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Article

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Borsa İstanbul Review

Provided in Cooperation with:

Borsa İstanbul Anonim Şirketi, İstanbul

Suggested Citation: Aslam, Adnan; Newaz, Mohammad Khaleq (2025) : Shielding against oil shocks: Contagion dynamics in Islamic versus conventional markets, Borsa İstanbul Review, ISSN 2214-8469, Elsevier, Amsterdam, Vol. 25, Iss. 6, pp. 1682-1695, <https://doi.org/10.1016/j.bir.2025.10.021>

This Version is available at:

<https://hdl.handle.net/10419/340660>

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Shielding against oil shocks: Contagion dynamics in Islamic versus conventional markets

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ARTICLE INFO

JEL classification:

JEL: C58

G01

G11

G12

G15

Keywords:

Contagion

Islamic stock market

Conventional stock market

Oil shocks

Portfolio diversification

ABSTRACT

This paper empirically examines the decoupling hypothesis by assessing the asymmetric transmissions and contagion effects of oil price shocks on Islamic and conventional stock indices in major oil-importing and -exporting countries. Using the Asymmetric Dynamic Conditional Correlation GARCH (ADCC-GARCH) model, we analysed the dynamic relationships between oil price shocks and stock indices during three critical periods: the Global Financial Crisis (GFC, 2007–2009), the European Sovereign Debt Crisis (ESDC, 2010–2012), and the Oil Price Plunge (OPP, 2014–2016). Our findings indicate that oil-importing and -exporting countries mostly demonstrate insignificant asymmetric responses, suggesting that Islamic and conventional indices are not excessively affected by negative oil shocks. The contagion analysis reveals that oil price shocks predominantly exhibited contagion effects in Islamic and conventional stock indices during the GFC. However, Islamic stock indices in countries such as Japan, Korea, Saudi Arabia, the UAE, Norway, Oman, and Brazil were less affected by these shocks compared with their conventional counterparts. Notably, Islamic indices in Korea, Italy, Saudi Arabia, and Qatar during the ESDC, as well as in the USA, India, Korea, and Germany during the OPP, demonstrated strong resilience to oil price shocks, lending support to the decoupling hypothesis. Portfolio analysis further shows that incorporating Islamic indices into conventional portfolios enhances risk-adjusted returns and hedging effectiveness, with performance improving as the allocation to Islamic indices increases. These findings hold significant implications for investors, portfolio managers, policymakers, and market participants.

1. Introduction

Financial market contagion has gained significant attention from researchers, investors, policymakers, and economists, particularly during major global crises such as the Global Financial Crisis (GFC, 2007–2009), the European Sovereign Debt Crisis (ESDC, 2010–2012), and the Oil Price Plunge (OPP, 2014–2016). Contagion refers to the phenomenon of financial shocks in one country or market being transmitted to other countries or markets, often amplifying volatility and leading to co-movements across seemingly unrelated markets (Forbes & Rigobon, 2002). For example, a crisis in one region's equity market may trigger declines in other equity markets through investor panic, portfolio rebalancing, or trade and financial linkages. Understanding the mechanisms and asymmetries of such contagion effects is essential for developing effective risk management strategies and for safeguarding financial stability in an increasingly interconnected global economy.

While some crises may originate in specific regions or sectors, their widespread repercussions highlight the systemic vulnerabilities of the global financial system.

The fluctuating co-movement across markets during crisis periods provides clear evidence of financial contagion (Dewandaru et al., 2016). The GFC stemmed from the subprime credit crisis in the US, which rapidly spread globally, causing a sharp decline in stock values tied to the US real estate market and significant damage to financial institutions worldwide. In response, the US Federal Reserve implemented a series of Quantitative Easing (QE) programmes aimed at promoting economic recovery and financial stability. The effectiveness of these unconventional policies, particularly in terms of their impact on stock markets and financial contagion, has been widely debated (Joyce et al., 2012; Petmezas & Santamaria, 2014). Similarly, contagion was evident in the ESDC which was triggered by Greece's debt repayment struggles and significant deficits within several Eurozone countries. The OPP of 2014

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<https://doi.org/10.1016/j.bir.2025.10.021>

Received 16 May 2025; Received in revised form 6 September 2025; Accepted 24 October 2025

Available online 25 October 2025

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was caused by a dramatic drop in oil prices, falling below \$50 per barrel due to shifts in OPEC policy, reduced geopolitical risks, and a strengthening US dollar. This dramatic drop had far-reaching effects on the economic stability of both oil-importing and -exporting countries (Hamilton, 2014; Kilian & Murphy, 2014).

The literature showcases financial contagion during major crises like the GFC, ESDC, and OPP, where financial shocks rapidly spread globally, reducing diversification opportunities in stock markets.¹ However, Islamic stock markets offer a viable alternative, with less significant impacts from global crises compared to conventional markets, making them attractive for investors (Jawadi et al., 2014). For example, the GFC drove the 17 % annual rate of growth of the Islamic financial industry from 2009 to 2013, and it reached \$4 trillion in 2022.² This growth is attributed to Islamic finance's adherence to Sharia law, which prohibits interest-based financing and promotes risk-sharing (Siddiqui, 2008). Likewise, Islamic indices, recognised for their ethical practices, gained global attention, leading to the development of the decoupling hypothesis, which suggests that Islamic stocks are weakly linked to their conventional counterparts (Ibrahim, 2015). The decoupling hypothesis posits that due to the unique structural and ethical foundations of Islamic equity markets, they may respond differently to external shocks such as oil price volatility, thereby showing less vulnerability or correlation compared to conventional markets during periods of financial stress (Kenourgios et al., 2016). Empirical validation of this hypothesis could demonstrate that Islamic stocks act as a buffer against financial crises, offering valuable implications for investors and portfolio managers.

The decoupling hypothesis has gained significant attention in recent years. Numerous studies have explored this hypothesis in various contexts, such as comparisons between Islamic and conventional markets in developed and emerging economies (Ali et al., 2018; Dewandaru et al., 2014; Naeem et al., 2024; Shahzad et al., 2017), across regions like the GCC, BRICS, and G7 (Arif et al., 2022; Aun et al., 2015; Bossman et al., 2022; Hassan et al., 2018; Hoque et al., 2016; Mezghani & Boujelbene, 2018; Tuna et al., 2021), and in other asset classes, such as gold, oil, cryptocurrencies, and precious metals (Ali, Khattak, et al., 2023; Godil et al., 2020; Kang et al., 2023; Khan et al., 2023; Mensi et al., 2019; Mishra et al., 2019; Shahzad et al., 2018). While some studies support the hypothesis, suggesting that Islamic markets are more resilient during financial crises (Al-Yahyaee et al., 2020; Ali, Khattak, et al., 2023; Chazi et al., 2023; Foglie & Panetta, 2020; Kenourgios et al., 2016; Rahman et al., 2021; Usman et al., 2018), the evidence remains inconclusive. Notably, there is a lack of research examining this relationship in the context of major oil-importing and oil-exporting countries. By analysing contagion between oil-importing and oil-exporting Islamic and conventional stock indices during major crises, we aim to help investors better assess risks and develop strategies to protect their portfolios from systemic shocks and market downturns.

This gap in the research is crucial due to the significant impact these countries have on global economic stability and financial markets (Wang et al., 2013). Oil-exporting countries, dependent on oil revenues, are vulnerable to price fluctuations, leading to economic instability and contagion. In contrast, oil-importing countries face inflation and higher costs when oil prices rise, affecting their economic stability (Nasir et al., 2020). The effects of oil price shocks vary between oil-exporting and oil-importing countries, as well as between their respective Islamic and conventional stocks. Islamic financial markets located in oil-rich regions (Lin & Su, 2020) adhere to Sharia principles and therefore avoid speculative sectors, which may enhance their resilience against oil price

volatility. This resilience allows Islamic stocks to perform more steadily than conventional indices, which are more exposed to affected sectors. Understanding contagion in this context is essential, especially amid economic instability and the shift to alternative energy sources. As such, this research is crucial for policymakers seeking to mitigate financial risks and for investors aiming to improve portfolio diversification and resilience against oil price shocks.

Oil price shocks are inherently asymmetric in nature (Herrera et al., 2019; Rahman & Serletis, 2011). Stock markets often react more strongly to negative shocks than to positive ones, due to heightened investor uncertainty, reduced corporate profitability, and fears of broader economic slowdown (Kilian & Park, 2009; Ratti & Vespignani, 2016). These asymmetries can generate disproportionate spillover effects (Zhang et al., 2023), particularly in energy-dependent economies (Balcilar et al., 2021) where declining oil prices may trigger fiscal imbalances in exporting countries or stimulate inflationary pressures in importing nations. Moreover, the asymmetric responses may differ between Islamic and conventional markets due to variations in sectoral exposure, risk-sharing mechanisms, and compliance with ethical investment principles. Understanding the directional impact of oil price changes is therefore crucial for accurately assessing systemic risk, enhancing crisis preparedness, and informing both monetary and investment strategies.

We compare the contagion effects on Islamic and conventional stock markets in response to oil price shocks in major oil-importing and -exporting countries. Using daily data from 2007 to 2020, we employ the ADCC-GARCH model (Cappiello et al., 2006) to capture asymmetries and to assess whether Islamic equity markets exhibit greater resilience to oil-induced financial contagion compared to conventional counterparts across major crisis periods. Our findings reveal that oil-importing and -exporting countries generally exhibit insignificant asymmetric responses, indicating that Islamic and conventional indices are not disproportionately affected by negative oil shocks. Moreover, the contagion effects vary across countries: during the GFC, most oil-importing and -exporting nations exhibited contagion, but Islamic stocks in Japan, Korea, Saudi Arabia, the UAE, Norway, Oman, and Brazil showed greater resilience. No significant contagion was observed during the ESDC and OPP periods, with Islamic indices in Korea, Italy, Saudi Arabia, and Qatar (ESDC) and the US, India, Korea, and Germany (OPP) remaining less affected than their conventional counterparts. These results support the decoupling hypothesis, suggesting that Islamic indices provide diversification benefits during crises.

Finally, our portfolio diversification results show higher Sharpe ratios and improved hedging effectiveness, demonstrating that integrating an equal allocation of Islamic indices into conventional portfolios significantly reduces risk and enhances performance. Furthermore, our sensitivity analysis reveals that increasing the allocation to Islamic equities from 25 % up to 75 %, consistently improves portfolio performance, delivering stronger risk-adjusted returns and greater hedging capabilities across both oil-importing and -exporting countries. These findings underscore the role of Islamic stocks in strengthening portfolio resilience and investment strategies.

Our research contributes to the ongoing debate on the decoupling hypothesis of Islamic equities in four keyways. First, we present an analysis of the contagion effects of oil price shocks on Islamic and conventional indices from the perspective of major oil-importing and oil-exporting countries. Knowing how financial contagion affects these markets is vital, given the significant role of oil price fluctuations in shaping market behaviour. This knowledge is crucial for policymakers when making informed decisions and for investors seeking effective diversification strategies, particularly during periods of economic instability. Second, our research examines three major crisis periods (GFC, ESDC, OPP) and includes the impact of quantitative easing measures. These periods had profound effects on global financial markets, and incorporating unconventional monetary policies strengthens the robustness of our analysis. This addition enhances the credibility of our

¹ Studies focus on GFC, ESDC and OPP (Bagchi, 2017; Beirne & Fratzscher, 2013; Glover & Richards-Shubik, 2014; Gunay et al., 2022; Mensi, 2019; Missio & Watzka, 2011; Niyitegeka & Zhou, 2023; Yiu et al., 2010; Yuan et al., 2023):

² Islamic Finance Development Report 2022, <https://www.refinitiv.com/en/resources/special-report/islamic-finance-development-report-2022>.

findings, offering valuable insights for both policymakers and investors by assessing market responses under different types of crisis conditions.

Third, we investigate the asymmetric responses of Islamic and conventional indices to oil price shocks. By utilising the ADCC-GARCH model, we evaluate whether negative oil price shocks have a greater impact than positive shocks. This analysis helps to distinguish the resilience and vulnerabilities of these markets under varying magnitudes and directions of oil price fluctuations, providing crucial insights for optimising risk management and investment strategies. Finally, we assess the benefits of combining Islamic indices with conventional portfolios in oil-importing and -exporting countries. This analysis offers practical guidance for investors and portfolio managers, highlighting how Islamic finance principles can contribute to more resilient and efficient investment strategies across global financial markets.

The remainder of the paper is structured as follows: Section 2 explains the methodology, Section 3 presents data and statistics, Section 4 discusses empirical results, Section 5 explores portfolio diversification, and Section 6 provides the conclusion and practical implications.

2. Model specification

We employed a bivariate Asymmetric Dynamic Conditional Correlation (ADCC) GARCH model proposed by [Cappiello et al. \(2006\)](#) to explore asymmetries and examine the contagion effects between oil price returns and Islamic and conventional stock indices. This model is ideally suited to our research as it flexibly estimates time-varying correlations and asymmetric responses, recognising that negative shocks often have stronger effects on market volatility ([Cappiello et al., 2006](#)). Moreover, the model has been widely used in the financial econometrics literature to analyse volatility spillovers and dynamic correlations across markets ([Shahzad et al., 2017](#)). However, given the significant monetary interventions during crisis periods, we enhance the model by incorporating dummy variables for QE programmes and crisis phases ([Petmezas & Santamaria, 2014](#)). These additions enable us to isolate and control for policy-driven influences and structural shifts in market behaviour, providing a comprehensive and contextually relevant analysis of contagion dynamics. As such, the ADCC-GARCH model combined with QE and crisis dummies offers a robust and comprehensive framework well-aligned with the aims of this study.

First, we estimate the autoregressive AR (1) model based on the information set I_{t-1} as follows:

$$r_t = \mu + ar_{t-1} + \varepsilon_t \quad (1)$$

Where r_t represents the return on either the oil returns or the Islamic (or conventional) stock returns at time t , μ is the mean returns, a is the autoregressive coefficient, and ε_t denotes the residuals. The residuals are assumed to follow a multivariate GARCH process with the conditional covariance matrix decomposed as:

$$H_t = D_t R_t D_t \quad (2)$$

Where H_t represents the $n \times n$ conditional covariance matrix, R_t denotes the conditional correlation matrix which is equal to $\text{diag}(q_{1,t}^{-1/2}, \dots, q_{n,t}^{-1/2}) Q_t \text{diag}(q_{1,t}^{-1/2}, \dots, q_{n,t}^{-1/2})$ and D_t is a diagonal matrix with time-varying standard deviations on the diagonals. To capture volatility clustering for both indices and oil returns, the GARCH (1,1) model expresses the components of H_t as:

$$h_{i,t} = \omega_i + \alpha_i \varepsilon_{i,t-1}^2 + \beta_i h_{i,t-1} \quad (3)$$

Where $h_{i,t}$ represents the conditional variance at time t for either the oil returns, or the stock index returns. To measure time-varying correlations, we utilise the Dynamic Conditional Correlation (DCC) model proposed by [Engle \(2002\)](#). The conditional correlation between Islamic (or conventional) stock indices and oil prices is calculated as:

$$\rho_{i,j,t} = q_{i,j,t} / \sqrt{q_{i,i,t} q_{j,j,t}} \quad (4)$$

Where $q_{i,j,t}$ denotes the time-varying covariance between oil and stock returns. Building on the DCC model, [Cappiello et al. \(2006\)](#) introduced an asymmetric term which was established by [Glosten et al. \(1993\)](#). Thus, the element of conditional covariance matrix H_t can be presented as follows:

$$h_{i,t} = \omega_i + \alpha_i \varepsilon_{i,t-1}^2 + \beta_i h_{i,t-1} + r_i \varepsilon_{i,t-1}^2 I(\varepsilon_{i,t-1}) \quad (5)$$

Where $I(\varepsilon_{i,t-1})$ is the asymmetric term which means that ‘negative’ news tends to increase volatility more than ‘positive’ news and takes the value 1 if $\varepsilon_{i,t-1} < 0$ and 0 otherwise. If so, Equation (5) can therefore be rewritten to allow for asymmetric impacts in conditional correlation as:

$$Q_t = (\bar{Q} - A\bar{Q}A - B\bar{Q}B - G\bar{N}G) + \hat{A}z_{t-1}\hat{z}_{t-1}A + \hat{B}Q_{t-1}B + \hat{G}z_{t-1}zG \quad (6)$$

Where A , B , and G are $n \times n$ parameter matrices and the ADCC is obtained once these matrices are replaced by the scalars α , β , and γ .

2.1. Quantitative easing and crisis periods adjustments

Given that global financial crises often lead to significant monetary interventions, we incorporate the effects of quantitative easing (QE) programmes in our model, aligning with [Petmezas and Santamaria \(2014\)](#). Central banks, including the Federal Reserve (Fed), European Central Bank (ECB), and Bank of England (BoE), implemented large-scale asset purchase programmes that influence stock market dynamics ([Gagnon et al., 2011](#); [Joyce et al., 2012](#)). Our dataset spans three major crises including the GFC, ESDC, and OPP, where QE played a crucial role in shaping financial market behaviour ([Mollah et al., 2016](#)). Therefore, to control for these external influences, we modify the AR(1) model by incorporating dummy variables that capture the impact of QE programmes and financial crises:

$$r_{i,j,t} = \mu + \pi_j \sum_{j=1,2,3} D_j + \psi_k \sum_{k=1,2,3} D_k + \varepsilon_t \quad (7)$$

Where D_j are dummy variables that capture the effects of QE programmes at different stages. The use of the term $j = 1, 2, 3$ allows for the isolation of the impacts of asset purchasing programmes on the stock markets during different stages. Furthermore, D_k are dummy variables representing the crisis periods and $k = 1, 2, 3$ represents dummies that correspond to the crisis periods such as GFC, ESDC and OPP, respectively.

2.2. Contagion test using Dynamic Conditional Correlation coefficient

Following [Forbes and Rigobon \(2002\)](#), we define contagion as a statistically significant increase in the correlation between Islamic (or conventional) stock returns and oil prices during crises compared to pre-crisis periods. Adopting the approach used by [Celik \(2012\)](#), we calculate the change in conditional correlation ($\Delta\rho$) between indices and oil returns as:

$$\Delta\rho = \left(\frac{\rho_{\text{pre-crisis}} - \rho_{\text{crisis}}}{\rho_{\text{pre-crisis}}} \right) \quad (8)$$

Where $\rho_{\text{pre-crisis}}$ is the conditional correlation between oil and stock (Islamic or conventional index) returns during a stable period and ρ_{crisis} is conditional correlation between oil and stock (Islamic or conventional index) returns during a turbulent phase. We obtain these conditional correlations from the ADCC-GARCH model (Equation (4)) and examine whether these correlations are statistically significant during periods of

crisis in comparison to pre-crisis periods in order to determine the presence of contagion. Thus, a notable rise in the conditional correlation ($\Delta\rho > 0$) combined with a t -test statistic exceeding the critical value indicates contagion (C). This combination signifies a heightened correlation during crises, indicating increased interdependence or spillover effects between these markets. In contrast, if ($\Delta\rho \leq 0$) and the t -test statistic is below the critical value, it indicates an absence of contagion (NC).

3. Data and summary statistics

Our dataset includes daily price data for Islamic and conventional indices of twenty countries that either import or export oil. We have chosen ten major oil-importing countries such as United States of America (USA), China (CHN), India (IND), South Korea (KOR), Japan (JPN), Netherlands (NLD), Germany (DEU), France (FRA), Spain (ESP), and Italy (ITA), while ten oil-exporting countries include Russia (RUS), Saudi Arabia (SAU), Kuwait (KWT), Canada (CAN), United Arab Emirates (UAE), Qatar (QAT), Norway (NOR), Oman (OMN), United Kingdom (GBR), and Brazil (BRA).³ These countries were selected based on the criteria recommended by Filis et al. (2011). They needed to have well-established Islamic and conventional stock markets, and they needed to be among the top ten oil importers and exporters. Additionally, a combination of developed, emerging, and frontier markets was taken into account. We also use the Brent crude oil index to measure oil price shocks, given that this index represents 60 % of the world's daily oil production (Maghyreh & Awartani, 2016). The Brent index is recognised as one of the world's foremost and most closely observed indices and although it is derived from the North Sea, it serves as a benchmark for oil in broader markets, including the Middle East, Europe, and Africa.⁴

The study covers the period from September 3, 2007 to January 31, 2020, comprising 3241 observations. Our sample period encompasses significant disruptions, including the 2008 GFC, the 2012 ESDC, and the 2014–2016 OPP. The timeframes of these crisis periods are determined based on existing literature and major news releases⁵ (see Appendix A). All data were gathered through the Bloomberg terminal. Figs. 1 and 2 show the natural log returns of oil-importing and oil-exporting Islamic and conventional indices over the sample period, highlighting significant fluctuations during major crisis periods.

Table 1 presents the preliminary data analysis of our datasets. The mean returns of Islamic and conventional indices for countries such as Qatar, Brazil, the USA, China, Japan, and Germany show near-zero values on average. This central tendency is indicative of a balanced equilibrium as well as market stability. Moreover, the standard deviation results demonstrate heterogeneity across oil importing and exporting countries' indices, signifying a greater degree of return dispersion from the mean. For example, Brazil exhibits higher volatility, suggesting the potential for increased returns but with elevated risk, while among oil importers, China and Korea display higher volatility, and the Netherlands shows lower volatility. Furthermore, both the ADF and PP unit root tests offer compelling evidence against the presence of a unit root in the series for oil-exporting and oil-importing countries, indicating that the data are stationary and suitable for further analysis.

³ Once the criteria are satisfied, the countries are selected as of 31/01/2020 from the CIA.gov website.

⁴ For details: <https://www.ice.com/brent-crude#:~:text=Brent%20is%20the%20price%20barometer,easily%20transported%20around%20the%20world.>

⁵ Official timelines of the crises are in line with the Bank of International Settlements and Federal Reserve Board of St. Louis from 2009. Also, see the related literature: Kilian and Murphy (2014), Hamilton (2014); Zhu et al. (2015); Mollah et al. (2016); Mezghani and Boujelbene (2018); and Hassan et al. (2020).

4. Empirical findings

4.1. Oil importing countries

Table 2 presents the full sample univariate GARCH and ADCC estimates for oil-importing economies. Both Islamic and conventional indices exhibit near-unity volatility persistence, indicating prolonged volatility clustering, a characteristic of crisis-driven markets (Dewandaru et al., 2016). For instance, the USA conventional index and its Islamic counterpart show near-identical persistence, highlighting systemic vulnerability to oil shocks regardless of Sharia compliance. This vulnerability aligns with prior evidence that oil-importing economies reliant on energy-intensive sectors face inherent volatility due to input cost fluctuations (Wang et al., 2013). Notably, South Korea's Islamic index and Japan's conventional index display lower persistence, suggesting structural resilience in markets with diversified industrial bases or technological export dominance. Moreover, the QE adjustments and crisis-period dummies are largely insignificant, emphasising the limited efficacy of unconventional monetary policies in mitigating oil shock transmissions. For example, USA QE interventions had no distinct stabilising effect, supporting the critiques of QE's uneven impact on equity markets (Joyce et al., 2012).

Similarly, crisis controls for the GFC, ESDC, and OPP show negligible influence, suggesting that structural factors such as energy dependency ratios and sectoral linkages dominate policy-driven adjustments during turmoil. Likewise, our findings illustrate that stock returns show an insignificant response to negative oil price shocks compared with positive shocks, except for the USA conventional index which has a significant value at the 1 % level. These results align with previous research by Kilian and Park (2009) which showed that oil price shocks had a notable impact on the USA stock market with negative oil price shocks having a more pronounced and enduring effect than positive shocks. However, the Islamic indices of Japan and the Netherlands show greater impact from positive shocks than negative shocks. This greater impact suggests that investors may benefit from including Islamic equities from Japan and the Netherlands in their portfolios as these assets appear to be more responsive to positive market movements.

We further examine the contagion dynamics and asymmetric responses of Islamic and conventional stock indices to oil price shocks in oil-importing countries during three major crisis periods (GFC, ESDC, and OPP). The results from the pre-GFC and GFC periods in Table 3 demonstrate that conventional indices generally exhibit stronger contagion effects compared to Islamic indices, particularly during the GFC. For instance, the USA conventional index shows a higher change in time-varying conditional correlation ($\Delta\rho$) of 7.356 compared to the Islamic counterpart (5.4648). A similar pattern is observed in China and Italy where indices are more sensitive to oil price shocks. This reduced impact on Islamic indices suggests that these indices may offer better resilience during such periods, supporting the decoupling hypothesis.

Islamic indices also appear less sensitive to negative oil price shocks, as reflected in the negative γ values for the USA and China with the USA Islamic index showing greater stability and a smaller negative impact. In some cases, Islamic indices show no contagion at all, unlike their conventional counterparts. For example, South Korea and Japan experienced significant contagion in conventional indices, while the Islamic indices remained unaffected. This lack of contagion reinforces the idea that Islamic indices may act as a buffer against global financial shocks, aligning with the decoupling hypothesis. These results are consistent with Kenourgios et al. (2016) and Shahzad et al. (2017) who highlighted differences in the behaviour of Islamic and conventional equities during the GFC. Our findings support the concept of diversification opportunities for investors as Islamic equities may act as a hedge against adverse market movements.

The results for the Pre-ESDC and ESDC periods highlight that, for most countries, $\Delta\rho$ remains minimal, suggesting no significant contagion during these periods. This lack of contagion challenges the decoupling

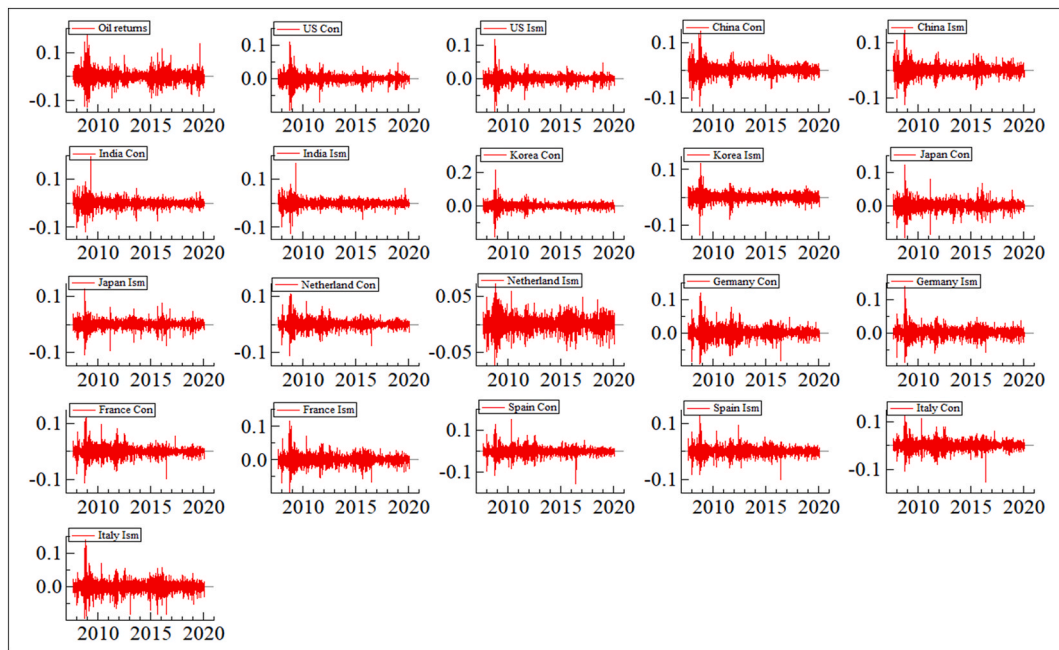


Fig. 1. Returns dynamics over time for oil-importing countries

Notes: This figure reports the time-varying returns variations of Islamic and conventional indices from oil-importing countries.

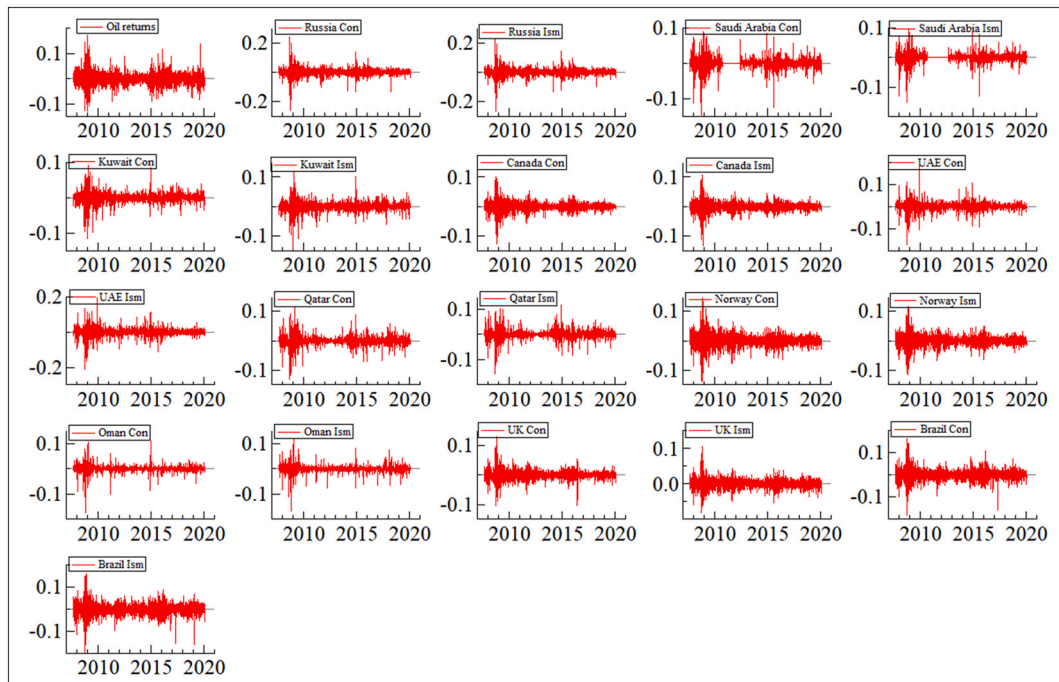


Fig. 2. Returns dynamics over time for oil-exporting countries

Notes: This figure reports the time-varying returns variations of Islamic and conventional indices from oil-exporting countries.

hypothesis, as both Islamic and conventional indices exhibit similar responses, with no notable divergence. Additionally, the γ values indicate no significant asymmetries between the two markets, implying that both Islamic and conventional indices display symmetrical responses to oil price shocks. Contrary to [Shakir and Masih \(2016\)](#), who highlighted the vulnerability of Islamic equities to external shocks during the ESDC, our findings suggest that neither market type experienced substantial contagion.

However, conventional indices in South Korea and Italy displayed

significant contagion, with notable increases in correlation between the Pre-ESDC and ESDC periods, indicating that oil price shocks were transmitted across these markets during the crisis. In contrast, Islamic indices for these countries remained stable with no significant change in correlation further supporting the idea that Islamic markets are less susceptible to external shocks and therefore reinforcing the decoupling hypothesis. These findings are consistent with [Hengchao et al. \(2021\)](#), who observed that Islamic stock markets were resilient to the USA shocks during the ESDC, while significant contagion occurred between

Table 1
Summary statistics for oil-importing and oil-exporting countries.

	Conventional Indices				Islamic Indices			
	Mean	Std. Dev	ADF	PP	Mean	Std. Dev	ADF	PP
Oil-Importing Countries								
USA	0.0001	0.0144	−37.7556***	−56.2841***	0.0001	0.0137	−57.2313***	−57.5641***
CHN	0.0000	0.0169	−55.1619***	−55.1373***	0.0000	0.0177	−55.0211***	−55.0211***
IND	0.0001	0.0162	−53.1711***	−53.1319***	0.0002	0.0137	−54.2963***	−54.2379***
KOR	0.0000	0.0173	−56.0063***	−56.0025***	0.0001	0.0134	−56.0038***	−56.2707***
JPN	0.0000	0.0134	−45.9927***	−67.6111***	0.0000	0.0143	−57.7472***	−57.9609***
NLD	0.0001	0.0145	−27.1284***	−56.9549***	0.0003	0.0125	−58.1931***	−58.1938***
DEU	0.0000	0.0154	−56.2113***	−56.2418***	0.0001	0.0135	−42.1647***	−56.2942***
FRA	0.0000	0.0157	−36.1854***	−57.723***	0.0000	0.0135	−36.2121***	−59.9856***
ESP	−0.0002	0.0177	−54.8615***	−54.8714***	0.0002	0.0145	−42.8153***	−58.5426***
ITA	−0.0003	0.0181	−57.608***	−57.6943***	−0.0002	0.0162	−60.2577***	−60.3064***
Oil-Exporting Countries								
RUS	−0.0001	0.0228	−52.1993***	−52.0049***	−0.0001	0.0231	−52.5296***	−52.3791***
SAU	0.0000	0.0129	−54.2062***	−54.433***	0.0000	0.0129	−37.2274***	−54.7144***
KWT	−0.0002	0.0121	−53.9162***	−54.069***	−0.0002	0.0137	−36.59***	−54.8208***
CAN	0.0000	0.0142	−26.3729***	−54.3875***	0.0000	0.014	−26.8441***	−60.0316***
UAE	−0.0001	0.0166	−35.6135***	−51.0628***	−0.0003	0.0201	−36.5541***	−55.0494***
QAT	0.0001	0.0136	−52.3439***	−52.4954***	0.0001	0.015	−36.1018***	−52.1499***
NOR	−0.0002	0.0197	−58.0525***	−58.163***	0.0000	0.0164	−43.4317***	−59.8253***
OMN	−0.0002	0.0115	−36.3206***	−52.2539***	−0.0001	0.0123	−52.6745***	−52.5393***
GBR	−0.0001	0.0139	−27.9566***	−57.1854***	0.0001	0.0122	−58.2615***	−58.3963***
BRA	−0.0001	0.0221	−55.1039***	−55.1059***	−0.0003	0.0238	−55.4267***	−55.4461***

Notes: This table reports the summary statistics of Islamic and conventional indices from oil-importing and oil-exporting countries. The ADF is the augmented Dickey-Fuller and PP is the Phillips-Perron unit root tests. *, **, and *** denote statistical significance at the 10 %, 5 %, and 1 % levels, respectively.

the USA and GCC Islamic markets.

During the OPP period, our analysis reveals that conventional indices in the USA, India, Germany, and South Korea experienced significant contagion, with large increases in conditional correlation, indicating the transmission of oil price shocks across these markets. However, Islamic indices in these countries showed no contagion, further supporting the decoupling hypothesis. This increased correlation suggests that conventional markets are more interconnected and vulnerable to the effects of falling oil prices, while Islamic markets appear to be insulated from these shocks, potentially due to their distinct investment principles and restrictions. This further supports the idea of Islamic markets offering a diversification opportunity.

Moreover, the γ values were generally insignificant for most countries, indicating that both Islamic and conventional indices responded similarly to positive and negative oil price movements. These findings are consistent with Hashmi et al. (2021), who argued that oil prices affect stock returns differently in the short and long term for oil-importing countries. Immediate fluctuations influence market volatility and investor sentiment, while long-term effects result in structural economic adjustments and policy responses that help stabilise markets. Notably, countries like Japan, France, Spain, and Italy displayed no significant contagion for either market, further highlighting the broader stability of Islamic indices during the oil price plunge. This observation is supported by Charles et al. (2015), who found that Islamic and conventional equities behave similarly during extreme events, with slight differences in volatility, with Islamic equities exhibiting slightly higher volatility. Our findings offer valuable insights for investors and policy-makers seeking to optimise strategies in the face of volatile market conditions.

4.2. Oil exporting countries

Table 4 presents the full sample ADCC estimates for oil-exporting countries. Both Islamic and conventional indices exhibit near-unity volatility persistence, reflecting strong ties to commodity cycles. For example, Saudi Arabia's conventional index shows extreme persistence, while its Islamic counterpart exceeds unity, indicating heightened volatility during oil price fluctuations. This is consistent with studies on oil-exporting economies' sensitivity to energy price changes (Hamilton,

2014). However, Norway's indices show slightly lower persistence, likely due to the stabilising role of its sovereign wealth fund. The findings highlight systemic vulnerabilities in oil-dependent markets, where shocks propagate rather than dissipate quickly.

Furthermore, the QE adjustments and crisis-period controls are statistically insignificant across most countries, suggesting limited efficacy of monetary policy in mitigating oil shock transmission in export-driven economies. For instance, the UK's QE interventions have no measurable impact, supporting critiques of QE's ineffectiveness in commodity-dependent markets. This underscores the importance of structural factors like fiscal diversification and sovereign wealth management (Aslam & Brahmana, 2025). Our results also show no significant asymmetry, indicating that negative oil shocks do not have a greater impact than positive shocks. In oil-exporting nations, oil price increases generally boost economic growth and attract foreign investment (Moshiri, 2015). These findings align with Basher et al. (2018), who discussed the asymmetric effects of oil price shocks on stock returns in oil-exporting countries and identified four categories of oil shocks that impact stock returns: oil-demand, oil-supply, speculative, and oil-market shocks.

Table 5 shows that the Islamic stocks of the UAE, Norway, Oman, Brazil, and Saudi Arabia remained more resilient to oil price shocks compared with their conventional counterparts. These findings suggest that Islamic indices from oil-exporting countries support the idea of decoupling and provide investors with opportunities for diversification. The existence of contagion in conventional equities supports the wake-up call theory of Goldstein and Pauzner (2004), which proposes that government measures like QE initiatives can reduce the spread of financial distress. Moreover, oil-exporting countries do not exhibit significant asymmetry in most returns during the GFC. The lack of significant asymmetry during the GFC suggests that these economies might have been more resilient to oil price shocks due to their reliance on oil revenues. However, Islamic equities in the USA, UAE, Kuwait, and the UK were more impacted by negative shocks than positive ones, possibly due to their investment principles and market dynamics. Our results align with Guesmi and Fattoum (2014), who suggested a positive relationship between oil prices and stock markets of oil-exporting countries during periods of turmoil, with no significant diversification advantages.

During the ESDC, most oil-exporting countries exhibit an insignificant asymmetric response, except for Qatar's Islamic and Oman's

Table 2
Estimation of full sample results for oil-importing countries using the ADCC-GARCH (1,1) model.

Country	Univariate estimates										ADCC estimates			
	μ	α_1	β_1	Persistence	QE Adjustments			Control Variables			α	β	γ	ρ
				$\alpha_1 + \beta_1$	π_1	π_2	π_3	Ψ_1	Ψ_2	Ψ_3				
USACon				0.9838	0.0005 (0.7828)	−0.0002 (−0.4284)	−0.0000 (−0.3039)	−0.0041 (−1.0510)	0.0001 (0.2471)	−0.0004 (−1.3970)	0.0316*** (1.4870)	0.9677*** (63.0900)	−0.0316*** (0.5320)	0.3241 (0.5430)
USAIsM	0.0005*** (3.3650)	0.1343*** (7.8940)	0.8463*** (49.9600)	0.9806	0.0004 (0.6373)	−0.0001 (−0.1987)	0.0000 (0.3006)	−0.0026 (−0.8174)	0.0002 (0.4700)	−0.0005 (−1.4260)	0.0149 (1.5610)	0.9801*** (78.9700)	0.0170 (1.3120)	0.0939 (0.3780)
CHNCon	0.0007** (2.4860)	0.0637*** (5.8450)	0.9250*** (72.9600)	0.9894	−	−	−	0.0007 (0.2079)	−0.0005 (−1.0310)	−0.0004 (−0.7583)	0.0042 (0.7194)	0.9862*** (86.9400)	0.0092 (1.1020)	0.0320 (0.2769)
CHNIsM	0.0010** (2.3670)	0.0622*** (6.3770)	0.9253*** (80.0100)	0.9876	−	−	−	0.0002 (0.0818)	−0.0006 (−1.2120)	−0.0005 (−0.9870)	0.0026 (0.7701)	0.9907*** (106.4000)	0.0052 (0.6435)	0.0657 (0.7531)
INDCon	0.0007*** (2.6640)	0.0826*** (4.5970)	0.9102*** (50.8600)	0.9929	−	−	−	−0.0025 (−0.6891)	−0.0003 (−0.5709)	−0.0006 (−1.3860)	0.0075 (2.2930)	0.9906*** (217.1000)	0.0009 (0.4065)	0.0920 (0.8781)
IND IsM	0.0007*** (2.7410)	0.0700*** (3.6130)	0.9204*** (40.5000)	0.9904	−	−	−	−0.0018 (−0.5186)	−0.0003 (−0.9229)	−0.0004 (−0.9217)	0.0048** (2.4240)	0.9937*** (255.9000)	0.0011 (0.2929)	0.0616 (0.3557)
KORCon	0.0004 (1.4780)	0.0536*** (6.2450)	0.9378*** (98.3200)	0.9914	−	−	−	−0.0002 (−0.0635)	0.0000 (0.0956)	−0.0009* (−1.7150)	0.0086 (1.5160)	0.9822*** (86.1900)	0.0083 (1.0160)	0.0802 (0.6320)
KORIsM	0.0004* (1.9010)	0.0500*** (6.6520)	0.9422*** (115.3000)	0.9923	−	−	−	0.0009 (0.3659)	−0.0004 (−0.9969)	−0.0006 (−1.5520)	0.0027 (0.1529)	0.7616*** (6.3870)	0.0523 (1.4160)	0.0866*** (3.1290)
JPN Con	0.0003 (1.5100)	0.1130*** (4.5800)	0.8639*** (27.2100)	0.9771	−	0.0004 (0.4718)	−0.0000 (−0.0282)	−0.0022 (−0.6929)	−0.0000 (−0.0745)	−0.0001 (−0.2982)	0.0111 (0.2870)	0.4337 (4.8540)	−0.0332 (0.2900)	0.0759 (0.2140)
JPN IsM	0.0004** (1.9690)	0.1142*** (6.1820)	0.8661*** (41.2600)	0.9803	−	0.0002 (0.2068)	0.0005 (0.8385)	−0.0015 (−0.5728)	−0.0001 (−0.1026)	0.0001 (0.2317)	0.0060 (0.8235)	0.9631*** (40.3700)	0.0054*** (0.5158)	0.0634 (1.1290)
NLDCon	0.0005*** (2.8360)	0.0922*** (4.7500)	0.9005*** (44.0600)	0.9927	0.0002 (0.1990)	0.0000 (0.0230)	−	−0.0009 (−0.2432)	−0.0000 (−0.0178)	−0.0006 (−1.4530)	0.0235*** (4.2150)	0.9706*** (146.9000)	0.0248 (1.6300)	−0.1334 (−0.6940)
NLDIsM	0.0006*** (2.6410)	0.0702*** (4.7700)	0.9143*** (46.4300)	0.9845	0.0010 (1.2600)	−0.0003 (−0.5053)	−	−0.0019 (−0.6625)	−0.0001 (−0.1920)	−0.0002 (−0.4913)	0.0215*** (3.1850)	0.9685*** (109.6000)	0.0446* (1.6520)	0.3356* (1.7700)
DEUCon	0.0005** (2.2450)	0.0823*** (5.3210)	0.9066*** (55.6800)	0.9891	−0.0003 (−0.2490)	0.0003 (0.2901)	−	−0.0018 (−0.4554)	0.0000 (0.0989)	−0.0009* (−1.7970)	0.0209*** (3.5570)	0.9748*** (137.3000)	0.0105 (1.0560)	0.0655 (0.3463)
DEUIsM	0.0006** (2.5260)	0.1043*** (6.4420)	0.8743*** (50.3800)	0.9786	0.0005 (0.6391)	0.0002 (0.3728)	−	−0.000 (−0.2536)	−0.0000 (−0.1108)	−0.0003 (−0.5398)	0.0190** (3.0580)	0.9740*** (128.4000)	0.0335 (1.4720)	−0.2438 (−1.1650)
FRACon	0.0005*** (2.3450)	0.1098*** (4.6720)	0.8847*** (38.5000)	0.9945	−0.0000 (−0.0592)	0.0001 (0.0917)	−	−0.0002 (−0.0567)	0.0001 (0.1426)	−0.0008 (−1.7660)	0.0261*** (3.6920)	0.9679*** (114.7000)	0.0152 (1.1830)	0.0601 (0.3080)
FRAIsM	0.0005** (2.5730)	0.1225*** (5.8170)	0.8632*** (40.1800)	0.9858	0.0004 (0.4649)	0.0001 (0.1905)	−	0.0001 (0.0452)	−0.0000 (−0.0612)	−0.0002 (−0.4951)	0.0208*** (2.9020)	0.9711*** (111.1000)	0.0352 (1.4840)	−0.1071 (−0.5395)
ESP Con	0.0004* (1.7570)	0.1012*** (4.7970)	0.8893*** (44.8000)	0.9906	0.0002 (0.2002)	−0.0002 (−0.1880)	−	−0.0010 (−0.2820)	−0.0001 (−0.1460)	−0.0013** (−2.1450)	0.0204*** (3.7140)	0.9718*** (126.4000)	0.0084 (0.7842)	0.1688 (1.0850)
ESP IsM	0.0004* (1.8560)	0.0954*** (5.4590)	0.8913*** (46.4200)	0.9868	0.0000 (0.0964)	0.0001 (0.0956)	−	−0.0009 (−0.4476)	0.0001 (0.1749)	−0.0002 (−0.4210)	0.0236*** (3.5480)	0.9615*** (85.4500)	0.0200 (0.8088)	0.0506 (0.2548)
ITA Con	0.0006** (2.1960)	0.0900*** (5.5740)	0.9000*** (53.1200)	0.9901	−0.0001 (−0.0776)	0.0002 (0.1426)	−	−0.0022 (−0.5201)	−0.0005 (−0.4942)	−0.0016** (−2.2700)	0.0190*** (4.0080)	0.9760*** (180.5000)	0.0170 (1.3180)	0.0208 (0.1002)
ITA IsM	0.0001 (0.6509)	0.0700*** (5.7780)	0.9076*** (61.3700)	0.9777	0.0005 (0.3900)	0.0009 (0.5692)	−	−0.0003 (−0.0886)	−0.0006 (−0.4060)	−0.0005 (−0.7075)	0.0153*** (2.7330)	0.9777*** (131.0000)	0.0151 (0.9427)	0.2001 (1.0130)

Notes: This table reports the univariate and ADCC estimates for oil-importing countries over the full sample period. The countries represent the estimation against oil price shocks on Islamic and conventional indices. α and β are the ARCH and GARCH parameters, γ is the asymmetric term, and ρ is the time-varying conditional correlation term. The control variables represent the dummy variables for different crisis periods. The QE adjustments indicate the dummy variables to account for the effect of QE policy in respective countries. The lag length is determined by the AIC and SIC criteria. The t-statistics are in parentheses. *, **, and *** denote statistical significance at the 10 %, 5 %, and 1 % levels, respectively.

Table 3

Contagion results for oil-importing countries during crisis periods.

Country	γ (pre-GFC)	γ (GFC)	$\Delta\rho$	C/ NC	γ (pre-ESDC)	γ (ESDC)	$\Delta\rho$	C/ NC	γ (pre-OPP)	γ (OPP)	$\Delta\rho$	C/ NC
USACon	−0.0866*** (0.9060)	−0.0778* (−1.719)	7.356** (22.784)	C	−0.0503 (−1.3530)	−0.0091 (−0.2591)	−0.1357 (−0.7975)	NC	0.2670 (0.8455)	−0.0116 (−0.4197)	3.9214** (3.4954)	C
USA Ism	0.0543 (0.1778)	−0.1054** (−2.3940)	5.4648** (17.3708)	C	−0.0620 (−1.3750)	−0.0146 (−0.5480)	−0.088 (−0.6729)	NC	0.0427 (0.2991)	−0.0536*** (−2.8460)	0.9286 (0.2366)	NC
CHN	−0.0547*** (−0.0011)	−0.1284** (−2.1090)	0.5819** (6.9424)	C	0.0337 (0.1818)	0.0112 (0.1060)	−0.0073 (−0.1021)	NC	−0.0121** (−0.3232)	−0.0130 (−0.4496)	−0.2339 (0.0582)	NC
CHN Ism	−0.1282 (−0.8226)	−0.0986* (−1.746)	0.2250** (85.4286)	C	0.0283 (0.1975)	0.0151 (0.1502)	0.0779 (−0.0059)	NC	−0.0032*** (−33.0700)	0.0503 (0.1805)	−0.8672 (−0.9596)	NC
IND Con	−0.0380*** (−0.0011)	0.0189 (0.1790)	0.7515** (4.3844)	C	−0.0297 (−0.7249)	−0.0157 (−1.2230)	0.1107 (0.0544)	NC	−0.0480 (−0.0007)	0.1429 (0.5948)	0.4601** (7.4699)	C
IND Ism	−0.0465*** (−0.1832)	0.0418 (0.3936)	0.7871** (1.6892)	C	−0.0246 (−0.4712)	0.0051 (0.2248)	−0.1614 (−0.4496)	NC	−0.0141 (−0.6811)	0.0600 (0.4196)	−0.5634 (−0.3842)	NC
KOR	−0.0567 (−0.2376)	−0.040 (−1.0350)	0.6044** (3.5131)	C	0.1194 (0.9250)	0.0125 (0.2294)	0.924** (8.3786)	C	0.0711 (0.6675)	0.0396 (0.6336)	4.7683** (7.6123)	C
KOR Ism	−0.1114 (−0.8410)	0.0863 (0.4500)	0.2969 (0.6403)	NC	0.0631 (0.4792)	0.0319 (0.5434)	−0.0869 (0.0791)	NC	0.0187 (0.1784)	0.0332 (0.5674)	−2.31 (−7.6102)	NC
JPN	0.0389 (0.5854)	0.1124 (0.6386)	0.6442** (−3.5246)	C	−0.0063 (−0.1186)	0.0429 (1.0180)	−5.4492 (−2.5152)	NC	−0.0572*** (−0.0007)	−0.0201 (−0.6805)	−3.5855 (−4.5485)	NC
JPN Ism	−0.0742*** (−0.0012)	0.1191 (0.8791)	−0.2512 (1.3192)	NC	0.0592 (0.5203)	0.0354 (0.4170)	−0.3298 (−0.6961)	NC	−0.0476*** (−0.3035)	−0.0097 (−0.3653)	3.3761 (−0.3547)	NC
NLD	−0.0121 (−0.9464)	−0.1367 (−0.0046)	0.9354 (−0.9924)	NC	−0.1767 (−48.0000)	0.0227 (0.7770)	−0.3143 (−0.7547)	NC	0.2200 (0.9064)	0.0222 (0.0384)	−13.2105 (−1.21)	NC
NLD Ism	−0.0415*** (−0.0006)	0.0446 (0.5213)	−4.8909 (−4.0549)	NC	−0.0405 (−0.4359)	0.0386 (1.0120)	−0.4145 (−0.3149)	NC	−0.0042 (−1.0270)	0.0751 (0.8524)	−7.2548 (−3.7064)	NC
DEU	−0.0693*** (−0.4447)	0.0382 (0.1032)	0.0034** (1.6744)	C	−0.1541*** (−17.1200)	0.0161 (0.6991)	−0.2604 (−0.7303)	NC	−0.0475*** (−0.0014)	0.0549 (0.2706)	1.744** (−1.7099)	C
DEU Ism	−0.0016 (−0.0327)	0.1132 (0.7669)	1.398** (1.7783)	C	−0.0308 (−0.5361)	0.0576 (0.8869)	−0.3975 (−0.7937)	NC	0.0594 (0.3221)	0.0712 (1.0490)	3.202 (0.3112)	NC
FRA	−0.0236*** (−0.0004)	0.0910 (0.3904)	0.1746** (2.4073)	C	−0.1870*** (−7.1590)	0.0125 (0.5267)	−0.2493 (−0.8238)	NC	0.3645 (1.1940)	0.0199 (0.4590)	−8.7431 (−2.1595)	NC
FRA Ism	−0.0053 (−0.1798)	0.0540 (0.571)	2.0444** (2.8244)	C	−0.0624 (−0.5841)	0.0298 (0.6449)	−0.3351 (−0.7668)	NC	0.2186 (0.9238)	0.1384 (0.3484)	−2.8754 (−54.7389)	NC
ESP Con	−0.0379*** (−2.8310)	−0.0413 (−0.5121)	0.6742 (0.3453)	NC	−0.0604 (−1.0090)	0.0025 (0.1418)	−0.2351 (−0.626)	NC	0.2796 (0.3279)	0.1744 (1.3570)	−14.5839 (−7.2748)	NC
ESP Ism	−0.0264 (−0.7736)	0.0540 (0.5712)	0.408 (−0.4056)	NC	0.0414 (0.9134)	0.0554 (0.7284)	−0.4657 (−0.5727)	NC	0.4314 (1.5690)	0.2061 (0.4556)	5.9179 (1.1825)	NC
ITA Con	−0.0422*** (−3.1710)	−0.0413 (−0.5122)	0.6788** (2.5814)	C	−0.1796*** (−0.0026)	0.0062 (0.2794)	0.2619** (3.6018)	C	0.1843 (0.4906)	0.1480 (0.3018)	−11.6147 (−1.3785)	NC
ITA Ism	−0.0732*** (−0.3575)	−0.0688 (−0.7733)	0.2255** (7.4694)	C	−0.0560 (−0.5435)	0.0195 (0.3474)	−0.3302 (−0.9039)	NC	0.1277 (0.6706)	0.0173 (0.4083)	−0.2986 (−0.8848)	NC

Notes: This table reports the contagion results from ADCC estimates for oil-importing countries during the GFC, ESDC and OPP periods. The countries represent the estimation against oil price shocks on Islamic and conventional indices. γ is the asymmetric term, $\Delta\rho$ is the change in time-varying conditional correlation, C represents contagion, and NC represents no contagion based on the hypothesis. The t-statistics are in parentheses. *, **, and *** denote statistical significance at the 10 %, 5 %, and 1 % levels, respectively.

conventional indices, which are more negatively impacted by negative shocks than by positive ones. This trend can be explained by unfavourable oil price changes leading to decreased economic activity, reducing oil demand and causing price drops (Wen et al., 2022). As a result, oil-dependent countries face reduced earnings and profits, negatively affecting stock returns. During the ESDC, negative oil shocks, combined with economic uncertainty and financial instability, increased market volatility and heightened sensitivity to adverse shocks.

Additionally, the change in conditional correlation during the ESDC reveals a decrease under oil price shocks, indicating that oil-exporting countries were somewhat protected from contagion. Our findings suggest that oil-exporting Islamic equities behave similarly to conventional equities, which contradicts the decoupling hypothesis but offers hedging opportunities for investors seeking alternatives to oil-related assets. However, Saudi Arabia and Qatar's Islamic equities showed resilience during the crisis periods compared with their conventional counterparts, supporting the decoupling hypothesis for these markets. Both Russian Islamic and conventional stocks, however, remained susceptible to contagion during the ESDC. These findings consistent with Bein and Mehmet (2016), who highlighted that the relationship between European stock markets and crude oil fluctuates over time.

During the OPP, oil-exporting countries generally exhibit an insignificant response to negative shocks compared with positive ones,

except for Kuwait's conventional indices, which react more strongly to positive shocks at a 5 % significance level. Overall, oil-exporting markets show no significant asymmetric effects before and during the OPP, contradicting Bagchi (2017), who found greater volatility from negative oil shocks in BRICS nations. The shift in conditional correlation during the oil price plunge indicates a negative response to oil shocks, suggesting that these markets remain insulated from contagion. Islamic equities in oil-exporting countries behave similarly to conventional equities, challenging the decoupling hypothesis while still providing hedging opportunities. Notably, Islamic equities in Kuwait, Norway, and the UK exhibit no signs of contagion, reinforcing their role in portfolio diversification. These results align with Siddiqui et al. (2020), who found that GCC stock returns display symmetric patterns and positive correlations with oil price movements, particularly in the short run. Their findings further support that oil-exporting countries experience a stronger impact from rising oil prices due to demand, supply, and fiscal policy dynamics.

5. Portfolio diversification perspectives

Next, we provide a portfolio diversification perspective by allocating investments across various asset classes to enhance overall portfolio efficiency and reduce risk (Markowitz, 1952, 1976). Following Kroner

Table 4
Estimation of full sample results for oil-exporting countries using the ADCC-GARCH (1,1) model.

Country	Univariate estimates										ADCC estimates			
	μ	$\alpha 1$	$\beta 1$	Persistence	QE Adjustments			Control Variables			α	β	γ	ρ
				$\alpha 1 + \beta 1$	π_1	π_2	π_3	ψ_1	ψ_2	ψ_3				
RUS	0.0008**	0.0809***	0.9083***	0.9893	–	–	–	–0.0002	–0.0002	–0.0011	0.0107	0.9862***	0.0100	0.0856
Con	(2.2740)	(57.8300)	(57.8300)					(–0.0362)	(–0.4786)	(–1.3860)	(2.8538)	(268.1000)	(0.9310)	(0.5238)
RUS	0.0007*	0.0765***	0.9119***	0.9885	–	–	–	–0.0000	–0.0003	–0.0012	0.0103***	0.9863***	0.0089	0.1155
Ism	(1.8780)	(5.3120)	(58.2800)					(–0.0043)	(–0.5363)	(–1.3610)	(2.8910)	(255.4000)	(0.8876)	(0.7990)
SAU	0.0008**	0.0809***	0.9083***	1.0031	–	–	–	–0.0061	–0.0005	–0.0005	0.0154	0.9548***	–0.0035	0.0780
Con	(2.2740)	(5.3790)	(57.8300)					(–1.4020)	(–1.5090)	(–0.4435)	(0.6964)	(10.8200)	(–0.1565)	(0.9648)
SAU	0.0007**	0.0789***	0.9342***	1.0132	–	–	–	–0.0064*	–0.0006*	–0.0002	0.0176*	0.9573***	–0.0117	0.1167***
Ism	(2.1090)	(5.0270)	(105.6000)					(–1.7350)	(–1.7380)	(–0.1528)	(1.7830)	(32.9800)	(–1.0870)	(3.1440)
KWT	0.0002	0.0739***	0.9119***	0.9859	–	–	–	–0.0110	–0.0003	–0.0005	0.0059	0.9691***	–0.0042	0.0575
Con	(1.2230)	(3.1960)	(32.0300)					(–1.4870)	(–0.9316)	(–1.4580)	(1.3640)	(31.8100)	(–0.3901)	(0.5122)
KWT	0.0001	0.0841***	0.8984***	0.9826	–	–	–	–0.0063	–0.0005	–0.0005	0.0043	0.9763***	–0.0003	0.0374
Ism	(0.7432)	(4.9890)	(43.9300)					(–0.9776)	(–1.2810)	(–1.2050)	(1.1480)	(110.5000)	(–0.0372)	(0.6437)
CAN	0.0004***	0.0873***	0.9110***	0.9983	–	–	–	–0.0018	–0.0002	–0.0007*	0.0142**	0.9799***	0.0022	0.4307**
Con	(2.987)	(6.5700)	(72.0200)					(–0.5083)	(–0.5310)	(–1.6990)	(1.9750)	(81.3600)	(0.1742)	(2.3070)
CAN	0.0003*	0.0706***	0.9232***	0.9939	–	–	–	–0.0002	–0.0002	–0.0007	0.0095	0.9804***	–0.0015	0.4687***
Ism	(1.8510)	(6.4820)	(78.8800)					(–0.0826)	(–0.6327)	(–1.5460)	(1.1090)	(51.8500)	(–0.1444)	(6.5180)
UAE	0.0000	0.0682***	0.9285***	0.9968	–	–	–	–0.0055	0.0007	–0.0002	0.0066	0.9535***	0.0122	0.0202
Con	(0.3662)	(4.7110)	(61.0200)					(–1.0530)	(1.6000)	(–0.4250)	(0.7152)	(44.6800)	(0.8032)	(0.3755)
UAE	0.0001	0.0582***	0.9375***	0.9958	–	–	–	–0.0075	0.0000	–0.0004	0.0136	0.8502***	–0.0065	0.0622**
Ism	(0.3933)	(4.4480)	(67.5900)					(–0.8502)	(0.1285)	(–0.5785)	(1.0130)	(8.1700)	(–0.3870)	(2.3600)
QAT	0.0008**	0.0688**	0.9360***	1.0048	–	–	–	–0.0061	–0.0006	–0.0012*	0.0000	0.9597***	0.0305*	–0.0288
Con	(2.0960)	(2.1640)	(32.0700)					(–1.0890)	(–1.5710)	(–1.8530)	(0.0000)	(56.3100)	(1.7320)	(–0.4857)
QAT	0.0007**	0.0961***	0.9167***	1.0128	–	–	–	–0.0053	–0.0006	–0.0014*	0.0011	0.9610***	0.0263	–0.0206
Ism	(1.9730)	(3.8910)	(48.5400)					(–1.1400)	(–1.4140)	(–1.7500)	(0.1102)	(60.5800)	(1.5200)	(–0.3508)
NOR	0.0004	0.0634***	0.9310***	0.9944	0.0003 (0.2242)	0.0007 (0.6324)	–	–0.0011	–0.0003	–0.0012*	0.0088***	0.9877***	0.0071	0.2797**
Con	(1.4740)	(5.9250)	(79.0000)					(–0.2466)	(–0.4554)	(–1.9280)	(3.1160)	(334.0000)	(1.0440)	(2.4622)
NOR	0.0005**	0.0658***	0.9284***	0.9942	0.0001 (0.1413)	0.0007 (0.8624)	–	–0.0006	–0.0008	–0.0009	0.0049	0.9887***	0.0189	0.1434
Ism	(2.3900)	(6.2630)	(82.0100)					(–0.1888)	(–1.4020)	(–1.5550)	(0.8134)	(337.40000)	(0.8210)	(0.9334)
OMN	0.0000	0.1575***	0.8264***	0.984	–	–	–	–0.0085	0.0002	0.0001	0.0128	0.8631***	0.0102	0.0327
Con	(0.2756)	(4.8460)	(37.9800)					(–1.4020)	(0.8315)	(0.3532)	(1.0330)	(9.1190)	(0.5590)	(1.0510)
OMN	–0.0001	0.1711***	0.8107***	0.9819	–	–	–	–0.0086*	–0.0004	0.0002	0.0130	0.9272***	0.0177	–0.0156
Ism	(–0.2957)	(4.0800)	(27.5300)					(–1.8510)	(–0.7692)	(0.4867)	(1.6110)	(40.6900)	(0.8747)	(–0.4153)
GBR	0.0002	0.0958***	0.8958***	0.9917	0.0016 (1.1710)	0.0001 (0.1560)	0.0003 (0.6064)	–0.0005	0.0001	–0.0007	0.0218***	0.9718***	0.0126	0.1812
Con	(1.4160)	(4.1870)	(36.1600)					(–0.1286)	(0.3470)	(–1.4600)	(3.2040)	(104.4000)	(0.9519)	(0.8595)
GBR	0.0002	0.0888***	0.8938***	0.9827	0.0014 (1.4030)	–0.0004 (–0.5396)	0.0003 (0.5297)	–0.0005	0.0002	–0.0004	0.0133*	0.9806***	0.0115	0.2163
Ism	(1.2050)	(3.9820)	(31.9500)					(–0.1882)	(0.5843)	(–1.0420)	(1.9390)	(103.5000)	(0.8584)	(1.0050)
BRA	0.0006	0.0812***	0.9030***	0.9843	–	–	–	0.0005	–0.0007	–0.0009	0.0135***	0.9851***	0.0032	0.1449
Con	(1.2740)	(5.1310)	(49.7700)					(0.1181)	(–1.1000)	(–0.8083)	(3.1050)	(199.7000)	(0.5975)	(0.9109)
BRA	0.0002	0.0649***	0.9133***	0.9783	–	–	–	0.0012	–0.0006	–0.0013	0.0103***	0.9890***	0.0003	0.2221*
Ism	(0.4481)	(4.5650)	(44.9600)					(0.2522)	(–0.8140)	(–1.1960)	(3.1770)	(268.6000)	(0.1154)	(1.7680)

Notes: This table reports the univariate and ADCC estimates for oil-exporting countries over the full sample period. The countries represent the estimation against oil price shocks on Islamic and conventional indices. α and β are the ARCH and GARCH parameters, γ is the asymmetric term, and ρ is the time-varying conditional correlation term. The control variables represent the dummy variables for different crisis periods. The QE adjustments indicate the dummy variables to account for the effect of QE policy in respective countries. The lag length is determined by the AIC and SIC criteria. The t-statistics are in parentheses. *, **, and *** denote statistical significance at the 10 %, 5 %, and 1 % levels, respectively.

Table 5

Contagion results for oil-exporting countries during crisis periods.

Country	γ (pre-GFC)	γ (GFC)	$\Delta\rho$	C/ NC	γ (pre-ESDC)	γ (ESDC)	$\Delta\rho$	C/ NC	γ (pre-OPP)	γ (OPP)	$\Delta\rho$	C/ NC
RUS	−0.0831	0.0219	−0.2712	NC	−0.0678***	−0.0078	0.1365**	C	−0.0393***	0.1354	−4.6749	NC
Con	(−0.0005)	(0.8309)	(−0.7772)		(−0.0015)	(−0.0998)	(57.2319)		(−0.0015)	(1.6140)	(−5.7301)	
RUS	−0.1235	0.0166	−0.1249	NC	−0.0713***	−0.0260	0.0689**	C	−0.0997***	0.1260	−4.8624	NC
Ism	(−0.0001)	(0.7639)	(−0.7765)		(−0.0013)	(−0.6690)	(9.0268)		(−0.0190)	(1.3160)	(−4.8228)	
SAU	−0.1444***	−0.0387***	0.1179**	C	−0.0023	0.0793	0.9395**	C	0.0079	0.0019	−1.4617	NC
Con	(−2.6970)	(−5.9560)	(2.3677)		(−0.2645)	(0.6587)	(21.3077)		(0.5256)	(0.1191)	(−1.8207)	
SAU	0.0875	−0.0056	−0.6179	NC	10.4235	−0.0538	−1.129	NC	0.0087	0.0042	−1.4522	NC
Ism	(0.2682)	(−0.0017)	(1.4385)		(1.1310)	(−0.2606)	(−1.3384)		(0.4345)	(0.1476)	(−1.5311)	
KWT	−0.0356	−0.0415***	−0.1353	NC	−0.0253	0.0214	0.1225	NC	−0.0350***	−0.0133*	20.037**	C
Con	(−0.1779)	(0.0039)	(−0.5716)		(−0.3577)	(0.1359)	(0.0739)		(−0.7656)	(−1.8620)	(20.4967)	
KWT	0.0239	−0.0324***	0.7117**	C	−0.0294	0.0282	−1.4211	NC	0.0478	−0.0096	−7.1785	NC
Ism	(0.0852)	(−0.0589)	(4.283)		(−0.9004)	(1.3040)	(−1.5158)		(0.4720)	(−0.6164)	(−4.2646)	
CAN	−0.0212	−0.0431	0.4435	NC	−0.0625**	0.0003	−0.0885	NC	0.0098	−0.0394	9.2575**	C
Con	(−0.3102)	(−0.6719)	(0.9541)		(−1.9820)	(0.0217)	(−0.6527)		(0.8618)	(−0.9761)	(39.8044)	
CAN	0.0347	−0.0694	0.1629	NC	−0.0680**	−0.0357	−0.029	NC	0.0090	0.0098	0.6543**	C
Ism	(0.2559)	(−0.9183)	(−0.9467)		(−0.6490)	(−1.4780)	(1.4425)		(0.1991)	(0.1973)	(2.6664)	
UAE	−0.0005	−0.0246	1.532**	C	−0.0172	0.0208	−1.2822	NC	0.1144	−0.0306	−11.406	NC
Con	(−0.6378)	(−1.0870)	(3.335)		(−0.3391)	(0.4780)	(−1.158)		(0.1865)	(−0.9946)	(−14.0701)	
UAE	−0.0289***	−0.0261**	1.4327	NC	−0.0379	0.0076	−0.6945	NC	−0.0088	−0.0263	7.0289	NC
Ism	(−0.4361)	(−2.1150)	(−0.4346)		(−1.4640)	(0.2511)	(−0.774)		(−0.3367)	(−0.9909)	(1.5402)	
QAT	0.0818	0.0149	−1.1086	NC	0.4202	0.0223	0.8623**	C	0.0660	0.0907	−2.389	NC
Con	(0.9962)	(0.0806)	(−1.2803)		(1.7600)	(1.2460)	(2.2481)		(0.5379)	(0.7302)	(−2.1516)	
QAT	0.0909	−0.0443	−1.3258	NC	0.2852	−0.0358*	4.7143	NC	0.0145	0.0678	−5.4361	NC
Ism	(1.0330)	(−0.2988)	(−1.6222)		(1.1680)	(1.738)	(1.5872)		(0.1576)	(0.4361)	(−4.4539)	
NOR	−0.0480***	0.0557	0.1227**	C	−0.0996	0.0148	−0.2174	NC	−0.0632***	0.0005	0.4096**	C
Con	(−0.2402)	(0.8166)	(55.2233)		(−1.8440)	(0.7345)	(−0.6628)		(−0.0019)	(0.0103)	(8.5652)	
NOR	−0.0641***	0.0193	0.6104	NC	−0.0785	0.0199	−0.2962	NC	−0.0418*	0.0558	0.3482	NC
Ism	(−0.4145)	(0.1997)	(1.0786)		(−0.8286)	(0.4356)	(−0.731)		(−1.6620)	(0.6264)	(0.8532)	
OMN	−0.0138	0.1071	0.8031**	C	0.0525	−0.0022***	−1.6718	NC	0.1744	0.0552	−1.2261	NC
Con	(−0.8158)	(0.6244)	(1.8611)		(1.5220)	(−2.8250)	(−2.8409)		(0.8479)	(0.3446)	(−1.2103)	
OMN	0.1048	−0.0014	−0.9716	NC	0.2924*	0.0554	−1.0002	NC	−0.0192	−0.0226	−3.7437	NC
Ism	(0.1048)	(−0.0257)	(−0.7048)		(1.8900)	(0.9143)	(−1.0003)		(−0.3663)	(−0.2624)	(−4.0132)	
GBR	−0.0388	−0.0087	0.6721	NC	−0.1241**	0.0115	−0.2117	NC	−0.0146	−0.0171	0.5722**	C
Con	(−1.5310)	(−0.0773)	(0.0173)		(−2.0110)	(0.5269)	(−0.723)		(−0.5780)	(−1.1510)	(2.2613)	
GBR	−0.0042	−0.0909**	1.4921**	C	−0.0383	−0.0118	−0.0303	NC	−0.0085	−0.0005	1.2288	NC
Ism	(−0.0785)	(−2.0430)	(8.906)		(−1.1540)	(−0.3802)	(−0.4697)		(−0.0580)	(−0.0060)	(0.9689)	
BRA	0.0458	0.0149	1.172**	C	−0.0665	−0.0071	−0.1679	NC	0.1000	0.0147	0.745	NC
Con	(0.0631)	(0.0562)	(3.8736)		(−1.5450)	(−0.5495)	(−0.4587)		(0.7515)	(0.4862)	(−0.1382)	
BRA	−0.0217	−0.0281	0.5156	NC	−0.0427	0.0018	−0.1936	NC	0.1240	0.0733	0.8313	NC
Ism	(−0.5101)	(−0.2291)	(1.561)		(−0.6576)	(0.0939)	(−0.5208)		(0.8081)	(0.6864)	(0.8765)	

Notes: This table reports the contagion results from ADCC estimates for oil-exporting countries during the GFC, ESDC and OPP periods. The countries represent the estimation against oil price shocks on Islamic and conventional indices. γ is the asymmetric term, $\Delta\rho$ is the change in time-varying conditional correlation, C represents contagion, and NC represents no contagion based on the hypothesis. The t-statistics are in parentheses. *, **, and *** denote statistical significance at the 10 %, 5 %, and 1 % levels, respectively.

and Ng (1998), we construct portfolios with a 50 % allocation to Islamic indices, aiming to reduce overall portfolio risk and improve risk-adjusted returns. This allocation is selected for its simplicity facilitating clear performance comparisons with conventional portfolios (Guidi & Ugur, 2014), and its alignment with portfolio performance literature (Plyakha et al., 2012, 2015; Swade et al., 2022; Taljaard & Maré, 2021), which highlights the resilience of equally weighted portfolios. Therefore, we determine the effectiveness of hedging (HE) for the portfolios constructed using the following method:

$$HE = 1 - \frac{Var_{hedge}}{Var_{unhedge}} \quad (9)$$

Where Var_{hedge} represents the variance of the hedged portfolio that includes 50 % of the Islamic indices and $Var_{unhedge}$ denotes the variance of the unhedged portfolio containing only conventional indices. A higher hedging effectiveness ratio indicates a superior ability to mitigate risk and reduce portfolio variance, thereby signifying the investment policy as a highly effective hedging strategy. In order to assess the portfolios' performance based on Jobson and Korkie (1981) methodology, this study uses the Sharpe Ratio (SR) calculated as follows:

$$SR = \frac{R_p - R_f}{SD_p} \quad (10)$$

Where R_p represents the portfolio return, R_f is the risk-free rate (assumed to be zero following Guidi & Ugur, 2014) and SD_p is the standard deviation of the portfolio. We compare portfolios with equal-weight Islamic and conventional indices against portfolios with only conventional indices, using the Sharpe ratio as a benchmark. Additionally, consistent with Nomran and Haron (2021), we apply a *t*-test to compare the Sharpe ratios between benchmark and mixed portfolios to assess whether adding Islamic indices improves diversification with the null hypothesis is as follows:

$$H_0 : SR_p = SR_b \quad (11)$$

Where SR_b represents the benchmark Sharpe ratio which is calculated for portfolios containing conventional stock only and SR_p represents the Sharpe ratio of portfolios after adding 50 % of Islamic stock. The alternative hypothesis is as follows:

$$H_1 : SR_p > SR_b \quad (12)$$

Table 6 presents the findings on Islamic and conventional index portfolios across oil-importing and exporting countries using an equal allocation. The inclusion of Islamic indices consistently reduces portfolio variance, enhancing diversification and lowering overall risk. Investors seeking lower-risk portfolios may benefit from countries with

Table 6

Portfolio performance across oil-importing and oil-exporting countries (50 % Islamic and 50 % conventional).

Oil Importing Countries	$\sigma(p)$	$\mu(p)$	HE(p)	SR(p)	SR	Oil Exporting Countries	$\sigma(p)$	$\mu(p)$	HE(p)	SR(p)	SR
USA	0.0063	0.75 %	55.70 %	1.19	0.80	RUS	0.0122	1.48 %	51.09 %	1.21	0.83
CHN	0.0087	1.16 %	51.56 %	1.34	0.90	SAU	0.0078	0.62 %	51.72 %	0.80	0.56
IND	0.0073	0.99 %	63.57 %	1.36	0.88	KWT	0.0078	0.80 %	49.99 %	1.02	0.72
KOR	0.0072	1.01 %	70.31 %	1.40	0.84	CAN	0.0069	0.91 %	59.84 %	1.32	0.85
JPN	0.0065	0.94 %	54.46 %	1.44	0.96	UAE	0.0110	1.04 %	46.17 %	1.03	0.69
NLD	0.0060	0.92 %	69.34 %	1.54	0.89	QAT	0.0081	0.78 %	49.22 %	0.96	0.66
DEU	0.0068	0.98 %	64.75 %	1.45	0.92	NOR	0.0088	1.20 %	64.88 %	1.37	0.88
FRA	0.0070	0.98 %	63.69 %	1.40	0.90	OMN	0.0065	0.59 %	56.91 %	0.90	0.57
ESP	0.0067	1.10 %	72.97 %	1.64	0.92	GBR	0.0061	0.88 %	66.33 %	1.44	0.87
ITA	0.0076	1.18 %	66.50 %	1.56	0.95	BRA	0.0111	1.58 %	52.34 %	1.42	0.94
t-stats	12.4505**(0.000)					4.5728**(0.000)					

Notes: This table presents the performance of equally weighted (50 % Islamic and conventional indices each) portfolios across oil-importing and oil-exporting countries. Here σ represents the portfolio standard deviation, μ portfolio returns, HE represents hedging effectiveness and SR_p represents the portfolio Sharpe ratios, while SR shows the Sharpe ratio of a portfolio without Islamic indices. SR_p represents the benchmark for portfolio Sharpe ratios, respectively. The t-statistics test whether the inclusion of Islamic indices significantly improves portfolio performance. ** indicates statistical significance at the 5 % level. Corresponding p-values are reported in parentheses.

lower standard deviations, indicating reduced volatility. The average returns (μ) of Islamic-conventional portfolios vary across markets over the full sample period with Russia (1.48 %) and Brazil (1.58 %) offering the highest returns, making them attractive for diversification. The HE results show that portfolios in Korea and Spain exhibit the strongest hedging capabilities, suggesting these markets provide effective protection against adverse market movements. Furthermore, the Sharpe ratio analysis indicates significant improvement when Islamic stocks are incorporated. For example, portfolios with an equal weighting of Islamic and conventional indices consistently outperform conventional-only portfolios, with t-statistics of 12.4505 and 4.5728, supporting the alternative hypothesis. These findings highlight the role of Islamic stocks in enhancing portfolio resilience and offer valuable insights for investors aiming to construct well-diversified global portfolios.

5.1. Sensitivity analysis of portfolio weights

We conducted a further sensitivity analysis to examine how varying the portfolio allocation weights between Islamic and conventional indices influences diversification benefits and overall portfolio performance. In Table 7, where portfolios are weighted 25 % Islamic and 75 % conventional, the findings suggest modest diversification benefits with outperformance observed in portfolios containing only the conventional index. Although there are some improvements in HE and SR, the magnitude of gains is relatively limited compared to equal weighting. For instance, in oil-importing markets such as Spain, the Netherlands,

and Korea, the portfolios exhibit strong HE values and relatively high Sharpe ratios, indicating major diversification benefits. However, several oil-exporting countries such as Saudi Arabia, Kuwait, and Qatar show comparatively lower performance, both in terms of returns and hedging effectiveness.

On the other hand, Table 8 shows that allocating 75 % of the portfolio to Islamic indices and only 25 % to conventional equities significantly enhances performance across both risk and return dimensions. The results indicate substantial improvements in portfolio Sharpe ratios and hedge effectiveness across most markets. Notably, oil-importing countries such as Spain and Italy emerge as top performers, while oil-exporting countries like Brazil and the UK also demonstrate strong results. Moreover, the higher Sharpe ratio t-statistics differences for both oil importers and exporters are significant at the 1 % level, further confirming that Islamic equities play a critical role in enhancing portfolio resilience, particularly when they constitute a larger share of the allocation. Overall, the sensitivity analysis highlights that increasing the allocation to Islamic equities consistently improves portfolio performance, providing stronger risk-adjusted returns and greater hedging capability.

6. Conclusion

This study examines the decoupling hypothesis by assessing the asymmetric transmissions and contagion effects of oil price shocks on Islamic and conventional stock indices in major oil-importing and

Table 7

Portfolio performance across oil-importing and oil-exporting countries (25 % Islamic and 75 % conventional).

Oil Importing Countries	$\sigma(p)$	$\mu(p)$	HE(p)	SR(p)	SR	Oil Exporting Countries	$\sigma(p)$	$\mu(p)$	HE(p)	SR(p)	SR
USA	0.0054	0.75 %	66.77 %	1.38	0.8	RUS	0.0106	1.47 %	63.31 %	1.38	0.83
CHN	0.0075	1.15 %	63.66 %	1.52	0.9	SAU	0.0068	0.63 %	63.79 %	0.93	0.56
IND	0.0063	1.03 %	72.67 %	1.63	0.88	KWT	0.0068	0.80 %	62.49 %	1.18	0.72
KOR	0.0062	1.06 %	77.73 %	1.7	0.84	CAN	0.0059	0.91 %	69.88 %	1.53	0.85
JPN	0.0057	0.94 %	65.85 %	1.65	0.96	UAE	0.0087	0.99 %	59.62 %	1.14	0.69
NLD	0.0052	0.94 %	77.00 %	1.82	0.89	QAT	0.007	0.76 %	61.91 %	1.09	0.66
DEU	0.0058	1.01 %	73.56 %	1.73	0.92	NOR	0.0076	1.25 %	73.66 %	1.65	0.88
FRA	0.0061	1.02 %	72.76 %	1.66	0.90	OMN	0.0056	0.58 %	67.68 %	1.03	0.57
ESP	0.0058	1.15 %	79.73 %	1.97	0.92	GBR	0.0053	0.90 %	74.74 %	1.70	0.87
ITA	0.0066	1.22 %	74.87 %	1.85	0.95	BRA	0.0096	1.55 %	64.25 %	1.61	0.94
t-stats				14.4294** (0.000)				5.6715** (0.000)			

Notes: This table presents the portfolio performance with a 25 % allocation to Islamic indices and 75 % to conventional indices across oil importing and exporting countries. Where, σ represents portfolio standard deviation, μ portfolio returns, HE is the hedge effectiveness and SR_p presents portfolio Sharpe ratios, SR shows the Sharpe ratio without Islamic indices. SR_p presents the benchmark for portfolio Sharpe ratios, respectively. The t-statistics test whether the inclusion of Islamic indices significantly improves portfolio performance. ** indicates statistical significance at the 5 % level. Corresponding p-values are reported in parentheses.

Table 8

Portfolio performance across oil-importing and oil-exporting countries (75 % Islamic and 25 % conventional).

Oil Importing Countries	$\sigma(p)$	$\mu(p)$	HE(p)	SR(p)	SR	Oil Exporting Countries	$\sigma(p)$	$\mu(p)$	HE(p)	SR(p)	SR
USA	0.0054	0.74 %	66.77 %	1.36	0.8	RUS	0.0106	1.49 %	63.31 %	1.4	0.83
CHN	0.0075	1.18 %	63.66 %	1.57	0.90	SAU	0.0068	0.62 %	63.79 %	0.91	0.56
IND	0.0063	0.95 %	72.67 %	1.51	0.88	KWT	0.0068	0.80 %	62.49 %	1.18	0.72
KOR	0.0062	0.96 %	77.74 %	1.54	0.84	CAN	0.0059	0.90 %	69.88 %	1.52	0.85
JPN	0.0057	0.95 %	65.84 %	1.68	0.96	UAE	0.0087	1.09 %	59.61 %	1.25	0.69
NLD	0.0052	0.90 %	77.01 %	1.74	0.89	QAT	0.007	0.79 %	61.91 %	1.13	0.66
DEU	0.0058	0.95 %	73.56 %	1.62	0.92	NOR	0.0076	1.15 %	73.66 %	1.52	0.88
FRA	0.0061	0.95 %	72.76 %	1.56	0.90	OMN	0.0056	0.60 %	67.68 %	1.06	0.57
ESP	0.0058	1.06 %	79.73 %	1.81	0.92	GBR	0.0053	0.86 %	74.74 %	1.63	0.87
ITA	0.0066	1.15 %	74.87 %	1.76	0.95	BRA	0.0096	1.61 %	64.25 %	1.67	0.94
t-stats	15.8873** (0.000)					6.2067** (0.000)					

Notes: This table presents the portfolio performance with a 75 % allocation to Islamic indices and 25 % to conventional indices across oil importing and exporting countries. Where, σ represents portfolio standard deviation, μ portfolio returns, HE is the hedge effectiveness and SR_p presents portfolio Sharpe ratios, SR shows the Sharpe ratio without Islamic indices. SR_p presents the benchmark for portfolio Sharpe ratios, respectively. The t-statistics test whether the inclusion of Islamic indices significantly improves portfolio performance. ** indicates statistical significance at the 5 % level. Corresponding p-values are reported in parentheses.

-exporting countries. Following the approach of [Forbes and Rigobon \(2002\)](#), we analysed the impact of oil prices as an external shock on Islamic and conventional indices during significant crises such as the GFC, ESDC, and OPP. To capture the time-varying conditional correlations and asymmetries between the oil price movements and the Islamic (or conventional) stock indices, we utilised the ADCC-GARCH model introduced by [Cappiello et al. \(2006\)](#). Our sample comprised daily data from September 3, 2007 to January 31, 2020.

Our analysis found that the responses to oil price shocks were generally symmetric in most oil-importing and -exporting countries, both in the overall sample and during most crisis periods. Islamic and conventional indices were similarly unaffected by negative oil shocks compared with positive ones. Contagion effects varied across countries: during the GFC, both oil-importing and -exporting countries exhibited vulnerability to oil price shocks. However, Islamic stocks in Japan, Korea, Saudi Arabia, the UAE, Norway, Oman, and Brazil displayed greater resilience than their conventional counterparts. No significant evidence of contagion was observed during the ESDC and OPP periods, although some Islamic indices, such as those from Korea, Italy, Saudi Arabia, and Qatar (ESDC) and the USA, India, Korea, and Germany (OPP), were less affected by contagion. These findings support the decoupling hypothesis and suggest that Islamic indices provide diversification benefits during times of crisis. Lastly, portfolio diversification results further show that incorporating a 50 % allocation of Islamic indices into conventional portfolios reduces risk and improves performance, with higher Sharpe ratios and greater hedging effectiveness. The sensitivity analysis reinforces these results by demonstrating the enhanced hedging capabilities of Islamic indices across both oil-importing and -exporting countries.

Our results have significant implications. For investors and portfolio managers, the demonstrated resilience of Islamic indices, particularly during major crisis periods, highlights their potential for diversification and risk management strategies. For instance, Islamic indices in Japan, Korea, Saudi Arabia, UAE, Norway, Oman, and Brazil provide protection from oil price shocks compared with their conventional counterparts. These investors can leverage these indices for diversification purposes, especially during periods of market volatility induced by oil price fluctuations. Likewise, market participants, including traders and analysts, can use the differentiated responses of Islamic and conventional markets to refine their trading strategies and market analysis, enhancing decision-making processes.

For policymakers, the resilience of Islamic indices during major crises suggests that integrating Islamic financial principles into broader economic frameworks could enhance market stability. By promoting the growth of Islamic finance, policymakers can foster a more stable and diversified financial environment, helping to cushion economies against

external shocks such as oil price volatility. Additionally, the development of supportive regulatory frameworks for Islamic financial products could encourage their adoption, contributing to greater economic resilience and stability.

Nevertheless, this study has certain limitations. By focusing on country-level indices, it does not capture variations at the sectoral and firm level. The dataset also concludes before the onset of the COVID-19 pandemic, thereby excluding the pandemic's significant market implications. Additionally, the ADCC-GARCH framework does not account for structural breaks or regime shifts. Future research could address these gaps by incorporating more comprehensive data and extending the analysis to alternative assets such as cryptocurrencies and precious metals. More comprehensive data and analysis of alternative assets would provide an in-depth understanding of the contagion effects and resilience dynamics across different segments of the market. Additionally, researchers could explore the determinants of these shocks. For instance, they could distinguish between demand-side and supply-side drivers to uncover the specific factors influencing market reactions. Such investigations could reveal deeper insights into the mechanisms of financial contagion and the comparative stability of Islamic and conventional financial systems under diverse economic conditions.

Author contribution statement

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Conceptualisation, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Validation, Visualisation, Writing - original draft, Writing - review and editing.

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Authors' statement

The views expressed are solely those of the authors and do not necessarily reflect the views of their respective employers.

Declaration of competing interest

The authors have no conflict of interest.

Acknowledgement

No specific funding.

Appendix A

Table A: Crisis Timelines

Crisis	Timelines
Global Financial Crisis	
Pre-GFC	September 03, 2007 to September 14, 2008
GFC	September 15, 2008 to April 02, 2009
European Sovereign Debt Crisis	
Pre-ESDC	April 03, 2009 to November 04, 2009
ESDC	November 05, 2009 to June 09, 2013
Oil Price Plunge	
Pre-OPP	June 10, 2013 to June 18, 2014
OPP	June 19, 2014 to November 18, 2016

Note: This table reports the crisis timelines for the Global Financial Crisis (GFC), European.

Sovereign Debt Crisis (ESDC), and Oil Price Plunge (OPP) as per the literature.

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