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DETECTION OF DAY ANOMALIES AND ITS EFFECT; BIST FOOD-BEVERAGE INDEX APPLICATION

GÜN ANOMALİLERİ VE ETKİSİNİN TESPİTİ; BIST GIDA-İÇECEK ENDEKSİ UYGULAMASI

Eda ORUÇ ERDOĞAN[1], Aykan Burak BOLAT[2], Murat ERDOĞAN[3]

1. Doç. Dr., Akdeniz Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, İşletme Bölümü, edaoruc@akdeniz.edu.tr, https://orcid.org/0000-0003-1507-4232
2. Doktora Öğrenci, Akdeniz Üniversitesi, Sosyal Bilimler Enstitüsü, İşletme Ana Bilim Dalı, bolat.aykan@gmail.com, https://orcid.org/0000-0002-0259-9614
3. Doç. Dr., Akdeniz Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, İşletme Bölümü, muraterdogan@akdeniz.edu.tr, https://orcid.org/0000-0002-4506-0731

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Abstract

The market efficiency approach is a knowledge-based approach and argues that if the market is efficient, the information entering the market is effective on the price level. However, over time, it has been revealed in studies conducted at different times that the markets were not always efficient on the basis of this view. On this basis, it is seen that there are various anomalies that arise in case of deviations from efficiency in the markets. One of the anomalies observed in the stock market is the anomalies related to the days. In this study, it is aimed to evaluate the differences in the stock returns of the companies traded in the stock market and included in the Food-beverage index on the basis of the days of the week. In the study, the stock returns of the businesses whose data are accessed continuously in the determined period in the BIST Food-beverage index are analyzed as the dependent variable and the traded days of the week are analyzed as the independent variable. According to the results obtained, it is seen that Monday has a negative effect at the 5% significance level in terms of stock returns of the companies included in the food-beverage index.

Keywords: Anomaly, Day Anomalies, Day of the Week Effect, Stock Market.

Öz

Piyasa etkinliği yaklaşımı bilgi temelli bir yaklaşım olup piyasanın etkin olması durumunda pazara giren bilginin fiyatlar düzeyinde etkili olduğunu öne sürmektedir. Ancak zaman içerisinde, piyasaların bu görüş temelinde her zaman etkin olmadığı farklı zamanlarda yapılmış çalışmalarda ortaya konulmaktadır. Bu temelde piyasalarda etkinlikten sapma halinde ortaya çıkan çeşitli anomaliler olduğu görülmektedir. Hisse senedi piyasasında gözlemlenen anomalilerden biri günlere ilişkin anomalilerdir. Bu çalışmada borsada işlem gören ve Gıda-içecek endeksinde yer alan işletmelerin pay senedi getirilerinin haftanın günleri temelinde farklılığının değerlendirilmesi amaçlanmaktadır. Çalışmada BİST Gıda-içecek endeksinde, belirlenen dönemde verilerine kesintisiz ulaşılan işletmelerin hisse senedi getirileri bağımlı değişken olarak, haftanın işlem gören günleri ise bağımsız değişken olarak analiz edilmiştir. Elde edilen sonuçlara göre gıda-içecek endeksi içerisinde yer alan işletmelerin hisse senedi getirileri bakımından %5 anlamlılık seviyesinde pazartesi gününün negatif etkisi olduğu görülmektedir.

Anahtar Kelimeler: Anomali, Gün Anomalileri, Haftanın Günü Etkisi, Hisse Senedi Piyasası.

GENİŞLETİLMİŞ ÖZET

Çalışmanın Amacı

Etkin piyasalar hipotezi, bireylerin rasyonel davrandığı algısı üzerine inşa edilen bir hipotez olarak finans literatüründe yer almaktadır. Fakat piyasalarda rasyonel davranışları ve etkinliği etkileyen çeşitli sapmaların diğer bir ifade ile anomalilerin olduğu bilinmektedir. Bu çalışmada BİST Gıda-içecek alt sektörü içerisinde yer alan işletmelerin 1999-2020 yıllarını analiz ederek etkin piyasalardan sapma olarak kabul edilen haftanın günü anomalilerinin ilgili sektörde varlığının incelenmesi amaçlanmaktadır.

Araştırma Soruları

Bu çalışmada finansal piyasada ortaya çıktığı düşünülen anomalilerden gün anomalileri öncelikli olarak ele alınarak, elde edilecek getiriler üzerine haftanın günü etkisinin tespit edilmesi amaçlanmaktadır. Böylelikle finansal piyasalarda işlem yapmak isteyen finans aktörlerine gün etkisinin olduğu tespit edildiği durumda yatırım kararlarını yönlendirebilecek bilgiler sunulması hedeflenmektedir. Buna bağlı olarak çalışma araştırma sorusu, "Hisse senedi getirileri ile haftanın günleri arasındaki etki" değerlemesi üzerine inşa edilmiştir.

Literatür Araştırması

Anomalilere ilişkin literatür incelemesi yapıldığında çok sayıda çalışmanın olduğu görülmektedir. Cross (1973) S&P bileşik endeksi üzerinde haftanın günü anomalisini ele almıştır. 1953-1970 yılları arasını inceleyen çalışmada cuma günü elde edilen değerlerin bir önceki güne göre yüksek olduğunu vurgularken, pazartesi günü elde edilen değerlerin ise bir önceki güne göre daha düşük olduğunu belirtmektedir. Lakonishok ve Smidt (1988) haftanın günü etkisini Dow Jones Sanayi Endeksinde ele almışlardır. Çalışma sonucunda pazartesi günü elde edilen getirilerin negatif, cuma günü elde edilen getirilerin ise pozitif olduğu tespit edilmiştir. Gharaibeh ve Hammadi (2013), Bahreyn menkul kıymetler borsasında, haftanın günü etkisinin varlığının tespit edilmesi amaçlanmıştır. Bu amaç doğrultusunda regresyon, pearson korelasyon ve t testi gibi istatistiki testler yapılmıştır. Analiz için Ocak 2006 ve Aralık 2010 arasındaki döneme ait günlük veriler kullanılmıştır. Çalışmanın bulgularına göre Bahreyn borsasında haftanın günü etkisinin varlığından söz edilmiştir. Watanapalachaikul ve Islam (2006), çalışmasında Tayland borsasında haftanın günü ve ocak ayı etkisinin varlığının incelenmesi amaçlanmıştır. Analiz için gerekli veriler hem aylık hem de günlük olarak toplanırken zaman aralığı olarak Ocak 1992 ve Aralık 2001 arası kullanılmıştır. Çalışmanın sonucuna göre hem haftanın günü hem de ocak ayı etkisinin varlığından söz edilebilir. Pazartesi günü ile en iyi getiri elde edilen gün arasındaki fark oldukça yüksek olduğu görülmektedir. Gürbüz (2006 Borsa İstanbul üzerinde haftanın günü etkisini incelemiş ve elde ettiği sonuçlara göre pazartesi ve salı günleri negatif getiri sağladığını cuma günü ise pozitif getiriler elde edildiğini ifade etmektedir. Fettouhi ve Kifani (2022), Katar borsasında haftanın günü anomalisinin varlığını araştırmıştır. Bu analiz için veri aralığı Şubat 2018 ve Temmuz 2021 olarak belirlenmiştir. Günlük veriler kullanılarak getiriler hesaplanmıştır. Analiz için

GARCH VE OLS modelleri kullanılmıştır. Çalışmanın sonucunda pazartesi günü için negatif etki bulunurken çarşamba günü için pozitif bir etki bulunmuştur.

Yöntem

Çalışmada BİST gıda-içecek endeksinde işlem gören ve 1999-2020 yılları arası verilerine kesintisiz ulaşılan işletmelerin günlük kapanış fiyatları üzerinden değerleme yapılmıştır. 54680 adet veri derlenmiştir. Veri seti hem zaman hem de yatay kesit verileri içerdiğinden panel veri analizi yöntemi ile analiz edilmiştir. Panel veri analizi içerisinde, klasik model, sabit etkiler modeli ve tesadüfi etkiler modeli yer almaktadır. Model tercihine geçmeden önce birim kök testleri yapılmıştır. Klasik modelin geçerliliği diğer bir ifade ile birim ve zaman etkilerinin olup olmadığını değerlemek için F testi ve Likelihood-ratio test (LR) uygulamıştır. F testi sonucunda elde edilen olasılık değeri ile likelihood-ratio test sonucunda elde edilen olasılık değeri değerlendirildiğinde klasik modelin uygun olduğu görülmüştür. İstatistiki değerlendirmeler sonucunda Arellano, Froot ve Rogers Tahmincisi kullanılmıştır.

Sonuç ve Değerlendirme

Analiz sonuçları değerlendirildiğinde hisse senedi getirisi açısından pazartesi gününün negatif ve anlamlı etkiye sahip olduğu görülmektedir. Diğer bir ifade ile pazartesi günü hisse senedi getirileri bakımında diğer günlere göre farklılık arz etmektedir. Pazartesi gününün diğer günlere kıyasla negatif etkisinin olduğu ve pazartesi günlerinin hisse senedi getirileri üzerinde olumsuz etkiye sahip olduğu ifade edilebilir. İncelenen dönem itibariyle Bist Gıda-içecek endeksinde gün etkisi anomalilerinin varlığının olduğunu söylemek mümkündür. Bist Gıda-içecek endeksinde çıkan, pazartesi günü kaynaklı etkinin nedeni literatür temelinde ele alındığında, bilgi paylaşımının hatalı zamanda yapılmasına veya piyasaya ilişkin paylaşılan olumsuz haberlerin haftasonu paylaşılmasına bağlı olarak, yansımasının pazartesi günü görülmesi olabilir. Bu çalışma özellikle alt endeks bazında yatırım yapmayı planlayan finans aktörlerini yönlendirecek nitelikte olup, pazartesi günü etkisine dikkat çekerek, diğer anomalilerin de varlığının incelenmesine dair dikkat çekici bir veri olma niteliği sunmaktadır.

1. INTRODUCTION

There are various approaches in financial markets that can influence or direct the decisions of financial actors. One of these approaches is the efficient markets hypothesis, which was brought to the literature by Fama in the 1970s, based on the existence of rational people and the fact that the pricing in the market reflects the information entering the same market, which states that stock prices reflect the information reached by the investors.

The efficient market hypothesis states that securities and information about the securities are reflected in the prices, and therefore it is not possible for investors to earn excessive returns (Fama, 1970). However, in the following period, with the financial developments, there was a change in their perspectives and it was concluded that the rule of not obtaining continuous profit on the market put forward by Fama was destroyed under certain conditions, and the concept of anomaly, which meets the definition of continuous gain on the market, was brought to the literature. Accordingly, financial actors will be able to create the opportunity to obtain abnormal returns by developing various investment strategies against anomalies that may arise in financial markets. When the anomalies, which are one of the indicators of the ineffectiveness of the markets, are examined, we encounter day anomalies, lunar anomalies, holiday anomalies, seasonal anomalies as anomalies related to various periods and cross-sectional anomalies (Latif et al., 2011).

Among the anomalies that emerge regarding whether the stock returns perform better or worse in any time period compared to other time periods, day anomalies draw attention. Day anomalies are considered as intraday anomalies and day of the week anomalies. Day anomalies are the type of anomalies that occur when stocks provide lower or higher returns on a certain or a few days of the week or days (Barak, 2008). Day anomalies indicate the opposite operation of the efficient markets hypothesis by revealing that the returns obtained between days or during the day differ. There are studies examining the day of the week or intraday anomaly in almost all world stock markets. At the point of examining intraday anomalies, it is seen that certain hour intervals on a certain day of the week or periods are allocated to stock market sessions and it is evaluated whether a profit can be made on the market continuously in these periods (Dadenova, 2012; Bolat, 2020). At the point of examining the anomalies on the day of the week, the effect that causes the earnings to be high on some days of the week and low on some days is seen. In particular, Mondays have lower values compared to the previous day, while Fridays generally have higher values (Cross, 1973; Jaffe and Westerfield, 1985; Lakonishok and Smidt, 1988).

In the following part of this study, there is a literature review especially on day anomalies. Then, panel data analysis was made for the purpose of the study and the study was concluded with evaluations. Thus, it is aimed to provide financial actors who want to trade in financial markets with information that can guide their investment decisions in case the day effect is determined.

2. LITERATURE REVIEW

When the literature review on the day-of-week anomalies is made, it is seen that there are many studies. One of the global studies on the day-of-week anomaly was done by Cross in 1973. Cross (1973) carried out his work on the S&P composite index. As a result of the study covering the period between 1953 and 1970, it was revealed that the data on Friday was higher than the day before it, and the data on Monday was lower than the day just before it. After this study, 7 years after the publication of the study on the same index, the returns analyzed by French on a daily basis were divided into sub-periods, and the data revealed as a result shows that Monday has a negative return effect and Friday has a positive return effect (Yiğiter and Sarı, 2016; Bolat, 2020).

In the study based on the Dow Jones Industrial Index, which was put forward by Lakonishok and Smidt (1988) and covers a long period of 90 years, it was determined that the returns on the first day of the week on Monday are negative and the returns on the last day of the week are positive. A study was carried out by Barone (1989) on the Italian (Milan) stock market and the results were in parallel with the studies on the industrial index. As a result of the study, negative results were obtained on Monday. Athanassakos and Robinson (1994) investigated the day of the week effect on Canadian stocks between January 1, 1975 and June 30, 1989. When the results obtained in the study are evaluated, it is seen that Tuesday has a greater negative effect instead of the negative effect of Monday in the literature. Sias and Starks (1995) investigated the effects of the weekend and the day of the week with the data obtained from the NYSE. Two basic data were used for the analysis. These are stock volume data and stock return data, respectively. According to the results of the analysis, the existence of the weekend effect was revealed. In addition, companies with higher institutionalization for Mondays following Fridays, which have a positive effect, have higher Monday returns compared to lower ones. In the study by Coutts and Hayes (1999), UK stock indices were examined in terms of days of the week. Results have been obtained that there is a day of the week effect in the UK stock indices, but this effect is not strong compared to previous periods. Mehdian and Perry (2001) evaluated the effect of the day of the week in the 1987 and 1998 periods. In their study on SP500, DJCOMP AND NYSE indices, they stated that there was no significant difference between the days of the week in terms of returns.

Lyroudi, Subeniotis and Komisopoulos (2002) empirically examine the day-of-week effect anomaly in the Athens Stock Exchange (ASE). The results show that the day of the week effect is strongly observed in the Greek Stock Exchange. However, as in other markets, it is in a different form than in other developed capital markets, as negative returns are on Thursdays instead of Mondays or Tuesdays. Aly, Mehdian, and Perry (2004) aim to analyze the existence of the day of the week effect in Egypt's largest stock market index. For this purpose, the data set was created based on the daily closing prices of the index between April 1998 and June 2001. As a result of the statistical tests, it was determined that Monday has a positive effect.

Watanapalachaikul and Islam (2006), in their study, aimed to examine the existence of the day of the week and January effect in the Thai stock market. While the data required for the analysis were collected both monthly and daily, the time interval between January 1992 and December 2001 was used. According to the results of the study, it can be mentioned that both the day of the week and the January effect exist. It is seen that the difference between Monday and the day with the best return is quite high. Gürbüz (2006) conducted research on Borsa İstanbul focusing on the effect of the day of the week and according to the results he found, it provided negative returns on Mondays and Tuesdays, while positive returns on Friday.

Tunçel (2007) deals with the effect of the day of the week in Borsa Istanbul. For the period between January 1, 2002 and June 30, 2005, daily closing data were taken and Borsa İstanbul 100 index data was used. According to the findings, while the highest return of the week was achieved on Friday, Monday was the day that provided the lowest return of the week.

Atakan (2008) took the daily returns of the ISE national 100 index as a basis and made its analyzes in this context. As a result of his study, it was observed that Monday was the day with the least return, and Friday was the day with the highest return.

Rahman (2009) aimed to determine the existence of the day of the week effect on the Dhaka (DSE) stock market. In order to complete the analysis of the study, the help of the dummy variable regression model and GARCH models was taken. When the findings of the study were examined, according to the results of the regression analysis, a positive and significant result was obtained only on Thursday from the trading days, while a negative and positive result was obtained for Sunday and Monday according to the GARCH model.

Hussain and et al. (2011) analyzed the anomalies in the KSE-100 index in Pakistan stock markets for the period of 2006-2010. According to the results obtained, the returns obtained on Tuesday are significant and positive, and there is a day effect in the Pakistan stock market. It has been determined that the returns obtained on Tuesday are higher than the other days. Gharaibeh and Hammadi (2013) aimed to determine the existence of the day of the week effect in the Bahrain stock market. For this purpose, statistical tests such as regression, pearson correlation and t test were performed. Daily data for the period between January 2006 and December 2010 were used for the analysis. According to the findings of the study, the existence of the day of the week effect was mentioned in the Bahrain stock market.

Soares, Herling, Lima and Moritz (2014) examined the effect of the day of the week from stock market anomalies in the stock market in Brazil. For the period 1994-2011, valuation was made over the daily stock prices of the Ibovespa Index. In the study, it was concluded that Friday returns are quite significant and positive and there is a day effect in the Brazilian stock market. On average, returns on Friday are higher than returns on other days. Konak and Kendirli (2014) examined the existence of the

global financial crisis on the effect of the day of the week based on the daily closing prices of the BIST100 index. Ţilică and Oprea (2014) examined the day of the week anomaly in the Romanian stock market. As a result of the study, it was concluded that Friday differed from other days and the returns were higher than other days.

Güç et al. (2016) BIST100 used daily closing data and stated that Thursday and Friday yielded more returns, and although it was not statistically significant, Monday showed less returns than other days. Özarı and Turan (2016) found that for the BIST30 and BIST 100 indices, positive returns on Friday and negative returns on Mondays. Lu and Gao (2016) discussed the day anomalies in the Chinese stock market. According to the results they obtained, while positive returns are provided on Monday, negative returns are provided on Tuesday. They put forward the financial crisis as the reason for the negative return on Tuesday.

Akbalık and Özkan (2016) carried out their studies on 30 stocks traded under the BIST30 index, and as a result of the study, it was revealed that only four stocks were statistically positive on Monday, contrary to the literature, that is, the direction of the average return was positive. Karcıoğlu and Özer (2017) examined multiple indices on the BIST and concluded that Monday and Tuesday had a negative effect as a result of these transactions.

Du Toit,Hall and Pradhan (2018) examine the existence of the day of the week effect on the Johannesburg Stock Exchange (JSE) indices for the period March 1995-2016 using a GARCH model. According to the results, the highest and lowest returns are observed on Monday and Friday, respectively, while volatility is observed in all five days from Monday to Friday. Aliyev and Gamarli (2018) focused on the anomaly detection of weekdays in the BIST100 index in their study. For this purpose, one-year data as of 2015 was analyzed with the T test. When the findings of the study were examined, no anomaly was found in the relevant period.

Kayral (2019) examined the Benelux country stock markets and discussed the effect of the day of the week and the moon. Benelux countries include Belgium, the Netherlands and Luxembourg, and the closing prices of the relevant period are taken as a basis to obtain return series by examining the March 2010 and March 2019 periods. When the results of the analysis are examined, there is a day of the week effect in the AEX (Netherlands) stock market due to the abnormal return on Tuesday, while the effect of the day of the week is not found in other stock markets. In addition, there is no evidence of the anniversary effect on any stock market. Gümüş (2019) determined that Monday is the day with the highest return among the days of the week, in his study based on the daily closing prices on the BIST100 index, and in addition, he revealed that Friday is the day with the lowest return. Oğuz (2019) found positive and high volatility on Monday by including dummy variables in the study, and detected low volatility and negative direction on Tuesday and Friday. Patjoshi and Nandini (2020) focused on the existence of the day of the week effect in the Indian stock market. He analyzed the period of January

2000 and December 2018 with the T test and GARCH model. According to the analysis findings, it was observed that the highest return was observed on Wednesday, while the lowest return was observed on Tuesday.

Mazviona, Mah, and Choga (2021) discussed whether there is seasonality in the day of the week, the turn of the month, holiday and January in the South African stock market. They analyzed the Johannesburg stock market index data for the period 1995-2018. Based on their results, investors are advised to trade on Mondays to get the highest return throughout the week. Investors have the potential to generate excess returns when they invest at the beginning of the month. For the holiday strategy, traders should trade the day after the holiday as it will bring more profit from the investment. In addition, the authors point out that Investors can make more money by trading in October than in January. Güneş (2021) investigated the existence of day of the week and January anomalies on BIST100 and KAT30 indices. Analysis was made based on daily stock market closing prices between 07 January 2011 and 24 July 2020. The EGARCH model with a dummy variable was used in the analysis and according to the results of the analysis, the day of the week effect could not be detected in the BIST100 index. However, the negative effect of Monday and Wednesday was detected in the KAT30 index. Looking at the results of the analysis in terms of the January effect, the January effect could not be detected in both indices. Chiah and Zhong (2021) examined the mood effect of investors and the day of the week effect in Australia. It has been determined that the returns on Tuesday in Australia are lower than the other days of the week. This condition is called Tuesday blue in the literature. It has been revealed that the effect of Tuesday is related to the effect of Monday in the USA, but the effect of Monday shows the effect of Tuesday in the Austrian market due to the 14-hour time difference. In general, it is among the results that there is a contagion effect on the mood of the investors.

Bankoti (2021) investigated day anomalies in the Indian stock market. Statistical analyzes were made with SPSS and EVIEWS 8 package programs using the closing prices of the index between 2010 and 2019, and as a result of the study, the existence of the day of the week effect in the relevant period cannot be mentioned. Wuthisatian (2021), in his study, aimed to investigate the effects of the day of the week and the month of January in the Thai stock market. In the study, a regression analysis was performed using daily stock market closing prices between March 2014 and March 2019. According to the results of the analysis, although the Monday effect was detected, it was determined that Monday had a negative effect and yielded lower returns than all other trading days. In the findings of the January effect, it was determined that there was a positive return and it was differentiated with a higher return compared to other months.

Dutta and Das (2021), the aim of the study is to investigate both calendar and day of the week anomalies in the Indian stock market. Index values for the period of March 2001 and March 2015 are taken as a basis. As a result of the analysis, the effect of Monday and Friday was determined. Among

the calendar anomalies, it has been determined that there is a March and October effect in the Indian stock market. Kayral and Aksoy (2022) investigated the existence of the day of the week effect in the Barley, Wheat and Corn indices. For this purpose, index returns between April 2021 and January 2022 were used. In the analyzes made with the GARCH model, according to the results obtained, it has been determined that it is possible to obtain returns above the normal return on Mondays and Tuesdays in the Barley index, on Mondays and Thursdays in the Wheat index, and on Mondays in the Egypt index. Samaniego, Salgado, and Pérez (2022) investigated the presence of day of the week and holiday effect anomalies in the Mexican stock market (MSE). Analysis was carried out in large, medium and sub-capital indices. The GARCH model was used for analysis in the study. The day of the week effect was detected in 3 sub-indices in the Mexican stock market. The holiday effect was detected only in the middle capital index. Fettouhi and Kifani (2022) investigated the existence of the day of the week anomaly in the Qatar stock market. The data range for this analysis is February 2018 and July 2021. Returns are calculated using daily data. GARCH AND OLS models were used for analysis. As a result of the study, a negative effect was found for Monday, while a positive effect was found for Wednesday. Khadidja and Chahida (2022) investigated the existence of the day of the week anomaly in the Qatar stock market. In this context, a data set was created using daily closing prices for the period of February 2018 and July 2021. GARCH and OLS models were used for the analysis of the created data set. According to the results of the analysis, a negative effect was detected on Monday, while a positive effect was detected on Wednesday and Tuesday, and positive on Friday (Erdogan and Elmas, 2010).

As a result of the literature review, it is seen that the effect of the days is generally examined on the basis of the general index, not on the basis of sub-indices. It is thought that this study, which focuses on the sub-index, will contribute to the literature at the point of examining the day relationship with the stock returns of the companies that are carefully followed by the investors, operating to meet the basic food needs of the consumers and included in the food-beverage index.

3. METHODOLOGY

In the study, it is aimed to examine the existence of the day anomaly by considering the relationship between the returns of the stocks of the companies traded in the BIST food-beverage index and the day of the transaction. This section is devoted to the explanation of the data and methodology used in the analysis.

For the purpose of the study, a valuation was made over the daily closing prices of 10 companies that were traded in the BIST food-beverage index and whose data between 1999 and 2020 were accessed without interruption. The daily closing price data of each firm was obtained from the BIST Data Store.

The hypothesis created in the study, which aims to examine the relationship between stock returns and days of the week on the basis of anomalies, is stated below;

H_0 = Stock returns do not differ in terms of days of the week.

H_1 = Stock returns differ in terms of days of the week.

In the study, the model created to determine the day effect on the stock returns of the companies in the BIST food-beverage index is as follows.

$$Return_{it} = a + \beta_1 MNDY_{it} + \beta_2 TUEDY_{it} + \beta_3 THUDY_{it} + \beta_4 FRIDY_{it} + \varepsilon_{it} \qquad \text{Model 1}$$

In the model, there are return values calculated over the closing prices of the stocks to be examined as the dependent variable. The daily closing prices data of each firm were obtained with the data set sent by the institution through the BIST Data Store within the framework of a written request to BIST and arranged according to the application method used.

The following formula was used while calculating the return (Abdioğlu and Değirmenci (2013), Arı (2019), Akbalık ve Özkan (2016), Güç, Saçan and Yıldırım (2016)).

R_t=ln $(\frac{P_t}{P_{t-1}})$

R_t= Return in period t

P_t= Daily closing price in period t

P_{t-1} = Daily closing price in period t-1

As an independent variable, the trading days of stocks were determined as a dummy variable and included in the model. Dummy variables were created by assigning days on which the stock was traded (1) and days on which it was not traded (0). The inclusion of all dummy variables in the model causes a multicollinearity problem. In order to avoid a dummy variable trap, the multicollinearity problem was avoided by using one less dummy variable than the number of variables to be expressed with a dummy variable in the fixed parameter model (Mazviona, Mah and Choga (2021), Abdioğlu and Değirmenci (2013), Arı and Yüksel (2016), Worthington (2010), Darrat, Li and Chung (2013)). In the model created accordingly, R represents the return value and D values represent the dummy variables defined for each trading day in the stock market. Here, the dummy value defined for Monday takes the value of 1 for the relevant day, Monday, and takes the value 0 for other days, and this method is applied for all other trading days. MNDY, dummy variable for Monday (if traded on Monday:1 if not traded on Monday: 0); TUEDY, dummy variable for Tuesday (if trading Tuesday:1 if not traded Tuesday:0); THUDY refers to the dummy variable for Thursday (if trading Thursday:1 if not trading Thursday:0) and FRIDY refers to the dummy variable for Friday (if trading Friday:1 if not trading Friday:0). On the other hand, Wednesdays (WEDDY) were added to the regression model as a constant. Also, while constructing the Model, Mazviona et al. (2021), Abdioğlu and Değirmenci (2013), Arı and Yüksel (2016) studies are based.

Since the created model contains both time and cross-section data, it was analyzed by panel data analysis method. Pool OLS, Fixed Effects Model (FEM) and Random Effects Model (REM) are included in panel data analysis. Before moving on to model preference, unit root tests were carried out. F test and Likelihood-ratio test (LR) were applied to evaluate the validity of the classical model, in other words, whether there are unit and time effects. When the probability value obtained as a result of the F test and the probability value obtained as a result of the likelihood-ratio test were evaluated, it was seen that the classical model was suitable.

Before proceeding to the analyses, in order to test the heteroscedasticity with the Breusch-Pagan (1979)/Cook-Weisberg (1983) test, residues were first obtained in the estimation of the model by the pooled least squares method. According to the Breusch-Pagan/Cook-Weisberg test result, chi2(1)=8.67 and prob>chi2=0.0032. In addition, with White test, prob>chi2=0.0300. Accordingly, there is heteroscedasticity in the model. With the Wooldridge test for autocorrelation the prob is > F = 0.0030. In addition, with the Breusch-Godfrey test, prob > F = 0.0358 was obtained. Accordingly, it is seen that there is autocorrelation. On the basis of the evaluations, the classical model is handled with the help of resistive coefficient estimators. The classical model was estimated using the Arellano, Froot and Rogers estimator, which was developed by Arellano (1987), Froot(1989) and Rogers(1993) and produces resistant standard errors by making estimations when the assumption of independent distribution of residues becomes flexible (Mazviona, Mah and Choga, 2021). Mazviona, Mah, and Choa (2021) found similar results in their study of day anomalies and evaluated them with Arellano, Froot, and Rogers estimators.

3.1 Analysis Results

In the study, firstly, unit root analyzes of the dependent variable were made and the results are as given in Table 1.

Table 1. Unit Root Test Result

		Statistic	p- value
Return (IPS)	t-bar	-84.7764	
	t-tilde-bar	-54.5405	
	Z-t-tilde-bar	-2.0e+02	0.000
Return (LLC)	Unadjusted t	-1.8e+02	0.000
	Adjusted t	-2.1e+02	0.000
Return(ADF)	Inverse Chi-Squared	720.8731	0.000
	Inverse normal	-25.6963	0.000
	Inverse logit	-63.4418	0.000

The daily closing prices of the 10 companies in the Bist Food-beverage index and the returns obtained in the light of these data and the stock market trading days; The results of panel data analysis on the relationship between Monday, Tuesday, Wednesday, Thursday, and Friday are as indicated in Table 2.

Table 2. Analysis Results

	Model 1		
	Coef.	t-statistic	p-value
MNDY	-.0063698	-5.53	0.000*
TUEDY	.0035777	.0042458	0.84
WEDDY	-.0013176	-0.73	0.482
THUDY	.0021285	0.77	0.462
FRIDY	.0016397	1.35	0.211
F-value	41.41		
Prob>F	0.000		
R-kare	0.005		
Obs.	54680		

* It is statistically significant at the 5% level.

When Monday, Tuesday, Wednesday, Thursday and Friday, which are the trading days of the week determined as independent variables in the analysis, are examined, it is observed that Monday differs from the other days with statistical significance. Accordingly, it has been determined that Monday, one of the days of the week, has a statistical significance level of 1% compared to other days. In the examined period of the determined companies, it is seen that Monday has a significant negative effect in terms of company stock returns, and it does not have a significant effect on Tuesday, Wednesday, Thursday and Friday, which are the other days of the week, in terms of returns from stocks.

In terms of stock returns on Monday, it differs from other days. It is seen that Monday has a negative effect compared to other days, in other words, Mondays have a negative effect on stock returns. When the literature is examined, it is known that there are various opinions about the significant difference of the returns obtained on Monday and the Monday effect. While some of these views accept the existence of the effect on Monday, some studies emphasize that the effect on Monday gradually decreases, and some emphasize that there is no effect of Monday and/or the day of the week. Results obtained from studies accepting that Monday, one of the days of the week, has an effect on stock returns, emphasize that the returns on Mondays are generally lower compared to other days (Cross, 1973; Gibbons and Hess; 1981). The phenomenon that Monday stock returns are on average less than the returns on other days of the week and in fact the net returns are negative is called the Monday effect (Cho, Linton and Whang, 2007).

In cases where it is accepted that the Monday effect exists, one of the views regarding the emergence of the effect is that the effects of information and news related to the market or stocks, which will lead to negative perception or incorrect pricing by market actors, are reflected on Monday, depending on the sharing of the weekend effect (Karcıoğlu and Özer, 2017). Accordingly, the effect on Monday is the result of postponing the publication of particularly negative news or information to the weekend. Another view is related to different commercial behavior preferences of market actors. Accordingly, it is stated that market actors prefer to be in the position of seller on Monday, the first day of the week, and they have different behavior patterns compared to other days of the week (Cho, Linton

and Whang, 2007). Also, one of the views is the Monday effect arising from credit transactions. To put it more clearly, financial actors that make credit transactions do not want to pay the loan interest on the weekend. For this reason, investors will avoid paying loan interest at the weekend, as they tend to buy on Thursday and Friday, the last two days of the week, but by adding stocks to their portfolios on Monday. As a result of this process, there will be a difference in the markets on Monday compared to other days (Gurbuz, 2006).

4. CONCLUSION

In the efficient market hypothesis, which states that the information obtained in the market is fully reflected by the prices, the investors who invest in the market do not have a different, above-average economic gain. In addition, there are various anomalies that cause the efficiency of the markets to deviate due to the investors not acting rationally. This study was carried out to evaluate whether the day of the week effect, which is among the anomalies described as deviation from the efficient market hypothesis, exists in terms of BIST Food-beverage index. For this purpose, ten companies traded in the stock market and included in the food-beverage index between 1999-2020 were evaluated. In the valuation made over the closing prices of the stocks, the days of the week are included in the analysis on the basis of dummy variables. Analyzes were carried out on the basis of the panel data method. When the results of the analysis are evaluated, it is seen that Monday has a negative and significant effect in terms of stock returns. In other words, it differs from other days in terms of stock returns on Monday. It can be stated that Monday has a negative effect compared to other days and Mondays have a negative effect on stock returns. It is possible to say that there are day effect anomalies in the Bist Food-beverage index as of the analyzed period.

When the reason for the effect originating from Monday is considered on the basis of the literature, it may be that the reflection is seen on Monday, depending on the sharing of information at the wrong time or the sharing of negative news about the market on the weekend, or it may be that the investor's behavior creates a negative effect by being in the seller position on Monday. French (1980) states that postponing the announcement of negative market news or macro/microeconomic news during the week to Friday is the most common trend preferred to prevent market deterioration. In addition, because small investors, who usually abstain, take the information they have on the weekend and implement their decisions on Monday, it is among the information in the literature that Monday transactions include sell orders (Miller, 1988).

In the study, both the reflection of negative news and the sales concentration preferences of individual investors can be seen among the reasons for the Monday effect in the Bist Food-beverage index. In this context, it is seen that the effect of days is generally analyzed on the basis of the general index, not on the basis of sub-indices.

It is thought that this study, which focuses on the sub-index, will contribute to the literature and guide the financial actors who are considering investing in the relevant index, at the point of examining the day relationship with the returns of the stocks of the companies in the food-beverage index, which is carefully followed by the investors.

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