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THE EFFECTS OF MACROECONOMIC NEWS SURPRISES ON BORSA ISTANBUL SECTORAL INDICES: A STUDY WITH VOLATILITY MODELS*

Makroekonomik Haber Sürprizlerinin Borsa İstanbul Sektörel Endekslerine Etkileri: Volatilite Modelleriyle Bir Çalışma

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Keywords:
Stock Market, Istanbul, Volatility, ARCH, GARCH.

JEL Codes:
E44, G14, C22, G12.

Abstract

This study aims to determine the impact of unexpected economic news announcements on the returns of sectoral indices in Borsa Istanbul (BIST). Utilizing volatility models, the research examines how unexpected developments in key financial indicators influence sectoral returns and volatility reactions. The dataset comprises daily closing prices of 26 BIST sectoral indices from January 1, 2018, to December 31, 2022, sourced from Tradingview. Data regarding expectations and realized values for inflation, growth, unemployment, CBRT policy rates, and FED interest rates were obtained from Bloomberg. The findings reveal that average returns across all sectoral indices are positive, with positive news announcements yielding a more favorable impact than negative ones. Furthermore, negative shocks induce higher volatility than positive shocks, indicating a significant leverage effect across the indices. As the most comprehensive study to date covering 26 indices, these results provide vital insights for investors regarding market reactions to economic surprises and contribute significantly to the existing literature on emerging market efficiency.

Anahtar Kelimeler:
Hisse Senedi Piyasası, Istanbul, Volatilite, ARCH, GARCH.

JEL Kodları:
E44, G14, C22, G12.

Öz

Bu çalışmanın amacı, Borsa İstanbul'daki sektörel endekslerin getirileri üzerindeki ekonomik haber duyurularındaki beklenmeyen gelişmelerin etkilerini belirlemektir. Bu amaçla, Borsa İstanbul'da işlem gören seçilmiş sektörel endekslerin getirileri üzerindeki beklenmeyen ekonomik haber duyurularının etkisi ve bu beklenmeyen gelişmelere sektörel endekslerin verdiği tepkiler volatilite modelleri kullanılarak test edilmiştir. Çalışmada, 01 Ocak 2018 – 31 Aralık 2022 dönemini kapsayan 26 BIST sektörel endeksine ait günlük kapanış fiyatları TradingView veri platformundan elde edilmiştir. Enflasyon oranı, büyüme oranı, işsizlik oranı, TCMB politika faizi ve FED faiz oranı gibi ekonomik değişkenlere ilişkin beklenti ve gerçekleşme verileri Bloomberg veri platformundan temin edilmiştir. Çalışma sonucunda, tüm sektörel endekslerde ortalama getirilerin pozitif olduğu ve olumlu haber duyurularının, olumsuz haberlere kıyasla sektörler üzerinde daha olumlu etkiler yarattığı belirlenmiştir. Ayrıca BIST endekslerinde negatif şokların pozitif şoklara göre daha fazla volatiliteye neden olduğu ve bu bağlamda endekslerde kaldıraç etkisinin daha yüksek olduğu tespit edilmiştir. Bu sonuçlar, BIST'te işlem yapan yatırımcılara ekonomik haberlerin ve beklenmeyen gelişmelerin etkileri konusunda fikir vermesi açısından önemlidir. Çalışma, 26 BIST sektörel endeksinin ekonomik duyurular ve beklenmeyen gelişmelere verdiği tepkileri ölçen şimdiye kadarki en kapsamlı çalışma olması bakımından literatüre katkı sunması beklenmektedir.

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1. Introduction

Understanding the impact of unexpected economic developments on financial markets is crucial, as such events often trigger volatility and influence investor decisions. Among financial markets, stock exchanges play a key role in reflecting changes in macroeconomic conditions, with stock prices serving as indicators of both corporate performance and broader economic trends. This study investigates how sectoral indices within Borsa Istanbul (BIST) respond to unexpected economic announcements, emphasizing the influence of economic surprises—defined as deviations between market expectations and actual outcomes of key macroeconomic indicators (Wallenius et al., 2017; Christiansen et al., 2007; Niu and Zhang, 2021).

While previous research has extensively examined the effects of macroeconomic variables such as exchange rates, inflation, GDP, and interest rates on stock returns, most studies have focused on the announcements themselves rather than the differences between expected and realized values. However, financial markets react not only to the release of economic data but also to how closely these data align with or diverge from prior expectations. This difference—often referred to as an economic "surprise"—is crucial, as it influences market volatility and return dynamics. Notably, negative surprises tend to elicit stronger and longer-lasting market reactions compared to positive surprises, reflecting asymmetrical investor behavior (Niu and Zhang, 2021; Christiansen et al., 2007).

Despite extensive research on this topic in developed markets, the sector-specific effects of economic surprises in emerging markets, particularly Türkiye, remain underexplored. This study addresses this gap by examining the responses of 26 BIST sectoral indices to unexpected economic developments between January 2018 and December 2022. The analysis compares analyst expectations with actual announced values for key indicators, including the Consumer Price Index (CPI), Gross Domestic Product (GDP), Unemployment Rate, and interest rates from both the Central Bank of the Republic of Türkiye (CBRT) and the Federal Reserve (Fed). The use of GARCH and EGARCH models captures the time-varying nature of volatility and investigates whether positive and negative shocks produce asymmetric responses (Hashimoto et al., 2010; Gupta et al., 2013).

The findings indicate that ARCH and GARCH effects are statistically significant across all sectoral models, confirming the presence of volatility persistence. Moreover, asymmetry effects emerge, with GDP growth surprises eliciting stronger responses to positive shocks, whereas inflation, unemployment, and interest rate surprises primarily generate stronger negative reactions. Sectoral differences also play a significant role: for example, food-related firms benefit from positive GDP growth surprises, while labor-intensive sectors are more sensitive to unemployment shocks. Additionally, CBRT rate surprises tend to yield positive sectoral responses, whereas Fed rate surprises often lead to negative returns, highlighting the contrasting impacts of domestic and global monetary policy.

The primary contribution of this research lies in its comprehensive analysis of sector-specific reactions to economic surprises, offering insights into how different sectors within Borsa Istanbul respond to both domestic and global economic developments. By distinguishing between positive and negative shocks, the study provides a nuanced understanding of volatility dynamics, enhancing both theoretical knowledge and practical investment strategies. Furthermore, the findings support the semi-strong form of the Efficient Markets Hypothesis (Fama, 1976), as new information related to macroeconomic indicators quickly influences stock prices. Nonetheless,

the mixed outcomes observed across different sectors underscore the need for sector-specific analyses when evaluating market reactions to economic surprises.

The remainder of this paper is structured as follows: The literature review discusses key theoretical and empirical studies on the relationship between macroeconomic indicators and stock market volatility. The research methodology outlines the data sources, variables, and econometric models employed. The results section presents the empirical findings, highlighting sectoral differences and asymmetric responses. Finally, the conclusion summarizes the key insights, discusses their implications for investors and policymakers, and suggests avenues for future research.

2. Literature Review

The relationship between macroeconomic indicators, unexpected economic announcements, and stock returns has long been examined from both theoretical and empirical perspectives. The core premise of these studies is that variables such as interest rates, inflation (CPI, PPI), employment, and economic growth (GDP) influence investor expectations and companies' future cash flows, making unexpected or misaligned announcements a catalyst for market fluctuations (Rad, 2011; Pilinkus and Boguslauskas, 2009; Bhunia, 2013; Zhu, 2012; Özcan, 2012; Ünal, 2021; Albeni and Demir, 2005; Süslü and Gök, 2021; Şimşek, 2019). Changes in interest rates affect firms' capital costs and alternative investment returns, while inflationary pressures can increase operational costs and reduce pricing power. Consequently, economic announcements that diverge from market expectations often result in volatility and shifts in stock prices.

The concept of “surprise” in economic announcements—measured as the difference between expected and actual values—has been shown to significantly influence stock market volatility and returns (Wallenius et al., 2017; Christiansen et al., 2007; Heinlein et al., 2022; Andika et al., 2019). Negative surprises typically trigger prolonged price declines, whereas positive surprises can reduce volatility and stabilize prices (Niu and Zhang, 2021; Christiansen et al., 2007). This asymmetry reflects how investor sentiment and market liquidity influence stock price movements, with positive surprises often resulting in short-lived gains and negative surprises causing longer-lasting downward trends.

Measuring economic surprises requires accounting for the heterogeneity of analyst forecasts and consensus estimates, as variations between expected and realized values shape market reactions (Garaffa et al., 2023; Fisher et al., 2022). Inflation exceeding expectations often raises concerns about monetary tightening, depressing stock prices, while lower-than-expected unemployment figures can boost growth expectations, leading to price increases. The intensity of these reactions also depends on the significance of the announcement and prevailing market conditions.

Sectoral differences in response to macroeconomic announcements are well-documented. Interest rate announcements have prolonged effects on interest-sensitive sectors such as banking, whereas inflation and employment data more strongly impact consumer-facing industries (Hashimoto et al., 2010; Gupta et al., 2013). Negative surprises generally produce longer-lasting effects, while positive surprises tend to generate shorter-term gains (Niu and Zhang, 2021; Aray and Agnani, 2008). Central bank announcements are particularly influential, as unexpected rate

hikes typically lower stock prices, while positive economic signals can boost risk appetite (Jarociński et al., 2018).

International comparisons reveal that developed markets, such as those in the US and Europe, often react more swiftly and deeply to announcements, while emerging markets may exhibit delayed but more intense responses (Hanousek et al., 2009; Hussain et al., 2020). US economic announcements have global repercussions, particularly during crises like the 2008 financial crisis, where increased correlations led to synchronized market reactions (Gürgül et al., 2016; Rühl et al., 2014). European Central Bank decisions also affect both European and emerging markets, with varying effects depending on the type of announcement (Wallenius et al., 2017). Beyond equities, macroeconomic surprises influence bond and cryptocurrency markets, with Bitcoin, for example, reacting negatively to positive employment and durable goods data while showing a limited response to GDP and inflation announcements (Corbet et al., 2020).

Methodologically, volatility models such as the GARCH family are widely used to measure the uncertainty induced by economic announcements, while event studies capture abnormal returns and volatility changes around announcement dates (Niu and Zhang, 2021; Christiansen et al., 2007). Regime-switching models and high-frequency data (e.g., minute-by-minute or hourly intervals) provide insights into immediate market reactions, offering a more granular view of volatility patterns (Li and Engle, 1998; Aray and Agnani, 2008). Behavioral finance research further highlights that investor responses to surprises are not always rational, with negative surprises eliciting stronger and longer-lasting reactions compared to positive surprises (Niu and Zhang, 2021).

Several studies have examined the impact of macroeconomic announcements and volatility transmission across major global stock markets using GARCH-type models (Malik and Ewing, 2009; Arouri et al., 2013; Creti et al., 2013).

Recent research focusing on the Turkish stock market has also explored volatility spillovers and asymmetric effects. Akkaya (2021) analyzed volatility transmission from developed and emerging markets to Borsa Istanbul using the EGARCH framework and found strong evidence of leverage effects and volatility spillovers from global indices such as the Dow Jones and exchange rate shocks, indicating that BIST is significantly influenced by international dynamics. Similarly, Akkaya and Küçükpınar (2023) identified volatility spillovers from DAX (Germany) and NIFTY (India) to BIST100, further confirming the sensitivity of Turkish markets to global shocks and asymmetric information flows. Kamışlı and Sevil (2018) examined volatility interactions among Borsa Istanbul's sub-sector indices using the DCC-GARCH model and found that crises and policy shocks changed sectoral volatility structures. These results are consistent with international evidence showing that financial contagion and cross-market linkages intensify during crises (Naoui et al., 2010; Syllignakis and Kouretas, 2011; Creti et al., 2013).

The relationship between volatility and macroeconomic news surprises can also be explained theoretically through the Efficient Market Hypothesis (Fama, 1970) and the Rational Expectations Theory, where markets react immediately to unexpected information. Such news surprises (e.g., inflation, GDP, or interest rate announcements) alter investors' expectations and risk perception, leading to volatility clustering as described by Engle (1982) and refined by Nelson (1991) through the EGARCH model. Negative shocks typically generate stronger volatility than positive ones of equal magnitude—a phenomenon known as the leverage effect (Black, 1976; Christie, 1982).

In emerging markets such as Türkiye, volatility reactions are often amplified due to exchange rate sensitivity, external dependency, and structural fragilities. Therefore, analyzing sectoral volatility responses to economic surprises through the EGARCH approach provides a solid theoretical and empirical basis for understanding asymmetric information transmission and risk dynamics in Borsa Istanbul.

Although previous studies have provided valuable insights into the volatility dynamics of Borsa Istanbul and other emerging markets, most have primarily focused on aggregate indices or crisis periods without differentiating sector-level reactions or linking them explicitly to macroeconomic news surprises. For instance, Kamışlı and Sevil (2018) and Akkaya (2021) examined volatility transmission and asymmetry using GARCH-type models but did not incorporate the role of economic announcements or news-based shocks. Similarly, international studies such as Naoui et al. (2010) and Syllignakis and Kouretas (2011) concentrated on contagion and spillover effects across countries, leaving the question of how sectoral volatility responds to domestic macroeconomic developments largely unexplored.

Furthermore, most of the existing literature adopts static or market-wide approaches, limiting the understanding of how volatility behaves differently across sectors exposed to distinct macroeconomic risks. Therefore, this study extends the current literature by integrating the EGARCH model with macroeconomic news surprise variables to capture the asymmetric and sector-specific volatility responses within the Turkish market.

By connecting information shocks to sectoral return dynamics, the research contributes to both theory and practice by providing new evidence on the informational efficiency, asymmetric behavior, and sensitivity of Borsa Istanbul to domestic and global macroeconomic developments.

In summary, existing research demonstrates that macroeconomic announcements and central bank communications can influence stock prices both immediately and over longer periods, with the difference between expected and realized values acting as a key driver of volatility. Negative surprises typically have more persistent effects, while positive surprises lead to shorter-term price increases. Sectoral differences in sensitivity to macroeconomic developments further highlight the need for sector-specific analyses. Despite extensive research on these topics, the sectoral effects of unexpected economic announcements in emerging markets like Türkiye remain underexplored. This study addresses this gap by examining how unexpected economic developments influence the returns of BIST sectoral indices, assessing the speed, magnitude, and asymmetry of these responses, thus offering a more comprehensive understanding of how financial markets react to economic surprises.

3. Data and Methodology

In the study, the daily closing prices of 26 BIST sectoral indices covering the period between January 1, 2018, and December 31, 2022, are obtained from the Tradingview data platform. The expected and actual data on the inflation rate, growth rate, unemployment rate, CBRT policy interest rate, and FED interest rate economic variables obtained from Bloomberg data platforms are used.

Table 1. Sector-based Indices in BIST

Index Code	Index Name
XBANK	BIST BANKS
XBLSM	BIST INF. TECHNOLOGY
XELKT	BIST ELECTRICITY
XFINK	BIST LEASING FACTORING
XGIDA	BIST FOOD BEVERAGE
XGMYO	BIST REAL EST. INV. TRUSTS
XHOLD	BIST HOLD. AND INVESTMENT
XILTM	BIST TELECOMMUNICATION
XINSA	BIST CONSTRUCTION
XKAGT	BIST WOOD PAPER PRINTING
XKMYA	BIST CHEM. PETROL PLASTIC
XMADN	BIST MINING
XMANA	BIST BASIC METAL
XMESY	BIST METAL PRODUCTS MACH.
XSGRT	BIST INSURANCE
XSPOR	BIST SPORTS
XTAST	BIST NONMETAL MIN. PRODUCT
XTCRT	BIST W. AND RETAIL TRADE
XTEKS	BIST TEXTILE LEATHER
XTRZM	BIST TOURISM
XUHIZ	BIST SERVICES
XULAS	BIST TRANSPORTATION
XUMAL	BIST FINANCIALS
XUSIN	BIST INDUSTRIALS
XUTEK	BIST TECHNOLOGY
XYORT	BIST INVESTMENT TRUSTS

ARCH models, GARCH, and EGARCH models are used to investigate the volatility of sectoral returns in response to shocks. m ARCH models, GARCH, and EGARCH models are used to examine the volatility of sectoral returns in response to shocks. The autoregressive conditional variance (ARCH) model was developed by Engle (1982). The model's error term is defined as u_t, and the conditional variance of u_t is defined as σ_t^2. The conditional variance of the error term is the sum of the squares of all values of these terms in period p. We first estimate the return equation (Y_t) and construct the error term (u_t) to define the variance model. It is also assumed that (u_t) is normally distributed $u_t \sim N(0, \sigma_t^2)$. In the model equation, p is the number of lags, and α is the model's parameter. In the model, the conditions $\alpha_0 > 0, i > 0$, and $\alpha_i \geq 0$ must be satisfied for $\alpha_0 > 0, i > 0$, and $\alpha_i \geq 0$ respectively.

Return and conditional variance equations, ARCH(p),

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \cdots + \beta_1 Y_{t-p} + u_t$$

$$u_t = \sigma_t \varepsilon_t \tag{1}$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + \cdots + \alpha_p u_{t-p}^2$$

When forecasting using financial time series, ignoring the characteristics of these series leads to significant deviations in the model results. To overcome this problem, Engle (1982) developed the ARCH model to model the volatility cluster in financial time series. Bollerslev (1986) added conditional variance to the volatility model and introduced the generalized autoregressive conditional heteroskedasticity model called GARCH.

Generalized conditional variance equation, GARCH (p,q)

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^{p} \alpha_p \, u_{t-i}^2 + \sum_{j=1}^{q} \beta_j \, \sigma_{t-j}^2 \quad (2)$$

In this equation, the p parameter indicates the number of lags of the ARCH model, while the q parameter indicates the number of lags of the GARCH model. Moreover, the conditions $\alpha_0 > 0, \alpha_0 > 0, \beta_j \geq 0$ and $\alpha_i + \beta_j \geq 1$ must be satisfied in the model.

When the conditional error of the return series is not normally distributed, the GARCH model represents a generalized error distribution (GED). In the GARCH model, the sum of αi and βi gives the persistence of volatility in response to a shock. If the sum of αi and βi equals 1, the integrated generalized autoregressive conditional variance model is called the IGARCH model.

The EGARCH model is vital in capturing asymmetry, which is the differential impact of equal-sized positive and negative shocks on conditional volatility and, possibly, leverage, the negative correlation between return shocks and subsequent shocks to volatility (Chang and McAleer, 2017). The EGARCH model developed by Nelson (1991) can be represented as follows;

$$\ln(\sigma_t^2) = \omega + \alpha 1 \, ln(\sigma t - 1\, 2\,) + \vartheta 1 \,|\, \varepsilon\, t - 1\, /\sigma\, t - 1\,| + \text{﬩}\, \varepsilon\, t - 1/\sigma\, t - 1 \quad (3)$$

In the model equation, σ_t^2 estimates the next period variance considering the past period data, called the conditional variance. ϑ in the equation indicates the past period shocks on the current period's conditional variance. α denotes volatility robustness and indicates the persistence of past shocks on the conditional variance in the current period. ﬩ Denotes the leverage effect of positive or negative news announcements on future volatility. When ﬩ = 0, there is a symmetric relationship between the variables, whereas when ﬩ ≠0, an asymmetric link emerges. If ﬩ it is positive, the effect of shocks on the conditional variance is expected to be ϑ +﬩; if ﬩ it is negative, the impact of shocks on the conditional variance is expected to be - ϑ + ﬩ (Enders and Lee, 2012).

In the analysis, daily returns of BIST Indices are calculated by taking the natural logarithm of daily closing prices.

In the formula, Pt represents the closing price of the BIST Indices on day t, and Rt represents the logarithmized return of the index on day t. The following formula is used to calculate the logarithmic return represented by Rt;

$$Rt = LN\,(Pt\,/Pt - 1) \quad (4)$$

First, the daily return values of the index are calculated. After this calculation, the volatility structure of the index returns is modeled.

4. Results

Descriptive statistics of index returns are presented in Table 2. According to the analysis results, the presence of the ARCH effect at lag 5, tested by the ARCH–LM method, is significant, and average returns are positive for all indices. The XELKT index has the highest average daily return, followed by the XTRZM and XMADN indices. According to the standard deviation of index returns, XFINK, XSPOR, and XMADN indices have the highest volatility (Table 2).

Table 2. Descriptive Statistics of Indices

Indices	Mean	Max	Min	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Arch (5)	Q36	Obs.
XBANK	0,000877	0,094521	-0,10416	0,024437	-0,16341	5,824649	420,1065***	22,891***	39,863(0,302)	1247
XBLSM	0,001717	0,093818	-0,15362	0,02034	-0,84465	8,673864	1820,955***	18,281***	104,94(0,000)	1247
XELKT	0,001953	0,066699	-0,10461	0,018329	-0,61446	6,785651	823,0928***	16,794***	80,865(0,000)	1247
XFINK	0,001429	0,1448	-0,18737	0,031986	-0,57727	9,436194	2221,611***	30,071***	118,11(0,000)	1247
XGIDA	0,001125	0,067214	-0,09704	0,016305	-1,00002	7,573125	1294,471***	13,571***	27,638(0,840)	1247
XGMYO	0,001264	0,072185	-0,11812	0,017134	-1,1285	8,869924	2054,954***	16,342***	52,558(0,037)	1247
XHIZ	0,001396	0,059438	-0,10064	0,01475	-1,1136	8,9717	2110,632***	15,262***	41,931(0,229)	1247
XHOLD	0,001356	0,062228	-0,10413	0,017123	-0,95732	8,089082	1536,125***	18,238***	35,639(0,486)	1247
XILTM	0,00081	0,094836	-0,10534	0,021995	-0,23743	5,951366	464,3021***	12,537***	43,302(0,188)	1247
XINSA	0,00171	0,089245	-0,09718	0,019897	0,013224	6,329108	575,8884***	17,266***	37,609(0,395)	1247
XKAGT	0,001763	0,075185	-0,13492	0,01937	-0,79376	7,849854	1353,062***	15,529***	92,447(0,000)	1247
XKMYA	0,001718	0,07616	-0,10014	0,018423	-0,69767	7,081659	966,7847***	25,375***	37,629(0,395)	1247
XMADN	0,001869	0,094662	-0,10516	0,027589	-0,18578	4,706014	158,3974***	9,826***	32,694(0,627)	1247
XMANA	0,001295	0,081173	-0,1451	0,021722	-0,39077	6,2928	595,0968***	8,038***	29,870(0,754)	1247
XMESY	0,001619	0,069174	-0,10169	0,017901	-0,88818	7,530405	1230,373***	24,026***	43,023(0,196)	1247
XSGRT	0,00121	0,066153	-0,09084	0,013658	-0,49079	7,778763	1236,611***	17,923***	83,055(0,000)	1247
XSIN	0,00153	0,064207	-0,10154	0,015441	-1,17836	9,103708	2224,306***	21,456***	36,292(0,455)	1247
XSPOR	0,000954	0,155674	-0,2086	0,030683	-0,42112	8,40664	1555,691***	37,418***	110,46(0,000)	1247
XTAST	0,001481	0,063799	-0,10385	0,017798	-0,92945	8,114485	1538,667***	17,576***	50,936(0,051)	1247
XTCRT	0,001179	0,073513	-0,10523	0,016789	-0,58424	7,611233	1175,755***	22,302***	30,234(0,739)	1247
XTEKS	0,00183	0,072099	-0,13994	0,018793	-1,26834	9,01095	2211,671***	20,917***	67,655(0,001)	1247
XTRZM	0,001869	0,08785	-0,15746	0,02453	-0,59624	6,348558	656,4853***	43,017***	88,201(0,000)	1247
XULAS	0,001801	0,089526	-0,12843	0,026079	-0,1619	5,171798	250,5198***	14,765***	45,005(0,144)	1247
XUMAL	0,001111	0,069748	-0,1031	0,018317	-0,64991	6,629101	772,0945***	7,995***	28,783(0,798)	1247
XUTEK	0,001256	0,093636	-0,10496	0,020824	-0,48394	6,767973	786,3582***	16,549***	43,204(0,191)	1247
XYORT	0,001436	0,101921	-0,17297	0,020235	-1,03401	13,17754	5604,18***	31,409***	57,310(0,013)	1247

A negative skewness coefficient, i.e., skewed to the left, indicates that extreme negative returns are more frequent than extreme positive returns. Skewed to the right shows that there are asymmetrically significant changes every month. Accordingly, in XGIDA, XHOLD, XTAST, XMESY, XBLSM, XKAGT, XKMYA, XUMAL, XELKT, XTRZM, XTCRT, XFINK, XSGRT, XUTEK, XSPOR, XMANA, XILTM, XMADN, XBANK, XULAS sectors, extreme negative return is more than extreme positive return. In the XINSA sector, there are asymmetrically significant changes every month. Moreover, since the kurtosis coefficients of all variables are more significant than 3 (excess kurtosis), the series exhibits a leptokurtic (thick tail) distribution. When analyzing returns as a time series from past to present, the kurtosis of a variable can be used to measure the risk level of an asset. The leptokurtic distribution indicates that investors may be exposed to a broader range of fluctuations (Kutlu and Türkoğlu, 2023).

When the Jarque-Bera test statistic value is used to test whether the series is normally distributed, the statistic value for the period analyzed is used. The probability of this value is considered; accordingly, at the 1% significance level, the return series of all indices does not have a normal distribution.

In this study, the Extended Dickey-Fuller (ADF) unit root test is used for the returns of BIST indices (Dickey and Fuller, 1979). In the ADF unit root test, three different regression equations are tested with a constant term, without a continuous term, and with a constant term and trend. The ADF test statistics for the returns of the BIST indices are presented in Table 3.

Table 3. Unit Root Test Table (ADF)

Variables	At Level			At First Difference		
	With Constant	With Constant & Trend	Without Constant & Trend	With Constant	With Constant & Trend	Without Constant & Trend
XBANK	-33,2853***	-33,4462***	-33,2582***	-18,6596***	-18,6521***	-18,6673***
XBLSM	-20,1596***	-20,2749***	-20,0078***	-17,2688***	-17,2616***	-17,2758***
XELKT	-32,2225***	-32,5729***	-31,9045***	-17,3239***	-17,3171***	-17,3304***
XFINK	-30,1771***	-30,1662***	-30,137***	-18,4918***	-18,4843***	-18,4994***
XGIDA	-32,8559***	-33,0609***	-32,7237***	-16,0617***	-16,0563***	-16,0682***
XGMYO	-32,914***	-33,219***	-22,205***	-16,1801***	-16,1734***	-16,1864***
XHIZ	-21,9674***	-22,3429***	-21,7183***	-16,2214***	-16,2151***	-16,2281***
XHOLD	-22,7515***	-34,6981***	-22,5647***	-16,2541***	-16,2481***	-16,2607***
XKMYA	-32,3549***	-32,6571***	-32,1111***	-22,0458***	-22,0373***	-22,0546***
XMADN	-23,392***	-23,4833***	-23,2431***	-18,1436***	-18,1357***	-18,1511***
XMANA	-36,8895***	-37,0005***	-36,7677***	-18,2201***	-18,2128***	-18,2275***
XMESY	-21,7668***	-21,9981***	-21,5405***	-17,6338***	-17,6271***	-17,6409***
XSGRT	-21,5644***	-21,6776***	-21,3597***	-16,6813***	-16,6744***	-16,6879***
XSIN	-21,8638***	-22,1655***	-21,5858***	-17,5096***	-17,5025***	-17,5167***
XSPOR	-30,0404***	-30,07***	-30,0274***	-19,4214***	-19,4138***	-19,4293***
XTAST	-34,2196***	-34,4959***	-34,0053***	-16,3422***	-16,3357***	-16,3489***
XILTM	-36,6865***	-36,7973***	-36,6496***	-17,8543***	-17,8478***	-17,8615***
XINSA	-37,8799***	-38,2068***	-37,5965***	-17,1988***	-17,1924***	-17,2046***
XKAGT	-30,4656***	-30,5985***	-21,2806***	-15,7906***	-15,7847***	-15,7971***
XTCRT	-34,4278***	-34,5538***	-34,2767***	-16,9769***	-16,9705***	-16,9836***
XTEKS	-21,6971***	-21,8586***	-21,4458***	-17,1177***	-17,1108***	-17,1246***
XTRZM	-30,854***	-30,924***	-30,7096***	-20,0042***	-19,996***	-20,0124***
XULAS	-22,8504***	-34,7378***	-22,7095***	-16,9324***	-16,926***	-16,9392***
XUMAL	-34,406***	-34,6937***	-34,2968***	-16,712***	-16,7057***	-16,7189***
XUTEK	-35,9051***	-36,144***	-23,2702***	-18,1558***	-18,1481***	-18,1632***
XYORT	-32,744***	-32,7487***	-32,6045***	-16,8409***	-16,834***	-16,8477***

To construct the volatility model, the presence of autocorrelation in the data was investigated, and ARMA processes were estimated for this index. According to the correlogram graph, the results of ARMA(p,q), an Autoregressive Moving Average model up to the 5th lag (lag), were estimated to select the most appropriate model for the analyzed series. AR(p), the Autoregressive Model that best explains the index return series, and MA(q), the Moving Average Model, were selected, and the average return equation was formed. Then, the Lagrange multiplier test is applied to test the series' Autoregressive Conditional Variance (ARCH) effect (Engle, 1982). The most appropriate model should be estimated to test for the existence of a variance problem and to eliminate this problem if it exists in the series.

According to the ARCH LM test results of the estimated regression equation of the BIST Indices return series, heteroskedasticity in the model is calculated according to the F value. To eliminate the problem of heteroskedasticity and changing variance, the GARCH model was determined to be the most appropriate model for the series. The parameters of the selected model are required to be statistically significant. The highest R Square (R2), the lowest Akaike Information Criterion (AIC), the Shwartz Information Criterion (SIC), and the Hannan-Quinn Criterion (HQC) results are taken into consideration as preference criteria.

Accordingly, the relationship between 26 sectoral indices in BIST and economic data such as Inflation Rate (CPI), Gross Domestic Product (growth), Unemployment Rate, Central Bank of the Republic of Türkiye Interest Rate, and Federal Reserve Interest Rate is estimated with GARCH and EGARCH models. Accordingly, when the AIC and SIC information criteria of the GARCH and EGARCH models are analyzed, it is found that the results are consistent with other

studies in the literature. The EGARCH model has better explanatory power than the GARCH model due to the smaller values of the AIC and SIC information criteria and the absence of ARCH effect. Thus, the EGARCH model is found to be the most appropriate model.

Table 4 summarizes the EGARCH model results examining how sectoral BIST indices react to macroeconomic news surprises related to inflation, GDP growth, unemployment, and interest rate decisions of both the Central Bank of the Republic of Türkiye (CBRT) and the Federal Reserve (FED). Across all models, the absence of autocorrelation and the statistical significance of the ARCH (α) and GARCH (β) coefficients confirm that volatility clustering exists in sectoral returns. The leverage parameter (γ) is predominantly negative and significant, indicating that negative shocks increase volatility more than positive ones, consistent with the leverage effect.

In terms of inflation surprises, most sectors display increased volatility, especially financial and manufacturing indices (XFINK, XMANA, XKMYA), reflecting the cost and interest rate sensitivity of these sectors. For GDP growth announcements, food and consumer sectors (XGIDA, XTCRT) react positively to positive surprises due to rising income expectations, while capital-intensive sectors (XBLSM, XILTM) exhibit asymmetric or counterintuitive responses—possibly due to expectations of higher interest rates accompanying growth. Regarding unemployment announcements, increased joblessness tends to raise uncertainty in services and construction sectors (XHIZ, XINSA), whereas export-oriented sectors (XILTM, XBLSM) sometimes show positive reactions to negative news, likely due to anticipated exchange rate depreciation improving competitiveness.

The CBRT interest rate surprises generate the strongest volatility effects across financial sectors (XBANK, XFINK, XUMAL), emphasizing the sensitivity of monetary intermediaries to domestic rate adjustments. Finally, FED rate surprises significantly influence externally oriented and technology sectors (XUTEK, XTRZM), highlighting the importance of global liquidity conditions and capital flows for BIST volatility. Overall, Table 4 reveals pronounced asymmetric and heterogeneous volatility patterns across sectors. While domestic macroeconomic shocks primarily affect financially and consumption-driven industries, international monetary developments influence export-oriented and technology-based sectors. These results collectively confirm that the Turkish stock market's sectoral dynamics are deeply linked to both internal and external macroeconomic conditions.

Table 4. EGARCH model for Macroeconomic News Surprises

	INFLATION RATE (CPI)				GDP				UNEMPLOYMENT RATE		CBRT INTEREST RATE				FED INTEREST RATE			
	Expected		Announced		Expected		Announced		Expected	Announced	Expected		Announced		Expected		Announced	
	Y_1	Y_2	Y_1	Y_2	Y_1	Y_2	Y_1	Y_2		Y_1 Y_2	Y_1	Y_2	Y_1	Y_2	Y_1	Y_2	Y_1	Y_2
XBANK	0,1692	-0,367**	-0,014	-0,102	-0,163	-0,237	-0,0910	-0,2620		0,1780 -0,0931	-0,033	0,711***	-0,2467	0,6761***	0,4612	0,5079	0,1706	0,0803
XBLSM	-0,203	-0,2495	-0,318	-0,088	-0,202	-0,248	-0,3423	0,4839**		-0,321* -0,3299**	0,002	0,699***	0,3309**	0,8875***	1,7502**	-1,6585	-0,3736	-0,6002**
XELKT	0,1389	0,1488	0,344**	-0,004	-0,4886***	-0,2497	-0,7905**	-0,1133		-0,5085*** -0,5482***	0,069	1,029***	0,1673	0,7587	-0,8104	-1,6278**	-0,0842	-0,7878***
XFINK	-0,4835***	-0,1664	-0,349*	-0,241**	-0,6505**	-0,2866	-0,5537*	-1,1122***		0,06 0,706***	-0,861***	-0,415	0,126	-0,237	1,526*	-1,084	0,116	-1,138***
XGIDA	0,119	-0,0507	-0,079	0,061	0,091*	-0,5083	0,1508	-0,6247		-0,2109 -0,0586	-0,283	0,997***	0,0703	0,9219***	0,635	-0,593	0,206	-0,5007
XGMYO	0,003	-0,287**	0,075	-0,294*	-0,389	0,465	-0,236	0,1496		-0,132 -0,441**	-0,419	1,268***	0,448***	1,053***	1,028	-0,951	-1,225	-1,155***
XHIZ	0,179	-0,098	0,087	-0,068	-0,482*	-0,087	-0,643**	-0,163		-0,034 -0,294*	-0,37	1,581***	0,054	0,752***	-1,789	-0,912	-1,287**	-0,803*
XHOLD	-0,079	-0,455***	-0,035	0,267	-0,198	0,104	-0,086	0,059		0,211 -0,098	-0,441	0,348	0,391**	0,605***	-0,285	-2,215***	-0,209	-0,610*
XILTM	0,2267	-0,057	-0,098	-0,033	-0,043	-0,613	0,0087	0,2902*		0,105 -0,169**	0,109	0,517***	0,285**	0,506***	0,687	-0,2908	0,207	-0,017
XINSA	-0,327**	-0,593***	-0,156	-0,681***	-0,536**	-0,204	-0,716**	-0,036		0,333** 0,181*	-0,393**	-0,009	0,094	-0,156	1,496***	-1,248	-0,207	-0,104
XKAGT	-0,157	-0,373**	-0,4062*	-0,1525	-0,587**	0,306	-0,191	-0,302		-0,044 -0,244	-0,586*	-0,227	-0,067	0,067	1,574**	0,4709	-0,634	0,169
XKMYA	-0,141	-0,302*	-0,232	-0,191	0,0328	-0,116	-0,417	0,291		-0,109 -0,465***	-0,192	0,815***	0,116	0,761***	1,036	-1,589	0,364	-0,074
XMADN	0,079	0,0303	0,303**	-0,148	0,091	-0,1	0,142	0,191		-0,034 -0,259**	-0,623**	0,646***	0,091	0,761***	1,054***	1,130**	0,413*	0,027
XMANA	0,483**	-0,031	0,176	0,301	-0,209	-0,357	0,069	-0,477*		-0,161 -0,249*	-0,011	0,064	0,082	0,468***	-0,438	-2,943	0,056	0,167
XMESY	-0,037	-0,498***	-0,276	-0,231	-0,271*	0,407	-0,179	0,148		0,0303 -0,029	-0,154	0,702**	0,255	0,809***	0,711	-0,321	-0,253	-0,274
XSGRT	0,061	-0,151	0,188	-0,251**	-0,336**	0,027	-0,239	-0,123		-0,041 -0,456	0,274	0,671**	0,351***	0,658***	-0,886*	-3,299***	-0,016	-0,002
XSIN	0,184	-0,242	-0,218	-0,171	-0,126	0,035	-0,0008	-0,229		0,195 -0,058	-0,141	0,717**	0,424**	0,531	1,314**	-2,121	0,174	-0,531**
XSPOR	0,266	0,171	0,292*	0,087	-0,303	0,284	-0,087	0,367		-0,307** -0,066	-0,026	0,113	0,099	0,256	1,942***	-1,236	-0,626*	-0,444*
XTAST	0,134	-0,436***	0,0401	-0,243	-0,382**	0,038	-0,255	-0,1207		-0,007 -0,697***	0,103	0,568***	0,397***	0,388**	1,026	-2,482	0,457	-1,177***
XTCRT	0,316***	0,067	0,485***	-0,123	-0,521***	0,192	-1,206***	0,236		-0,0504 -0,327***	-0,263	1,003***	-0,042	1,144***	1,438***	-0,761	0,123	0,026
XTEKS	-0,109	-0,172	0,017	-0,249	-0,652*	0,677*	-0,081	0,202		-0,079 -0,461**	-0,074	1,253***	0,366**	1,271***	2,045***	-1,695	-0,361	-0,713*
XTRZM	-0,313*	0,004	-0,343**	-0,017	-0,431*	-0,231	-0,218	-0,382		-0,172 0,206	-0,517***	0,318**	-0,219*	0,197	1,080*	-3,002***	-0,487	-0,6104**
XULAS	0,308**	-0,0908	0,157	0,182	-0,232	-0,066	-0,223	0,081		-0,295 -0,112	-0,135	0,247	0,2508	0,252	0,461	0,473	-0,544	-0,744**
XUMAL	0,115	-0,400**	-0,064	-0,202	-0,009	-0,154	0,118	-0,263		0,158 -0,147	-0,166	0,808***	-0,033	0,817***	-0,198	-0,0809	-0,199	-0,393
XUTEK	-0,1201	-0,232*	-0,186	-0,1702	-0,286	0,134	-0,133	-0,1904		-0,0904 -0,301**	-0,156	0,886***	0,0902	0,969***	1,678**	-1,457	0,171	-0,459
XYORT	0,114	-0,448*	-0,296	-0,0506	-0,464	-0,16	-0,151	-0,061		0,319 -0,165	0,038	-0,189	0,504**	-0,297	1,513	-1,215	1,146***	0,047

Table 5. Effects of All Macroeconomic Variables

	INFLATION				GDP				UNEMPLOYMENT			CBRT INTEREST RATE				FED INTEREST RATE			
	Expected		Announced		Expected		Announced		Expected	Announced		Expected		Announced		Expected		Announced	
	Positive Surprise	Negative Surprise	Positive Surprise	Negative Surprise	Positive Surprise	Negative Surprise	Positive Surprise	Negative Surprise		Positive Surprise	Negative Surprise	Positive Surprise	Negative Surprise	Positive Surprise	Negative Surprise	Positive Surprise	Negative Surprise	Positive Surprise	Negative Surprise
XBANK		-						+		-	-				+	+			-
XBLSM														+					
XELKT			+			-				-	-						-		-
XFINK	-		-			-		-			+	-	+		+	+			-
XGIDA					+										+				
XGMYO		-		-							-			+	+				-
XHIZ						-	-				-				+			-	-
XHOLD		-											+	+	+		-		-
XILTM								+			-			+	+				
XINSA	-	-		-		-	-			+	+		+			+			
XKAGT		-	-			-						-			+	+			
XKMYA		-									-				+				
XMADN			+								-	-			+	+	+	+	
XMANA	+							-			-		+		+				
XMESY		-				-									+				
XSGRT				-		-								+	+	-	-		
XSIN														+		+			-
XSPOR			+							-			+			+		-	-
XTAST		-				-					-			+	+				-
XTCRT	+		+			-	-				-				+	+			
XTEKS						+					-			+	+	+			-
XTRZM	-		-			-						-		-		+	-		-
XULAS	+												+						-
XUMAL		-													+				
XUTEK		-									-				+	+			
XYORT		-											+	+				+	

A summary of the impact of all economic variables on the analyzed sectoral indices is given in Table 5. The XFINK index reacted to ten news announcements, the XINSA index reacted to 9 news announcements, and the XTRZM index reacted to eight news announcements. It was found to be the most sensitive sector to economic news announcements. On the other hand, XBANK, XGIDA, and XUMAL indices reacted to two news announcements and were found to be the indices with the least sensitivity to economic news announcements.

In a globalizing world, financial leasing and factoring sectors are critical in the national economy due to their position in strengthening financial markets and meeting the funding needs of enterprises. The undeniable impact of all economic variables is supported by the fact that the XFINK sector index is the most sensitive sector to economic news announcements. Each activity carried out within the scope of the construction sector affects the related sectors due to the inputs involved in the production process (Kılıç and Demirbaş, 2012). With the developments in the construction sector, there are expected to be positive reflections on the companies that produce intermediate and final goods needed by the industry, and these companies will increase their production, employment capacity, and income. The policies pursued by governments, international credit institutions, policies, and decisions affecting the course of the economy may have a direct impact on the construction sector (Berk and Biçen, 2017).

Tourism contributes significantly to the country's economy by reducing the current account deficit by providing foreign currency inflows. At the same time, it is one of the sectors most affected by fluctuations in exchange rates during times of global crisis and contraction in national economies. Therefore, it is under the influence of all economic variables. In this respect, especially in the face of negative news announcements, Türkiye has become a much cheaper choice in terms of vacation. While a negative impact is expected in other sectors sensitive to exchange rate movements due to their cost-oriented nature, a positive impact is expected in the tourism sector. It is an index that has the quality of reducing portfolio risk for investors in risky periods. (Yıldırım et al., 2020).

In line with the empirical findings of this study, the XTRZM index reacts negatively to positive macroeconomic surprises and positively to adverse shocks. This counterintuitive pattern can be explained by the sector’s dependence on external demand: during periods of negative domestic economic news or currency depreciation, Türkiye becomes a relatively cheaper destination for foreign tourists, leading to higher revenues for tourism firms. Conversely, when macroeconomic conditions improve and the Turkish lira appreciates, foreign demand tends to moderate, resulting in weaker stock performance for tourism companies.

Although the Banking sector is a sub-sector of the financial industry, both indices are the least responsive and sensitive to economic news and unexpected developments. Since the XUMAL index covers 122 companies in the country's financial system, including banks, financial leasing, holding companies, real estate investment trusts, securities investment trusts, and venture capital investment trusts, the XUMAL index is the least sensitive to unexpected news developments.

The food and beverage sector is one of the sectors with both high forward and backward linkages. It generates a high backward linkage effect in the production process due to the demand it creates in the economy to provide inputs to the agricultural and industrial sectors. After production, there is a demand for services and transportation sectors due to requirements such as

distribution and marketing. Therefore, almost all of the products of this sector are used in the services sector as intermediate inputs. Thus, the food and beverage sector has a high forward linkage effect (Akın, 2012). Thus, the food sector is affected by all events in countries and the world, but it is seen that it is one of the indices that reacts the least to economic news announcement shocks in index returns.

XFINK, XINSA, and XTRZM sectors react negatively to inflation news announcements and unexpected developments, while XMANA, XTCRT, and XULAS sectors react positively to positive news and unexpected developments. It can be said that these sectors are structurally more sensitive to the inflation rate. XBANK, XGMYO, XHOLD, XINSA, XKAGT, XKMYA, XMESY, XTAST, XUMAL, XUTEK, and XYORT sectors reacted negatively to adverse news and unexpected developments. This situation increases the production costs of the financial, industrial, and real estate sectors due to inflationary pressure and decreases future cash flows; therefore, the expected profitability decrease negatively impacts companies' stock prices and, thus, their returns. If the discount rate increases under inflationary pressure, it will reduce the present value of cash flows and consequently affect the stock market return (Eyüboğlu and Eyüboğlu, 2018).

XELKT, XMADN, XSPOR, and XTCRT sectors reacted positively to positive news and unexpected developments, while XFINK, XKAGT, and XTRZM sectors reacted negatively to positive news and unexpected developments. While the financial leasing and tourism sectors reacted negatively to positive news of unforeseen developments in expectation of unexpected developments, they responded positively to positive news of unforeseen developments in the announcement of unexpected developments. This shows that these sectors are more sensitive to concrete developments. XGMYO, XINSA, and XSGRT sectors reacted negatively to negative news and unexpected developments. An increase in inflation will lead to an increase in consumption expenditures, which will cause a decline in savings and investments. In such a case, it will reduce the demand for stocks and other financial assets and decrease share prices. For these reasons, no sector reacts positively to adverse news or unexpected developments.

For the GDP news announcement of unexpected developments, only the XGIDA sector reacted positively to the positive news about unexpected developments. In contrast, XELKT, XFINK, XHIZ, XINSA, XKAGT, XMESY, XSGRT, XTAST, XTCRT, XTEKS, and XTRZM sectors reacted negatively. An increase in real income will increase the disposable income of the people in that country, the demand for goods and services of people with higher income levels will increase, and as a result, a significant increase in aggregate demand will have a positive effect on the earnings of companies, raising the prices and returns of stocks. Therefore, this result proves that the food sector is most significantly affected. Only the XTEKS sector reacted positively to negative news and unexpected developments. Since the textile sector is export-intensive, it was not affected by the negative news surprise and responded positively. As for unexpected news developments, XHIZ, XINSA, and XTCRT sectors reacted negatively to positive news developments. Notably, no sector responded positively to positive news announcements or unexpected developments. For this situation, it can be said that there were no surprise reactions since it was a situation expected by the market. While the XBLSM and XILTM sectors reacted positively to negative news and unexpected developments, the XFINK and XMANA sectors responded negatively.

In the unemployment rate announcement of unexpected developments, the XINSA sector reacted positively to positive news, while the XELKT, XBLSM, and XSPOR sectors responded negatively. An increase in the unemployment rate in an economy brings along the idea that there is a problematic process in the economy. Therefore, labor-intensive and industrial sectors are likely to be affected by this situation. While XFINK and XINSA sectors reacted positively to negative news and unexpected developments, XBLSM, XELKT, XGMYO, XHIZ, XILTM, XKMYA, XMADN, XMANA, XTAST, XTCRT, XTEKS, XUTEK sectors reacted negatively.

XFINK, XINSA, XKAGT, XMADN, and XTRZM sectors reacted negatively to positive news and unexpected developments regarding the interest rate announcements of the Central Bank of the Republic of Türkiye. On the other hand, all sectors except XFINK, XHOLD, XINSA, XMANA, XSPOR, XULAS, and XYORT reacted positively to negative news and unexpected developments. XBLSM, XGMYO, XHOLD, XILTM, XSGRT, XSIN, XTAST, XTEKS, and XYORT sectors reacted positively to positive news and unexpected developments, while the XTRZM sector responded negatively. On the other hand, all sectors except XELKT, XINSA, XSIN, XSPOR, XTRZM, XULAS, and XYORT reacted positively to negative news and unexpected developments. The negative reactions to positive announcements and positive reactions to negative announcements of the interest rate of the Central Bank of the Republic of Türkiye can be interpreted as negative news, i.e., an increase in the interest rate can be interpreted as a situation desired by the market. As a result, positive reactions have occurred.

In the US Federal Reserve interest rate announcement of unexpected developments, only the XSGRT sector reacted negatively to positive news of unforeseen developments. XBLSM, XFINK, XINSA, XKAGT, XMADN, XSIN, XSPOR, XTCRT, XTEKS, XTRZM, XUTEK sectors reacted positively. Only the XMADN sector responded positively regarding unexpected negative news developments, while the XELKT, XHOLD, XSGRT, and XTRZM sectors reacted negatively. XHIZ and XSPOR sectors reacted negatively to positive news and surprising developments, while XMADN and XYORT sectors reacted positively. XBLSM, XELKT, XFINK, XGMYO, XHIZ, XHOLD, XSIN, XSPOR, XTAST, XTEKS, XTRZM, XULAS sectors reacted negatively to negative news and unexpected developments. The fact that there are mostly positive reactions to positive news and negative responses to negative news indicates that the US Federal Reserve's decisions align with market expectations and that there is transparency in the decisions of the US Federal Reserve.

On the other hand, investors who do not want to take a position against the dollar, which strengthens with the interest rate hike, exit the stock markets of developing countries and buy dollars, resulting in a loss of liquidity with the decrease in the foreign share in the indices. Thus, due to a negative scenario on the index, there are sharp movements in share prices. Since the financial sector relies on interest rates as its primary revenue model, it was unexpected that the sector index was not affected by the interest rate news, even though an increase in interest rates would mean that banks and finance companies would earn more income from the loans they provide.

5. Conclusion

This study aims to model the volatility of BIST sectoral indices to examine their reactions to economic news and unexpected developments. To capture the time-varying nature of volatility,

GARCH and EGARCH models were employed. Among these, the EGARCH model was identified as the most appropriate for the dataset, providing a framework to test both volatility persistence and asymmetry. In measuring unexpected developments ("positive" vs. "negative" shocks), analyst expectations and actual announced values were compared. A positive (negative) shock indicates that the announced value exceeded (fell short of) consensus expectations.

The findings reveal that ARCH and GARCH effects are statistically significant in all sectoral models, confirming the presence of volatility persistence across the board. Furthermore, an asymmetry effect emerges, meaning the market reacts differently to positive and negative shocks. In particular, positive shocks in GDP growth generate stronger responses than negative shocks, whereas for most other macroeconomic indicators (inflation, unemployment, interest rates), negative shocks outweigh positive ones in terms of market impact.

Regarding inflation, 13 sectors gave positive responses to positive inflation surprises, while 7 sectors reacted positively and 14 sectors negatively to negative surprises. This broad distribution underscores inflation's pivotal role in shaping BIST returns. The mixed responses reflect divergent views in the literature: (i) equities as a good hedge against inflation, (ii) a negative relationship between inflation and stock returns, and (iii) independence between the two (Albeni and Demir, 2005). The results presented here align with the possibility that inflation's effect can vary by sector and the nature of the surprise.

In terms of GDP growth, only the XGIDA sector responded positively to positive unexpected developments, presumably because increased GDP growth signals rising income per capita, which can directly benefit food-related firms. Conversely, for negative GDP surprises, XBLSM, XILTM, and XTEKS responded in a counterintuitive positive manner, while 14 other sectors showed negative returns. Although some studies find that GDP growth has a limited or no effect on BIST returns, these findings suggest that at least certain sectors respond sensitively to growth announcements, indicating heterogeneous sectoral dynamics.

This differentiated response across sectors can be attributed to the structure of sectoral demand and production linkages within the Turkish economy. GDP growth primarily stimulates domestic consumption-oriented sectors, whereas sectors more dependent on exports or external financing may not benefit directly, or may even face cost pressures due to rising interest rates and inflation expectations accompanying growth. Moreover, the timing and composition of growth—whether driven by consumption, investment, or exports—can lead to varying sensitivities across industries. Therefore, the asymmetric and heterogeneous reactions observed in the model reflect the underlying structural differences among BIST sectors rather than the absence of an overall GDP effect.

Unemployment-related news also revealed clear patterns. Negative shocks elicited negative reactions in 12 sectors, aligning with the notion that a rise in unemployment reduces consumption and overall economic vitality. By contrast, the XINSA sector demonstrated a positive response to positive shocks, possibly due to its close linkage to labor-intensive activities. This suggests that unemployment data can differentiate sectors based on their labor cost structure and consumer demand sensitivity.

In examining interest rate announcements, the study distinguished between the CBRT (domestic) and the Fed (U.S.) shocks. Notably, negative unexpected developments for the CBRT rate yielded positive price responses in 23 sectors, while positive CBRT shocks prompted mixed

responses (with both negative and positive reactions across various sectors). However, Fed rate announcements produced an opposite pattern: negative Fed surprises led to negative returns, whereas positive surprises were positively received. These findings are in line with portfolio flow theory (Branson, 1983; Frankel, 1983), where expectations about domestic vs. international interest rates can shift foreign capital flows, thus influencing exchange rates and stock market returns.

Overall, the results confirm that unexpected economic developments are significant drivers of returns in BIST sectoral indices. Notably, negative unexpected announcements in inflation, GDP, unemployment, and Fed interest rates appear to depress returns, while negative CBRT shocks lead to positive returns, highlighting the complexity of domestic policy expectations versus global monetary signals. From a theoretical perspective, these findings support the semi-strong form of the Efficient Markets Hypothesis (Fama, 1976; Çelik and Taş, 2009), as new information related to macroeconomic indicators quickly influences prices. Yet the literature continues to report mixed outcomes regarding the magnitude and direction of such effects, suggesting that factors like sample period, model specification, and sector-specific characteristics can shape empirical results.

The results of the sectoral volatility analysis provide several implications for monetary policy. The finding that financial and banking sectors exhibit the highest sensitivity to macroeconomic news, particularly to interest rate and inflation surprises, underlines the importance of clear and predictable monetary policy communication. Volatility responses indicate that unexpected policy changes or inconsistent forward guidance can amplify uncertainty and risk perception in financial markets. Therefore, policymakers should aim to strengthen policy credibility and transparency to reduce information asymmetry and stabilize market expectations. Moreover, the relatively mild or opposite reactions observed in sectors such as tourism and consumer goods suggest that exchange rate movements and domestic demand conditions play a buffering role, which should be considered in designing sector-sensitive policy measures. Overall, these results imply that a well-communicated, data-driven monetary policy framework can mitigate the asymmetric volatility effects triggered by economic announcements in Türkiye.

This study provides practical implications for both investors and policymakers. For investors, understanding sectoral sensitivities to macroeconomic news surprises can support more effective portfolio diversification and risk management strategies, particularly during periods of heightened uncertainty. Recognizing that certain sectors, such as financial and industrial indices, exhibit stronger reactions to negative surprises enables investors to adjust their asset allocations accordingly. For policymakers, the findings highlight that monetary and economic announcements influence market sectors asymmetrically, underscoring the need for carefully designed communication and timing strategies in policy implementation. By considering sector-specific market responses, policymakers can enhance the predictability and stability of financial markets, thereby strengthening overall economic resilience.

Investors and portfolio managers could use these insights to optimize sector allocations and hedge strategies around key economic announcement dates. By recognizing which sectors exhibit higher volatility sensitivity to specific macroeconomic news, they can diversify or adjust positions accordingly. Nonetheless, one limitation of this study is that it focuses on a particular timeframe and set of macroeconomic news variables. Future research might incorporate higher-frequency data, additional global risk factors (e.g., geopolitical risks), or alternative modeling approaches

(e.g., regime-switching or behavioral finance frameworks) to provide a more comprehensive perspective. Despite these limitations, the evidence presented here emphasizes the importance of monitoring macroeconomic surprises and sectoral volatility patterns in BIST, offering valuable insights for both practitioners and academics.

Declaration of Research and Publication Ethics
This study which does not require ethics committee approval and/or legal/specific permission complies with the research and publication ethics.

Researcher's Contribution Rate Statement
The authors declare that they have contributed equally to the article.

Declaration of Researcher's Conflict of Interest
There is no potential conflicts of interest in this study.

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