaibi & Mishra, 2017; Maghyereh, Awartani, & Tziogkidis, 2017; Mimouni, Charfeddine, & Al-azzam, 2016). But recent empirical studies on the GCC markets have sent some alarming news to investors. As GCC countries are highly sensitive to regional changes and instability, they have the potential to collapse with little prior indication (Balcilar, Demirer, & Hammoudeh, 2013). Also, studies show that diversification opportunities are decreasing and do not accrue during stressful periods (Balcilar et al., 2013; Bouoiyour & Selmi, 2019; Demirer, 2013).

From the current perspective of the debate over financial dynamics, an important question is whether Islamic stock indexes offer a diversification benefit or a hedge during stressful periods.

To begin with, GCC countries have played a major role in establishing and developing this financial niche worldwide. After the oil boom in the 1970s, GCC countries were the first to invest their wealth according to Islamic principles, using *mourabaha* (cost plus financing) contracts; in the same period, they created the Islamic Development Bank (IDB) and the first commercial Islamic banks in the world. Second, GCC investment in Islamic securities reached USD 1.499 trillion in 2020, amounting to 44 percent of Islamic financial assets, the world's largest share. Moreover, Islamic finance assets in Bahrain, which is considered the financial center of the GCC region, totaled $102 billion in 2020, making Bahrain among the top 10 countries that invest in Islamic finance and banking assets. Third, the region is home to three of the most competitive Islamic banks in the world: the Bank Al-Rajhi in Saudi Arabia, the Dubai Islamic Bank, and Finance House in Kuwait. These three financial institutions dominate the Islamic finance industry worldwide.

Having said that, it seems important to understand that no consensus has been reached in the literature about the potential diversification benefits of Islamic stock indexes. Studies have found that Islamic equities provide a suitable alternative for hedging against economic externalities as they are more stable and resilient during crises, the least disturbed during bad markets, and outperform conventional equities (Alexakis, Pappas, & Tsikouras, 2017; Alkhazali & Zoubi, 2014; Arouri et al., 2013; González, Jareño, & El Haddouti, 2019; Hassan, Rubio, Hassan, Ozkan, & Merdad, 2017; Safiullah & Shamsuddin, 2019). Furthermore, studies confirm the decoupling hypothesis and suggest that Islamic equities provide potential diversification benefits (Antar & Alahouel, 2019; Jawadi, Jawadi, & Cheffou, 2018, 2019; Karim & Masih, 2019; Paltrinieri, Floreani, Kappen, Mitchell, & Chawla, 2019).

Few studies reports that this diversification benefit depends on the market state. For instance, Hoepner, Rammal, and Rezec (2011) find that Islamic equities underperform or perform similar to their conventional peers in bear markets but outperform during a bull market. Azad, Azmat, Chazi, and Ahsan (2018) find that Islamic equities perform better than their conventional counterparts during normal and bearish markets.

However, a different strand of the literature rejects the decoupling hypothesis and claim that Islamic and conventional equities follow the same dynamic patterns (Alam, Arshad, & Rizvi, 2016; Ali, Shahzad, Raza, & Al-Yahyaee, 2018; Aloui, Hkiri, Lau, & Yarovaya, 2016; Ashraf, 2016; Camgöz, Köse, & Seval, 2019; Sherif, 2016).

The majority of studies on GCC countries focus on the nexus between sukuk and Islamic stocks, instead of comparing Islamic and conventional markets. The few relevant studies on the subject finds contradictory results. Although some papers state that Islamic equities do not offer diversification benefits as they mimic the performance of conventional equities in the GCC markets even during a crisis (Mensi, Hammoudeh, Aljarrah, & Kang, 2019; Miniaoui, Sayani, & Chaibi, 2015), others claim that Islamic equities offer a hedging tool and serve as a safe haven for GCC investors, especially during periods of stress (Aloui, Jammazi, & Hamida, 2018; Mensi, Hammoudeh, Reboredo, & Nguyen, 2015; Mezghani & Boujelbène, 2018, pp. 157–181; Yousaf, Beljid, Chaibi, & Al, 2022). However, these studies do not take into account the distinction between Islamic and conventional markets in each of the GCC countries separately.

Finally, it is important to include local macroeconomic indicators because stock markets react to economic

fundamentals. Thus, including inflation and exchange rates is crucial to control for local economic conditions. No consensus exists in the literature about the effect of inflation on stock markets. The Fisher effect implies that a positive relationship is expected between stock returns and inflation, which means that fundamental investors are compensated for the decrease in purchasing power caused by inflation. Several studies empirically support Fisher's claim and thus the ability of stock investment to serve as an inflation hedge (Jaffe & Mandelker, 1976; Solnik & Solnik, 1997; Spyrou, 2004). However, a different strand of the literature shows a reverse relationship between expected inflation and stock market returns (Fama, 1981; Feldstein, 1980; Geske & Roll, 1983). They obtain similar results for the Islamic stock market, finding that inflation has a positively effect on Islamic stock prices (Krasicka & Nowak, 2012; Mgammal, 2012). Also, no consensus has been reached about the effect of the exchange rate on the stock market. One strand of the literature shows a positive relationship between the exchange rate and stock prices (Granger & Pesaran, 2000; Tian & Ma, 2010), but another group claims that the exchange rate negatively affects stock markets (Ajayi & Mougouė, 1996; Branson, 1981, p. 801; Frankel, 1992; Zhao, 2010).

3. Data

This study employs monthly data from April 2011 to April 2021. This period was a decade of high regional political volatility, beginning with the Arab spring, multiple coups, war in Yemen, the intervention of multiple nonstate actors in Syria, and a diplomatic crisis among Qatar, Saudi Arabia, and the UAE that turned into an embargo against Qatar. These events are essential to this study because it incorporates regional geopolitical risk as a factor that affects GCC stock market dynamics.

The regional factors comprise two components: a fundamental or economic factors and non-economic factors. Fundamental factors may not be sufficient for explaining stock price dynamics and thus stock returns. Furthermore, deviations in fundamentals occurs as a possible outcome of a non-economic component, such as fads (Wu, Ohk, & Ko, 2021). In this study, we use a regional stock index as an economic factor because it reflects historical regional prices. Also, we employ regional geopolitical risk as a non-economic factor to reflect the effect of fads.

The time-series dataset consists of the following: monthly Islamic/conventional indexes of six stock markets in each GCC country, conventional and Islamic regional stock market indexes, a regional geopolitical risk index, the consuemr price index (CPI), and exchange rates. We use the MSCI GCC conventional and Islamic indexes to capture the impact of regional stock dynamics on local markets. Following the literature (Alqahtani & Klein, 2021; Ben Cheikh et al., 2021; Bouri et al., 2019), we use the regional GPR developed by Caldara and Iacoviello (2018), GPR KSA. This index is formed to capture the changes in geopolitical risk by calculating the number of words in global and national news associated with wars, tension between states, and terrorist acts that affect the normal course of international relations. The GPR is calculated among the GCC economies only for Saudi Arabia. Because Saudi Arabia is the largest global oil exporter and the leader among GCC stock markets, increasing political tensions there can be expected to affect the other GCC members. The exchange rate and inflation are local factors used as control variables. All the data are obtained from Bloomberg and Datastream, except the GPR KSA taken from the website of Caldara and Iacoviello.[2] All variables except the CPI rate are expressed in the first difference of the natural logarithm.

Table 1 presents the descriptive statistics. The Islamic index of Qatar has an average of 3528.11 with the highest standard deviation (772.95), and Bahrain has an average of 27.41 (the lowest mean among Islamic index prices). The mean of the conventional Qatari index is the highest, and Kuwait has the lowest mean for the conventional index in the GCC region. Stock prices have negative skewness (except in Bahrain for both Islamic and conventional index, KSA for Islamic index, and Qatar for conventional index) and positive kurtosis. Regarding the Jarque-Bera (JB) test, the normality assumption is rejected for all series, except for CPI (in KSA and UAE), the Islamic index of Kuwait, the conventional index in Oman, and the regional GPR. These results indicate that almost all series have a degree of nonnormality. Thus quantile regression is the best fit for capturing the determinants of GCC stock returns, characterized by nonnormal distribution.

To assess the stationarity properties of the variables, we apply the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests and provide the unit-root test results in Table 2. The ADF and PP test results confirm that all series reject the null hypothesis that the variable has a unit root.

4. Methodology

Following Joo and Park (2021) and Alotaibi and Mishra (2015), we analyze the effect of regional factors (RF) while controlling for local economic conditions using local factors (LF) on both Islamic and conventional stock market returns in each of the GCC countries using the following model,

$$R_t = \alpha_0 \sum_{i=1}^{N} \beta_i LF_{it} + \sum_{j=1}^{M} \delta_j RF_{jt} + \varepsilon_t \quad (1)$$

In this specification, i and j represent the local and regional factors, respectively. α_0 and ε_t refer to the intercept and disturbance, respectively. β_i reflects the sensitivity of the local (Islamic/conventional) index return in each of the GCC stock markets (separately) to local factors i, and δ_j reflects the sensitivity of the local (Islamic/conventional) index return in each of the GCC stock markets to regional factors j.

The variables used in our specification are defined as follows:

R_t: the local (Islamic/conventional) index returns in each of the GCC stock markets at time t

LF_{it}: Local factors i in GCC countries at time t

[2] https://www.matteoiacoviello.com/gpr.htm.

Table 1
Descriptive statistics.

	Variable	Mean	Std.dev	Max	Min	JB	Kurtosis	Skewness
Panel A: Country-Specific Factors								
KSA	CPI	2.64	1.94	7.00	−2.20	3.94	3.36	−0.40
	EXC Rate	3.75	0.001	3.76	3.74	7520.14***	39.92	5.66
	Islc index	169.27	24.14	240.58	128.65	9.63***	3.07	0.69
	Conv index	1072.59	120.15	1423.69	741.75	6.92***	4.13	−0.14
UAE	CPI	0.73	1.85	6.40	−2.71	0.27	2.96	0.11
	EXC Rate	3.67	0.0001	3.67	3.67	308.93**	10.08	−1.66
	Islc index	139.20	30.58	182.06	78.09	14.41***	2.18	−0.73
	Conv index	4227.39	914.75	6046.81	2402.28	13.13***	2.58	−0.78
Kuwait	CPI	0.10	0.11	0.70	−0.40	280.30***	10.43	0.29
	EXC Rate	0.29	0.01	0.31	0.27	15.32***	1.74	−0.60
	Islc index	111.85	13.04	145.61	81.02	1.19	3.17	−0.22
	Conv index	551.88	80.63	714.92	378.57	3.47***	2.51	−0.33
Qatar	CPI	0.80	1.68	3.70	−4.05	10.82***	3.46	−0.69
	EXC Rate	3.64	0.01	3.83	3.63	32,524.82***	81.48	8.52
	Islc index	3528.11	772.95	4725.93	1882.67	10.70***	2.32	−0.64
	Conv index	9987.24	1365.46	13,728.31	7714.26	11.77***	3.14	0.76
Bahrain	CPI	1.31	2.19	8.80	−7.00	30.80***	4.95	−0.75
	EXC Rate	0.37	0.0003	0.38	0.37	90.39***	7.22	0.12
	Islc index	27.41	7.24	46.72	15.72	8.03***	2.54	0.58
	Conv index	1301.44	141.90	1660.48	1026.23	2.57	2.34	0.14
Oman	CPI	1.30	1.25	5.40	−1.50	11.21***	3.90	0.59
	EXC Rate	0.38	0.0002	0.38	0.38	46.80***	5.28	−1.01
	Islc index	76.42	17.94	105.22	47.04	9.17***	1.69	−0.16
	Conv index	5343.24	1069.23	7484.17	3448.29	5.35**	2.03	−0.18
Panel B: Regional (GCC) Factors								
	MSCI GCC	511.40	67.60	707.09	407.55	7.95**	2.73	0.61
	MSCI GCC Islc	753.64	83.19	1010.78	559.33	12.79***	3.78	0.69
	GPR KSA	106.96	27.81	196.28	53.27	0.96	3.08	0.21

Note: ***, **, and * significant at 1%, 5%, and 10%, respectively CPI refers to consumer price index, Islc refers to Islamic, Conv refers conventional.

$_{RFjt}$: Regional factors j in GCC countries at time t

To determine the effect of RF, we first use an ordinary least square (OLS) regression. However, the OLS method can be distorted by outlier observations, especially in financial data, such as stock market data with thick-tailed disturbance distributions, which are highly affected by this kind of problem. In other words, OLS becomes less robust and is likely influenced by outliers when data is analyzed beyond the mean or toward its extreme values (Greene, 2020).

We use the quantile regression model developed by Koenker and Bassett (1978) to overcome the shortcomings of OLS. This method is employed by and large to examine the dependence structures and study asymmetry in financial markets (e.g., Baur, 2013; Joo & Park, 2021; Naifar & Hammoudeh, 2016; Xiao, Hu, Ouyang, & Wen, 2019; Zhu, Guo, You, & Xu, 2016). The quantile regression is a nonparametric specification that requires fewer details about the specification of the population distribution. Thus it requires no assumptions about the distribution of Y|x or its conditional variance. The main advantage of quantile regression is that it represents the complete picture of the conditional distribution, explaining stock market dynamics across different quantiles, which represent different market states, and highlighting asymmetric dependence structures (Zhu et al., 2016). Therefore, we apply the quantile regression model to study the asymmetric dependence structure between the local (Islamic/conventional) index return and regional factors in each GCC stock market (separately) across different quantiles.

The quantile regression model of Koenker and Bassett (1978) is developed as follows:

$$Q_y\left(\frac{\tau}{x}\right) = x'\beta(\tau) \tag{2}$$

This model assumes the linearity of the dependence of x on y, and $Q_y\left(\frac{\tau}{x}\right)$ denotes the conditional quantile of y.

$$Q_y\left(\frac{\tau}{x}\right) = inf\left\{\frac{d}{F_y\left(d/x\right)} \geq \tau\right\} = \sum_k \beta_k(\tau)x_k \tag{3}$$

The conditional probability distribution of Y|x is denoted $F_y(d/x)$. In this research, we employ LF (CPI and exchange rates) and RF (MSCI GCC Islamic/conventional and GPR KSA) to capture the determinants of the local (Islamic/conventional) index returns in each of the GCC stock markets. We analyze the dynamics of Islamic/conventional stock index in the GCC countries separately across nine quantiles (0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9). In our study, the quantile regression model, $\beta_{(\tau)}$ measures the degree of dependence between x and the τ_{th} conditional quantile of y. Hence, if the

Table 2
Unit-root tests.

	Variable	ADF test	PP test
Panel A: Country-Specific Factors			
KSA	CPI return	−10.39***	−10.38***
	EXC Rate return	−6.79***	−6.84***
	Islamic index return	−7.45***	−7.15***
	Conv index return	−11.53***	−11.53***
UAE	CPI return	−6.19***	−9.19***
	EXC Rate return	−4.76***	−8.25***
	Islamic index return	−8.44***	−8.32***
	Conv index return	−12.28***	−12.20***
Kuwait	CPI return	−5.97***	−10.18***
	EXC Rate return	−11.66***	−11.63***
	Islamic index return	−9.97***	−9.93***
	Conv index return	−10.48***	−10.59***
Qatar	CPI return	−14.14***	−14.09***
	EXC Rate return	−10.78511***	−11.01268***
	Islamic index return	−11.19958***	−11.20041***
	Conv index return	−12.30399***	−12.35647***
Bahrain	CPI return	−3.783572*	−3.661668*
	EXC Rate return	−6.70***	−6.77**
	Islamic index return	−7.55***	−7.58***
	Conv index return	−11.20***	−11.06***
Oman	CPI return	−15.96***	−21.06***
	EXC Rate return	−4.29**	−9.49***
	Islamic index return	−9.24***	−9.18***
	Conv index return	−10.94***	−10.95***
Panel B: Regional (GCC) Factors			
	MSCI GCC return	−9.77***	−9.74***
	MSCI GCC Islc return	−9.88***	−9.86***
	GPR KSA	−7.93***	−8.07***

Note: ***, **, and * significant at 1%, 5%, and 10%, respectively. CPI refers to consumer price index, EXC refers to exchange rate, conv refers to conventional. ADF refers to augmented Dickey-Fuller test and PP refers to Philips-perron test.

values of $\beta_{(\tau)}$ are invariant across quantiles, the dependence structure is identical. Moreover, the structure of dependence increases as $\beta_{(\tau)}$ increases and vice versa. At the same time, the structure of dependence displays symmetry/asymmetry depending on the similarity/dissimilarity of high and low quantiles (Koenker, 2005; Zhu et al., 2016). In addition, the existence of an exogenous/non-exogenous variable in x indicates the conditional/unconditional dependence.

The coefficients of the variables are obtained by minimizing the weighted absolute difference between y and x for a given τ as follows:

$$\beta_{(\tau)} = \sum_{i=1} \left(\tau - 1_{\{yl < xl\beta(\tau)\}}\right) \left| Y_l - x_l' \beta(\tau) \right| \quad (4)$$

In Equation (4), the usual indicator function is represented by $1_{\{y_l < x_l\beta(\tau)\}}$

To better highlight our results, we illustrate the coefficient estimates in order to show the asymmetric dependence structure between the explanatory (regional factors) and dependent variables (conventional/Islamic GCC local stock market return).

For a robustness check, we use two methods. First, we perform a Wald test to check the parameter heterogeneity across quantiles under the null hypothesis of quantile slope coefficients' identicality. Second, we rerun the estimation using a different proxy for the regional stock market.

5. Results and interpretation

In this section, we present the dependence structures between regional factors and six local markets in the GCC across different market states, using a quantile approach. Moreover, we compare the results of Islamic and conventional stock indexes.

5.1. The impact of regional factors on Islamic stock index returns

In Table 3, we report the results of the OLS and quantile regressions for Islamic indexes in GCC countries. According to the OLS estimation results, the estimated exchange rates are significantly negative for KSA and Kuwait and insignificant for the rest of the countries. The exchange rate negatively affects the stock return in Kuwait and KSA, but its impact on the latter is stronger. Also, the OLS results show that inflation has no significant impact on the GCC countries, except Kuwait. When it comes to regional factors, the MSCI GCC Islamic index positively affects all GCC Islamic stock index returns. Surprisingly, it has no impact on Bahrain, which is considered a financial hub in the region and home to most Islamic finance regulatory institutions (e.g., the Accounting and Auditing Organization for Islamic Financial Institutions - AAOIFI). The regional GPR has no impact on KSA, Bahrain, and Oman; however, it negatively affects Islamic stock returns in the UAE, Kuwait, and Qatar. The regional GPR has the strongest impact on Qatar; this might be due to the Qatari crisis and the embargo imposed on Qatar by KSA, UAE, Egypt, and Bahrain starting in 2017, which lasted over three years.

Overall, the OLS results indicate that GCC Islamic stock market returns are affected by regional factors; this implies that the GCC Islamic stock markets are regionally integrated. This result is in line with Arouri and Nguyen (2010), Arouri, Rault, and Teulon (2014), and Alqahtani and Klein (2021), showing that the GCC equity markets are regionally integrated.

However, the OLS results only show the average relationship between variables and stock market returns based on the conditional mean of the index returns; hence, it is impossible to see the changes in each variable's effect under different market conditions. To overcome this shortcoming, we use a quantile regression.

The quantile results show that the effect of each variable varies across quantiles. Overall, the exchange rate negatively affects GCC Islamic indices' return during bearish and normal markets. The result can be explained by the GCC's interconnectedness to the US politically and economically. According to EL-Gamal and Jeffy (2010), the dollar is the main currency and means of payment for international crude-oil transactions. As significant portions of oil-exporting countries' assets remain invested in dollar-denominated instruments (petrodollar recycling), these countries have high sensitivity to exchange rate changes. Inflation positively affects GCC Islamic stock returns.

Table 3
The impact of regional factors on Islamic stock index returns.

Country	Variable	Quantile Levels									OLS
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	
KSA	C	−0.0036	−0.0066	0.0093	0.0129	0.0093	0.0210	0.0322	0.0301**	0.0436***	0.0137
		(0.8991)	(0.8154)	(0.6764)	(0.5366)	(0.6342)	(0.2085)	(0.0321)	(0.0222)	(0.0003)	(0.3497)
	β_1	−9.443104	−13.66415	−14.19490	−19.2224*	−23.0288**	−24.4777*	−20.3553*	−18.6582*	−9.7948	−17.0867**
		(0.2845)	(0.2183)	(0.1720)	(0.0907)	(0.0435)	(0.0527)	(0.0699)	(0.0627)	(0.3255)	(0.0360)
	β_2	0.0112***	0.0055	−0.0019	0.0024	0.0014	0.0047	0.0061	0.0029	0.0043	0.0032
		(0.000)	(0.2331)	(0.7797)	(0.5685)	(0.7140)	(0.3398)	(0.2944)	(0.6910)	(0.4406)	(0.4686)
	β_3	0.4348***	0.4888**	0.5964***	0.5480**	0.4789*	0.3168	0.4169**	0.3683**	0.4149***	0.4712***
		(0.0000)	(0.0130)	(0.0061)	(0.0345)	(0.0778)	(0.1676)	(0.0456)	(0.0216)	(0.0006)	(0.0000)
	β_4	−0.0004*	−0.0001	−0.0001	−0.0001	−1.1E05	−5.2E05	−6.6E05	6.3E05	1.0E06	−9.1E05
		(0.0984)	(0.4858)	(0.4475)	(0.5432)	(0.9503)	(0.7378)	(0.6367)	(0.6192)	(0.9924)	(0.4899)
UAE	C	−0.0385***	−0.0200***	−0.0122***	−0.0042	0.0027	0.0135***	0.0195***	0.0318***	0.0435***	0.0040
		(0.0000)	(0.0000)	(0.0040)	(0.2588)	(0.4699)	(0.0022)	(0.0000)	(0.0000)	(0.0000)	(0.2310)
	β_1	−83.7273	−96.9410	−80.9158	−48.8286	−46.9799	−92.9789	−128.2386	−138.5323	−143.3775	−86.3933
		(0.6716)	(0.1159)	(0.1955)	(0.3250)	(0.3723)	(0.3737)	(0.2120)	(0.2470)	(0.2813)	(0.2151)
	β_2	0.0032	0.0082	0.0095*	0.0101*	0.0097	0.0059	0.0049	0.0065	0.0053	0.0083
		(0.7538)	(0.1255)	(0.0842)	(0.0831)	(0.1307)	(0.5309)	(0.5309)	(0.4058)	(0.4663)	(0.1433)
	β_3	0.6699***	0.5794***	0.5357***	0.5045***	0.4775***	0.4664***	0.4232***	0.5464*	0.6698	0.5430***
		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0025)	(0.0102)	(0.0922)	(0.1010)	(0.0000)
	β_4	−0.0619**	−0.0335*	−0.0227	−0.0096	−0.0120	−0.0271	−0.0389*	−0.0239	−0.0218	−0.0437***
		(0.0172)	(0.0704)	(0.2044)	(0.5516)	(0.4650)	(0.2050)	(0.0556)	(0.3412)	(0.4254)	(0.0011)
Kuwait	C	−0.0350***	−0.0227***	−0.0140***	−0.0062*	−0.0001	0.0055	0.0106***	0.0204***	0.0408***	0.0012
		(0.0000)	(0.0000)	(0.0001)	(0.0581)	(0.9633)	(0.1196)	(0.0056)	(0.0000)	(0.0000)	(0.6738)
	β_1	−1.7807**	−1.1715	−1.0281	−0.7098	−0.2363	−0.4742	0.0964	−0.2031	−0.6478	−1.1641**
		(0.0233)	(0.2277)	(0.1840)	(0.3160)	(0.7250)	(0.4900)	(0.8822)	(0.7726)	(0.5448)	(0.0487)
	β_2	0.0413*	0.0211	0.0275**	0.0292**	0.0379**	0.0308*	0.0444***	0.0613***	0.0805***	0.0346**
		(0.0563)	(0.1219)	(0.0406)	(0.0473)	(0.0252)	(0.0931)	(0.0081)	(0.0009)	(0.0000)	(0.0487)
	β_3	0.6031***	0.5299***	0.5538***	0.5560***	0.5429***	0.4809***	0.4901***	0.5213***	0.4013**	0.5554***
		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0315)	(0.0000)
	β_4	−0.0451***	−0.0373**	−0.0275**	−0.0191	−0.0232	−0.0189	−0.0180	−0.0126	−0.0340*	−0.0292***
		(0.0013)	(0.0292)	(0.0296)	(0.1425)	(0.1072)	(0.3008)	(0.4059)	(0.4843)	(0.0520)	(0.0088)
Qatar	C	−0.0461***	−0.0219***	−0.0101**	−0.0005	0.0056	0.0147***	0.0289***	0.0415***	0.0556***	0.0067
		(0.0000)	(0.0001)	(0.0285)	(0.9031)	(0.2317)	(0.0038)	(0.0000)	(0.0000)	(0.0000)	(0.1319)
	β_1	−0.3798	−1.0330**	−1.1790**	−1.3332**	−1.5333**	−1.2626	−0.0792	0.5799	−1.0216	−0.5024
		(0.1264)	(0.0316)	(0.0325)	(0.0333)	(0.0167)	(0.2173)	(0.9846)	(0.8592)	(0.9221)	(0.4120)
	β_2	0.0119	−0.0031	0.0016	−0.0005	−0.0005	−0.0114	−0.0027	−0.0091	−0.0056	−0.0009
		(0.3030)	(0.5829)	(0.7852)	(0.9395)	(0.9411)	(0.3686)	(0.8816)	(0.5101)	(0.6330)	(0.8963)
	β_3	0.2414	0.5272***	0.5496***	0.6258***	0.6475***	0.6179***	0.6031***	0.5836***	0.6227***	0.4565***
		(0.4285)	(0.0061)	(0.0011)	(0.0002)	(0.0001)	(0.0015)	(0.0004)	(0.0005)	(0.0000)	(0.0001)
	β_4	−0.0549	−0.0313	−0.0220	−0.0153	−0.0240	−0.0323	−0.0493*	−0.0362	−0.0468	−0.0574***
		(0.1037)	(0.1365)	(0.2287)	(0.4447)	(0.2685)	(0.2304)	(0.0988)	(0.2886)	(0.2389)	(0.0013)

Bahrain	C	2.8966***	3.0725***	3.1471***	3.1765***	3.2354***	3.2877***	3.4369***	3.5278***	3.6392***	3.2746***
		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
	β_1	15.8792	40.3368	14.9208	19.9166	10.2623	3.3224	14.8933	37.5506	68.3087	23.7475
		(0.6280)	(0.3803)	(0.8107)	(0.7785)	(0.8320)	(0.9376)	(0.8150)	(0.5357)	(0.1530)	(0.4194)
	β_2	0.0101	−0.0101	0.0031	0.0015	−0.0058	−0.0016	0.0360*	0.0350*	0.0550**	0.0122
		(0.6936)	(0.5846)	(0.8929)	(0.9497)	(0.8245)	(0.9599)	(0.0521)	(0.0873)	(0.0269)	(0.4821)
	β_3	0.5887	0.2574	0.0628	0.4536	1.3786*	2.0764***	1.0749	0.8190	−0.1768	0.3918
		(0.0000)	(0.8169)	(0.9569)	(0.7191)	(0.0829)	(0.0052)	(0.2818)	(0.3991)	(0.8585)	(0.5267)
	β_4	−0.0886***	0.0596	−0.0213	0.0293	0.0120	−0.0376	−0.0479	−0.1089	−0.0662	−0.0159
		(0.0000)	(0.6650)	(0.8754)	(0.8467)	(0.9145)	(0.7177)	(0.7840)	(0.5154)	(0.6777)	(0.8626)
Oman	C	−0.0376***	−0.0238***	−0.0180***	−0.0113***	−0.0030	0.0045	0.0093**	0.0198***	0.0306***	−0.0041
		(0.0000)	(0.0000)	(0.0000)	(0.0009)	(0.3986)	(0.2787)	(0.0278)	(0.0000)	(0.0000)	(0.0998)
	β_1	−12.2551	−4.8841	−8.2392*	−5.2787	−6.2089	−2.7582	−3.5149	−4.5452	2.3990	−4.9972
		(0.1925)	(0.3236)	(0.0784)	(0.2188)	(0.1168)	(0.4498)	(0.2927)	(0.1868)	(0.5541)	(0.1123)
	β_2	−0.0046	0.0011	−0.0022	−0.0040	−0.0036	−0.0064	−0.0048	−0.0098***	−0.0063	−0.0063
		(0.7986)	(0.7950)	(0.7238)	(0.4560)	(0.4869)	(0.2033)	(0.4025)	(0.0077)	(0.2365)	(0.1027)
	β_3	0.2165**	0.3076***	0.3511***	0.2949***	0.2581	0.2038	0.1814	0.0605	−0.0787	0.2477
		(0.0169)	(0.0000)	(0.0000)	(0.0052)	(0.1272)	(0.3217)	(0.3853)	(0.7162)	(0.6140)	(0.0002)
	β_4	−0.0088	−0.0229*	−0.0142	−0.0178	−0.0115	−0.0166	−0.0132	−0.0068	−0.0038	−0.0109
		(0.5108)	(0.0527)	(0.4034)	(0.2749)	(0.4985)	(0.2922)	(0.3975)	(0.6607)	(0.8182)	(0.2649)

Note: ***, **, and * significant at 1%, 5%, and 10%, respectively. β_1, β_2, β_3, and β_4 represent exchange, rate, inflation, regional Islamic index, and regional GPR, respectively.

The inflation in the GCC region is caused by high liquidity in the economy (revenues from oil exports). Because these undiversified economies have few channels for absorbing it, most of this liquidity is absorbed by the stock market, whose capitalization represents more than 50 percent of the gross domestic product (GDP) in GCC countries. Moreover, during periods of high inflation, investors tend to protect their wealth by moving their investment from fixed-income assets to the stock market, as the return rates are higher than the real interest rates.

With respect to regional factors, we observe that the effect of the MSCI GCC Islamic index varies with the change in quantile levels, which is a clear indication of asymmetric dependence. The MSCI GCC Islamic index has a significantly positive impact across all quantiles for each GCC country, except for Bahrain and Oman, where the significance is limited to (Q5, Q6) and (Q1, Q2, Q3, Q4), respectively. This result implies that an increase in the regional Islamic market index returns lead to a rise in local Islamic stock returns.

In addition, the dependence structure is stronger when the stock market is in the last stage of a bearish market while transitioning to a normal market state (Q3, Q4, and Q5), then we observe a slight decrease in the effect. But it increases again at the uppermost quantiles (Q8 for Kuwait and Q9 for KSA and Qatar) except for the UAE, where the impact of MSCI GCC declines from lower quantiles to Q7, and Bahrain, where the MSCI GCC Islamic index returns tend to increase significantly from the lower to the upper quantiles.

Overall, the MSCI GCC Islamic index's return has a stronger positive impact during bearish markets, but this effect weakens during normal and bullish market states. The synchronization between regional and local markets indicates regional integration of GCC equity markets, which becomes stronger during a bearish market. This result is consistent with Baur and Mcdermott (2010), who claim that the dependence structure is influenced by extreme market states.

As expected, the regional GPR is significantly negative in all GCC countries. Generally, the negative impact is observed in bearish markets in all countries, except UAE (Q7), Kuwait (Q9), and Qatar (Q7). These results are in line with the findings of Alqahtani and Klein (2021), Antonakakis et al. (2017), Balcilar et al. (2018), Ben Cheikh et al. (2021), and Kollias, Papadamou, and Stagiannis (2011). The asymmetric effect of regional GPR indicates that rising GPR might inspire fear in investors. During a bearish period, markets are often characterized by high volatility. In fact, investors' pessimistic expectations in stressful periods affect their ability to make rational decisions and lead to herding. Herding leads to high market volatility and crashing prices and thus negative dependence and low quantiles (Dong, Li, & Yoon, 2020).

Surprisingly, Saudi Arabia, though the political and economic leader of the GCC, is the least affected by its GPR. This unexpected result emphasizes the economic and political leadership of Saudi Arabia in the GCC region. During bearish markets, which is the most disturbing phase, increasing geopolitical risk causes panic and severe reactions by

investors, yet it has no effect on investors' decisions during normal and bullish markets.

The Islamic market results clearly indicate that the dependence structure between regional factors and GCC Islamic local markets is asymmetric, implying that the effect of changes in regional factors are more pronounced during bearish markets than normal and bullish market states.

To gain further insight into the dependence structure, we illustrate the coefficient estimates for the distribution of regional Islamic stock market returns and regional GPR in each of the GCC countries. Fig. 1 shows clear differences in the dependence structure across quantiles and confirm the asymmetric effect of the regressors.

5.2. The impact of regional factors on conventional stock index returns

In Table 4, we report the results of the OLS and quantile regressions for conventional indexes in GCC countries. In the OLS estimation results, the estimated exchange rate values are significantly negative for Saudi Arabia, Kuwait, and Oman; however, they are insignificant for the rest of the countries. Furthermore, our results show that the exchange rate affects Saudi Arabia the most, followed by Oman and Kuwait. Inflation has no significant impact on the GCC countries except Kuwait. This is similar to the results of the Islamic index.

The MSCI GCC index has a significantly positive impact on all GCC Islamic stock index returns. Regional geopolitical risk negatively affects conventional stock return in the UAE, Qatar, Kuwait, and Bahrain. However, it has no impact on Saudi Arabia and Oman. As in the Islamic index results, the OLS estimation values indicate that GCC conventional stock market returns are affected by regional factors more than local macroeconomic indicators; this suggests that the GCC conventional stock markets are regionally integrated.

The quantile results show that the effect of each variable varies across quantiles. The exchange rate negatively affects all GCC stock returns. The same result is observed for the Islamic indexes except Bahrain. In general, the exchange rate affects GCC local conventional stock market returns in normal and bullish market states.

Inflation has a significantly positive impact on Saudi stock returns in bullish markets (Q8, Q9) and Kuwaiti stock returns in bearish and normal markets (Q1, Q3, Q4, Q5, Q6). However, inflation negatively affects stock returns in the UAE in

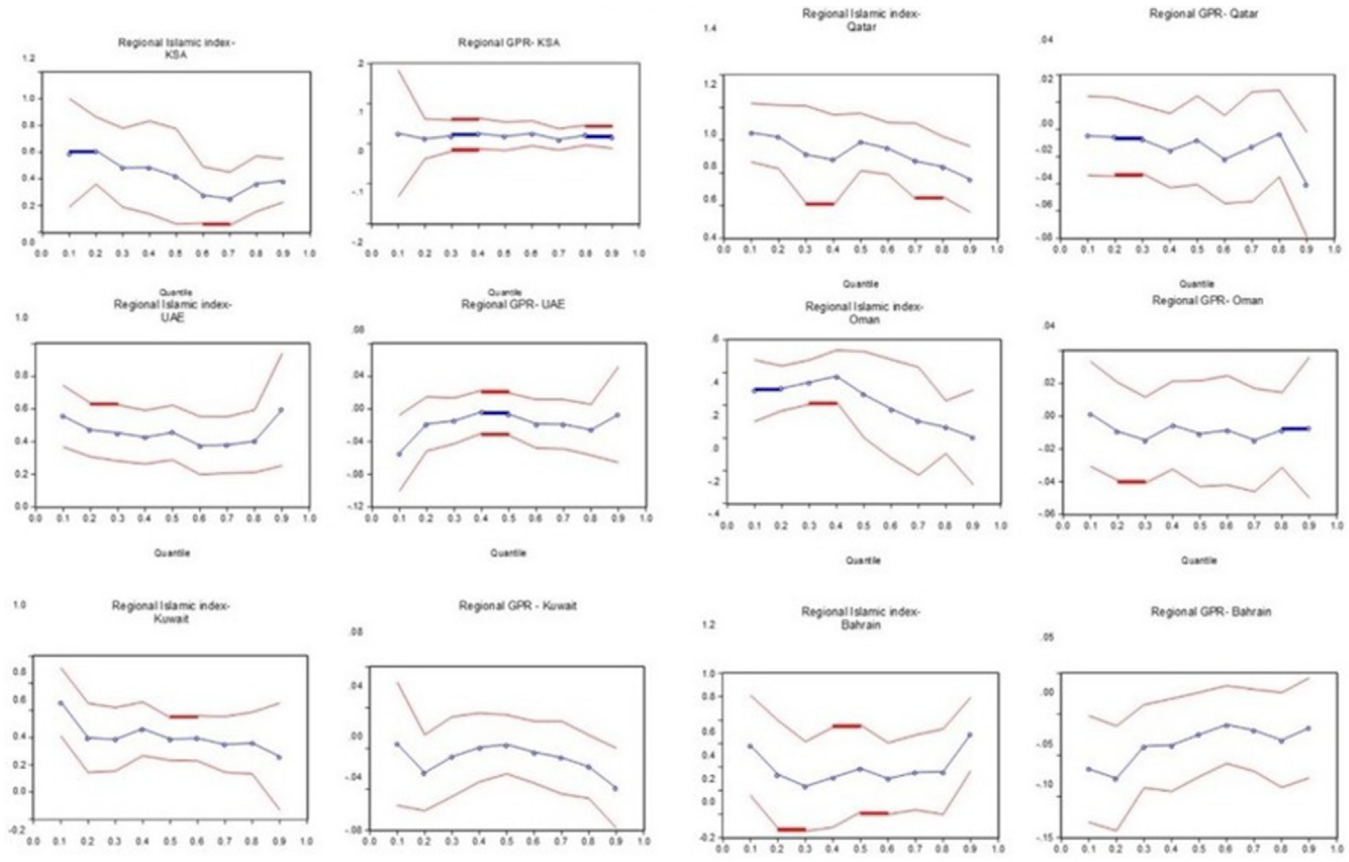

Fig. 1. Quantile regression coefficients for the GCC MSCI Islamic index returns and regional GPR. *Note*: The blue curve shows the quantile regression estimates of the regression parameters across the quantiles ranging from 0.05 to 0.95, while the red bands depict the 95% confidence intervals for the quantile regression estimates. Vertical axes measure the coefficient estimates of the explanatory variable, while the horizontal axes measure the quantiles of the dependent variable.

Table 4
The impact of regional factors on conventional stock index returns.

Country	Variable	Quantile Levels									OLS
		Q1	Q1	Q3	Q4	Q5	Q6	Q7	Q8	Q9	
KSA	C	−0.0395***	−0.0189***	−0.0008	−0.0001	0.0003	0.0010	0.0142**	0.0274***	0.0548***	0.0016
		(0.0000)	(0.0033)	(0.5242)	(0.9476)	(0.8361)	(0.4763)	(0.0235)	(0.0000)	(0.0000)	(0.6909)
	β_1	−3.6041	−18.253	−13.813	−16.122	−15.553	−14.419	−11.161	−20.276**	−30.579***	−18.354*
		(0.6085)	(0.2023)	(0.4657)	(0.4394)	(0.4681)	(0.4861)	(0.4978)	(0.0251)	(0.0000)	(0.0603)
	β_2	−0.0008	−0.0006	0.0009	0.0011	0.0009	0.0015	0.0062	0.0106**	0.0171***	0.0033
		(0.7479)	(0.8501)	(0.8394)	(0.8167)	(0.8522)	(0.7668)	(0.1390)	(0.0237)	(0.0027)	(0.5174)
	β_3'	0.5774***	0.3382	0.0203	0.0066	0.0047	0.0120	0.2173	0.3618***	0.3491***	0.2809***
		(0.0000)	(0.1057)	(0.5475)	(0.8550)	(0.8982)	(0.7366)	(0.2209)	(0.0023)	(0.0000)	(0.0062)
	β_4	0.0035	−0.0101	−0.0001	0.0001	−0.0005	−0.0017	−0.0068	−0.0038	−0.0381*	−0.0055
		(0.7966)	(0.5450)	(0.9813)	(0.9846)	(0.9441)	(0.8056)	(0.7057)	(0.8399)	(0.0937)	(0.7472)
UAE	C	−0.0294***	−0.0205***	−0.0128***	−0.0078*	0.0051	0.0139***	0.0200***	0.0271***	0.0481***	0.0047
		(0.0000)	(0.0000)	(0.0006)	(0.0504)	(0.2044)	(0.0024)	(0.0000)	(0.0000)	(0.0000)	(0.1246)
	β_1	−72.3839	−136.0726**	−134.5523**	−114.5543*	−72.2538	−97.3583	−78.1178	−68.3104	−9.1407	−72.0786
		(0.4065)	(0.0138)	(0.0188)	(0.0828)	(0.2646)	(0.1640)	(0.1440)	(0.1983)	(0.8869)	(0.2548)
	β_2	0.0070	0.0072	0.0017	0.0012	−0.0001	−0.0044	−0.0118	−0.0155*	−0.0174*	−0.0003
		(0.1076)	(0.1082)	(0.6601)	(0.7975)	(0.9805)	(0.7075)	(0.1999)	(0.0701)	(0.0790)	(0.9396)
	β_3'	0.5186***	0.4504***	0.4860***	0.5264***	0.5964***	0.6059***	0.6050***	0.6867***	0.8479***	0.6833***
		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
	β_4	−0.0340**	−0.0205	−0.0153	−0.0185	−0.0342	−0.0150	−0.0101	−0.0263	−0.0216	−0.0387***
		(0.0336)	(0.1722)	(0.3629)	(0.3318)	(0.1588)	(0.4850)	(0.5915)	(0.1186)	(0.2525)	(0.0018)
Kuwait	C	−0.0404***	−0.0318***	−0.0187***	−0.0092**	−0.0032	0.0053	0.0136***	0.0248***	0.0445***	−0.0002
		(0.0000)	(0.0000)	(0.0000)	(0.0227)	(0.3967)	(0.2072)	(0.0020)	(0.0000)	(0.0000)	(0.9489)
	β_1	−2.2422**	−1.7835*	−1.4990	−1.6009*	−1.1070	−1.2666*	−1.4395*	−2.3371**	−2.0708	−2.2626***
		(0.0109)	(0.0730)	(0.1379)	(0.0903)	(0.1570)	(0.0906)	(0.0955)	(0.0328)	(0.1792)	(0.0007)
	β_2	0.0331**	0.0273	0.0479**	0.0453**	0.0500**	0.0466**	0.0323	0.0471	0.0663	0.0405**
		(0.0295)	(0.1278)	(0.0154)	(0.0392)	(0.0154)	(0.0465)	(0.2915)	(0.2376)	(0.1182)	(0.0388)
	β_3'	0.6244***	0.6187***	0.5425***	0.5795***	0.5426***	0.4766***	0.4503***	0.4585***	0.4950	0.5612***
		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0026)	(0.1232)	(0.0000)
	β_4	−0.0529***	−0.0386*	−0.0197	−0.0214	−0.0222	0.0030	−0.0199	−0.0338	−0.0165	−0.0305**
		(0.0005)	(0.0560)	(0.1921)	(0.1781)	(0.1637)	(0.8726)	(0.3959)	(0.1175)	(0.4496)	(0.0140)
Qatar	C	−0.0462***	−0.0221***	−0.0148***	−0.0059	0.0045	0.0099**	0.0165***	0.0271***	0.0433***	8.2E05
		(0.0001)	(0.0000)	(0.0013)	(0.1440)	(0.2719)	(0.0143)	(0.0000)	(0.0000)	(0.0000)	(0.9804)
	β_1	−0.3363	0.1147	0.0111	−0.1954	−0.2758	−0.4222	−0.4852***	−0.7584*	0.4133	−0.1379
		(0.5450)	(0.7082)	(0.9834)	(0.7534)	(0.6952)	(0.4934)	(0.0021)	(0.0696)	(0.8724)	(0.7619)
	β_2	0.0006	0.0076	0.0044	−0.0013	−0.0045	−0.0041	−0.0021	−0.0095	−0.0075	−0.0017
		(0.9398)	(0.3989)	(0.5661)	(0.8455)	(0.4769)	(0.5086)	(0.7069)	(0.2159)	(0.3947)	(0.7485)
	β_3'	0.6060**	0.5094***	0.5506***	0.5722***	0.6713***	0.6413***	0.5808***	0.5246***	0.6670***	0.5984***
		(0.0183)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
	β_4	−0.0757**	−0.0287	−0.0267	−0.0317*	−0.0233	−0.0267	−0.0159	−0.0197	−0.0470*	−0.0381**
		(0.0281)	(0.1363)	(0.1725)	(0.0601)	(0.1829)	(0.1197)	(0.3887)	(0.3156)	(0.0533)	(0.0043)

(*continued on next page*)

Table 4 (*continued*)

Country	Variable	Quantile Levels									OLS
		Q1	Q1	Q3	Q4	Q5	Q6	Q7	Q8	Q9	
Bahrain	C	−0.0256***	−0.0161***	−0.0098***	−0.0050*	0.0012	0.0065**	0.0106***	0.0186***	0.0303***	0.0021
		(0.0000)	(0.0000)	(0.0002)	(0.0564)	(0.6370)	(0.0177)	(0.0002)	(0.0000)	(0.0000)	(0.5402)
	β_1	−3.5579	−0.6755	1.0704	2.2097	−0.7912	0.9897	3.3162	−0.0233	−3.6971	−4.7036
		(0.3150)	(0.8229)	(0.7111)	(0.4940)	(0.8258)	(0.8091)	(0.3658)	(0.9963)	(0.4274)	(0.2675)
	β_2	−0.0008	−0.0009	−0.0016	−0.0016	0.0013	0.0010	0.0013	0.0003	0.0010	0.0013
		(0.7871)	(0.7374)	(0.4186)	(0.4592)	(0.5356)	(0.5142)	(0.3919)	(0.8168)	(0.6765)	(0.5928)
	β_3'	−0.0248	0.1223	0.1341**	0.1573**	0.1580***	0.2408***	0.2932***	0.3299***	0.3677***	0.2365***
		(0.7274)	(0.1027)	(0.0305)	(0.0147)	(0.0082)	(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0031)
	β_4	−0.0114	−0.0147	−0.0101	−0.0091	−0.0155	−0.0149	−0.0157	−0.02191*	−0.0289**	−0.0223*
		(0.4292)	(0.2975)	(0.3126)	(0.3615)	(0.1474)	(0.1689)	(0.1462)	(0.0578)	(0.0173)	(0.0984)
Oman	C	−0.0469***	−0.0262***	−0.0177***	−0.0084**	−0.0037	0.0042	0.0127***	0.0176***	0.0299***	−0.0049**
		(0.0000)	(0.0000)	(0.0000)	(0.0219)	(0.2972)	(0.2042)	(0.0002)	(0.0000)	(0.0000)	(0.0697)
	β_1	−18.7301*	−5.9526	−6.5219	−6.9126	−8.9567*	−7.3654*	−4.8080	−7.2808*	−11.1972***	−10.6855***
		(0.0109)	(0.2390)	(0.1399)	(0.1379)	(0.0626)	(0.0800)	(0.2419)	(0.0540)	(0.0046)	(0.0018)
	β_2	0.0056	0.0024	0.0019	−0.0008	0.0010	−0.0007	−0.0010	0.0002	−0.0009	−0.0002
		(0.4300)	(0.6438)	(0.7165)	(0.8729)	(0.8579)	(0.8657)	(0.7920)	(0.9469)	(0.8702)	(0.9595)
	β_3'	0.3997***	0.3453***	0.2558**	0.3445***	0.3870***	0.3046**	0.3179**	0.3200**	0.3543**	0.3631***
		(0.0000)	(0.0007)	(0.0157)	(0.0010)	(0.0007)	(0.0207)	(0.0150)	(0.0134)	(0.0041)	(0.0000)
	β_4	−0.0194	−1.6E05	−0.0071	0.0152	0.0188	0.0255*	0.0278*	0.0318**	0.0173	0.0095
		(0.2146)	(0.9993)	(0.6990)	(0.3637)	(0.2690)	(0.0887)	(0.0681)	(0.0480)	(0.2664)	(0.3736)

Note: ***, **, and * significant at 1%, 5%, and 10%, respectively. β_1, β_2, β_3', and β_4 represent exchange, rate, inflation, regional conventional index, and regional GPR, respectively.

bullish markets (Q8, Q9). The effect in Bahrain, Qatar, and Oman is insignificant.

As expected, the effect of MSCI GCC conventional returns vary across quantile levels. MSCI GCC conventional returns have a significantly positive impact across almost all quantiles for each GCC country except Saudi Arabia, where the significance is lower (Q1, Q8, Q9). This result shows that an increase in MSCI GCC conventional returns leads to an increase in local conventional stock returns. Moreover, this effect becomes stronger when the stock market is in normal (Q4, Q5, Q6) and bullish (Q7, Q8, Q9) states in the UAE, Qatar, and Bahrain. Except in Kuwait and Saudi Arabia, the conventional regional index returns tend to decrease from the lower to the upper quantiles; it slightly increases at the most upper quantiles in Kuwait (Q8 and Q9). In Oman, the MSCI GCC conventional index varies across quantiles, yet its effect is stronger at the lowest quantile (Q1), the highest quantile (Q9), and the middle quantile (Q5); this means that the effect increases at market transition points.

Overall, MSCI GCC's conventional returns have a stronger effect on the UAE, Kuwait, and Qatar. In addition, the MSCI GCC conventional returns have a stronger positive impact during a bullish market state in the UAE, Qatar, and Bahrain, but its impact is stronger during the bearish market for Kuwait and Saudi Arabia. This result is not surprising, as the UAE and Bahrain are considered regional financial hubs, which has made remarkable advances in openness and reforms, and the three counties have the most resilient economic structures regionally and globally.[3]

As expected, the effect of regional geopolitical risk is negative for all countries except Oman, where it is positive. The regional GPR negatively affect Saudi Arabia (Q9) and Bahrain (Q8, Q9) at the uppermost quantiles but Kuwait (Q1, Q2) and UAE (Q1) at the lowest quantiles. In the case of Qatar, regional GPR negatively affects stock market returns at the lowest quantile (Q1), at the middle quantile (Q4), and the uppermost quantile (Q9). For Oman, we observe an unconventional result; the regional GPR positively affects local stock market returns in normal (Q6) and bullish market (Q7, Q8) states. Except in Oman, we note that the regional GPR affects local conventional stock market performance negatively in extreme market states (uppermost quantile and lowest quantile). Because of investors' cognitive biases, their information perception is disrupted by bad news in extreme market conditions.

Despite the asymmetric impact of regional factors across different quantiles for each country, the results corroborate that the six countries in the GCC have a similar response to regional factors. Structural similarities in GCC stock markets play a crucial role in explaining the nearly similar impact of regional factors (Dong et al., 2020). GCC market similarities are due to their common economic landscape (oil exports) and market structure (regulations and market players).

In addition to the Islamic indexes, we check the coefficients for each of the GCC countries. Fig. 2 shows clear differences

[3] According to the FM Global Resilience Index: UAE (32nd), Qatar (34th), Bahrain (45th), Saudi Arabia (55th), Oman (69th), and Kuwait (86th).

in the dependence structure across quantiles and confirm the asymmetric effect of the regressors. The presence of asymmetry can be linked to variations in regional factors, which is sensitive to market conditions and investor behavior (Dong et al., 2020).

5.3. Comparing Islamic and conventional stock index returns

The regional Islamic market stock return has a significantly positive impact on Saudi Arabia, the UAE, Kuwait, and Qatar almost across all quantiles with a stronger effect during a bullish market. We observe the same positive impact in the UAE, Qatar, Bahrain, Kuwait, and Oman for the regional conventional stock market. This impact is stronger during a bullish market for the UAE, Qatar, and Bahrain, but it is stronger during bearish and normal market states in Kuwait and Saudi Arabia. The regional GPR negatively affects Islamic stock returns during bearish markets in all countries except Qatar. Conventional stock return results have a negative effect on regional GPR but only in extreme market states.

The results indicate that portfolio diversification is not possible, as both Islamic and conventional stock markets have positive dependence with regional markets in most countries. However, in the case of regional GPR, investors in Saudi Arabia, the UAE, Bahrain, and Kuwait can alternate their investment between Islamic and conventional indexes, so they can reduce possible losses in extreme market conditions induced by a negative impact of GPR.

Regardless of their fundamental differences, Islamic and conventional stock markets in the GCC perform almost identically. First, regional stock markets—the economic factor—capture stock market variance in the GCC Islamic and conventional markets better than regional GPR—the non-economic component. This highlights the resilience of the GCC markets to geopolitical unrest. Second, the results imply that the gap between Islamic and conventional financial investment is diminishing; in other words, they are converging. That is, investing in shariah-compliant assets has no significant beneficial or detrimental impact on investors' wealth over investing in conventional assets (e.g., Delle Foglie & Panetta, 2020; Girard & Hassan, 2008; Krasicka & Nowak, 2012).

6. Robustness check

6.1. Wald test

To test the robustness of our results, we employ a Wald test to control for the quantile slopes, and the Wald test results are listed in Tables 5 and 6.

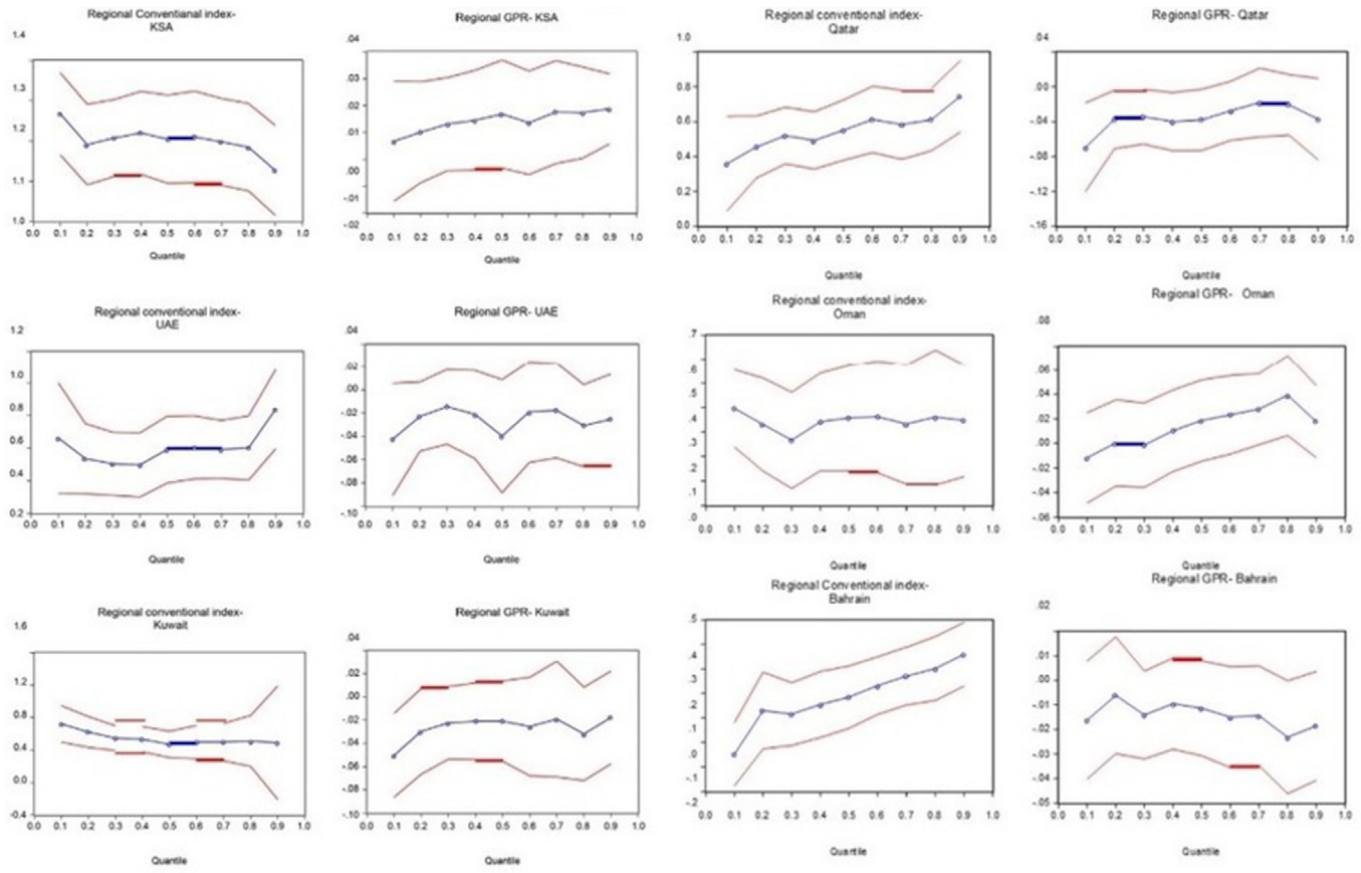

Fig. 2. Quantile regression coefficients for the GCC MSCI index returns, and regional GPR. *Note*: The blue curves show the quantile regression estimates of the regression parameters across the quantiles ranging from 0.05 to 0.95, while the red curves depict the 95% confidence intervals for the quantile regression estimates. Vertical axes measure the coefficient estimates of the explanatory variable, while horizontal axes measure the quantiles of the dependent variable.

Table 5
Wald test results (MSCI GCC Islamic).

Country	0.1 Quantile							
	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
KSA	−0.0074	−0.0400	−0.0720	0.1146	0.0838	0.0148	−0.0544	−0.0295
	(0.8808)	(0.8208)	(0.6798)	(0.5190)	(0.6275)	(0.9176)	(0.6919)	(0.8276)
UAE	−0.0253	0.1259	0.0677	0.0089	−0.0079	0.0576	−0.0506	−0.1720
	(0.5453)	(0.2376)	(0.4484)	(0.8966)	(0.9117)	(0.5715)	(0.7669)	(0.5901)
Kuwait	0.0142	0.0449	0.1370*	0.0877	0.0195	−0.0199	0.0113	0.0357
	(0.6971)	(0.6929)	(0.0187)	(0.3755)	(0.8124)	(0.8117)	(0.9065)	(0.8242)
Qatar	−0.1754	−0.1879	0.0401	−0.0619	0.0230	−0.0269	0.0282	−0.0222
	(0.1611)	(0.2937)	(0.7457)	(0.5707)	(0.8335)	(0.8275)	(0.8241)	(0.8670)
Bahrain	−4.4E16	0.2649*	−0.01771	−0.0824	−0.0638	0.0908	0.1038	−0.4160*
	(1.000)	(0.0879)	(0.8987)	(0.5401)	(0.6458)	(0.5446)	(0.5987)	(0.0990)
Oman	−2.7E17	−0.0984	−0.0310	0.0174	0.0252	0.1249	0.0491	0.1732
	(1.000)	(0.2141)	(0.6058)	(0.7938)	(0.8236)	(0.3388)	(0.7299)	(0.2286)
0.5 Quantile								
	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9
KSA	−0.0400	−0.0720	0.1146	−0.0256	0.1095	0.0148	−0.0544	−0.0295
	(0.8208)	(0.6798)	(0.5190)	(0.8417)	(0.4084)	(0.9176)	(0.6919)	(0.8276)
UAE	0.1259	0.0677	0.0089	0.0150	−0.0230	0.0576	−0.0506	−0.1720
	(0.2376)	(0.4484)	(0.8966)	(0.7514)	(0.6684)	(0.5715)	(0.7669)	(0.5901)
Kuwait	0.0449	0.1370 *	0.0877	0.0680	−0.0485	−0.0199	0.0113	0.0357
	(0.6929)	(0.0187)	(0.3755)	(0.2687)	(0.4089)	(0.8117)	(0.9065)	(0.8242)
Qatar	−0.1879	0.0401	−0.0619	−0.0208	0.0438	−0.0269	0.0282	−0.0222
	(0.2937)	(0.7457)	(0.5707)	(0.7822)	(0.5930)	(0.8275)	(0.8241)	(0.8670)
Bahrain	0.2649*	−0.0177	−0.08241	−0.0779	0.0141	0.0908	0.1038	−0.4160*
	(0.0879)	(0.8987)	(0.5401)	(0.4580)	(0.8933)	(0.5446)	(0.5987)	(0.0990)
Oman	−0.0984	−0.0310	0.0174	0.0704	−0.0451	0.1249	0.0491	0.1732
	(0.2141)	(0.6058)	(0.7938)	(0.4525)	(0.5676)	(0.3388)	(0.7299)	(0.2286)

Note: ***, **, and * significant at 1%, 5%, and 10%, respectively.

Table 5 reports the results of the Wald test for quantile slopes at the 0.1 and 0.5 quantiles: the null hypothesis stipulates the identicality of the quantile slope coefficients. The Wald test results at the 0.1 quantile level reject the null hypothesis for Bahrain at Q2 and Q9 and Kuwait. In addition, the results at the 0.5 quantile level are similar and suggest that the impact of MSCI GCC Islamic returns varies across different quantiles; this means that the regional Islamic stock market returns have heterogeneous effects on the stock markets in Kuwait and Bahrain.

Table 6 reports the Wald test results at the 0.1 quantile level, indicating the rejection of the null hypothesis in the UAE, Saudi Arabia, and Bahrain. In addition, the results at the 0.5 quantile level show that the null hypothesis is rejected at lower and higher quantiles in Saudi Arabia, at lower quantiles in the UAE, higher quantiles in Bahrain, and normal quantiles in Qatar. These results indicate that the impact of the MSCI GCC index varies across different quantiles; it has a heterogeneous effect on the local conventional stock markets in Saudi Arabia, the UAE, Qatar, and Bahrain.[4]

The results for the Islamic and conventional indexes show that estimated coefficients are not constant. Thus, changes in the structure of dependence with respect to the coefficients are not constant.

6.2. A different proxy for regional markets

To check the robustness of our results, we change our independent variable in Equations (1) (Islamic markets) and (2) (conventional markets) using the GCC Dow Jones Islamic and conventional indexes, instead of the GCC MSCI Islamic and conventional indexes, which depict the regional market returns of the GCC stock markets, excluding the period from 2011 to 2013, during which some countries in the Middle East experienced major political changes, which might have had a significant impact on GCC stock market performance. So we re-estimate both equations, and the results are reported in Tables 7 and 8.

Table 7 lists the results for the dependence structure across quantiles in Islamic indexes, which slightly differ from those in Table 3. A comparison of the results in the two tables reveals that the significance levels of regional factors—regional stock markets and regional GPR as well as the coefficients—are lower in Table 7 than in Table 3.

For Saudi Arabia, the regional market index result in Table 7 is similar to that in Table 3, with a stronger impact in bearish and normal markets, but regional GPR has no impact. For the UAE, the impacts of the regional stock market index and regional GPR are similar to those in Table 3, but the

[4] To conserve space, we only present the results at quantiles 0.1 and 0.5. All the results of the Wald test are available upon request from the corresponding author.

Table 6
Wald Test Results (MSCI GCC conventional).

Country	0.1 quantile							
	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
KSA	0.0083	0.3356***	0.2157*	0.0119	−0.0016	−0.1340*	−0.2183**	−0.0346
	(0.8304)	(0.0036)	(0.0958)	(0.6090)	(0.9436)	(0.0846)	(0.0108)	(0.7126)
UAE	−0.0028	0.0213	0.0208	−0.1292*	−0.0238	0.0437	−0.0937	−0.1104
	(0.9437)	(0.8208)	(0.7716)	(0.0696)	(0.7375)	(0.4764)	(0.1437)	(0.2401)
Kuwait	0.0192	0.0079	0.0434	0.0176	0.0221	−0.0188	0.0764	−0.1532
	(0.5705)	(0.9183)	(0.4231)	(0.7155)	(0.6576)	(0.7853)	(0.4509)	(0.2925)
Qatar	0.1676	−0.0665	−0.0490	−0.0343	−0.0537	0.0609	0.0288	−0.1074
	(0.2028)	(0.6954)	(0.5368)	(0.5830)	(0.3590)	(0.3870)	(0.7151)	(0.3379)
Bahrain	−0.0324	−0.1103	−0.03639	−0.0192	−0.0282	−0.0751**	−0.0151	−0.0754
	(0.3410)	(0.1262)	(0.4038)	(0.6294)	(0.4600)	(0.0480)	(0.7207)	(0.1681)
Oman	−0.0007	0.1201	0.0189	−0.1101	0.0092	0.0540	0.0148	−0.0766
	(0.9771)	(0.1159)	(0.7917)	(0.1157)	(0.8953)	(0.5040)	(0.8707)	(0.4984)
0.5 Quantile								
	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9
KSA	0.3356***	0.2157*	0.0119	0.0009	−0.0025	−0.1340*	−0.2183**	−0.0346
	(0.0036)	(0.0958)	(0.6090)	(0.9561)	(0.8788)	(0.0846)	(0.0108)	(0.7126)
UAE	0.0213	0.0208	−0.1292*	0.0122	−0.0360	0.0437	−0.0937	−0.1104
	(0.8208)	(0.7716)	(0.0696)	(0.8158)	(0.4511)	(0.4764)	(0.1437)	(0.2401)
Kuwait	0.0079	0.0434	0.0176	−0.0065	0.0286	−0.0188	0.0764	−0.1532
	(0.9183)	(0.4231)	(0.7155)	(0.8507)	(0.4370)	(0.7853)	(0.4509)	(0.2925)
Qatar	−0.0665	−0.0490	−0.0343	−0.0830*	0.0293	0.0609	0.0283	−0.1074
	(0.6954)	(0.5368)	(0.5830)	(0.0622)	(0.5109)	(0.3870)	(0.7151)	(0.3379)
Bahrain	−0.1103	−0.0363	−0.01928	0.0155	−0.0438	−0.0751**	−0.0151	−0.0754
	(0.1262)	(0.4038)	(0.6294)	(0.5859)	(0.1023)	(0.0480)	(0.7207)	(0.1681)
Oman	0.1201	0.0189	−0.1101	−0.0154	0.0246	0.0540	0.0148	−0.0766
	(0.1159)	(0.7917)	(0.1157)	(0.7600)	(0.6353)	(0.5040)	(0.8707)	(0.4984)

Note: ***, **, and * significant at 1%, 5%, and 10%, respectively.

coefficients of both variables are lower. In Kuwait, the significance of the regional market index is almost the same, but the coefficient is lower than in Table 3. In addition, the regional GPR index has almost the same impact. In Qatar, the regional stock market index is still significant across different quantiles, however, the coefficient is lower. Also, the regional GPR is still significant across different quantiles, with lower coefficients. In Bahrain, the regional market has a significant impact across all quantiles, whereas in Table 3 this is the case only at three quantiles. GPR is negatively significant during bearish markets, and its impact is stronger, as indicated by the higher coefficients. In Oman, the regional index has almost the same impact—significant only during bearish markets—but the coefficient is slightly lower than in Table 3. The regional GPR is not significant.

In Saudi Arabia, the regional market index is significant only at the lowest quantiles (Q1, Q2) with a stronger effect than in Table 4, and the regional GPR has no impact. In the UAE, the regional stock index coefficients are significant at fewer quantiles than in Table 4. The regional GPR is significant at higher quantiles, which is the opposite of the results in Table 4. In Kuwait, the coefficient of the regional market index is significant yet lower than in Table 4. The regional GPR index is significant across all quantiles, whereas in Table 4 it is significant only at lower quantiles. In Qatar, the coefficients of the regional stock index are significant and lower than in Table 4. Moreover, regional GPR is significant only at lower quantiles with smaller coefficients. In Bahrain, the regional market index is significant only in bullish market, but in Table 4 the index is significant almost across all quantiles, whereas the regional GPR is mostly significant across bullish markets, with the same coefficient. In Oman, the regional index is significant only at lower quantiles, whereas in Table 4 the index is significant across almost all quantiles. Moreover, the regional GPR is not significant, but in Table 4 the regional GPR is significant at upper quantiles.

Overall, the links between the GCC's the Islamic/conventional local indexes and regional factors remain, but the level of significance and the coefficients are lower than those for the full sample in 2011–2021 using the MSCI GCC market indexes. However, we can clearly see that regional GPR has a very weak link to the GCC's local conventional market performance. This indicates that the period of political instability in 2011–2013 had an impact on GCC conventional stock markets. We conclude that the results are almost the same, with minor differences that might be induced by particular events during a certain period. Hence, these results illustrate the robustness of our results.

Table 7
The impact of regional factors on Islamic stock indexes return.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
KSA									
C	−0.0632***	−0.0340**	−0.0139	0.0070	0.0087	0.0155**	0.0219***	0.0331***	0.0433***
	(0.0023)	(0.0157)	(0.3437)	(0.3590)	(0.2404)	(0.0232)	(0.0005)	(0.0000)	(0.0000)
β_1	0.0034	0.0030	0.0005	−0.0030	0.0003	0.0003	0.0005	0.0009	0.0003
	(0.5190)	(0.4989)	(0.9170)	(0.3540)	(0.9010)	(0.8752)	(0.7858)	(0.6255)	(0.8685)
β_2	12.662	2.1022	−0.0886	6.0981	10.875	12.870	15.938	22.294***	25.6310***
	(0.4513)	(0.7762)	(0.9909)	(0.6038)	(0.4471)	(0.3370)	(0.1696)	(0.0176)	(0.0013)
β_3	1.0879***	0.7875***	0.7538***	0.6462***	0.5150***	0.5151***	0.4340***	0.3863***	0.4581***
	(0.0007)	(0.0000)	(0.0000)	(0.0005)	(0.0051)	(0.0023)	(0.0007)	(0.0007)	(0.0000)
β_4	−0.0187	−0.0119	−0.0057	−0.0204	−0.0154	−0.0027	−0.0010	−0.0141	−0.0151
	(0.3615)	(0.5229)	(0.7933)	(0.3153)	(0.4437)	(0.8930)	(0.9553)	(0.4856)	(0.4835)
UAE									
C	−0.0350***	−0.0189***	−0.0110***	−0.0066	0.0025	0.0095**	0.0143***	0.0219***	0.0374***
	(0.0001)	(0.0000)	(0.0084)	(0.1069)	(0.5220)	(0.0196)	(0.0003)	(0.0000)	(0.0000)
β_1	−0.0023	0.0010	0.0013	0.0012	0.0040*	0.0058***	0.0068***	0.0069****	0.0095***
	(0.4453)	(0.6146)	(0.5073)	(0.5724)	(0.0518)	(0.0037)	(0.0001)	(0.0000)	(0.0070)
β_2	−45.260	−64.356	−54.290	−59.381	−59.339	25.287	23.368	116.6941	7.3450
	(0.7014)	(0.1128)	(0.2827)	(0.3187)	(0.7069)	(0.7914)	(0.8113)	(0.1096)	(0.9723)
β_3'	0.7081**	0.5089****	0.5474****	0.5218***	0.3909***	0.4431***	0.5033****	0.4745***	0.5056***
	(0.0107)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0000)	(0.0000)	(0.0000)	(0.0087)
β_4	−0.0397**	−0.0189***	−0.0210	−0.0201	−0.0288	−0.0241	−0.0306*	−0.0199	−0.0173
	(0.0108)	(0.0000)	(0.1790)	(0.2098)	(0.1013)	(0.1585)	(0.0586)	(0.1901)	(0.4098)
Kuwait									
C	−0.0497***	−0.0237***	−0.0139	−0.0047	0.0081	0.0208**	0.0223**	0.0309**	0.0508***
	(0.0001)	(0.0068)	(0.1054)	(0.6194)	(0.3275)	(0.0183)	(0.0115)	(0.0203)	(0.0047)
β_1	0.0551	−0.0141	−0.0068	0.0036	−0.0338	−0.0625	−0.0194	0.0048	−0.0475
	(0.3847)	(0.7750)	(0.8926)	(0.9495)	(0.5061)	(0.2366)	(0.7347)	(0.9656)	(0.7106)
β_2	−5.1185***	−4.7233**	−4.0611**	−3.1798*	−3.5539**	−2.2502	−0.5633	−1.2731	−0.3947
	(0.0000)	(0.0174)	(0.0174)	(0.0620)	(0.0158)	(0.1409)	(0.6534)	(0.2700)	(0.6890)
β_3'	0.3563*	0.3695**	0.2622*	0.1425	0.1884	0.1447	0.0725	0.1887	0.0967
	(0.0799)	(0.0142)	(0.0679)	(0.3303)	(0.1615)	(0.2999)	(0.4478)	(0.1477)	(0.3739)
β_4	−0.0445***	−0.0249	−0.0287	−0.0388	−0.0139	−0.0279	−0.0264	−0.0486**	−0.0265
	(0.0082)	(0.2034)	(0.1873)	(0.1873)	(0.5686)	(0.2758)	(0.2058)	(0.0284)	(0.1483)
Qatar									
C	−0.0514***	−0.0349***	−0.0259***	−0.0096	−0.0003	0.0102	0.0212**	0.0401***	0.0801***
	(0.0000)	(0.0000)	(0.0001)	(0.1551)	(0.9575)	(0.1679)	(0.0112)	(0.0000)	(0.0000)
β_1	0.0027	0.0047	0.0074	0.0038	0.0063	0.0073	0.0107	0.0062	0.0015
	(0.5760)	(0.2444)	(0.0491)	(0.4143)	(0.2253)	(0.1606)	(0.0644)	(0.3242)	(0.8265)
β_2	−0.5661**	−0.4998	−0.4713	−0.9583	−1.0109	−1.0917	−0.1337	0.6732	−1.0662
	(0.0487)	(0.1497)	(0.2567)	(0.2933)	(0.2878)	(0.2714)	(0.8951)	(0.4788)	(0.9510)
β_3'	0.2787	0.3732	0.2736*	0.1934	0.2915*	0.3502**	0.4318**	0.4814***	0.1770
	(0.3148)	(0.1080)	(0.0992)	(0.1954)	(0.0744)	(0.0463)	(0.0131)	(0.0019)	(0.6587)
β_4	−0.0509*	−0.0580**	−0.0521**	−0.0466	−0.0505	−0.0765**	−0.0769**	−0.0700	−0.0776
	(0.0555)	(0.0229)	(0.0435)	(0.1067)	(0.1090)	(0.0172)	(0.0419)	(0.1663)	(0.2367)
Bahrain									
C	−0.0761***	−0.0508***	−0.0304***	−0.0208**	−0.0053	0.0063	0.0193***	0.0398***	0.0493***
	(0.0000)	(0.0001)	(0.0012)	(0.0261)	(0.5190)	(0.4093)	(0.0081)	(0.0000)	(0.0000)
β_1	0.0032	6.9E07	−0.0005	−0.0008	−0.0009	−0.0020	−0.0018	0.0010	0.0026
	(0.3803)	(0.9999)	(0.8835)	(0.8259)	(0.7865)	(0.4993)	(0.5473)	(0.7730)	(0.3899)
β_2	5.6601	15.151*	13.759*	9.6551	3.2142	11.653	10.474	0.9003	−3.7101
	(0.6190)	(0.0815)	(0.0874)	(0.2759)	(0.7619)	(0.2250)	(0.3049)	(0.9325)	(0.6455)
β_3'	0.9027***	0.5607**	0.4680**	0.4692**	0.5513**	0.6530***	0.7815***	0.7122***	0.7375***
	(0.0007)	(0.0227)	(0.0161)	(0.0210)	(0.0115)	(0.0049)	(0.0021)	(0.0090)	(0.0008)
β_4	−0.0487*	−0.0575**	−0.0504**	−0.0460*	−0.0265	−0.0231	−0.0461	−0.0273	−0.0444
	(0.0674)	(0.0208)	(0.0302)	(0.0617)	(0.3565)	(0.4687)	(0.1784)	(0.4491)	(0.2037)
Oman									
C	−0.0517***	−0.0360***	−0.0260***	−0.0201***	−0.0137**	−0.0052	−0.0018	0.0146	0.0296***
	(0.0000)	(0.0000)	(0.0001)	(0.0013)	(0.0165)	(0.3582)	(0.73859)	(0.1209)	(0.0087)
β_1	0.0066	0.0024	0.0051	0.0090	0.0097*	0.0098*	0.0104*	0.0088	0.0030
	(0.1729)	(0.6391)	(0.4107)	(0.1406)	(0.0751)	(0.0750)	(0.0582)	(0.2953)	(0.7282)
β_2	−22.083***	−15.967**	−5.3641	−6.4042	−3.5969	−1.1620	−0.0618	3.8107	3.4608
	(0.0005)	(0.0329)	(0.3158)	(0.2001)	(0.4433)	(0.8193)	(80.9914)	(0.4769)	(0.4605)

(*continued on next page*)

Table 7 (*continued*)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
β_3'	0.1965**	0.3035***	0.3543***	0.1778	0.1253	0.0609	0.0890	0.0037	−0.0052
	(0.0408)	(0.0022)	(0.0010)	(0.2175)	(0.3616)	(0.6336)	(0.4607)	(0.9708)	(0.9549)
β_4	−0.0038	−0.0146	−0.0202	−0.0195	−0.0171	−0.0184	−0.0080	−0.0176	−0.0071
	(0.7819)	(0.3695)	(0.2772)	(0.2593)	(0.2810)	(0.2187)	(0.57499)	(0.2358)	(0.7069)

Note: ***, **, and * significant at 1%, 5%, and 10%, respectively. β_1, β_2, β_3', and β_4 represent the exchange rate, inflation, regional Islamic Dow Jones index, and regional GPR, respectively.

Table 8
The impact of regional factors on conventional stock index returns.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
KSA									
C	−0.0634	−0.0473	−0.0230	−0.0101	0.0049	0.0159	0.0248	0.0485	0.0737
	(0.0000)	(0.0008)	(0.0648)	(0.3823)	(0.6646)	(0.1525)	(0.0227)	(0.0003)	(0.0000)
β_1	−0.0035	−0.0025	8.4E05	0.0028	0.0011	0.0004	0.0022	0.0016	0.0016
	(0.4742)	(0.6390)	(0.9867)	(0.4743)	(0.7591)	(0.8943)	(0.5222)	(0.6738)	(0.7112)
β_2	−37.156**	3.6876	1.1034	−0.9593	2.4164	6.6805	10.9027	21.4104	31.7201**
	(0.0288)	(0.9013)	(0.9362)	(0.9406)	(0.8664)	(0.7061)	(0.5309)	(0.1260)	(0.0148)
β_3'	0.8613***	0.7005***	0.2486	0.0781	0.1563	0.0890	0.1723	−0.0810	−0.2288
	(0.0000)	(0.0012)	(0.3456)	(0.6533)	(0.3524)	(0.5964)	(0.3126)	(0.6446)	(0.2013)
β_4	−0.0057	0.0086	−0.0080	−0.0283	−0.0212	−0.0221	−0.0073	−0.0047	0.0119
	(0.7809)	(0.7034)	(0.78309)	(0.3143)	(0.4571)	(0.4512)	(0.8386)	(0.9025)	(0.7762)
UAE									
C	−0.0374	−0.0215	−0.0121	−0.0075	0.0016	0.0109	0.0250	0.0306	0.0538
	(0.00009)	(0.0000)	(0.0093)	(0.1009)	(0.7462)	(0.0488)	(0.0002)	(0.0000)	(0.0000)
β_1	−0.0053	−0.0013	0.0005	0.0007	0.0029	0.0017	0.0033	0.0029	0.0015
	(0.1049)	(0.5880)	(0.8261)	(0.7519)	(0.2753)	(0.5242)	(0.1798)	(0.1822)	(0.6288)
β_2	−135.9688*	−98.8123	−90.5423	−82.054	9.2357	32.5275	100.7790	87.6251	158.993
	(0.0635)	(0.1012)	(0.1354)	(0.1868)	(0.9174)	(0.7506)	(0.3589)	(0.35539)	(0.1018)
β_3'	0.2237	0.2053	0.2671**	0.3054**	0.2802**	0.2694**	0.1698	0.1454	−0.0551
	(0.3494)	(0.1920)	(0.0462)	(0.0123)	(0.0172)	(0.0163)	(0.1566)	(0.1630)	(0.7491)
β_4	−0.0347	−0.0430	−0.0261	−0.0156	−0.0316	−0.0306	−0.0468*	−0.0452**	−0.0212
	(0.2656)	(0.1424)	(0.3201)	(0.5102)	(0.2202)	(0.2116)	(0.05360)	(0.0355)	(0.3966)
Kuwait									
C	−0.0515	−0.0337	−0.0103	−0.0022	0.0068	0.0212	0.0268	0.0366	0.0517
	(0.0008)	(0.0028)	(0.2349)	(0.7828)	(0.4270)	(0.0116)	(0.0029)	(0.0009)	(0.0040)
β_1	0.0571	0.0062	−0.0426	−0.0484	−0.0531	−0.0607	−0.0286	−0.0373	0.0158
	(0.4101)	(0.9174)	(80.4102)	(0.2893)	(0.2795)	(0.2077)	(0.6306)	(0.6420)	(0.9074)
β_2	−6.4137***	−5.7907***	−5.2290***	−4.3913***	−3.9743**	−1.8149	−2.2001*	−2.2583*	−1.9227
	(0.0000)	(0.0000)	(0.0001)	(0.0060)	(0.0391)	(0.1961)	(0.0927)	(0.0545)	(0.2156)
β_3'	0.3099	0.4580***	0.3658***	0.3111**	0.2761*	0.1208	0.0498	0.1128	0.0752
	(0.1264)	(0.0062)	(0.0059)	(0.0188)	(0.0595)	(0.2666)	(0.5908)	(0.1544)	(0.4452)
β_4	−0.0517***	−0.0453***	−0.0452**	−0.0460**	−0.0318	−0.0430**	−0.0374*	−0.0347*	−0.0017
	(0.0009)	(0.0018)	(0.0204)	(0.0414)	(0.1990)	(0.0483)	(0.0847)	(0.0851)	(0.9506)
Qatar									
C	−0.0557	−0.0367	−0.0214	−0.0120	−0.0046	0.0041	0.0279	0.0360	0.0584
	(0.0000)	(0.0000)	(0.0011)	(0.0737)	(0.5052)	(0.4634)	(0.0064)	(0.0028)	(0.0000)
β_1	0.0044	0.0100*	0.0068*	0.0051	0.0041	0.0078*	0.0008	0.0054	−0.0014
	(0.4880)	(0.0325)	(0.0559)	(0.2124)	(0.3742)	(0.0632)	(0.8978)	(0.5563)	(0.6912)
β_2	−0.2241	−0.7859	−0.1768	−0.0934	−0.2480	0.2054	0.0618	0.7638	1.0401
	(0.6317)	(0.3032)	(0.7187)	(0.8522)	(0.6672)	(0.6835)	(0.9913)	(0.4754)	(0.5140)
β_3'	0.2329	0.2823**	0.2248*	0.3072**	0.3294**	0.3588**	0.2368	0.2664*	0.2242
	(0.1465)	(0.0171)	(0.0935)	(0.0405)	(0.0237)	(0.0127)	(0.1309)	(0.0844)	(0.1241)
β_4	−0.0768	−0.0560	−0.0436	−0.0417	−0.0372	−0.0330	−0.0412	−0.0583	−0.0594
	(0.0036)	(0.0203)	(0.1202)	(0.1399)	(0.1911)	(0.2501)	(0.2975)	(0.1158)	(0.1241)
Bahrain									
C	−0.0226	−0.0147	−0.0072	−0.0034	0.0043	0.0096	0.0151	0.0244	0.0385
	(0.0000)	(0.0004)	(0.0801)	(0.4561)	(0.3362)	(0.0242)	(0.0003)	(0.0000)	(0.0000)
β_1	−0.0003	−0.0009	−0.0018	−0.0014	−0.0015	−0.0025	−0.0028*	−0.0023	−0.0029
	(0.8128)	(0.5462)	(0.3885)	(0.5545)	(0.4551)	(0.1627)	(0.0961)	(0.1267)	(0.2112)
β_2	−1.9466	0.0424	0.6286	4.0614	2.9077	2.3245	0.7342	−0.5849	−8.3173*
	(0.6802)	(0.9913)	(0.8674)	(0.3131)	(0.4310)	(0.5193)	(0.8415)	(0.8907)	(0.0952)

(*continued on next page*)

Table 8 (*continued*)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
β_3'	0.1961*	0.1371	0.0398	0.0711	0.1190	0.1361*	0.1702***	0.1649***	0.2320***
	(0.0634)	(0.1933)	(0.6743)	(0.5066)	(0.1568)	(0.0590)	(0.0066)	(0.0041)	(0.0024)
β_4	−0.0126	−0.0077	−0.0117	−0.0147	−0.0254*	−0.0347**	−0.0350***	−0.0265*	−0.0234
	(0.3207)	(0.4981)	(0.2901)	(0.2432)	(0.0837)	(0.0173)	(0.0075)	(0.0899)	(0.1490)
Oman									
C	−0.0404	−0.0298	−0.0224	−0.0085	−0.0025	0.0014	0.0092	0.0121	0.0236
	(0.0000)	(0.0000)	(0.0007)	(0.1474)	(0.6413)	(0.7746)	(0.0607)	(0.0067)	(0.0000)
β_1	−0.0053	−0.0011	−4.4E05	−0.0021	0.0001	0.0018	0.0038	0.0082**	0.0087*
	(0.3308)	(0.8350)	(0.9937)	(0.6933)	(0.9798)	(0.7055)	(0.3919)	(0.0471)	(0.0780)
β_2	−15.994*	−14.984*	−9.9165	−5.0182	−2.0177	−0.6901	−3.4307	−0.7965	−4.0072
	(0.0570)	(0.0623)	(0.1983)	(0.4033)	(0.6894)	(0.8822)	(0.4879)	(0.8626)	(0.4569)
β_3'	0.2881***	0.2044*	0.1899	0.0998	0.0867	0.0557	−0.0077	−0.0778	0.0367
	(0.0057)	(0.0598)	(0.1245)	(0.3671)	(0.4265)	(0.5874)	(0.9396)	(0.3758)	(0.7440)
β_4	−0.0152	−0.0047	0.0083	−0.0007	−0.0003	0.0036	0.0169	0.0158	0.0127
	(0.3863)	(0.7717)	(0.6389)	(0.9645)	(0.9813)	(0.8034)	(0.2423)	(0.2495)	(0.4669)

Note: ***, **, and * significant at 1%, 5%, and 10%, respectively. β_1, β_2, β_3', and β_4 represent the exchange rate, inflation, regional Islamic Dow Jones index, and regional GPR, respectively.

7. Conclusions and implications

This study investigates the impact of regional factors on Islamic and conventional stock returns in GCC countries. The quantile regression method is used to identify the effect of regional factors on GCC local Islamic and conventional stock market returns during bearish, normal, and bullish market conditions.

We find that the GCC's Islamic and conventional stock market indexes respond asymmetrically to changes in regional factors. Our results show that regional Islamic market stock returns have a significantly positive impact on Saudi Arabia, the UAE, Kuwait, and Qatar across almost all quantiles, with a stronger effect during bullish markets. Our findings reveal that the reaction of market returns to regional factors is heterogeneous across the conditional distribution of the GCC's stock returns. More specifically, the results demonstrate that variation in regional factors, with respect to the Islamic and conventional markets, have asymmetric effects on stock returns in the majority of GCC markets. Except in Qatar, the regional geopolitical risk negatively affects the GCC's Islamic stock returns during bearish markets. Conventional stock return results have the same negative effect, but only in extreme market states. We find that the regional Islamic index has positive impact on the regional stock market, across almost all quantiles, with a stronger effect during bullish markets, except in Bahrain and Oman. We observe the same impact of conventional markets on all the GCC countries, except Saudi Arabia. The responses by Islamic and conventional markets to changes in regional factors have nearly similar behavior. Our results indicate that portfolio diversification is not possible, as Islamic and conventional stock markets display comovement with the regional market in most countries. Overall, our results indicate that sharia screening does not have any specific benefits for investors interested in GCC markets.

Our results have useful implications for GCC policy makers and market authorities regarding stock market stability, development, and coordination of monetary policies during ongoing regional tensions. First, we recommend that investors pay attention to market's different and unexpected responses during different phases of stock market dynamics in short-term trading. This enables investors to trade, depending on the bullish/bearish state of a given GCC local market. Second, serious challenges in the GCC remain. The critical issue for policy makers is the development of policies that minimize political instability in order to mitigate the impact of geopolitical risk on GCC financial markets. Policy makers should increase cross-border coordination to minimize the potential drawbacks of financial integration, mainly the propagation of shocks induced by geopolitical tensions. Third, taking regional political risk into account enables investors to mitigate geopolitical uncertainty and structure their portfolios so as to maximize profit. Policy makers and investors should be aware of changing geopolitical situations, when the market is declining, as in the case of Islamic indexes, or when the market is at an extreme, as in the case of conventional indexes. Furthermore, GCC governments can minimize the damage from geopolitical risk by implementing efficient measures to protect the market. However, excessive regulation can shield the market from externalities only in the short term (Zhu et al., 2016). What is required for the GCC is less dependence on oil and more diversified economic activities to reduce the relative sensitivity of GCC markets to political turmoil, especially in large markets, such as Saudi Arabia, the UAE, and Kuwait. Sound national economic strategies can stymie long-term development of GCC economies. Finally, policy makers in the GCC region must support financial innovation to help boost the development of Islamic finance in both quality and quantity. This development needs to be collective and over the long term to ensure that Islamic financial instruments are inherently distinctive. Sharia-compliant assets should serve as a genuinely alternative investment that helps investors minimize their risk and boost real economic growth, rather than unstable growth based on financial investment. This might require monetary, fiscal, and financial reforms.

Availability of data and materials

The datasets used during the current study are available from the corresponding author on reasonable request.

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Authors' contributions

AE: Conceptualization, Writing – original draft.
SG: Conceptualization, Writing – original draft.
MG: Methodology, Writing – original draft.

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The authors declare that they have no competing interests.

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Amal Essayem is currently working as a researcher in ISEFAM center at Sakarya University, Sakarya, Turkey. She is a PhD Candidate at the same center. Her research focuses on Moral political economy and Islamic economics and finance.

Prof. Dr. Sakir Gormus is currently working as a Professor in the Department of Public Finance at Sakarya University, Sakarya, Turkey. He received his Ph.D. degree from Oklahoma State University, USA in 2004. His research focuses on Financial Crises, Political Economy and Islamic economics and finance. His papers have been published in economic Journals.

Dr. Murat Guven is currently working as an Assistant Professor in the Department of Statistics at Sakarya University, Sakarya, Turkey. He received his Ph.D. degree from Istanbul Technical University, Istanbul, Turkey in 2018. His research focuses on panel data econometrics and time series econometrics. His works have been published in economic journals.