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Volatility Analysis of the Food Sector in Turkey in the Period of COVID-19[1]

(COVID-19 Döneminde Türkiye'de Gıda Sektörünün Volatilite Analizi)

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Abstract

In the literature, there are many studies investigating the direct and indirect effects of the pandemic. After the first COVID-19 case, these studies began to spread rapidly in Turkey. Due to the measures taken, activities in many sectors were suspended partially and full-time. Among the sectors, the food sector has experienced one of the most challenging processes. The food industry has entered a new era due to reasons such as changing consumption and production behaviors and disruptions in supply chains. The purpose of this study is to determine the impact of the COVID-19 outbreak on the food and beverage industry. In this context, daily data between 03.01.2017-08.04.2021 was used and the Food and Beverage Index (XGIDA) was included in the models as an explanatory variable. In the light of this information, the relationship between the XGIDA index and COVID-19 was examined with Univariate Volatility Models. In addition to the asymmetry and leverage effect in the XGIDA sector, an intra-period forecast was made to determine the fluctuations in the XGIDA sector during the sampling period.

Keywords:
COVID-19,
EGARCH Model,
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Öz

In the literature, there are many studies investigating the direct and indirect effects of the pandemic. After the first COVID-19 case, these studies began to spread rapidly in Turkey. Due to the measures taken, activities in many sectors were suspended partially and full-time. Among the sectors, the food sector has experienced one of the most challenging processes. The food industry has entered a new era due to reasons such as changing consumption and production behaviors and disruptions in supply chains. The purpose of this study is to determine the impact of the COVID-19 outbreak on the food and beverage industry. In this context, daily data between 03.01.2017-08.04.2021 was used and the Food and Beverage Index (XGIDA) was included in the models as an explanatory variable. In the light of this information, the relationship between the XGIDA index and COVID-19 was examined with Univariate Volatility Models. In addition to the asymmetry and leverage effect in the XGIDA sector, an intra-period forecast was made to determine the fluctuations in the XGIDA sector during the sampling period.

Anahtar Kelimeler:
COVID-19,
EGARCH Modeli,
XGIDA Sektörü,
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Introduction

With the international emergency declaration of the World Health Organization (WHO) at the beginning of 2020, a new process began in the world. There have been outbreaks previously declared as an emergency by the World Health Organization. Firstly, we can examine Swine Flu in 2009. With the spread of the H1N1 virus and the death of more than 200 thousand people, WHO declared an emergency. In 2013, when polio was on the rise again, WHO also declared an emergency. In 2016, there was a virus that is quite dangerous especially in pregnant women, it has been proven that the virus can be transmitted to the unborn baby and this causes birth anomalies in the baby. An emergency was declared with the rapid spread of the Zika virus, which caused babies to be born without completing their development, in the American continent. In 2014, an emergency was declared twice due to the deadly disease Ebola. The first emergency was between August 2014 and March 2016. More than 11,000 people died in West Africa during this time. The second emergency was declared very recently in the Democratic Republic of Congo in 2019. When Ebola started to spread again, the World Health Organization used its emergency mandate for prevention to spreading (BBC, 2020). At this point, the fifth emergency announcement made by the World Health Organization included the coronavirus outbreak. From this point on, a new process started all over the world. The coronavirus pandemic has affected countries deeply in many ways. Important economic problems such as unemployment have been triggered. Therefore, many business sectors have also experienced serious losses and shrinkages. The food sector is also one of the sectors that have been subjected to a big test during the pandemic process. Studies have revealed that the food industry is affected by the pandemic in many ways.

According to previous studies such as Pimentel et al.(2010) explained that population is expected to reach almost 13 billion by 2050 ant it will create danger because of humanity's restricted natural resources and also when the climate and environmental change joined to this equation, increasing the likelihood of the other pandemics. These situations and probabilities are closely connected with food crises and food prices at the same time. One of the studies emphasis supply chain systems and it explain that the global food system effect by worker absenteeism. Employees who carried the viruses, changes in demand, or inventory shortages affected supply chains (Kumar and Chandra 2010). Pandemics are deeply affecting food systems. Transporting food is getting hard. The food system depends on many supply chains like water, electricity, and more. Because of this situation, many systems had challenges due to labor shortages (Beck et al. 2006).

When it comes to research about Turkey, research is carried out by Güney and Sangün (2021). According to this research methodology, they interviewed 1,023 people from the seven regions of Turkey. According to analysis that included an ordered probit regression model showed that the changes in food consumption behaviors because of the pandemic were related to price increase concerns, stockpiling, etc.

For this purpose, a study consisting of five main chapters has been carried out. In the second part of the study, a wide literature review is made and studies on the

COVID-19 pandemic are included. In the third chapter, the theory of Univariate GARCH models is explained. In the fourth section, the findings obtained by giving information about the data used in the analysis are interpreted. In the last part, some evaluations have been made as a result of these findings.

1. Review of Literature

The research by Toktaş, Y. (2021) found that a substantial increase is observed in food shopping via credit cards in Turkey during the pandemic compared to the previous year. In the research data which are provided from BKM (the Interbank Card Center) are used. It must also be noted that many groceries and e-commerce websites have begun offering services in food products delivery through mobile applications. The other study Boyaci et. al (2021) emphasizes that food shortages and price spikes could also be related to the difficulties observed in supply chains due to border closings and quarantine measures, as well as fewer workers available for harvesting, production, logistics, and decreased production. They also explain that food shortages appeared in retailing food because of panic buying behaviors. When it query with decreasing availability of food and price spikes in production, panic increased for everyone who both consumers and producers.

A study that is carried out by Şahin and Yılmaz (2021) find out that crises like pandemics are a huge threat for industries like food and beverage. In their research, the COVID-19 pandemic and its effects on firms in these industries in Turkey experienced problems about operations, employees, customer behaviors, and more. For this purpose, a holistic model is proposed for reveals the effects of the pandemic on these companies. The other article Aday and Aday (2020) said that every country should recognize the seriousness of the situation and sometimes tighten or loosen measures according to the spread of the pandemic. They also said that the supply chain must be flexible enough to fixed challenges.

Pandemics research by Ceylan and Özkan (2020) examined a SWOT Analysis of Turkish agriculture. They focused on the relationship between agriculture and pandemic. They explained this relationship with strengths, weaknesses, opportunities, and threats. According to strengths, one of the determinations can summarize as durable agricultural products and the other is the annual harvest. According to weakness, absence of imported inputs, transportation problems have put prices up in the domestic market. According to opportunities, one of the determinations is increasing the export potential of high-quality storable grain to countries where domestic resources are disrupted. According to threats, one of the determinations is an underdeveloped domestic input market for seeds, pesticides and herbicides pose problems for continuing agricultural production, and transportation costs are increasing because of local restrictions and social distancing rules contribute to rising prices as they explained. Like most of the articles, they also pointed out that all the systems are connected like a chain, and this kind of connection can cause crises with a domino-effect.

One of the articles focusing on more specific areas in the food industry was by Demirci et al. (2020). Their interesting area was the fishing sector and they researched for Hatay province in Turkey's Mediterranean Region. They put emphasized in the beginning to FAO, The Food and Agriculture Organization of the United Nations, and they explained that FAO has been evaluated the pandemic in a larger context as global food security (FAO, 2020) In their research which is in Hatay province, they found that for protection of the fisheries sector's economy cannot provide in the pandemic. Decreasing in fisheries export in Hatay after COVID-19 was 65% according to their research.

Uysal and Demiroglu (2020) said in their research that if the COVID-19 is prolonged, permanent policies should be produced for fragile sectors such as agriculture and agricultural support packages, etc. should be implemented immediately. They explained people who work in agricultural activities for more than 225 days a year represent 37.4% in Turkey and the emphasize on-farm system resilience due to pandemics. Yavuz (2020) focused on his research on agricultural policy in the post-pandemic period from both a national and international perspectives. He clarified the agriculture of Turkey. He said that advantages of Turkey's agriculture come from climate differences, rich gene resources, ancient agricultural culture, and market vitality due to increasing population and income, and proximity to the countries with high food consumption based on imports and he said that increasing social awareness of strategic importance of agriculture because of COVID-19 pandemic may provide an opportunity to solve these problems with a holistic approach. Studies in the literature also refer to agriculture as well as the pandemic and food sector. Agricultural studies also constitute the basic dynamics for the food sector.

One of the research which is done by Jribi et. al (2020) wanted to draw attention to how food-wasting behaviors affected with the pandemic. On the other hand, an article which is carried out by Bucak and Yiğit (2021) showed three main categories in their analysis. One of them is opinions for post the COVID-19. These three main categories generally focused on the after scenarios for COVID-19. The second category is the changes in the food and beverage sector after COVID-19. The last one is including the opinions of the Turkish chefs.

2. Econometric Methodology

Another important feature of financial asset returns is volatility clustering. Mandelbrot (1963), the view put forward by the large scale price changes in financial assets that occur in large-scale price changes; Small-scale price changes follow small-scale price changes, forming a cluster. This situation is expressed as "volatility clustering".

The best methods for modeling volatility clusters that emerge in this way are GARCH, EGARCH and GJRGARCH (TGARCH) models, known as ARCH Family Models. The ARCH models and their extensions (GARCH, EGARCH, etc.) are among the most popular models that provide market returns, volatility and forecasting. For volatility models, an average model is needed first. In this study, the average model is established with the 1-period lagged value of the dependent variable. The parameters of the average model should be meaningful.

As a result of the emergence of uncertain behavior in financial time series, the need to analyze this uncertainty arose. Modeling of the second or higher-order moments of the series played an important role in addressing uncertainty as a research topic. The model formed by modeling the second moment is the Autoregressive Conditional Variable Variance (ARCH) model proposed by Engle (1982). Engle determined that when the unconditional variance is constant while the conditional variance is time-dependent, it is a function of the squares of the error terms. He also states that conditional mean and variance can be modeled separately.

Bollerslev (1986), has expanded the linear ARCH model by including current conditional variance values into the past conditional variance equation and introduced the Generalized Autoregressive Conditional Variable Variance (GARCH) model. This model predicts volatility better than the ARCH model. In addition, it provides an advantage by including the historical values of the infinite number of squares of errors into the model. The GARCH model is calculated as follows Bollerslev (1986);

$$y_t = \phi y_{t-1} + \varepsilon_t$$

$$\varepsilon_t = \eta_t \sqrt{h_t}$$

$$h_t = \omega + \alpha \varepsilon_{t-1}^2 + \beta h_{t-1}$$

$$\omega > 0 \quad \alpha \geq 0 \quad \beta \geq 0 \quad \alpha + \beta < 1$$

There is also a positivity condition for the parameters in the GARCH model. In addition, the sum of ARCH and GARCH parameters must be less than 1. The closer this total is to 1, the more the volatility persistence will be.

The GARCH model also has some limitations. While the model is estimated, the positivity condition of the coefficients is neglected. It does not take into account the effect of leverage. It cannot establish a linear relationship between conditional mean and conditional variance and does not take into account the asymmetry in volatility (Sarıkovanlık et al.2019).

Another model used in the study is the model known as the exponential GARCH (EGARCH) model is a constrained version of the ARMA (p, q) model and shows asymmetrically the effect of shocks on volatility. This model was developed by Nelson (1991). Also, this model takes into account the leverage effect. EGARCH model includes error terms of conditional variance and signs and sizes of conditional standard deviation. EGARCH (p, q) model is the most commonly used method to model variance. This model takes into account the possibility that upward and downward movements in the markets have a different effect on the predictability of future volatility of financial assets (Çil, 2018).

The reason why it is highly preferred is that the positivity condition in ARCH and GARCH models is not in this model. As a matter of fact, with the EGARCH model, the variance is also guaranteed to be positive. The EGARCH (p, q) model is shown as follows (Nelson,1991);

$$y_t = \phi y_{t-1} + \varepsilon_t$$
$$\varepsilon_t = \eta_t \sqrt{h_t}$$
$$\ln h_t = \alpha_0 + \beta_1 \ln h_{t-1} + \theta \frac{e_{t-1}}{\sqrt{h_{t-1}}} + \gamma \left| \frac{e_{t-1}}{\sqrt{h_{t-1}}} \right|$$

conditional variance of ht; ε_t, zero mean and constant variance error term; γ and β_1 show the effects of ARCH and GARCH on conditional variance, and θ shows the effect of asymmetry, respectively.

Since the presence of an asymmetric effect can be seen, it is also known as the asymmetric volatility model. If the θ parameter is statistically significant, there is an asymmetric effect, that is, positive shocks and negative shocks have different effects on volatility. If the value of the θ parameter is found to be negative, then we can conclude that the presence of leverage effect, negative shocks increase volatility more than positive shocks. β parameter is the parameter that shows the permanence of volatility. It is expected to receive a positive value.

Glosten et al. (1993) developed the GJRGARCH model in their work. This model is also referred to as the TGARCH model. The GJRGARCH model is defined as a simple extension of the GARCH model. The GJRGARCH model is an ARCH model that has a different effect on the volatility of the positive and negative shocks occurring in the series and takes into account the asymmetry in volatility. The GJRGARCH model is shown as follows (Glosten et al., 1993);

$$y_t = \phi y_{t-1} + \varepsilon_t$$
$$\varepsilon_t = \eta_t \sqrt{h_t}$$
$$h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 h_{t-1} + \gamma_1 \varepsilon_{t-1}^2 * D_{t-1}$$
$$D_{t-1} = \begin{cases} 1, & \varepsilon_{t-1} < 0 \\ 0, & \varepsilon_{t-1} \geq 0 \end{cases}$$

If the residuals obtained from the average are less than 0, it takes the value 1, if it is equal to or greater than zero. γ parameter is the parameter that reveals the presence of an asymmetric effect. If it is statistically significant, the presence of an asymmetric effect is mentioned. If it is meaningless, the TGARCH model becomes the GARCH model. In the GJRGARCH model, we can only observe the presence of asymmetric effects.

2.1. Forecast Performance Criteria

One of the widely accepted criteria in the process of choosing one of the various forecasting models is that the forecasting success of the model is high. In this context, various statistics are used to compare the prediction accuracy of the models.

For the successful test of the prediction, the differences between the predictive values and the actual values available based on the predicted model, that is, the prediction errors (u-residuals), are standardized with some formulas that can help to compare the prediction accuracy of the models. Statistics used to measure the prediction accuracy (prediction performance) of models;

I. Mean Squared Error (MSE) = $\frac{\sum_{t=1}^{n}(u)^2}{n}$

II. Root Mean Squared Error (RMSE) = $\sqrt{\frac{\sum_{t=1}^{n}(u)^2}{n}}$

III. Mean Absolute Error (MAE) = $\frac{\sum_{t=1}^{n}|u|_t}{n}$

IV. Mean Percentage Error (MPE)= $\frac{\sum_{t=1}^{n}\frac{u_t}{Y_t}}{n}$

V. Mean Absolute Percentage Error (MAPE) = $\frac{\sum_{t=1}^{n}\frac{|u_t|}{Y_t}}{n}$ *100

VI. Theil-U statistic = $\sqrt{\frac{\sum_{t=1}^{n-1}({}^{u_t}/_{Y_t})^2}{\sum_{t=1}^{n-1}(Y_{t+1} - Y_t/Y_t)^2}} = \frac{Error\ Relative\ Change\ of\ the\ Established\ Model}{Relative\ Variation\ of\ Random\ Walk}$

The desired result in these statistics is to create the prediction model with the smallest value MSE, RMSE, MAE, MPE and MAPE statistics.

3. Data and Empirical Findings

After the COVID-19 pandemic, there has been excessive demand for food products all over the world. The main motivation for this study was whether this increase in demand in the sector was reflected in the financial markets. In this context, the purpose of this study is to determine the impact of the pandemic on the returns and volatility of the food and beverage industry.

For this reason, the Food and Beverage Index (XGIDA) in Borsa Istanbul was used as a variable in the study. In the light of this information, the extent to which the XGIDA index is affected by COVID-19 was examined with Univariate Volatility Models. To determine the asymmetry and leverage effect in the XGIDA sector, as well as to determine the fluctuations in the XGIDA sector within the sampling period, a forecast was made within the period.

In this context, daily data between 03.01.2017-08.04.2021 were used. The data of the XGIDA industry has been compiled from investing.com. In the study, firstly, the returns of the daily price series were calculated and the formula rt = (Pt - Pt-1) / Pt-1 was used. Analyzes were made with Eviews 9 package program. The graphs of the return series are presented below in Figure 1 and Figure 2, respectively.

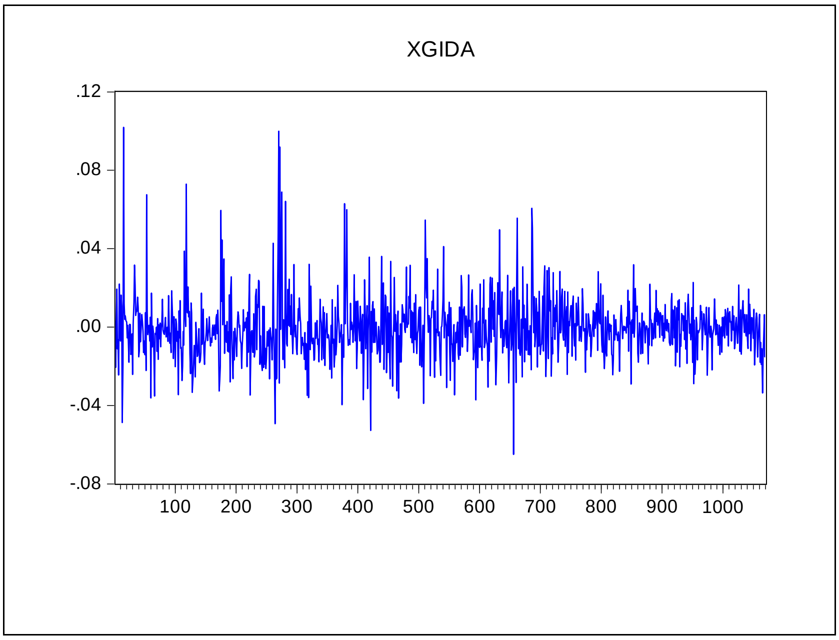

Figure 1. Graph of the XGIDA Sector

The most important features of financial asset returns are volatility clustering. When the chart above is examined, a distinct volatility cluster is seen for the XGIDA return. Figure 2 shows the histogram and statistics of the XGIDA return series.

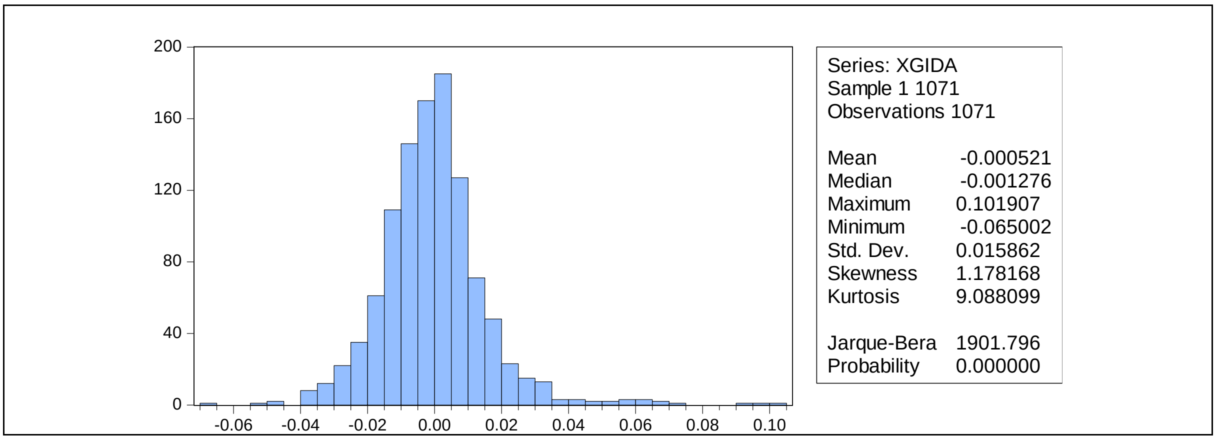

Figure 2.Histogram of XGIDA Sector

The distributions of financial asset returns, expressed as fat-tail, have a thicker distribution than the normal distribution in the tail part of the distribution and a sharper distribution on the average, and the XGIDA return series does not conform to the normal distribution. They show a leptokurtic distribution. When the histogram for the variable is examined, it is seen that it displays a skewed distribution to the left.

When the descriptive statistics are examined, it is observed that the average values of the return series are much smaller than the standard deviation values. This proves that financial time series follow a random walk process. For the normal distribution, the skewness value should be 0 and the kurtosis value should be 3. According to the table, it is seen that the XGIDA return series is positive, skewed to the left and flattened. In addition, considering the probability value of Jargue Berra test statistics, it is understood that the return series are not normally distributed.

After this stage, to use volatility models, it will be necessary to establish the average model and test the presence of the ARCH effect in this model. ARCH Family models can be used if the ARCH effect is detected.

There are 2 different methods commonly used to determine the average model. One of them is to decide the appropriate ar and ma delays for the XGIDA yield series by correlogram, and the other is to model the XGIDA yield series with a period delay. In this study, the ARCH test and Autocorrelation test were performed by establishing a model with a 1-period delay of the XGIDA return series. The results obtained are presented in Table 1.

Table 1.Autocorrelation and Heteroskedasticity Test Results for the XGIDA Return Series

		nR^2	**Probability**
XGIDA	Breusch Godfrey LM Testi	0.374870	0.8291
	ARCH-LM (1)	7.396372	0.0065

***ARCH-LM (1) refers to the values in 1st dela**y.

The hypotheses used for the ARCH test can be shown as follows;

H0: There is no ARCH effect.

H1: There is the ARCH effect.

According to the results, the ARCH effect was determined according to the probability value of the XGIDA return series. Volatile models can be used in this case.

The hypotheses established for the Breusch Godfrey LM Test can be shown as follows;

H0: There is no autocorrelation.

H1: There is autocorrelation.

According to these results, it was determined that there was no autocorrelation problem, but the existence of a variance problem. ARCH family models can now be used as the ARCH effect has been detected.

Table 2. GARCH (1,1), EGARCH (1,1) and TGARCH (1,1) Models of XGIDA Index Returns

		GARCH(1,1)	EGARCH(1,1)	TGARCH(1,1)
Mean Equation				
Constant		-0.0012* **(0.0019)**	-0.0012* **(0.0026)**	-0.0012* **(0.0025)**
XGIDA(-1)		0.0526*** **(0.0926)**	0.0548*** **(0.0760)**	0.0507*** **(0.0849)**
Variance Equation				
α_0		0.5915* **(0.0096)**	-0.6117** **(0.0067)**	0.3305* **(0.0328)**
α_1		0.1008* **(0.0001)**		0.0413* **(0.0441)**
β_1		0.8392* **(0.0000)**	0.9454* **(0.0000)**	0.8511* **(0.0000)**
θ			-0.0558* **(0.0465)**	
γ			0.2061* **(0.0000)**	0.1210* **(0.0039)**
AIC		-5.6621	-5.6718	-5.6678
SIC		-5.6389	-5.6438	-5.6399
ARCH-LM		0.6318	0.5005	0.4715

Note1: *, ** and *** denote 1%, 5% and 10% significance level, respectively.

Note2: Expressions in parentheses give probability values.

In Table 2, GARCH (1,1), EGARCH (1,1) and TGARCH (1,1) models were used to estimate volatility in the food and beverage industry. The 1-period delay and constant term of the dependent variable in the mean equation were found to be significant.

Since the ARCH (α) and GARCH (β) parameters in the established volatility models are positive and statistically significant, it is concluded that all index returns have both ARCH and GARCH effects. This result indicates that shocks in all index returns and previous period volatility affect current period volatility. The sum of $\alpha + \beta$ must be less than 1 to fulfill the stationary condition of ARCH and GARCH models. This equation gives information about the volatility clustering of returns. The closer to 1, the more volatility persistence and volatility clustering. According to the information obtained from the table, it was found as $\alpha + \beta = 0.93$. In the XGIDA sector, low-yield periods are followed by low-return periods, and high-return periods are followed by high-return periods.

GARCH models described above take into account the symmetrical effect. Positive shocks and negative shocks have the same effect on volatility.

The models where the asymmetric effect is valid, that is, positive shocks and negative shocks have different effects on volatility are EGARCH and TGARCH models. In the EGARCH model, θ is the parameter that provides information about the existence of the leverage effect. A Negative value (-0.055821) indicates the presence of leverage effect in the XGIDA sector. In other words, negative news increases volatility more than positive news. Being statistically significant indicates the presence of an asymmetric effect in this sector. In other words, positive shocks and negative shocks have different effects on volatility. GARCH parameter β indicator of volatility cluster. Taking a value close to 1 as 0.94 gives information about the permanence of volatility shocks.

In the TGARCH model, another asymmetric model, γ is the parameter that takes into account the presence of the asymmetric effect. Since it is statistically significant, it can be mentioned that there is an asymmetric effect. If it is meaningless, the TGARCH model becomes the GARCH model.

According to the ARCH-LM test results, it is seen that the conditional variance problem has disappeared in all models. Among the alternative models, the model with the smallest AIC and SIC value is selected as the appropriate model. The most suitable model for the XGIDA sector was selected as the EGARCH model with an AIC value of -5.671704 and a SIC value of -5.643805. In other words, the most suitable model used in modeling the volatility in the food and beverage industry return series is the EGARCH (1,1) model.

Using the EGARCH (1,1) model, it is aimed to make an ex-ante forecast of the XGIDA sector in the light of the available information. In this context, the information in Figure 3 has been obtained.

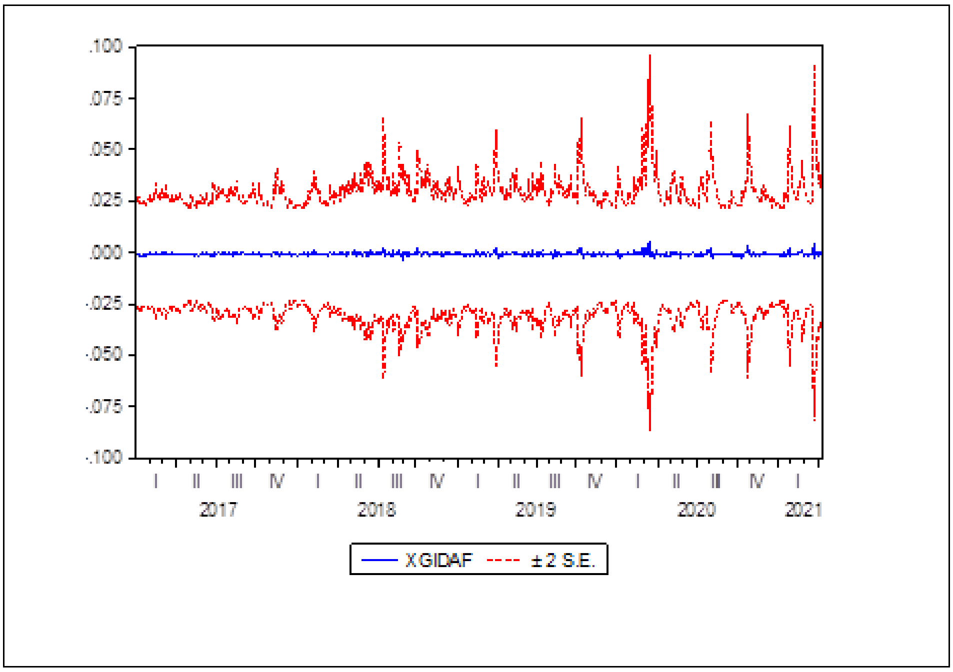

Figure 3.Ex-ante Forecast for XGIDA Sector

The red lines show the ± 2 standard error value band, while the blue lines show the forecast values of the XGIDA sector within the period. We can interpret the statistical results given below to evaluate the conformity of the estimates to graphical and actual values.

Table 3. Exante-Forecast Statistics

Forecast Sample	**01.03.2017 - 04.08.2021**
Root Mean Squared Error	0.015842
Mean Absolute Error	0.011110
Mean Abs.Percent Error	1.623.532
Theil Inequality Coefficient	0.093241
Bias Proportion	0.000196
Variance Proportion	0.100737
Covariance Proportion	0.899067

Root Mean Squared Error and Mean Absolute Error statistics depend on the scale of the dependent variable. These should be used as relative measures to compare forecasts for the same series across different models; the smaller the error, the better the forecasting ability of that model according to that criterion. Root Mean Squared Error and Mean Absolute Error values were 0.015842 and 0.011110, respectively. It is possible to conclude that the predictive ability of the model is quite strong.

Theil Inequality Coefficient is always between zero and one, and zero indicates a perfect fit and a value of 0.093241 indicates that the predicted values and the actual values are highly compatible with each other.

The bias proportion tells us how far the mean of the forecast is from the mean of the actual series.The variance proportion tells us how far the variation of the forecast is from the variation of the actual series. The covariance proportion measures the remaining unsystematic forecasting errors. Note that the bias, variance, and covariance proportions add up to one. If your forecast is "good", the bias and variance proportions should be small so that most of the bias should be concentrated on the covariance proportions. The Covariance Proportion value (0.899067) indicates that the estimate made is good.

Turkey, for the examination of the impact of the pandemic and its food industry COVID-19 chart, is shown below.

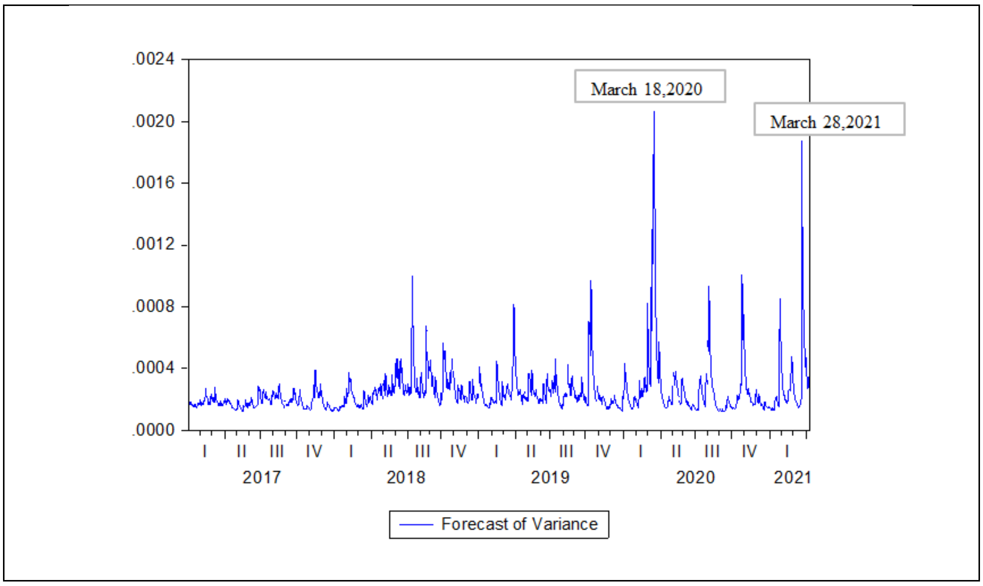

Figure 4. Movement of XGIDA Sector in the Period 01.03.2017 - 04.08.2021

When the graph above is examined, it is seen that there are sudden and big leaps at two different points. The first of these will be on March 18, 2020, and the second jump will be on March 28, 2021. Again between these dates, 3 different small leaps were detected in the XGIDA sector.

4. Conclusion

The food sector is one of the sectors least affected by the pandemic compared to other sectors. Some of the companies in the sector have expanded their activities, unlike other sectors, to meet the increasing customer demand. In this context, it aims to determine the effect of this increase on the market value of the food sector, taking into account the reaction of investors to the pandemic. For this purpose, daily data between 03.01.2017-08.04.2021 were used. The asymmetry and leverage effect in the XGIDA sector has been investigated with the help of volatile models. It was decided that the most suitable volatile model to be used in this study is EGARCH (1,1). According to the results obtained from this model, the existence of leverage and asymmetric effect has been observed in the XGIDA sector. In other words, negative news increases volatility more than positive news. In addition, positive shocks and negative shocks have different effects on volatility.

The measures taken by countries with the pandemic process caused by the effect of the COVID 19 virus have caused production to come to a halt all over the world. Therefore, consumption has led to more food and health. This situation can be clearly seen from the prediction graph. On March 18, 2020, it is seen that the number of COVID-19 patients reached 3 digits and some restrictions were brought to the agenda throughout the country. This situation created an atmosphere of panic in people and made them think that curfew decisions would be made and people were forced to stock up. This caused a sudden and huge movement in the food and beverage industry.

With a new decision taken on March 2, 2021, it is known that Saturday restrictions have been lifted in some provinces and Sunday bans are still valid. However, according to the data released in the first week of March, it is known that the number

This situation caused the second wave of panic throughout the country. We see that the idea of new restriction decisions to be taken at the meeting to be held on March 29, 2021, directed people to the food and beverage sector at that time. We can also see on the graph that the leap on March 28, 2021, is smaller than the leap on March 18, 2020. We can attribute this to the fact that the restrictions on March 28, 2021, are not as strict as those on March 18, 2020.

As a result, In the study investigating the effects of the COVID-19 pandemic on the food sector, the increases and decreases in the food sector have been determined since the first period of the pandemic in our country. It has been observed that these increases and decreases displayed a parallel movement with the restrictions taken within the scope of pandemic measures.

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