



## Assessing the Impact of Islamic Religious Holiday Calendar Anomalies: Evidence from Borsa Istanbul

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**Abstract:** This study investigates the impact of Islamic calendar events on stock returns and volatility in the Turkish stock market (Borsa Istanbul) by focusing on both conventional indices (BIST 100, BIST 50, BIST 30) and Shariah-compliant participation indices (BISTP 100, BISTP 50, BISTP 30). The analysis employed an ARMA (2, 2)–EGARCH (1,1) framework to address asymmetric volatility responses and the persistence of return dynamics. The findings from the mean equation indicated that Ramadan, Eid al-Fitr, and Eid al-Adha did not have statistically significant effects on average returns across all indices, implying that Islamic religious observances did not consistently affect return behavior. In contrast, the variance equation revealed more nuanced dynamics. A significant decline in volatility during Ramadan was observed only for the BISTP 100 index, indicating an index-specific effect rather than a market-wide phenomenon. Notably, participation indices exhibited higher volatility and stronger persistence than their conventional counterparts, challenging the common assumption that Shariah-compliant equities were inherently more stable. The leverage effect was consistently negative and statistically significant across all indices, indicating that negative shocks exerted a greater influence on volatility compared to positive shocks of equivalent size. The findings indicated that the impact of the Islamic calendar on the Turkish stock market was restricted and primarily affected certain indices, whereas volatility exhibited significant persistence and marked asymmetry. Given the relatively short sample period and index-specific nature of the results, the findings warrant careful interpretation, and broader datasets are needed before drawing definitive conclusions.

**Keywords:** Calendar Anomalies, Ramadan Effect, Eid Al-Adha, Stock Market Volatility, Borsa Istanbul, GARCH Model.

**Jel Classification:** G11, G12, G14, G40

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## Introduction

Behavioral finance is a relatively new discipline that provides an alternative perspective by studying human psychology and how our emotional and cognitive biases influence our investment decisions. It explains why investors often act irrationally, against their interests, and base their decisions on prejudices rather than facts. A firm grasp of investor psychology is crucial for anyone seeking to accurately predict price movements in financial markets (Putra et al., 2021).

A significant amount of academic research (Dallas, 2011; Mathras et al., 2016; Aslam et al., 2022; Almaida et al., 2023; Adam et al., 2025) on the evolution of behavioral finance has been conducted in recent years. Behavioral finance suggests that, rather than relying on economic and financial theory, investors' actions are often based on optimism and pessimism. Although all investors obtain the same amount of information, their information-processing abilities and emotions vary. This circumstance has resulted in certain market abnormalities (Yaş, 2020). As a result, behavioral finance economists have developed tools to model human behavior and understand deviations from the Efficient Market Hypothesis (Statman, 1999).

Several theories have explained stock market seasonality. These theories include calendar anomalies, which are systematic changes in stock returns connected to various seasons and often reported in worldwide financial markets. Several calendar anomalies challenge the efficient markets and equilibrium asset pricing model. Some examples of these anomalies are the weekend effect, the January effect, the Ramadan effect, and the Eid al-Adha effect. Several studies, including Seyyed et al. (2005), Hajieh et al. (2011), Halari et al. (2015), Chowdhury and Mostari (2015), Abbes and Abdelhedi-Zouch (2015), Öztürk et al. (2018), and Adam et al. (2025), have confirmed the existence of these anomalies in national stock and bond markets.

Islamic stock indices are specifically designed to track the performance of companies that adhere to Shariah principles. These indices stand apart from conventional indices in that they exclude companies involved in activities considered haram (forbidden), such as alcohol production, gambling, and financial services based on interest (FTSE Russell, 2020; MSCI, 2023). The core idea behind these indices is to provide a suitable investment avenue for Muslim investors, allowing them to invest in a manner consistent with their religious convictions (FTSE Russell, 2020). In 1999, Dow Jones launched the Dow Jones Islamic Market Index (DJIM), the world's first Islamic stock index (Moran, 2011; S&P Dow Jones Indices, 2024). A key motivation behind this choice was to address a substantial unmet demand:

providing investors across various jurisdictions a practical, broad-based vehicle for equity investment that strictly adhered to the tenets of Islamic law, or Shariah. This development certainly marked a turning point in accessible faith-based investing (Moran, 2011).

Shariah-compliant investing strategies have expanded most prominently in countries with large Muslim populations, with Türkiye providing a particularly illustrative case. Borsa Istanbul operates both conventional and participation indices, including the BIST Participation 30, 50, and 100, which track the largest publicly traded firms by market capitalization that meet Shari'a compliance requirements. Participation (Katılım) indices were first introduced in Türkiye in 2011 with the launch of the Participation-30 Index, followed by the expansion to additional participation indices, while their official calculation and real-time dissemination by Borsa İstanbul commenced on Nov 12, 2021, marking their formal institutional integration into Türkiye's capital markets (Yıldırım & Sakarya, 2019; Borsa İstanbul, 2021). The inclusion of firms in these indices is governed by pre-defined Shari'a-compliant rules and strict financial ratio filters designed to exclude companies with excessive reliance on interest-based income, reflecting the prohibition of *riba* in Islamic law (MSCI, 2023; Borsa İstanbul, 2024). Within this dual market structure, Borsa Istanbul offers a unique and contextually rich setting for examining calendar anomalies, as it simultaneously provides conventional benchmarks, such as the BIST 30, 50, and 100 and Islamic counterparts that prohibit interest-bearing and speculative activities, thereby allowing for a meaningful comparison of religious sentiment and market behavior in a region bridging Europe and the Middle East (Borsa İstanbul, 2025).

This study investigates, from a psychological and behavioral standpoint, whether religious practices can impact investors' moods and emotions, hence affecting stock market behavior and investor decisions in Muslim-majority nations, such as Türkiye. Religion and the observance of customs of faith are extremely important aspects of daily life for Muslims, and they have an impact on both personal and financial choices. According to Wasiuzzaman (2017), religious holidays, such as Ramadan, Eid al-Fitr, and Eid al-Adha, are characterized by increased devotion, prayer, and almsgiving throughout the holy season.

The impact of Ramadan and Eid Al-Fitr on financial markets has been extensively studied (see Fazal, Abraham, and Al-Hajji, 2005; Al-Ississ, 2015; Białkowski et al., 2013; Hassan & Kayser, 2014; Al-Khazali, 2014; Al-Khazali et al., 2014;

Halari et al., 2015; Hijazi & Tabash, 2020; Alvi, Rehan, and Mohiuddin, 2021), whereas the effect of Eid Al-Adha remains relatively underexplored. The decline in economic activity, coupled with the spiritual and emotional impact during the Eid Al-Adha holidays, may have implications for stock market behavior. While the ‘Ramadan effect’ and the ‘Eid Al-Fitr effect’ have been widely explored in empirical literature, Eid Al-Adha has received comparatively limited scholarly attention, presenting a valuable opportunity for further inquiry into its potential market impact.

To adequately capture the potential effects of Islamic religious seasons on market behavior, the study incorporates the key Islamic calendar dates for the years 2022–2024, as presented in Table 1. These dates include the full Ramadan fasting periods, as well as the Eid al-Fitr and Eid al-Adha celebrations for each year under review. Since these events often influence trading activity, investor sentiment, and liquidity in predominantly Muslim markets, aligning the dataset with the precise Islamic calendar dates ensures that the analysis accurately reflects any seasonal or event-driven market dynamics associated with these religious periods.

**Table 1**

*Islamic Calendar Dates in the Study*

	2022	2023	2024
Ramadan Period	Sat, Apr 2, 2022 – Sun, May 1, 2022	Thu, Mar 23, 2023 – Thu, Apr 20, 2023	Mon, Mar 11, 2024 – Tue, Apr 9, 2024
Eid al-Fitr	Mon, May 2, 2022 – Wed, May 4, 2022	Fri, Apr 21, 2023 – Sun, Apr 23, 2023	Wed, Apr 10, 2024 – Fri, Apr 12, 2024
Eid al-Adha	Sat, Jul 9, 2022 – Tue, Jul 12, 2022	Wed, Jun 28, 2023 – Sat, Jul 1, 2023	Sun, Jun 16, 2024 – Wed, Jun 19, 2024

This study makes a significant contribution by examining the influence of Islamic religious observances, including Ramadan, Eid al-Fitr, and Eid al-Adha, on stock return behavior and volatility in Borsa Istanbul. This research examines the impact of calendar anomalies related to religious festivals on market dynamics using robust econometric models, specifically ARMA(p, q) for the mean equation and EGARCH(p,q) for volatility modeling.

A central methodological element of this investigation is its comparative framework, which systematically contrasts the observed market dynamics between conventional equity indices and their Shariah-compliant counterparts (referred to here as participation indices). The study broadens the discourse on Islamic finance

by analyzing market dynamics within an emerging Muslim-majority economy, thereby linking behavioral finance paradigms with the efficacy of financial markets. By focusing on Türkiye's financial markets, the paper delineates the role of investor sentiment during Islamic holidays and offers a nuanced perspective on how such events may or may not generate predictable anomalies in trading. Ultimately, the study challenges prior findings that religious holidays cause market volatility, supporting the Efficient Market Hypothesis (EMH) by showing that these holidays do not regularly create trade anomalies.

The remaining sections of this paper are arranged as follows. The literature on financial markets and religious investor behavior is discussed in the next section, with a particular focus on the calendar anomalies that affect Muslims and non-Muslims. The next section provides a summary of the data and methodology employed by the econometric models used to examine patterns of volatility. In the last section, the study's conclusion and implications are discussed following a review of the empirical findings and discussions from the statistical tests that compare the behavior of conventional and Islamic indices.

## Literature Review

In recent decades, academics have explored whether beliefs and holidays influence investor mood, leading to seasonal fluctuations in the financial market. Culture, ethics, and spirituality impact trading decisions, calling traditional financial theories into doubt. The financial repercussions of Islamic religious observances and Muslim investment behavior are the topic of this review. This paper combines Islamic and non-Islamic settings to gain a better understanding of how religiously driven behavior and market dynamics operate and how these factors may impact market efficiency.

### Financial markets and religious investor behavior.

Studies on ethical and faith-based investing often explore how religious beliefs shape individual investor sentiment and their impact on stock price returns and volatility (Hijazi and Tabash, 2020; Rahmatullah et al., 2021). In contrast to regular investors in the stock market, ethical and religious investors direct their capital toward businesses whose economic activities are consistent with their ethical and religious beliefs. Consequently, the growing popularity of the ethical and religious investing sector has sparked new research concerns regarding the impact that the behavior of ethical and religious investors has on financial markets (Rahmatullah et al., 2021).

## The calendar effect

Calendar anomalies denote systematic return patterns associated with particular dates, months, or religious and cultural events. These anomalies, which endure despite anticipated arbitrage-driven corrections, undermine the concept of market efficiency. While some calendar effects, such as those linked to the start of a new year or particular periods, have been well-documented (Adam et al., 2025; Aslam et al., 2022), others, like those arising from religious holidays, offer more nuanced and complex outcomes (Białkowski & Yaghoubi, 2021; Sing et al., 2025). Understanding these patterns provides valuable insights into market inefficiencies and investor behavior, contributing to the broader field of behavioral finance.

## Non-Islamic calendar effect and investor behavior

The January Effect occurs when stock prices, particularly for small-cap businesses, rise more in January compared to other months. This has been attributed to factors, such as tax-loss selling, settlement procedures, information asymmetry, and bid-ask spread biases (Branch, 1977). However, findings on these patterns vary across markets and periods. Nisar, Asif, and Ali (2021) examined the January Effect in the UK market from 2009 to 2020, employing regression analysis and statistical testing on daily FTSE 100 results. They found weak evidence supporting the January Effect and the tax-loss selling hypothesis; however, the abnormal returns were insufficient to overcome transaction costs, thereby limiting arbitrage opportunities. Cheema, Ding, and Wang (2023) examined the cross-sectional January Effect by constructing 16 long-short portfolios sorted by sentiment sensitivity and arbitrage difficulty. Controlling for the Fama-French five-factor model plus momentum and an October dummy, they documented January returns that are over 20 times higher than those of other months, mainly driven by sentiment-prone stocks, which supports a behavioral mispricing explanation beyond risk premiums. Enow (2024) revisited the January Effect across five major international indices from 2019 to 2024 using daily returns and F-tests. The study found no statistically significant difference in January returns, suggesting that the effect has diminished due to improved market efficiency and the increased use of algorithmic trading. These findings suggest that while sentiment-driven mispricing continues to sustain the January Effect in certain contexts, its overall presence and exploitability have weakened in recent years.

The weekend effect, first documented in the 1980s, refers to the tendency for stock returns on Mondays to be lower than those on the preceding Friday, accom-

panied by increased volatility over weekends. French and Roll (1986) analyzed NYSE and AMEX data using variance decomposition techniques and found weekend volatility only about 10% higher than intraweek levels, suggesting limited price adjustment to weekend information. Fortune (1998) employed jump diffusion models on S&P 500 returns from 1962 to 1997, revealing that although weekend volatility was 10–20% greater, the negative Monday return anomaly largely disappeared after 1987. Miller (1988) used behavioral reasoning to explain this pattern, attributing lower Monday returns to investors' weekend selling, free from broker influence. Subsequent studies applying GARCH and other conditional heteroskedasticity models confirmed that jumps contribute about 80% of total volatility, with weekends exhibiting fewer but larger jumps (Berument & Kiyamaz, 2001). Overall, while the negative weekend drift has diminished, elevated weekend volatility persists, reflecting the accumulation of information and market uncertainty during non-trading periods.

Moreover, among the most widely studied anomalies are the day-of-the-week effect, where returns tend to be lower on Mondays and higher on Fridays, and the turn-of-the-month effect, where returns are higher at the beginning of the month (Hasan et al., 2022). Also, many calendar anomalies, including religious holidays and cultural events, are studied in depth to determine whether they affect stock market returns. Religions often rely on their calendars to coordinate their festivities. The Jewish High Holy Days of Rosh Hashanah and Yom Kippur have been shown to have a significant impact on American investors, as noted by Frieder and Subrahmanyam (2004), who examined the impact of holidays on the S&P 500 index. The result suggested that the stock market responds favorably to Rosh Hashanah and adversely to Yom Kippur.

### **Islamic calendar effect and investor behavior**

The Islamic calendar effect refers to the potential influence of religious observances, such as Ramadan, Eid al-Fitr, and Eid al-Adha, on stock market behavior, particularly returns and volatility. These religious holidays are crucial in the lives of Muslims and have historically been thought to influence investor behavior through changes in sentiment, trading volume, and market liquidity. The concept hinges on the idea that investor psychology and market activity may fluctuate during these periods due to the spiritual and social significance of the events, which include fasting, prayer, increased charitable giving, and festive spending (Białkowski & Yaghoubi, 2021).

*H1*: Stock returns during Ramadan and Eid al-Fitr will differ from other periods, driven by changes in investor sentiment, consumer spending, and market optimism.

The study explores several hypotheses regarding the impact of Islamic religious holidays on market behavior, particularly in the context of Borsa Istanbul. The first hypothesis suggests that stock returns during Ramadan will differ significantly from those outside the period, driven by the assumption that religious observances, such as fasting and prayer, may elevate investor sentiment, thus influencing returns (Białkowski & Yaghoubi, 2021). However, this is counterbalanced by the possibility that reduced trading volumes during Ramadan could suppress returns (Al-Najjar et al., 2023).

According to Białkowski and Yaghoubi (2021), the term “Ramadan effect” is used to explain the phenomenon of extraordinary stock market returns that are impacted by the psychological and religious activities of investors during the holy month of Ramadan. During the month of Ramadan, Muslims are required to observe fasting, participate in additional prayers, refrain from engaging in sinful deeds, and strive to maintain a positive outlook. Eid al-Fitr is a festival that commemorates the end of the month-long fasting season known as Ramadan. Due to the significant changes in daily routines, social interactions, and overall sentiment during this time, researchers have explored whether these behavioral shifts impact stock market performance.

Several empirical studies have identified a tendency toward elevated investor confidence during Ramadan. For example, Al-Khazali (2014), Halari et al. (2015), and Hijazi and Tabash (2020) document upward trends in market performance during the holy month, attributing these shifts to improved investor sentiment and a general atmosphere of optimism. Within the context of South Asian marketplaces, Alvi, Rehan, and Mohiuddin (2021) provide support for this view by establishing a connection between it and seasonal consumer behaviour, as well as cultural expectations surrounding giving and spending.

Between 1988 and 1999, Oğuzsoy and Güven (2004) explored the impact of Ramadan on the Istanbul Stock Exchange, finding that average returns were significantly higher during the holy month. Al-Hajieh et al. (2011) conducted a cross-country study and found positive abnormal returns in six out of eight Muslim-majority countries during Ramadan, attributing this anomaly to improved sentiment and increased social interaction during the fasting period.

Evidence from Türkiye shows a similar but more sector-specific picture. Tan (2017) analyzed data from Borsa Istanbul and 23 sectoral indexes from 1997 to 2015, finding that businesses, including transportation, power, and chemicals, experienced significant returns boost during Ramadan, especially in the first half of the month. This means that religious beliefs affect how investors think and how different sectors undergo their own cycles. These cycles may be driven by consumption patterns or lower competitiveness resulting from fewer active traders.

On a broader regional scale, Ali et al. (2023) evaluated stock market behavior across eight exchanges in Asia and Africa from 2001 to 2019. They reported a positive return anomaly around Eid al-Fitr in several Asian markets, attributing it to heightened consumer spending and economic buoyancy during the festive period. Their findings on Ramadan were more subdued, suggesting only a modest positive impact, pointing to differences in local economic structures and market maturity levels. Eid al-Fitr has also been associated with increased market returns, driven by celebratory spending and optimism (Jaziri & Abdelhedi, 2018). Moreover, the research conducted by Mahmood et al. (2015) demonstrated that Eid-ul-Fitr had a statistically significant impact on the stocks traded on the Karachi Stock Exchange. Adam et al. (2025) also found that Eid al-Fitr had a positive effect on the relationship between investor sentiment and returns in the financial markets of Qatar and the UAE.

Not all studies converge on positive effects. Some argue that religious periods may suppress market activity. Küçükşille and Özmutaf (2015) examined Turkish stock returns over a 26-year period. They found that during the month of Ramadan, there was a significant decline in the trading activity volume. The data revealed that investor engagement decreased, most likely due to fasting and shifts in daily routines. In a study on the impact of Ramadan on Borsa Istanbul, Akbalik and Tunay (2016) applied the GJR-GARCH (1,1) model. Their findings showed that there was a decrease in volatility throughout the month of Ramadan, despite the fact that the returns remained statistically insignificant. Additionally, an earlier study conducted by Alper and Aruoba (2001) highlighted the fact that Islamic holidays have a tendency to distort the Turkish financial markets, particularly in terms of introducing deterministic patterns that have the potential to harm market efficiency. They found that these holidays created predictable patterns that may undermine market efficiency. Their research revealed that higher volatility, especially around Eid, was associated with lower liquidity and irregular trading.

The Saudi market reflected a different trend in the Gulf region, according to Seyyed, Rahman, and Padala (2005). They observed that volatility had consistently decreased during Ramadan, which they attributed to reduced speculation and long-term investment horizons. While these findings suggest greater market stability, they also highlight how religious observance might indirectly influence portfolio strategies. Similarly, McGowan and Jakob (2010), analyzing the Malaysian stock exchange, found no statistically meaningful changes in return behavior around Eid al-Fitr, raising questions about the generalizability of earlier findings.

*H2:* Religiously mandated holidays, such as Eid al-Adha, do not significantly affect stock returns or volatility during the pre- and post-event periods.

The second hypothesis examines Eid al-Adha, suggesting that its unique economic and cultural significance might lead to changes in volatility and returns, particularly given the sacrificial spending and charitable contributions associated with the holiday (Al-Ississ, 2015). However, the empirical evidence supporting such effects remains limited, warranting further investigation.

The Eid al-Adha Effect is a term used to describe the potential impact of the Islamic holiday of Eid al-Adha (and the associated period of Hajj/Zul-Hijjah) on the returns and volatility of the stock market. The large outflows of funds mandated for sacrificial livestock (Qurbani), charitable contributions, and gifts during this period (Chowdhury & Mostari, 2015; Al-Ississ, 2015) may have affected aggregate financial activity and investor sentiment, affecting stock dynamics. While Eid al-Fitr is hypothesized to influence the market through increased consumption and optimism, potentially, the market impact of Eid al-Adha is more likely to stem from obligatory cash reallocations, diminished market participation (volume), and pilgrimage-related logistical withdrawals. These factors result in highly variable and less pronounced return anomalies, although they may also cause reduced volatility in certain markets (Akhter, Sandhu, & Butt, 2015).

Wasiuzzaman (2017) analyzed trading activity in the Saudi market during Hajj from 2010 to 2014 using ARMA-GARCH models. The investigation did not reveal substantial return anomalies; instead, it indicated heightened volatility, possibly due to reduced trading volume as investors temporarily withdrew to participate in the pilgrimage. Akhter, Sandhu, and Butt (2015) examined the market risk and return of six Islamic countries in relation to the Islamic calendar. Daily prices from 1997 to 2013 were utilized for Pakistan, Malaysia, and Indonesia, whereas those from 2006 to 2013 were employed for Türkiye, Morocco, and Egypt. The study revealed that Zul-Hijjah adversely impacted stock market returns in Malaysia, unlike

in other sampled nations. Zul-Hijjah reduced volatility in the Turkish and Egyptian stock markets but did not influence the other nations included in the study.

*H3: Shariah-compliant participation indices will exhibit lower volatility persistence compared to conventional indices, owing to the more conservative investment strategies that avoid high-risk sectors.*

The study posits that Shariah-compliant participation indices will exhibit lower volatility persistence relative to conventional indices, driven by more conservative investment strategies that exclude high-risk sectors. Sectors, such as gambling, banking, adult entertainment, and alcohol, are banned due to the perception that their underlying products or services are harmful or immoral (haram), which frequently results in elevated societal and regulatory risks in the conventional sphere. Consequently, these indices exhibit less risk exposure, resulting in decreased volatility persistence over time (Abu-Alkheil et al., 2024). Conversely, conventional indices, which include firms in more volatile industries, are anticipated to exhibit heightened volatility persistence due to their increased susceptibility to economic shocks and cyclical variations (Ahmed & Farooq, 2018).

Recent literature provides persuasive evidence that corroborates this hypothesis. Moussa Embarek and Berkem (2025) found that conventional indices exhibited more volatility persistence than their Islamic equivalents, which can be attributed to the incorporation of riskier businesses. Similarly, Abu-Alkheil et al. (2024) noted that Shariah-compliant indices exhibit greater stability and reduced volatility by eschewing the speculative and cyclical fluctuations typical of conventional sectors. This corresponds with the consensus that conservative investing techniques, utilized by Shariah-compliant indexes, inherently result in less volatility persistence. Ultimately, the theory posits that Shariah-compliant indices, by avoiding high-risk sectors, exhibit less susceptibility to volatile fluctuations and therefore have lower volatility persistence compared to conventional indices. This knowledge enhances comprehension of how structural disparities across these indicators affect their behavior over time.

## **Data and Variables**

The BIST 100, BIST 50, and BIST 30 indices are comprised of one hundred and fifty and thirty of the most valuable firms in terms of market capitalization. These indices are listed on the Borsa Istanbul in Türkiye. Participation indices, on the other hand, such as the BISTP 100, BISTP 50, and BISTP 30 indices, track the development of the top 100, 50, and 30 market capitalization companies that conduct their business in accordance with Islamic law.

For clarity and conciseness, BIST Participation 100, BIST Participation 50, and BIST Participation 30 indices are referred to as BISTP 100, BISTP 50, and BISTP 30 throughout this paper. It is essential to offer investment options that adhere to Shariah principles. They respect Muslim investors' religious convictions by upholding stringent ethical and financial standards, enabling them to engage in the financial markets. These indices promote transparency, ethical investing, and diversification, contributing to the overall development of the financial market.

Daily prices of the participation indices and conventional indices are used for estimations. The data for both indices are selected from November 15, 2021, to December 31, 2024. This date is considered because the participation indices were first listed on Borsa Istanbul on 15<sup>th</sup> November 2021. The daily data of all the indices were retrieved from the FINNET database.

This study investigates three calendar anomalies in Borsa Istanbul: the Ramadan effect, the Eid Al-Fitr festival effect, and the Eid Al-Adha festival effect. It analyzes stock returns and volatility for the entire Ramadan month and for ten business days before and after the Eid Al-Fitr and the Eid Al-Adha holidays, using dummy variables to account for these anomalies (Ramadan, Eid Al-Fitr, Eid Al-Adha), where a value of 1 indicates the presence of the variable and 0 otherwise. Ramadan is studied because previous research suggests significant changes in economic and social activities during Ramadan, potentially impacting stock market behavior (Seyyed et al., 2005). The study also concentrates on these two major Muslim festivals due to their annual occurrence and importance in Türkiye, a predominantly Muslim country. The findings aim to enhance understanding of how cultural and religious events affect financial markets in Muslim-majority nations.

## Methodology

To transform stock prices into returns, we calculated the change in the logarithm of prices. This approach offers a way to measure returns continuously. The equation applied for this transformation is;

$$Return_t = \ln(P_t) - \ln(P_{t-1}) \quad (2)$$

Where  $Return_t$  represents the daily stock return,  $P_t$  is the stock price at time  $t$ , and  $P_{t-1}$  is the stock price at the previous trading day. This transformation allows for a more accurate representation of percentage price changes over time.

The analysis employs:

- Descriptive statistics to assess overall return behavior.
- GARCH (p, q) model to capture volatility clustering and conditional heteroskedasticity.
- Dummy regression within the GARCH framework to assess the statistical significance of each calendar event.

The primary tool of analysis will be the GARCH (p, q) model, a widely respected volatility model that accounts for both past variances and past error terms. This model will help identify whether volatility clusters around Islamic holidays and whether these clusters differ between conventional and Islamic indices.

$$R_t = \alpha + \sum_{i=1}^p \theta_i R_{t-i} + \sum_{i=1}^q B_j \epsilon_{t-i} + B_1 D_{\text{Ramadan}} + B_2 D_{\text{Eidfitr}_b} + B_3 D_{\text{Eidfitr}_a} + B_4 D_{\text{Eidadha}_b} + B_5 D_{\text{Eidadha}_a} + \epsilon_t \quad (2)$$

Equation,  $R_t$  represents the stock returns at time t, while  $\alpha$  is the intercept term. The autoregressive components (AR (p)) are captured by  $\theta_i$ , and the moving average components (MA (q)) are represented by  $B_j$ .

The dummy variables  $D_{\text{Eidfitr}_b}$ ,  $D_{\text{Eidfitr}_a}$ ,  $D_{\text{Eidadha}_b}$ , and  $D_{\text{Eidadha}_a}$  account for the effects of Ramadan, as well as the pre- and post-Eid Al-Fitr, and pre- and post-Eid Al-Adha periods, respectively, on stock returns. Finally,  $\epsilon_t$  denotes the error term at time t.

Subsequently, the returns will be analyzed using the best-fitting ARMA model, which will then be integrated with dummy variables for Ramadan and Eid periods to explore their influence on volatility and stock market returns.

The variance equation is defined as:

$$h_t = \alpha + \sum_{i=1}^p \theta_i h_{t-i} + \sum_{i=1}^q B_j \epsilon_{t-i}^2 + B_1 D_{\text{Ramadan}} + B_2 D_{\text{Eidfitr}_b} + B_3 D_{\text{Eidfitr}_a} + B_4 D_{\text{Eidadha}_b} + B_5 D_{\text{Eidadha}_a} + \epsilon_t \quad (3)$$

Where  $h_t$  represents conditional variance,  $\alpha$  is the intercept, the past conditional variances are captured by the autoregressive components  $\theta_i$  (GARCH (p)), and the past squared error terms are represented by  $B_j$  (ARCH (q)). The dummy variables  $D_{\text{Eidfitr}_b}$ ,  $D_{\text{Eidfitr}_a}$ ,  $D_{\text{Eidadha}_b}$ , and  $D_{\text{Eidadha}_a}$  account for the effects of Ramadan, pre- and post-Eid Al-Fitr, and pre- and post-Eid Al-Adha periods, respectively, on stock returns. Finally,  $\epsilon_t$  denotes the error term at time t.

The Exponential GARCH (EGARCH) specification is compared to the basic GARCH model to determine whether one better fits asymmetric volatility, as normal GARCH models do not distinguish between the impacts of positive and negative shocks. Since a volatility model that ignores the sign of innovations may produ-

ce biased conclusions, several extensions and modifications to the GARCH model have been developed to address this issue. The EGARCH model mitigates this issue by including leverage effects, enabling negative shocks to have a more pronounced impact on volatility compared to positive shocks of the same magnitude.

The variance equation for the EGARCH process is specified as:

$$\ln(\sigma_t^2) = \omega + \sum_{i=1}^q \alpha_i (|z_{t-i}| - E(|z_{t-i}|)) + \sum_{i=1}^q \gamma_i z_{t-i} + \sum_{j=1}^p \theta_j \ln(\sigma_{t-j}^2) + B_1 D_{\text{Ramadan}} + B_2 D_{\text{EidulFtr.b}} + B_3 D_{\text{EidulFtr.a}} + B_3 D_{\text{Eidadaha.b}} + B_3 D_{\text{Eidadaha.a}} + \epsilon_t \quad (4)$$

where  $z_{t-i} = \varepsilon_{t-i} / \sigma_{t-i}$  denotes the standardized residuals. The term  $|z_{t-i}| - E(|z_{t-i}|)$  reflects the impact of the shock's magnitude, while the coefficient  $\gamma_i$  on  $z_{t-i}$  represents the asymmetry parameter, often described as the leverage effect. It determines whether negative shocks elicit stronger volatility responses than positive shocks of the same size. The  $\theta_j$  parameters capture the persistence of volatility. By including the Islamic calendar indicators in the variance equation, the model can assess whether volatility behaves differently during Ramadan or in the periods surrounding the two Eid festivals.

This methodological framework is consistent with recent empirical studies that employ EGARCH models to capture asymmetric volatility and calendar-related effects in both conventional and Islamic financial markets, including Çelik (2021) for the Turkish stock market, Alsayari and Wickremasinghe (2022) for the Saudi stock market, Tasi'u et al. (2024) for the Nigerian stock market, and Adam et al. (2025) for GCC equity markets.

### Analysis of Results

Table 2 presents descriptive statistics for both conventional (BIST 100, BIST 30, BIST 50) and participation (BISTP 100, BISTP 50, BISTP 30) indices, revealing key insights into their performance. The mean returns are similar across all indices, ranging from 0.002235 to 0.002256, indicating comparable average daily returns. However, participation indices show slightly higher median returns, suggesting a more favorable central tendency. Volatility, measured by standard deviation, is consistent across indices, with BIST 30 being the most volatile (0.020802) and BISTP 100 the least (0.019118). All indices exhibit negative skewness and high kurtosis, indicating left-skewed, leptokurtic distributions with a higher likelihood of extreme returns. The Jarque-Bera test strongly rejects normality for all indices, confirming non-normal return distributions. While both conventional and participation indices share similar risk-return profiles, participation indices demonstrate slightly lower downside risk and higher median returns, potentially appealing to risk-averse investors.

**Table 2***Descriptive Statistics*

	BIST 100	BIST 50	BIST 30	BISTP 100	BISTP 50	BISTP 30
Mean	0.002249	0.002240	0.002250	0.002235	0.002252	0.002256
Median	0.002392	0.002397	0.002129	0.003167	0.003200	0.003388
Maximum	0.094219	0.09506	0.095083	0.092619	0.093689	0.093710
Minimum	-0.090112	-0.09292	-0.095082	-0.087881	-0.088174	-0.092806
Std. Dev.	0.019714	0.020346	0.020802	0.019118	0.019696	0.020086
Skewness	-0.516898	-0.44843	-0.388579	-0.505050	-0.469037	-0.452458
Kurtosis	6.247066	6.053253	5.863530	6.185721	6.098433	6.051213
Jarque-Bera	379.3310*	330.8060*	287.5901*	364.8580*	342.3554*	330.8733*
Observations	784	784	784	784	784	784

Notes: \*\*\* indicates rejection of the null hypothesis at the 1% level. Normality is assessed using the Jarque-Bera test.

The Augmented Dickey-Fuller (ADF) unit root test results in Table 3 suggest that the return series across all the indices are stationary. This conclusion is based on highly negative t-statistics (-26.72 to -27.53), all of which are statistically significant at the 1% level. Since stationarity is a key requirement for many time series models, these findings confirm that the data is suitable for further econometric analysis. However, the ADF test does not capture volatility clustering or heteroskedasticity, both of which are common in financial time series. To address this, additional tests, such as the ARCH-LM test, are needed to assess whether volatility changes over time. When high and low volatility clustering occurs in financial markets, GARCH models are better at capturing these dynamics, making them vital for understanding risk and return fluctuations in financial data.

**Table 3***Augmented Dickey-Fuller Unit Root Tests for Return Series*

Indices	t-statistics (without intercept and trend)	Std. Error
BIST 100	-27.2116***	0.035739
BIST 50	-27.3064***	0.035742
BIST 30	-27.5315***	0.035748
BISTP 100	-26.72675***	0.035716
BISTP 50	-26.8000***	0.035722
BISTP 30	-26.7210***	0.035716

Notes: \*\*\* Indicates significance at the 1% level.

### ARMA model selection

The ARMA model selection results reported in Table 4 indicate a clear and consistent preference for the ARMA(2,2) specification across all six indices, namely BIST 100, BIST 50, BIST 30, and their participation-based counterparts (BISTP 100, BISTP 50, and BISTP 30). While the simpler models ARMA(1,1), ARMA(1,2), and ARMA(2,1) fail to achieve overall parameter significance, the ARMA(2,2) model is the only specification that yields statistically significant p-values for all indices, suggesting a better representation of the underlying return dynamics. The information criteria and likelihood measures further support this conclusion. For each index, ARMA(2,2) records the highest log-likelihood values and the lowest Akaike Information Criterion (AIC), Schwarz Criterion (BIC), and Hannan–Quinn Criterion (HQ) compared to alternative specifications. The consistent improvement in these metrics indicates superior in-sample fit despite the higher model complexity. Taken together, the statistical significance of the parameters and the dominance of the information criteria justify the selection of ARMA(2,2) as the most appropriate mean equation specification for modelling return behavior prior to volatility estimation.

**Table 4**

*ARMA Model Selection*

BIST 100				
	ARMA (1,1)	ARMA(1,2)	ARMA(2,1)	ARMA(2,2)
P-values (Significance)	No	No	No	Yes
Log likelihood	1968.073	1968.105	1968.112	1970.564
Akaike	-4.997636	-4.997717	-4.997734	-5.003989
Schwarz	-4.944091	-4.944172	-4.944189	-4.950444
Hannan-Quinn	-4.977047	-4.977128	-4.977145	-4.9834
BIST 50				
	ARMA (1,1)	ARMA(1,2)	ARMA(2,1)	ARMA(2,2)
P-values (Significance)	No	No	No	Yes
Log likelihood	1943.247	1943.274	1943.28	1945.598
Akaike	-4.934304	-4.934374	-4.934387	-4.940302
Schwarz	-4.880759	-4.880828	-4.880841	-4.886757
Hannan-Quinn	-4.913715	-4.913784	-4.913797	-4.919713

BIST 30				
	ARMA (1,1)	ARMA(1,2)	ARMA(2,1)	ARMA(2,2)
P-values (Significance)	No	No	No	Yes
Log likelihood	1925.719	1925.619	1925.624	1927.966
Akaike	-4.889589	-4.889334	-4.889347	-4.895321
Schwarz	-4.836044	-4.835789	-4.835802	-4.841775
Hannan-Quinn	-4.869	-4.868745	-4.868758	-4.874731
BISTP 100				
	ARMA (1,1)	ARMA(1,2)	ARMA(2,1)	ARMA(2,2)
P-values (Significance)	No	No	No	Yes
Log likelihood	1992.623	1992.718	1992.738	1994.377
Akaike	-5.060263	-5.060504	-5.060556	-5.064738
Schwarz	-5.006717	-5.006959	-5.007011	-5.011193
Hannan-Quinn	-5.039673	-5.039915	-5.039967	-5.044149
BISTP 50				
	ARMA (1,1)	ARMA(1,2)	ARMA(2,1)	ARMA(2,2)
P-values (Significance)	No	No	No	Yes
Log likelihood	1969.134	1969.211	1969.228	1971.167
Akaike	-5.000343	-5.000539	-5.000581	-5.005527
Schwarz	-4.946797	-4.946994	-4.947036	-4.951982
Hannan-Quinn	-4.979753	-4.97995	-4.979992	-4.984938
BISTP 30				
	ARMA (1,1)	ARMA(1,2)	ARMA(2,1)	ARMA(2,2)
P-values (Significance)	No	No	No	Yes
Log likelihood	1969.134	1969.211	1969.228	1971.167
Akaike	-5.000343	-5.000539	-5.000581	-5.005527
Schwarz	-4.946797	-4.946994	-4.947036	-4.951982
Hannan-Quinn	-4.979753	-4.97995	-4.979992	-4.984938

### GARCH model selection

Table 5 displays the model selection outcomes for the conditional volatility specifications, based on an ARMA(2,2) mean equation. This ARMA structure was preserved since it was the only model that yielded statistically significant AR(2) and MA(2) coefficients at the 5% level across all indices, while also producing comparably lower AIC, BIC, and Hannan–Quinn values.

Comparing the GARCH(1,1) and EGARCH(1,1) estimates, the results clearly favour the EGARCH specification. Across all indices, EGARCH(1,1) achieves higher log-likelihood values and lower AIC, BIC, and Hannan–Quinn criteria, indicating a better overall in-sample fit. Beyond its numerical superiority, the EGARCH framework offers a significant theoretical advantage: it captures leverage effects, allowing negative shocks to have a different impact on volatility than positive shocks of the same magnitude, a crucial feature in financial markets.

EGARCH(1,1) is preferred over more complex alternatives, such as EGARCH(2,1), because increasing the lag structure does not provide additional explanatory power and would risk overfitting. The (1,1) specification achieves the optimal balance between model parsimony and statistical performance.

Overall, Table 5 provides compelling empirical and theoretical justification for selecting the EGARCH(1,1) model as the most appropriate volatility specification for the data.

**Table 5**

*GARCH Model Selection Criteria*

Criteria	GARCH(1,1)					
	BIST 100	BIST 50	BIST 30	BISTP 100	BISTP 50	BISTP 30
AR(2) P-values	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
MA(2) P-Values	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Log likelihood	2004.505	1976.667	1955.242	2041.884	2019.106	2000.92
Akaike	-5.08569	-5.014494	-4.959698	-5.18129	-5.123032	-5.076521
Schwarz	-4.990306	-4.91911	-4.864315	-5.085906	-5.027649	-4.981138
Hannan-Quinn	-5.049008	-4.977812	-4.923017	-5.144608	-5.086351	-5.03984
Criteria	EGARCH(1,1)					
	BIST 100	BIST 50	BIST 30	BISTP 100	BISTP 50	BISTP 30
AR(2) P-values	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
MA(2) P-Values	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Log likelihood	2008.113	1978.926	1957.112	2047.792	2024.29	2007.707
Akaike	-5.092361	-5.017714	-4.961924	-5.193842	-5.133733	-5.091323
Schwarz	-4.991017	-4.916369	-4.860579	-5.092497	-5.032388	-4.989979

## Results and Discussion

The EGARCH (1,1) estimation in Table 6 provides a more nuanced understanding of volatility behavior in Turkish equity markets by accounting for asymmetry in the response of volatility to shocks. In the mean equation, there is no statistically significant impact of Islamic calendar dummies across all six indices: BIST 100, BIST 50, BIST 30, and their participation-based counterparts (BISTP 100, BISTP 50, BISTP 30). Although the coefficients on pre- and post-Eid periods and Ramadan fluctuate in sign and magnitude, none attain significance at conventional levels, except the constant term, which is positive and significant in BIST 50 (0.002300,  $p < 0.01$ ), BIST 30 (0.002064,  $p < 0.01$ ), BISTP 50 (0.002181,  $p < 0.01$ ), and BISTP 30 (0.002328,  $p < 0.01$ ). This supports the assertion that Islamic religious observances do not meaningfully alter average return behavior, echoing findings by Al-Ississ (2015) and McGowan and Jakob (2003), who concluded that such religious events are not priced in a way that systematically affects returns. Similar conclusions have been reached in recent EGARCH-based studies for emerging markets; for instance, Çelik (2021) finds that while calendar-related effects are more pronounced in volatility dynamics, their influence on mean returns remains limited in the Turkish stock market.

In the variance equation, however, more revealing dynamics emerge. Among all six indices, only BISTP 100 shows a statistically significant Ramadan volatility effect, with a coefficient of  $-0.191616$  ( $p < 0.05$ ). This indicates a decline in conditional variance during Ramadan for this particular participation index, potentially reflecting more disciplined or less speculative trading behavior aligned with investor sentiment during the holy month. The remaining indices show no significant Ramadan effect, nor do they exhibit volatility shifts surrounding Eid al-Fitr or Eid al-Adha. This stands in contrast to earlier literature by Białkowski and Yaghoubi (2021), who observed reduced volatility and improved returns during Ramadan in several Muslim-majority markets. However, their results were largely market-wide, whereas this study points to an index-specific anomaly. This localized Ramadan effect in BISTP 100 could stem from the composition of its constituent firms or from investor behavior unique to that segment. Comparable index-specific and market-dependent volatility responses are also reported by Tasi'u et al. (2024) for Nigeria, where EGARCH models reveal that holiday effects materialize primarily in volatility rather than returns and vary across trading days surrounding public and religious holidays.

One of the most notable and counterintuitive findings is that participation indices consistently display higher volatility compared to their conventional counterparts, contrary to many assumptions in Islamic finance literature. For instance, the ARCH term (which captures short-term reaction to shocks) is highest in BISTP 30 (0.425878) and lowest in BIST 30 (0.303791), while the GARCH term (reflecting volatility persistence) is also slightly elevated in BISTP indices, with BISTP 50 registering 0.811861 compared to 0.772163 in BIST 50. These findings challenge the narrative that Islamic stocks are inherently less volatile, a notion popularized by studies, such as Almaida et al. (2023), who reported that Shariah-compliant stocks tend to exhibit more stable performance. The results suggest otherwise, at least in the Turkish context, pointing instead to a higher responsiveness to shocks and more persistent volatility in Islamic indices. The reasons may lie in sectoral composition, limited diversification, or different investor bases. This observation is consistent with recent evidence from other emerging Islamic markets, where participation-based indices have been shown to exhibit comparable or even higher volatility persistence than conventional benchmarks when asymmetric volatility is properly modelled (Alsayari & Wickremasinghe, 2022).

Consistently across all indices, the leverage effect parameter ( $\gamma$ ) is negative and highly significant, ranging from  $-0.097678$  (BIST 30) to  $-0.135082$  (BIST 100), confirming that negative shocks exert a greater effect on volatility than positive shocks of the same magnitude. This is in line with the stylized fact of financial markets: volatility tends to rise more following bad news than after good news. These results support the broader EGARCH literature, including Ghallabi et al. (2024) and Aslam et al. (2022), which similarly report negative and significant  $\gamma$  coefficients in both conventional and Islamic markets. The presence of the leverage effect across all six indices strengthens the case that Turkish stocks are asymmetrically sensitive to downside risks, a feature that risk managers and policymakers should consider when modelling asset behavior. They also align closely with findings by Çelik (2021) and Alsayari and Wickremasinghe (2022), who document intense and persistent leverage effects in Turkish and Saudi stock markets, respectively, particularly around calendar-related trading periods.

Finally, both ARCH and GARCH terms are statistically significant and large in all indices, indicating strong volatility clustering and high persistence. The sum of the ARCH and GARCH terms for each index approaches 1, suggesting that volatility shocks decay slowly. For example, BISTP 50 has an ARCH term of 0.403212 and a GARCH term of 0.811861, totaling over 1.21, which may suggest potential

model instability or the presence of extended memory. This finding is consistent with empirical studies of emerging markets, where structural breaks, low liquidity, and economic shocks often lead to highly persistent volatility (Tan, 2017; Adam et al., 2025). Similar high persistence parameters are reported by Tasi'u et al. (2024), reinforcing the view that volatility in emerging and frontier markets is slow-moving and strongly path-dependent.

In summary, the EGARCH (1,1) results suggest that religious holidays have a minimal impact on Turkish stock volatility, except in one participation index. Contrary to expectations from the literature, participation indices exhibit higher, not lower, volatility, and all indices display significant leverage effects and persistent variance structures. These findings challenge some traditional assumptions in Islamic finance and underscore the importance of examining market behavior through models that allow for asymmetry and index-specific behavior.

**Diagnostic analysis after EGARCH (1,1) estimation** After estimating the EGARCH (1,1) model, it is essential to perform diagnostic tests to confirm that the model has adequately captured the volatility structure in both conventional indices (BIST 100, BIST 50, BIST 30) and participation indices (BISTP 100, BISTP 50, BISTP 30). Two key diagnostic tests are evaluated: the Ljung-Box Q test on squared residuals and the ARCH-LM F-test, which assesses the presence of serial correlation and any remaining heteroskedasticity in the residuals. The Ljung-Box Q test applied to the squared residuals evaluates whether any remaining serial correlation persists, which would suggest incomplete modelling of volatility dynamics.

In the results presented in Table 7, all p-values of the Ljung-Box Q test exceeded the conventional 5% threshold, with values ranging from 0.842 for BIST 30 to 0.994 across all indices. These outcomes indicate that the null hypothesis of no autocorrelation in the squared residuals cannot be rejected for any of the indices. To further assess the adequacy of the model, the ARCH-LM F-test was conducted. This test probes whether any additional autoregressive conditional heteroskedasticity remains unaccounted for in the residuals. The results again suggest a good model fit, with all p-values above the 5% threshold, with values ranging from 0.840 for BISTP 50 to 0.955 across all indices. Since none of the test statistics approached statistical significance, the null hypothesis that there are no remaining ARCH effects holds across all indices.

Overall, the diagnostic checks support the conclusion that the EGARCH (1,1) specification is appropriate for both index types. No evidence emerges of leftover

**Table 6**

**EGARC(1,1) Model Results**

Variables	BIST 100		BIST 50		BIST 30		BISTP 100		BISTP 50		BISTP 30	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
<i>Mean equation</i>												
Constant	0.000029	0.002763	0.002300***	0.000842	0.002064***	0.000809	0.001652	0.001031	0.002181***	0.000732	0.002328***	0.000768
AR (2)	0.992831***	0.008158	0.855750***	0.116425	0.890574***	0.082136	0.915214***	0.067999	-0.978294***	0.025314	-0.978986***	0.020582
MA (2)	-0.992298***	0.008394	-0.843957***	0.122400	-0.892657***	0.081073	-0.883272***	0.078913	0.978197***	0.025233	0.978801***	0.021383
	0.000529	0.002921	0.001391	0.003086	0.002168	0.003099	-0.000482	0.003094	-0.000026	0.002997	-0.000228	0.003020
	-0.001970	0.003914	-0.001036	0.004237	-0.001950	0.004320	0.000943	0.004189	-0.000324	0.004309	-0.000649	0.004224
	-0.004493	0.003189	-0.003674	0.003083	-0.003351	0.003241	-0.004024	0.003018	-0.005291	0.003128	-0.005884	0.003258
	-0.002641	0.003687	-0.003003	0.003831	-0.002860	0.003838	-0.003154	0.003898	-0.002568	0.003819	-0.003666	0.003688
	0.003473	0.003125	0.003118	0.003271	0.002861	0.003211	0.001017	0.003061	0.001555	0.003225	0.000684	0.003122
<i>Variance Equation</i>												
Constant	-2.304367***	0.467093	-2.028867***	0.460085	-1.850955***	0.466427	-2.008863***	0.335876	-1.798614***	0.343036	-2.059686***	0.369767
ARCH term	0.349312***	0.054569	0.330475***	0.051558	0.303791***	0.049420	0.372420***	0.043397	0.403212***	0.046105	0.425878***	0.051033
	-0.135082***	0.035280	-0.103870***	0.034183	-0.097678***	0.033035	-0.129939***	0.031563	-0.107965***	0.029769	-0.116552***	0.032365
GARCH term	0.740531***	0.055443	0.772163***	0.055294	0.790950***	0.056769	0.783432***	0.039312	0.811861***	0.040526	0.780333***	0.043720
	-0.175904	0.118582	-0.159766	0.114292	-0.134844	0.113583	<b>-0.191616**</b>	0.096438	-0.153159	0.095206	-0.182057	0.104129
	0.182943	0.150650	0.161481	0.152120	0.116586	0.151733	0.256091	0.136239	0.200265	0.136379	0.233238	0.143591
	-0.079244	0.127793	-0.078992	0.115179	-0.061139	0.107514	-0.162509	0.149880	-0.111759	0.135624	-0.108090	0.141622
	0.004527	0.138556	-0.010806	0.121144	-0.009828	0.114640	0.055680	0.126254	0.038854	0.122220	0.051903	0.135380
	-0.242310	0.133251	-0.211849	0.131266	-0.183481	0.126879	-0.223019	0.117563	-0.190155	0.106282	-0.198693	0.129752

\*\*\* indicates significance at the 1% level, \*\* at the 5% level, and \* at the 10% level.

serial dependence or unmodeled conditional variance, implying that further specification enhancements or alternative model structures are not required based on these residual diagnostics.

**Table 7**

*EGARCH (1,1) Diagnostic Statistics*

	BIST 100	P-Value	BIST 50	P-Value	BIST 30	P-Value
Ljung-Box Q (20)- squared residuals	9.219	0.980	12.027	0.915	13.779	0.842
ARCH-LM <i>F-statistics</i>	0.022	0.882	0.003	0.955	0.008	0.931
	BISTP 100	P-Value	BISTP 50	P-Value	BISTP 30	P-Value
Ljung-Box Q (20)- squared residuals	7.669	0.994	8.207	0.990	8.916	0.984
ARCH-LM <i>F-statistics</i>	0.031	0.861	0.041	0.840	0.010	0.921

## Conclusion

This study aimed to reexamine whether Islamic religious observances impact return and volatility dynamics in the Turkish stock market, employing an ARMA(2,2)–EGARCH(1,1) framework that explicitly accommodates asymmetric volatility responses.

The results indicate that Islamic religious holidays do not appear to exert a systematic effect on either returns or volatility across the indices examined, with only a localized effect observed in the BISTP 100 during Ramadan. In this sense, the findings align closely with earlier work by Al-Ississ (2015) and McGowan and Jakob (2003), who similarly reported little evidence that religious observances are priced in a way that consistently alters market behavior.

At the same time, the results diverge from studies that document broader market-wide Ramadan effects, such as Białkowski and Yaghoubi (2021), who found lower volatility and higher returns across several Muslim-majority markets. The contrast appears to stem from market structure and index composition. In the Turkish case, any calendar-related effect appears to be confined to a single participation index, rather than reflecting a generalized market response. This pattern became clearer when comparing conventional and Shariah-compliant indices side by side, suggesting that institutional features and investor composition matter more than religious timing alone.

Perhaps the most striking outcome concerns volatility behavior in participation indices. Contrary to the common assumption that Shariah-compliant indices are inherently more stable, the evidence here points to higher volatility levels and stronger persistence compared to conventional benchmarks. This result stands in contrast to studies such as Almaida et al. (2023), which emphasize the stabilizing role of Shariah screening. Factors, such as sector composition and the lack of diversity in Islamic indices, may contribute to this outcome.

The presence of significant leverage effects across all indices confirms that negative shocks have a greater impact on volatility than positive ones, aligning with established financial market behavior. The observed volatility persistence across all indices suggests that market shocks have enduring impacts and may not dissipate rapidly. Similar asymmetries have been documented in both Islamic and conventional markets by Aslam et al. (2022) and Ghallabi et al. (2024), suggesting that Turkish equities are no exception to this broader stylized fact. This highlights the importance of simulating market behavior while considering volatility clustering and asymmetric reactions to shocks.

From a policy and practical perspective, these findings carry several implications. Market participants and risk managers should be cautious about assuming lower risk in participation indices solely based on Shariah compliance, particularly given the evidence of strong volatility persistence and pronounced leverage effects. Regulators, meanwhile, may wish to account for these asymmetric risk dynamics when designing stress-testing frameworks or market-stability policies. However, the absence of significant holiday effects in this study suggests that market participants may not need to adjust their strategies based on religious events. More comprehensive data and studies across broader indices are needed to understand the broader implications for emerging markets.

While these findings contribute valuable insights into volatility dynamics in the Turkish market, it is important to note the limitations of the empirical data in drawing definitive conclusions, especially given the study's limited scope to a few indices. Thus, the conclusions drawn here should be treated with appropriate caution, and further research with broader datasets and across different time periods is necessary to validate these findings.

Future research could use longer samples, higher-frequency data, or alternative volatility specifications to explore these issues in greater depth. Extending the analysis to sentiment indicators or macroeconomic regimes may also help capture

short-term investor reactions that may not be fully reflected in daily stock returns. Additionally, exploring the interaction between religious observances and broader economic cycles could provide deeper insights into how investor psychology interacts with financial markets.

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