Araştırma Makalesi ● Research Article

The Relationship Between BIST100 Index Return and the Central Bank of the Republic of Turkey Interest Rate Decisions

BIST100 Endeks Getirisi ile Türkiye Cumhuriyet Merkez Bankası Faiz Kararları Arasındaki İlişki

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Abstract: Stock prices are affected by many economic and political factors. Interest rate, one of the macroeconomic indicators, is one of the important factors that are thought to affect share prices in the stock market. Central banks determine the interest rates of short-term loans given to banks and borrowing from banks. Through this interest rate, it aims to affect the general level of prices. A change in the interest rate changes the cost of borrowing and thus affects the firms's profitability and ability to pay dividends. Again, change in interest rate can affect the opportunity cost of equity investments and this in turn affects stock prices. In this study, it is aimed to determine whether the interest rate decisions taken by the CBRT Monetary Policy Committee cause abnormal returns on stock prices. In Borsa Istanbul, the existence of abnormal returns with the effect of interest rate changes was investigated by event study method. Using 131-month data between May 2010 and March 2021, the presence of abnormal returns around the date of 30 meetings, when the decision to change the interest rate, was tested on the BIST100 index. As a result, it has been determined that interest rate change decisions have a very low effect on the BIST100 index. Although the effect on the index was observed within five days after the date of the interest rate increase/decrease decision, it was observed that this effect remained very weak.

Keywords: Abnormal Return, Borsa Istanbul, BIST100, Event Study, Interest Rate.

Öz: Hisse senedi fiyatları ekonomik ve politik birçok faktörün etkisini taşır. Makroekonomik göstergelerden faiz oranı, borsadaki hisse fiyatlarını etkilediği düşünülen önemli faktörlerdendir. Merkez bankaları, bankalara verdiği kısa vadeli borçların ve bankalardan yaptığı borçlanmanın faiz oranlarını kendisi belirler. Bu faiz oranı aracılığıyla, fiyatlar genel seviyesini etkilemeyi amaçlar. Faiz oranındaki bir değişiklik borçlanmanın maliyetini değiştirir ve dolayısıyla firmaların kârlılığı ile temettü ödemesi yapma kabiliyetini etkiler. Yine faiz oranındaki değişiklik, özkaynak yatırımlarının fırsat maliyetini etkileyebilir ve bu da sonuç olarak hisse senedi fiyatlarını etkiler. Bu çalışmada, TCMB Para Politikası Kurulu tarafından alınan faiz kararlarının hisse senedi fiyatları üzerinde anormal getiri ortaya çıkarıp çıkarmadığının belirlenmesi amaçlanmıştır. Borsa İstanbul'da, faiz oranı değişikliğinin etkisi ile anormal getirilerin varlığı olay çalışması (event study) yöntemiyle araştırılmıştır. Mayıs

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2010-Mart 2021 dönemleri arasında 131 aylık veriler kullanılarak, faiz oranı değişikliği kararının alındığı toplam 30 toplantı tarihi etrafında anormal getirilerin varlığı BIST100 endeksi üzerinde test edilmiştir. Sonuçta, BIST100 endeksi üzerinde faiz değişiklik kararlarının çok düşük bir etkiye sahip olduğu belirlenmiştir. Faiz artırma/düşürme karar tarihinden sonraki beş gün içerisinde endeks üzerinde etkisi görülse de bu etkinin çok zayıf kaldığı görülmüştür.

Anahtar Kelimeler: Anormal Getiri, Borsa İstanbul, BIST100, Olay Çalışması, Faiz Oranı.

1. Introduction

Stock prices are affected by many factors such as macroeconomic factors, psychological approaches of investors and speculative movements. Macroeconomic factors are discussed under different headings. Internal factors can be listed as profit distribution policy, capital increase, insider trading, manipulation, financial structure, business activity and incentives. Non-operating factors can be listed as interest rate, exchange rate, money supply, inflation, oil and gold prices, political developments, import-export balance. In this context, besides events such as government crises, interstate political conflicts, military interventions, terrorist attacks, natural disasters; The Central Bank should also consider factors such as interest rate decisions, unemployment and employment data, and inflation rate.

The saved funds are transferred to those who request funds through the intermediaries in the financial system for a certain cost. Financial intermediaries pay a certain amount of interest to the fund holders in return for the savings they collect. By adding their own rate of return to the interest rate they pay, they transfer the funds collected to investors who request loans (Alam and Uddin, 2009: 43).

The effect of interest rates on companies' profits can be observed differently. Since interest payments are written as an expense, when interest rates increase, interest expenses will increase, so the company profit will decrease, and the high interest rate may affect the company profit by affecting the level of economic activity. Because of their effects on company profits, interest rates also affect stock prices. If interest rates rise excessively; stock investors can sell their stocks and move into the bond market, thinking that they can get more returns from bonds. As a result of this situation, the price of stocks decreases (Eugene and Brigham, 1999: 94).

Also, a change in the interest rate will change the cost of borrowing and thus affect the firm's profitability and ability to pay dividends. Again, change in interest rate can affect the opportunity cost of equity investments, and this in turn affects stock prices. Moreover, a change in the interest rate may affect the actual level of activity in the short and medium term, and as a result, affect stock prices by affecting the value of expected future cash flows (Henry, 2009: 405).

When interest rates increase, the discount rate used in stock valuation will increase, so investments will move from equity markets to loan markets and will lower stock prices. In the opposite case, interest in bonds will decrease and this time investors will move from bond markets to stock markets. As a result, stock prices will increase (Ayaydın & Dağlı, 2012: 49). On the other hand, when banks make an increase in deposit interest rates and the lending rate increases, investments in the economy will also decrease, which will be another reason for the decrease in stock prices. In conclusion, theoretically, there is an inverse proportion between the interest rate and the stock price (Alam and Uddin, 2009: 44). In this study, the effect of the decision of the Central Bank of the Republic of Turkey (CBRT) Monetary Policy Committee on the policy rate changes on the BIST100 index was examined. The effect of the CBRT's interest rate decisions on Borsa Istanbul was analyzed using the event study method. The 11-day event window was determined by taking five days before and five days after the event day. The presence of abnormal returns in the BIST100 index was tested within the event window.

2. The Central Bank of the Republic of Turkey Interest Rate Decisions

After the First World War, with the effect of the tendency for countries to determine their own monetary policies independently by establishing central banks that will provide emissions and in order to strengthen the political independence gained by the War of Independence with economic independence, efforts to establish a central bank in our country gained momentum. At the 1923 İzmir Economics Congress, where this issue was first discussed, the idea of establishing a "national state bank"; was emphasized (CBRT, 2021). With the adoption of the Central Bank Law No. 1715, the first steps were taken in the establishment of the CBRT. The CBRT undertook the domestic and foreign payments, foreign exchange and treasury transactions of the state and started its activities on October 3, 1931. In the law of 1930, it was stated that the CBRT was established to "help the economic development of the country" (Bakır, 2007: 30).

Monetary Politics refers to the decisions taken to affect the monetary availability and cost in order to achieve goals such as economic growth, employment increase and price stability. Monetary Policy Committee is a committee established within the CBRT, which is in charge and authorized to ensure price stability, achieve the determined inflation target, protect the internal and external value of the Turkish Lira, and inform the public about its practices in this field. In our country, it is decided by the CBRT Law that the main purpose of the Central Bank is to ensure price stability. Decisions on policy rates in Turkey are taken by the Monetary Policy Committee at meetings with a predetermined date. The decisions taken by the Committee are announced to the public at 14.00 on the day of the meeting (CBRT, 2021).

Central banks determine the interest rates of short-term loans given to banks and borrowing from banks. Through this interest rate, it aims to influence the general level of prices. This interest rate is called the policy interest rate. Policy interest rate is the interest rate applied to on one-week repo transactions.

Table 1. May 2010 – March 2021 Interest Rate Change Decision Date and Rates

Date	Interest (%)	Date	Interest (%)	Date	Interest (%)
20.05.2010	7,00	18.07.2014	8,25	13.12.2019	12,00
17.12.2010	6,50	21.01.2015	7,75	17.01.2020	11,25
21.01.2011	6,25	25.02.2015	7,50	20.02.2020	10,75
05.08.2011	5,75	25.11.2016	8,00	18.03.2020	9,75
19.12.2012	5,50	01.06.2018	16,50	23.04.2020	8,75
17.04.2013	5,00	08.06.2018	17,75	22.05.2020	8,25
17.05.2013	4,50	14.09.2018	24,00	25.09.2020	10,25
29.01.2014	10,00	26.07.2019	19,75	20.11.2020	15,00
23.05.2014	9,50	13.09.2019	16,50	25.12.2020	17,00
25.06.2014	8,75	25.10.2019	14,00	19.03.2021	19,00

During the period covered by the study, the CBRT changed interest rates 30 times. Among the decisions taken, the year 2020 draws particular attention. During this year, interest rates were changed 8 times. The majority of these changes consist of decisions to reduce the interest rate. The decisions to reduce interest rates, which started after Murat Uysal became the head of the Central Bank in July 2019, continued until September 2020. During this period, the policy rate was reduced from 24% to 10,25%. Under the chairmanship of Naci Ağbal, who took office in November 2020, decisions were taken to increase interest rates again.

3. Literature Review

In the literature, it is observed that the studies on the relationship between the CBRT interest rate decisions and stock returns are limited. It is pointed out that the studies conducted in Turkey are very few. Existing studies seem to focus on the effects of factors such as macroeconomic indicators and unexpected events on stock returns. Some of these studies are presented below.

Duran et al. (2010) have determined that increases in policy rates had a negative effect on stock prices as a result of their study in Turkey between 2008 and 2009. Şahin (2011) examined the effects of monetary policy decisions on the ISE100 index in his study covering the years 2005-2010. He concluded that unexpected changes in monetary policy have an effect on stock prices. He also determined that the effect differs according to the sectors.

Poyraz et al., (2020) examined the impact of the policy interest rates determined by CBRT on Borsa Istanbul. As a result, they found that there is a significant and inverse relationship between interest rate cut decisions and BIST100 index, while interest rate hike decisions have an opposite effect, but this effect is not at a significant level.

Bernanke and Kuttner (2004) emphasized that the unforeseen interest rate cut decision of the FED caused an increase of approximately 1% in the stock market index, and unexpected monetary policy changes created fluctuations in stock indices. Hayford and Malliaris (2008) concluded that the stock market indices did not react during the realization phase of the event, since the FED announces its decision to increase/decrease interest rates by giving signals to the markets beforehand after 1990.

Mutan and Topçu (2009) investigated the effects of 10 unexpected events that took place in Turkey between 1990-2009 on the capital market. As a result of the findings, the lowest abnormal return was found as 14.92% in the 19 February 2001 crisis.

Güngör and Kaygın (2015) discussed the factors affecting the stock price from both microeconomic and macroeconomic perspectives with the Dynamic Panel Data Analysis method in their study. The direction of the relationship between microeconomic and macroeconomic factors and stock price has been determined. Alper and Kara (2017) analyzed the effects of exchange rate, interest rate, inflation rate, gold prices, money supply, oil prices, foreign trade balance and industrial production index data in Borsa Istanbul on stock returns in the context of BIST Industrial Index. They concluded that the variables that are effective in explaining the changes in the variance of the real stock returns variable are gold prices, foreign trade balance, industrial production index and interest rate in order of importance.

Kaya et al. (2013) examined the relationship between the ISE100 Index and some macroeconomic variables. The ISE100 Index return was determined as the dependent variable, and the interest rate, money supply, industrial production index and exchange rate were determined as the independent variables. As a result, it has been determined that there is a positive relationship between stock returns and money supply, and a negative relationship with the exchange rate.

Keskin Köylü and Yücel (2019) examined the effect of the interest rate decisions taken by the Federal Reserve System on the Borsa Istanbul BIST100 index. As a result, it was observed that the effect of the interest rate announced by the FED on the BIST100 index remained limited for the next trading day, its effect became evident during the one-week trading period, and this effect decreased as time progressed and continued until the next interest rate announcement.

4. Purpose and Scope of the Research

The aim of the research is to try to determine whether the interest rate decisions taken by the CBRT Monetary Policy Committee cause abnormal returns on stock prices. Whether the interest rate change decisions cause abnormal returns in Borsa Istanbul was investigated using the event study method. Using 131-month data between May 2010 and March 2021, the presence of abnormal returns

around the date of 30 meetings, when the decision to change the interest rate was taken, was tested on the BIST100 index.

5. Research Methodology

The event study method was used in this study. The day on which the interest rate change decision is taken is considered as the event day. If statistically actual and predicted results differ from zero, it can be concluded that the said event affects stock returns (Tuominen, 2005: 50). Since the effect of interest rate change is tried to be measured on the basis of the entire market, it has been decided to use index returns in the calculation of abnormal returns. For this reason, the BIST100 index was used as the market index.

A total of 11-day event window was determined, 5 days before and 5 days after each event occurred. The reason why the event window is determined as (-5, +5) is to measure the sensitivity of the returns to the event in a more reliable way. Because as the period gets longer, it is assumed that other events and news that may affect the stock market may also have an impact on stock returns (Sakarya, 2011: 152).

The H_0 and H_1 hypotheses, which were determined to reveal the effect of the CBRT's interest rate change decisions on BIST100 index returns, were determined as follows.

H_0: The cumulative average abnormal return cannot be obtained around the event day when the interest rate change decision is taken.

H_1: The cumulative average abnormal return can be obtained around the event day when the interest rate change decision is taken.

Abnormal returns for the days before and after the event were calculated with the following formula (1) (Chen & Siems, 2004: 352).

$$AR_{it} = R_{it} - \bar{R}_i \qquad\qquad (1)$$

In the formula AR_{it} represents abnormal return on any day t; R_{it} represents the current index return observed at day t; $\bar{R}_i$ represents the average of the 10-day index returns realized in the forecast period (-15, -6).

Then, the calculated AR values were standardized by dividing the standard deviation of the relevant period and t values were obtained (Ada et al., 2013: 27).

$$SAR_{it} = \frac{AR_{it}}{\sigma_i} \qquad\qquad (2)$$

Since the sample size was less than 30, abnormal returns on the event window days were calculated with the t-test. The calculated "t" score was compared with the critical value. If the difference is statistically significant, the hypothesis H_0 is rejected and alternative hypothesis H_1 is accepted.

After standardizing the ARs, the cumulative average abnormal returns were calculated with the formula (3) by using abnormal returns to measure whether there were cumulative average abnormal returns (CAAR) in (-5, 0), (-1, +1), (-5, +5), (0, +3), (0,+5) different period intervals within the event window.

$$CAAR = \sum_{t=T_1}^{T_2} \frac{1}{n} \sum_{i=1}^{n} AR_{it} \qquad\qquad (3)$$

The determination of whether the cumulative average abnormal returns are statistically significant was performed according to the t-test result found with the following formula (4) (Hendricks & Singhal, 2008: 782).

$$t(CAAR) = \sqrt{\frac{1}{n.k}} \sum_{t=T_1}^{T_2} \sum_{i=1}^{n} \frac{AR_{it}}{\sigma_i} \qquad\qquad (4)$$

6. Analysis and Findings

All of the interest rate change decisions of the Central Bank were grouped as a single event and the event date of all decisions was determined as the realization date of this single event. In other words, the decisions were aggregated and analysed. Accordingly, a total of 11-day abnormal returns (AR) for the (-5, +5) event window and Cumulative Average Abnormal Returns (CAAR) for different event intervals and t-test results are presented below.

Table 2. Abnormal Returns of the Event Window of Interest Rate Change Decisions

Day	AR	t-statistic
t-5	-0,0002	-0,0667
t-4	0,0023	0,6217
t-3	-0,0025	-0,6719
t-2	0,0001	0,0331
t-1	-0,0004	-0,1124
t	0,0000	-0,0085
t+1	-0,0068	-1,8328
t+2	-0,0073	-1,9633
t+3	-0,0015	-0,5337
t+4	-0,0006	-0,1897
t+5	0,0042	1,3283

According to the values presented in Table 2, statistically significant abnormal returns did not occur in any of the days around the rate change decisions. Although there is no statistical significance on the day of the event, the presence of 0% AR value indicates that the stock returns are not affected by the decision to increase/decrease interest rates. The negative AR values for seven days and positive AR values for four days in the event window show that negative values are present in the majority of the days around the event.

Table 3. Cumulative Average Abnormal Returns (CAAR) at Different Event Intervals for Interest Rate Change Decisions

Event Interval	CAAR	t test	p Value
(-5, 0)	0,0817	0,9642	0,3792
(-1, +1)	-0,1697	-0,4228	0,7136
(-5, +5)	-3,5590	-2,0315	0,0696
(0, +3)	-1,3657	-2,2272	0,1123
(0,+5)	-1,3605	-3,3408	0,0205**

*0,01, **0,05 is significant at the level

According to the CAAR values and t test results given in Table 3, it is seen that there is a 5% significant difference between the CAAR values calculated for different event intervals only in the event interval of (0, +5). Although the effect on the BIST100 index was observed within five days of the decision to increase/decrease the interest rate, it can be said that this effect remained very weak.

During this period, the highest CAAR among different event intervals occurred in the interval of (-5, +5), but there was no statistical significance. Positive CAAR is found only in the interval of (-5, 0), while negative CAAR value is observed in all other event intervals.

Table 4. Abnormal Returns of Interest Rate Change Decisions in 2020 in the Event Window

DAY	16.01.2020		19.02.2020		17.03.2020		22.04.2020	
	AR	t-stat.	AR	t-stat.	AR	t-stat.	AR	t-stat.
t-5	0,041	**5,932**	0,003	0,438	-0,012	-0,929	-0,031	-1,170
t-4	0,001	0,141	0,004	0,603	0,006	0,524	0,000	-0,018
t-3	0,011	**2,506**	-0,003	-0,410	-0,068	**-5,473**	0,015	0,587
t-2	0,010	2,213	0,006	0,853	0,024	1,433	-0,001	-0,049
t-1	-0,004	-0,933	-0,009	-1,374	-0,078	**-3,994**	-0,023	-0,879
t	0,001	0,153	-0,003	-0,310	-0,002	-0,118	-0,004	-0,202
t+1	0,000	-0,026	-0,031	**-3,052**	-0,002	-0,063	-0,001	-0,072
t+2	0,005	0,529	0,010	0,963	0,009	0,350	0,018	0,961
t+3	0,002	0,162	-0,018	-1,746	0,024	0,981	-0,015	-1,281
t+4	-0,012	-1,004	-0,005	-0,426	-0,008	-0,333	0,002	0,135
t+5	-0,007	-0,617	0,009	0,722	0,078	**2,752**	-0,010	-0,863

DAY	21.05.2020		24.09.2020		19.11.2020		24.12.2020	
	AR	t-stat.	AR	t-stat.	AR	t-stat.	AR	t-stat.
t-5	0,005	0,300	0,003	0,308	-0,002	-0,145	0,003	0,176
t-4	-0,009	-0,565	0,002	0,205	0,018	1,122	0,006	0,325
t-3	0,005	0,324	-0,023	**-2,250**	0,002	0,115	-0,020	-1,191
t-2	0,022	1,933	0,006	0,530	-0,029	-1,706	0,007	0,410
t-1	0,003	0,185	0,004	0,355	0,019	1,078	0,004	0,228
t	0,006	0,486	0,013	1,284	0,004	0,194	0,001	0,055
t+1	0,004	0,321	0,001	0,100	-0,004	-0,201	-0,005	-0,303
t+2	0,021	1,696	-0,005	-0,524	-0,022	-1,177	0,004	0,222
t+3	0,005	0,420	0,003	0,437	-0,008	-0,379	0,010	1,032
t+4	-0,002	-0,132	0,019	**2,940**	-0,006	-0,371	0,009	**2,111**
t+5	0,013	1,285	-0,002	-0,282	0,002	0,143	-0,007	-1,414

The CBRT decided to increase/decrease interest rates in 2020 more than in any other year within the scope of the study. It changed the interest rate eight times during the said year. For this reason, it was thought that these decision dates in 2020 should be reviewed separately.

In Table 4, the abnormal returns in the event window of the interest rate increase/decrease decisions in 2020 are given. Accordingly, there are nine statistical significances for different decision dates. The decision that has the most impact on the market is the decision of 17.03.2020. While there was no significance on the day of the event, abnormal returns with statistical significance occurred one and three days before and five days after the event. Abnormal return values of -7.8% on day t-1 and 7.8% on day t+5 created the highest impact in the whole year. On March 17, 2020, the policy interest rate was reduced from 10.75 percent to 9.75 percent.

7. Conclusion

Since stocks are relatively riskier investment instruments compared to their alternatives, investors should also closely monitor the factors affecting the prices and returns of stocks in order to avoid or reduce risk. Investors who invest in stocks have to follow some basic economic data. One of

the most important of these data is the interest rate increase or decrease made by the Central Bank. The interest rate is a tool used by Central Banks to affect the cost of production and the amount of demand.

In this study, it has been examined whether the interest rate decrease/increase decisions taken by the CBRT Monetary Policy Committee cause abnormal returns on stock prices. By using the event study method, it has been investigated whether interest rate change decisions cause abnormal returns in Borsa Istanbul. Using 131-month data between May 2010 and March 2021, the presence of abnormal returns around the date of 30 meetings, when the decision to change the interest rate was taken, was tested on the BIST100 index.

According to the results of the analysis, it has been determined that the interest rate change decisions have a very low effect on the BIST100 index. According to the findings in the event window, where the meeting decisions are considered as a single event, no statistically significant abnormal returns emerged in any of the days around the rate change decisions. Among the CAAR values calculated for different event intervals, it was observed that there was only a negative 5% significant difference in the event interval of (0, +5). Although the effect was observed in the BIST100 index within five days after the decision date of the interest rate increase/decrease, it was observed that this effect remained very weak. The obtained results are consistent with the results found by Duran et al. (2010) and Poyraz et al., (2020).

BIST100 index is affected by many factors. This study will contribute to the literature in terms of revealing the effect of the CBRT policy interest rate decisions on the index. Similarly, the effect of interest rate decisions on the sub-sectors of the stock market can be investigated by the event study method. The effect of the decisions of the American or European Central banks on BIST100 can be investigated with the same method.

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