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THE EFFECT OF INDIVIDUAL FUTURE CONTRACTS ON THE ABNORMAL RETURNS OF UNDERLYING STOCKS: EVIDENCE FROM BORSA ISTANBUL

VADELİ İŞLEM SÖZLEŞMELERİ'NİN HİSSE SENEDİ ANORMAL GETİRİLERİ ÜZERİNE ETKİSİ: BORSA İSTANBUL ÖRNEĞİ

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Abstract

This study aims to shed light on the immediate stock price response to the introduction of individual future contracts (IFCs) in Borsa Istanbul and make a general assessment of the Turkish stock market efficiency. In this context, as of June 2020, all 37 stocks traded in the futures market are included in the study. The first trading day of each contract in the futures market is accepted as an "event" and the abnormal returns of the underlying stocks are analyzed with event study analysis. According to the empirical results, there are statistically significant positive abnormal returns especially one day before the event. It means that the introduction of IFCs has statistically significant impacts on the abnormal returns of underlying stocks traded in the spot market. The presence of statistically significant abnormal returns suggests that the Turkish stock market is not an efficient market in the semi-strong form.

Keywords: BIST, VIOP, Event Study, Efficient Market Hypothesis.

Öz

Bu çalışma, Borsa İstanbul'da hisse senedine dayalı vadeli sözleşmelerin işlem görmeye başlatılmasının dayanak hisse senedi fiyatına etkisine ışık tutmayı ve Türk hisse senedi piyasası etkinliğinin genel bir değerlendirmesini yapmayı amaçlamaktadır. Bu kapsamda 2020 Haziran ayı itibariyle vadeli işlemler piyasasında işlem gören 37 hissenin tamamı çalışmaya dahil edilmiştir. Vadeli işlem piyasasında her sözleşmenin ilk işlem günü bir "olay" olarak kabul edilmiş ve dayanak hisse senetlerinin anormal getirileri olay çalışması analiz yöntemi ile analiz edilmiştir. Ampirik sonuçlara göre, özellikle olaydan bir gün önce istatistiksel olarak anlamlı pozitif anormal getiriler bulunmaktadır. Bu durum, hisse senedine dayalı vadeli sözleşmelerin piyasaya sürülmesinin, spot piyasada işlem gören dayanak hisse senetlerinin anormal getirileri üzerinde istatistiksel olarak anlamlı etkileri olduğu anlamına gelmektedir. İstatistiksel olarak anlamlı anormal getirilerin varlığı, Türkiye hisse senedi piyasasının yarı güçlü formda etkin bir piyasa olmadığını göstermektedir.

Anahtar Kelimeler: BIST, VIOP, Olay Çalışması, Etkin Piyasa Hipotezi.

GENİŞLETİLMİŞ ÖZET

Çalışmanın Amacı

Bu çalışma, Borsa İstanbul'da hisse senedine dayalı vadeli sözleşmelerin işlem görmeye başlatılmasının dayanak hisse senedi spot fiyatına etkisine ışık tutmayı ve Türk hisse senedi piyasası etkinliğinin genel bir değerlendirmesini yapmayı amaçlamaktadır.

Araştırma Soruları

Hisse senedine dayalı vadeli işlemler sözleşmelerinin türev piyasasında işlem görmeye başlaması dayanak hisselerin spot piyasadaki getirisine herhangi bir etkisi var mıdır? Türkiye hisse senedi piyasası yarı-güçlü formda etkinliğe sahip midir?

Literatür Araştırması

James Dolley'in ilk olay çalışmasından başlayarak belirli bir olayın menkul kıymet fiyatları üzerindeki etkisine odaklanan önemli sayıda çalışma yapılmıştır (MacKinlay, 1997; Dutta, 2014; Basdas ve Oran, 2014). Dolley (1933), hisse senedi bölünmelerinin hisse senedi fiyatları üzerindeki etkilerini, 1921'den 1931'e kadar 95 bölünmeden oluşan bir örneklem kullanarak araştırmaktadır. Fama vd. (1969) olay çalışması yöntemini ile ilgili en önemli çalışmalardan birini gerçekleştirmiştir. Hisse bölünmelerinin getiriler üzerindeki etkisinin araştırıldığı çalışmada bölünme günü "olay" olarak kabul edilmekte ve olay etrafında hisse senedi fiyatlarında anormal bir davranış olup olmadığı incelenmektedir. Çalışmayada New York Borsası'nda işlem gören 622 hisse senedine ait 940 bölünme analiz edilmektedir.Detemple ve Jorion (1990) olay çalışması yöntemi ile hisse senedine dayalı opsiyon sözleşmelerinin işlem görmeye başlamasının dayanak varlıklar üzerindeki etkisini incelemişlerdir. Opsiyonların işlem görmeye başladığı tarih etrafında dayanak hisse senetlerinin fiyatında önemli artış, oynaklığında ise düşüşler olduğunu gözlemlemişlerdir. Peat ve McCorry (1997) olay çalışması yöntemi ile hisse senedine dayalı vadeli işlemler sözleşmelerinin işlem görmeye başlamasının dayanak hisse senetleri üzerindeki etkisini araştırmışlardır. Elde edilen bulgulara göre hem hacim hem de volatilitede önemli artışlar olmakla birlikte, dayanak varlıkların fiyat ya da getirisinde önemli bir değişiklik bulunmadığı sonucuna varmışlardır. Dennis ve Sim (1999) asimetrik üstel ARCH modeli ile vadeli işlemler sözleşmelerinin işlem görmeye başlamasının dayanak varlık volatilitesi üzerindeki etkisini araştırmışlardır. Yapılan analiz sonucunda vadeli işlem sözleşmelerinin işlem görmeye başlamasının dayanak hisse fiyatının oynaklığı üzerinde önemli bir etkisi olmadığını bildirmişlerdir.Türkiye'de yapılan çalışmalar incelendiğinde, çalışmaların çoğunun piyasa endeksine odaklandığı görülmektedir. Vadeli işlem sözleşmelerinin (endeks vadeli işlemleri ve / veya döviz vadeli işlemleri) endeks oynaklığına etkisi birçok çalışmada [Baklacı ve Tutek (2006); Bekgöz (2006); Kasman ve Kasman (2008); Dikmen (2008); Gökbulut, vd. (2009); Tokat ve Tokat (2010); Çağlayan (2011); Doğanay, vd. (2013); Gök ve Kalaycı (2013); Er, vd. (2015); Özdemir (2017); İşeri ve Kacmazer (2017); Çimen (2018)] incelenmektedir. Öte yandan, çeşitli çalışmalarda [Çevik ve Pekkaya (2007); Öztürk (2008); Kalayci, vd. (2010); Kayalı ve Çelik (2010); Demireli, vd. (2010); Kayalıdere, vd. (2012); Korkmaz vd.

(2017)] türev piyasa ile spot piyasa arasındaki nedensellik analiz edilmektedir. Basdas (2009); Ersoy ve Bayrakdaroğlu (2013); Ersoy ve Citak (2015)] ise spot ve türev piyasalar arasındaki öncül-ardıl ilişkiye odaklanmaktadır. Bildiğimiz kadarıyla, Hisse senedine dayalı vadeli işlemler sözleşmelerinin işlem görmeye başlamasının dayanak hisselere etkisine odaklanan ampirik bir çalışma yoktur. Bu çalışmanın literatüre bu anlamda katkıda bulunması beklenmektedir.

Yöntem

Çalışma kapsamında 2020 Haziran ayı itibariyle vadeli işlemler piyasasında işlem gören 37 hissenin tamamı analize dahil edilmiştir. Vadeli işlem piyasasında her sözleşmenin ilk işlem günü bir "olay" olarak kabul edilmiş ve dayanak hisse senetlerinin anormal getirileri olay çalışması analiz yöntemi (event study analysis) ile analiz edilmiştir.

Sonuç ve Değerlendirme

Elde edilen ampirik sonuçlara göre, özellikle olaydan bir gün önce istatistiksel olarak anlamlı pozitif anormal getiriler bulunmaktadır. Bu durum, hisse senedine dayalı vadeli sözleşmelerin piyasaya sürülmesinin, spot piyasada işlem gören dayanak hisse senetlerinin anormal getirileri üzerinde istatistiksel olarak anlamlı etkileri olduğu anlamına gelmektedir. İstatistiksel olarak anlamlı anormal getirilerin varlığı, Türkiye hisse senedi piyasasının yarı-güçlü formda etkin bir piyasa olmadığını göstermektedir.

1. INTRODUCTION

Efficient Market Hypothesis (EMH) is one of the major theories in the history of finance. EMH was first proposed by Maurice G. Kendall (1953) and improved by Fama (1965; 1970) in the following years. According to EMH, it is a general belief that when new information arises in the market, it spreads very quickly and is priced without any delay. Therefore, it is not possible to obtain abnormal returns neither technical nor fundamental analysis (Malkiel, 2003). EMH assumes that security prices "fully reflect" all available information at any time in markets and such a market is called "efficient". The market efficiency is examined in three groups; namely, “weak form”, “semi-strong form” and “strong form” (Fama, 1970; Fama, 1991). There are a lot of studies conducted to test the efficiency of markets.

This article aims to demonstrate the impact of the introduction of individual future contracts (IFCs) on abnormal returns of underlying stocks and make a general assessment of the Turkish market efficiency. For this purpose, as of June 2020, all 37 stocks traded in Futures and Options Markets (VIOP), are analyzed with event study methodology. The first trading date of each IFC is accepted as the event date and the abnormal returns around the event are evaluated.

The remainder of this paper is organized as follows. In the next section, a literature review of the topic is provided. The third section explains the data and methodology of the paper. Section four presents the findings, and the last section is dedicated to concluding remarks.

2. LITERATURE REVIEW

It is common to classify the financial markets into two groups as spot markets and derivative markets. While derivative instruments such as futures and options contracts are traded in derivatives markets the underlying assets of these contracts are traded in spot markets. Although these two markets are different, the prices interact with each other. Because the derivative securities are defined as financial instruments whose values are determined by the values of the underlying assets such as bonds, equities, and commodities (Hull, 2003). Therefore, the relationship between the spot market and the derivatives market has been an important research topic for many studies.

In financial markets, any information on companies is important for existing and potential investors since investors make their decisions after evaluating all available information in the market. Therefore, in efficient markets, each new piece of information is priced and reflected in the financial instruments by investors. The process of measuring the effects of an event on prices has been investigated by academics and researchers in numerous studies.

A significant number of studies, which focus on the impact of a specific event on the security prices, have been conducted starting with the first event study of James Dolley (MacKinlay, 1997; Dutta, 2014; Basdas and Oran, 2014). Dolley (1933) investigates the effects of stock splits on stock prices

using a sample of 95 splits from 1921 to 1931. According to the evaluations, it is indicated that 26 stock splits are resulting in a negative price effect, 12 cases with no price effect, and 57 cases with positive price effects.

Fama et al. (1969) conducted one of the most important studies related to the event study methodology. They investigated the effect of share splits on returns. The split day was considered as an event and whether there was an abnormal behavior around the event was examined. The study analyzed 940 splits beginning from January 1927 through December 1959 based on 622 stocks listed on the New York Stock Exchange (NYSE). According to their findings, the market was found to use the announcement of a split to re-evaluate expected income from the shares and on average the market's judgments of a split were priced and fully reflected the share prices almost immediately after the announcement but at least by the end of the split month. They concluded that the NYSE was considered as "efficient" because of the very rapid adjustments of the market to new information. Day and Lewis (1988) regarded the nonquarterly expiration days of options and quarterly expiration days of futures contracts on the index as events and investigated stock-market volatility around the event dates. They indicated that the call options prices on stock indices increase in volatility of the market at the quarterly expiration of stock index futures contracts. They also found that there are positive and significant abnormal returns for call options on the S&P 100 and Major Market Indices on the day before both quarterly and nonquarterly expirations.

Conrad (1989) examined the impact of the option introduction on individual securities around the date of introduction and announcement of the introduction with event study analysis. It was reported that there were permanent price increases in underlying securities-related to the introduction of an option but not the announcement. However, when option introduction announcement dates were examined, no immediate increase in returns around the announcement was observed. Similar to Conrad, Detemple and Jorion (1990) analyzed the impact of the introduction of options on the underlying stocks using event study methodology. They reported that, around the listing date, there were significant increases in the price of the optioned stock and decreases in the volatility of underlying securities. Defusco et al. (1990) examined whether the executive stock options had a significant increase in managerial risk-taking. They also investigated the bond market reaction to changes in stock option plans. They reported that executive stock option plan announcements caused a significant increase in implicit stock variance and stock return variance.

Peat and McCorry (1997) investigated the effect of future contract introductions on the underlying equities' trading behaviors with a market-adjusted event study. According to their findings, there are significant increases in both volume and volatility but no significant change in price or return of the underlying asset. Kumar et al. (1998) analyzed the effect of options trading on the market quality of the underlying stocks with regression analysis. They reported that option listings improved market

quality via decreasing the variance of the pricing error, and adverse selection. Bollen and Wahaley (1999) investigated the effect of expiration-days of index derivatives on trading volume and price movements in Hong Kong. According to the empirical results, the derivative expirations are not an important event in the stock market. They concluded that the trading volume and variance of the return on expiration-day were not higher than non-expiration days. Dennis and Sim (1999) investigated the effect of future contract introductions on underlying asset volatility via asymmetric exponential ARCH model and reported that the introduction of futures did not have any significant effect on the volatility of the underlying share price.

Corredor et al. (2001) examined the expiration date effect of the individual shares and index derivatives in the Spanish Equity Derivatives Exchange. They focused on the trading volume and volatility of the underlying assets and stated there were no effects on the index return; however, they documented a downward pressure on stock prices before the expiration date. McKenzie et al. (2001) investigated the effect of share future contract introductions on the systematic risk and volatility of the underlying shares. According to their findings, after the listing of futures, there is a general decrease in systematic risk and volatility. Mazouz and Bowe (2006) investigated the effect of the introduction of equity futures contracts on the underlying stocks' systematic and diversifiable risk characteristics. They employed the Fama-French three-factor asset pricing model to test their hypothesis. Their findings show that futures innovation does not have any effect on the systematic risk of underlying assets or the residual variance of their returns.

When the studies performed in Turkey are examined, it is seen that most of the studies focus on the impact of futures contracts (index futures and/or currency futures) on the volatility of the spot market [Baklaci and Tutek (2006); Bekgoz (2006); Kasman and Kasman (2008); Dikmen (2008); Gokbulut, et al. (2009); Tokat and Tokat (2010); Caglayan (2011); Doganay, et al. (2013); Gok and Kalaycı (2013); Er, et al. (2015); Ozdemir (2017); Iseri and Kacmazer (2017); Cimen (2018)].

On the other hand, several papers have analyzed the causality between derivative market and spot market [Cevik and Pekkaya (2007); Ozturk (2008); Kalayci, et al. (2010); Kayali and Celik (2010); Demireli, et al. (2010); Kayalidere, et al. (2012); Korkmaz et al. (2017)].

Another group of studies such as [Basdas (2009); Ersoy and Bayrakdaroglu (2013); Ersoy and Citak (2015)] focuses on the lead-lag relationship between spot and future stock markets. Apart from these groups, Erken (2016) examines the impact of margin levels on futures trading activity. Gok (2015) examines BIST30 index futures' expiration-day effects. Avci, et al. (2009) try to minimize the risks of stock portfolios, using BIST30 index futures contracts. Dayi et al. (2018) investigate the relationship between footballer and head coach transfer news and stock prices of sport clubs. Ulusoy and Kendirli (2019) investigate the impacts of terrorist attacks on the VIX index, BİST100 and CDS in Turkey with event study analysis. To the best of our knowledge, there is no empirical study focusing on the

immediate stock price response to the introduction of IFCs in the Turkish spot market. This is where this study attempts to contribute to the literature.

3. RESEARCH METHODOLOGY

This article aims to demonstrate the impact of the introduction of individual future contracts (IFCs) on abnormal returns of underlying stocks and make a general assessment of the Turkish market efficiency. This section is devoted to the explanation of the data and methodology used in the analysis.

3.1. Data Set

There are three major pieces of information used within the scope of the analysis which are the daily closing prices of equities, the daily closing price of the XU100 market index, and the event dates. As of June 2020, there are 37 IFCs on equity stocks traded in VIOP, and the sample of the study consists of these 37 stocks which are shown in Table 1. The first trading day data of IFCs have been collected from takasbank.com.tr and, the daily closing prices of equities and markets have been gathered from Bloomberg data terminal and google.com/finance. As stated above, the study has twofold objectives; finding an answer to the question; "how the future contracts affect the underlying stocks' abnormal returns" and evaluating the "efficiency of the Turkish stock market".

Table1. List of Underlying Equities Investigated in the Study and Event Dates

1	AKBNK	21.12.2012	20	SISE	11.02.2016
2	EREGL	21.12.2012	21	ASELS	14.12.2018
3	SAHOL	21.12.2012	22	BIMAS	14.12.2018
4	GARAN	21.12.2012	23	DOHOL	14.12.2018
5	ISCTR	21.12.2012	24	ENJSA	14.12.2018
6	TUPRS	21.12.2012	25	KOZAA	14.12.2018
7	THYAO	21.12.2012	26	KOZAL	14.12.2018
8	TCELL	21.12.2012	27	SODA	14.12.2018
9	VAKBN	21.12.2012	28	TAVHL	14.12.2018
10	YKBNK	21.12.2012	29	TKFEN	14.12.2018
11	ARCLK	11.02.2016	30	CCOLA	15.11.2019
12	EKGYO	11.02.2016	31	ENKAI	15.11.2019
13	KRDMD	11.02.2016	32	FROTO	15.11.2019
14	KCHOL	11.02.2016	33	MGROS	15.11.2019
15	PGSUS	11.02.2016	34	SASA	15.11.2019
16	PETKM	11.02.2016	35	TRKCM	15.11.2019
17	TOASO	11.02.2016	36	TSKB	15.11.2019
18	TTKOM	11.02.2016	37	ULKER	15.11.2019
19	HALKB	11.02.2016			

Source: https://www.borsaistanbul.com.tr, https://www.takasbank.com.tr (25.06.2020)

3.2. Event Study

Event study analysis is a powerful tool to assess whether an "abnormal" stock price effect is associated with an endogenous event. This method has been used extensively in the fields of accounting and finance (McWilliams and Siegel, 1997: 626). Event study provides the opportunity to conduct a direct measurement of market efficiency (Brown and Warner, 1980: 205), especially the semi-strong form (Yen and Lee 2008), and make it possible to investigate how firm-specific events affect the securities (Ball and Torous, 1988).

Any event such as stock splits (Dolley, 1933), new product introductions (Chaney et al., 1991), merger and acquisitions (Ma et al., 2009), independent audit report announcements (Kelten and Saritas, 2020) corporate governance rating announcements (Kandir, 2013) that are likely to affect the stock price or value of the firm may be potential research topics in the event study analysis. This study focuses on measuring the effects of futures contracts on the underlying stocks that are traded in BIST. The first trading date of each contract in VIOP is considered as an event and the abnormal returns around the event date are investigated.

There are three different time windows in an event study which are: the "estimation window", the "event window" and the "post-event window", respectively. The event window should be determined as short as possible to eliminate the potential effects of other events (Ryngaert and Netter, 1990). Although the 200-250 days corresponding to a year before the events are preferred (Bartholdy, et. al., 2007), it will be beneficial to state that, for a healthy prediction the estimation windows should contain at least 126 observations (Benninga, 2014).

The event dates in this study are the first trading dates of equity futures contracts in VIOP. The event window was determined as (±1) days from the event date and later extended to (±5) days. In other words, the abnormal returns of each equity are calculated for five different event windows as (±1, ±2, ±3, ±4, ±5) days around the event dates. Within the estimation window, 210 observations are starting from one day before the event window. The steps of the analysis are as follows: First of all, to analyze the behavior of stock prices, the actual returns of each stock are calculated with Equations (1) throughout the analysis period.

$$R_{i,t} = \left[\frac{P_{i,t} - P_{i,(t-1)}}{P_{i,(t-1)}}\right] \quad (1)$$

Where R_(i,t) refers to the daily actual return of "i" at time "t", P_(i,t) the daily closing price of "i" at time "t" and P_(i,(t-1)) the daily closing price of "i" at time "t-1".

After calculating the actual returns, the expected returns of each stock are calculated with Market Model which is shown in Equation (2). In order to calculate the expected returns of stocks listed on XU100, the daily actual returns of the market (R_(m,t)) are also calculated with the Equation (1).

$$\hat{R}_{i,t} = \alpha_i + \beta_i \times R_{m,t} + \varepsilon_{it} \quad (2)$$

$\hat{R}_{i,t}$: Expected return of stock "i" at time "t"

α_i : The alpha value of "i"

β_i : Systematic risk value of "i"

$R_{m,t}$: The daily actual return of market at time "t"

ε_{it} : Error term

The abnormal return of each stock calculated with Equation (3) is given in the Appendix for each event windows.

$$AR_{i,t} = R_{i,t} - \hat{R}_{i,t} \quad (3)$$

$$= \left[\frac{P_{i,t}-P_{i,(t-1)}}{P_{i,(t-1)}}\right] - \left(\alpha_i + \beta_i \times R_{m,t}\right)$$

$AR_{i,t}$: Abnormal return of stock "i" at time "t"

To understand the total effect of the event, cumulative abnormal returns are calculated with Equation (4) through the event windows.

$$CAR_{i,n} = \sum_t^n AR_{i,t} \quad (4)$$

$CAR_{i,n}$: Cumulative abnormal return of stock "i" day "n"

Table 2 shows the descriptive statistics of market returns, actual returns, expected returns, abnormal returns, and cumulative abnormal returns.

Table 2. Descriptive Statistics of the Dataset

	$R_{m,t}$	$R_{i,t}$	$\widehat{R}_{i,t}$	$AR_{i,t}$	$CAR_{i,n}$
Mean	0.0006	0.0008	0.0012	-0.0004	0.0006
Median	0.0001	0.0000	0.0008	-0.0013	0.0003
Maximum	0.0262	0.0745	0.0390	0.0511	0.1431
Minimum	-0.0296	-0.0784	-0.0451	-0.0778	-0.1071
Std. Dev.	0.0104	0.0189	0.0098	0.0156	0.0334
n	1295	1295	1295	1295	1295

$R_{m,t}$: Daily actual return of the market at time "t"

$R_{i,t}$: Daily actual return of stock "i" at time "t"

$\widehat{R}_{i,t}$: Expected return of stock "i" at time "t"

$AR_{i,t}$: Abnormal return of stock "i" at time "t"

$CAR_{i,n}$: Cumulative abnormal return of stock "i" day "n"

Generation and testing of the hypotheses are the last stage of our analysis. Our null hypothesis is that "the abnormal returns and the cumulative abnormal returns are equal to zero". The alternative hypothesis is that "the abnormal returns and the cumulative abnormal returns are not equal to zero".

H_0: $AR_{i,t} = 0, CAR_{i,t} = 0$

H_1: $AR_{i,t} \neq 0, CAR_{i,t} \neq 0$

The hypotheses have been tested with the Single Sample t-test via Statistical Package for the Social Sciences (SPSS).

4. EMPIRICAL RESULTS

Table 3 provides the empirical results for the first event window (±1). When table 3 is examined, it is seen that one day before the introduction of IFCs there is statistically significant value at a 5% significance level and also it can be seen that the average abnormal and cumulative abnormal returns are positive (0.005). Graph 1 illustrates the average AR and CAR values for the first event window.

Table 3. Abnormal and Cumulative Abnormal Return Statistics for event window (±1)

Days	AR (N=37)				CAR (N=37)			
	Mean	Standard Deviation(σ)	t statistics	Sig. (2-tailed)	Mean	Standard Deviation(σ)	t statistics	Sig. (2-tailed)
-1	0.005	0.015	2.150	0.038*	0.005	0.015	2.150	0.038*
0	-0.002	0.018	-0.770	0.447	0.003	0.021	0.859	0.396
1	0.002	0.014	0.680	0.501	0.004	0.027	0.994	0.327

* significant at %5 level.

Graph 1. Average AR and Cumulative Average AR values in (±1)

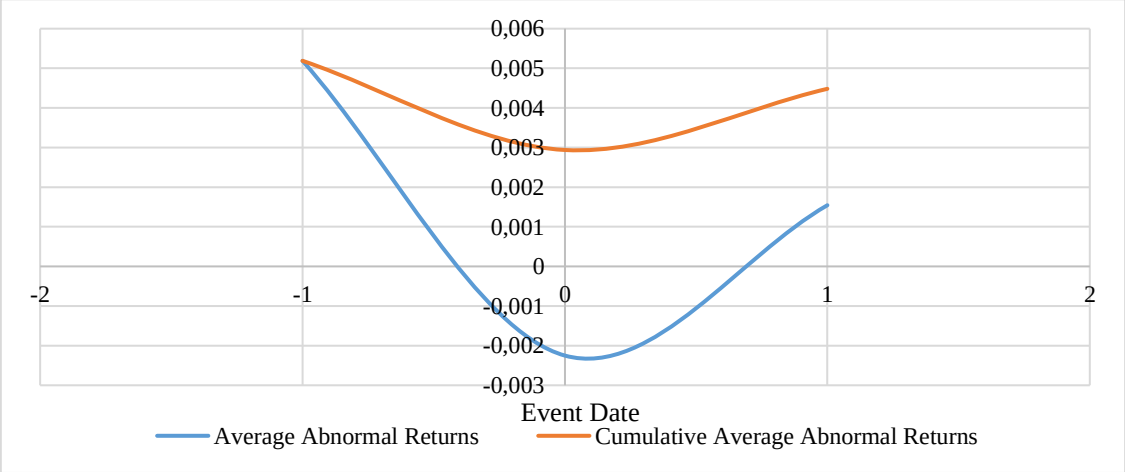


Table 4. Abnormal and Cumulative Abnormal Return Statistics for event window (±2)

Days	AR (N=37)				CAR (N=37)			
	Mean	Standard Deviation σ)	t statistics	Sig. (2-tailed)	Mean	Standard Deviation(σ)	t statistics	Sig. (2-tailed)
-2	-0.002	0.015	-0.953	0.347	-0.002	0.015	-0.953	0.347
-1	0.005	0.015	2.150	0.038*	0.003	0.021	0.848	0.402
0	-0.002	0.018	-0.775	0.444	0.001	0.027	0.148	0.883
1	0.002	0.014	0.675	0.504	0.002	0.033	0.402	0.690
2	-0.002	0.015	-0.988	0.330	0.000	0.037	-0.036	0.971

* significant at %5 level.

Table 4 provides the empirical results for the second event window (±2). When table 4 is examined, it is seen that one day before the introduction of IFCs there is a statistically significant abnormal return at a 5% significance level, but it can be seen that there are no statistically significant cumulative abnormal returns. Graph 2 illustrates the average AR and CAR values for the second event window.

Graph 2. Average AR and Cumulative Average AR values in (±2)

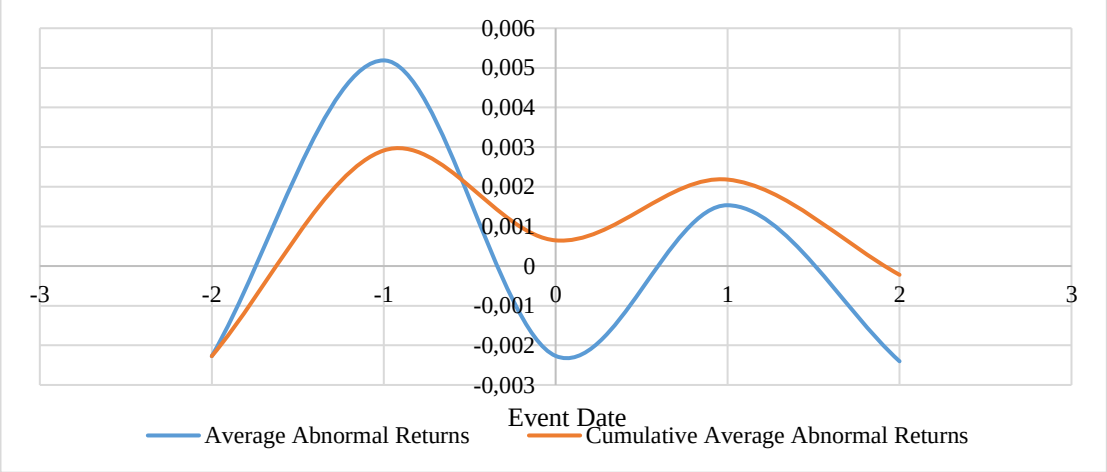


Table 5. Abnormal and Cumulative Abnormal Return Statistics for event window (±3)

Days	AR (N=37)				CAR (N=37)			
	Mean	Standard Deviation(σ)	t statistics	Sig. (2-tailed)	Mean	Standard Deviation(σ)	t statistics	Sig. (2-tailed)
-3	-0.001	0.016	-0.295	0.770	-0.001	0.016	-0.295	0.770
-2	-0.002	0.014	-0.955	0.346	-0.003	0.021	-0.884	0.382
-1	0.005	0.015	2.151	0.038*	0.002	0.023	0.560	0.579
0	-0.002	0.018	-0.775	0.443	0.000	0.031	-0.031	0.975
1	0.002	0.014	0.672	0.506	0.001	0.036	0.230	0.820
2	-0.002	0.015	-0.988	0.330	-0.001	0.042	-0.150	0.882
3	-0.005	0.014	-2.325	0.026*	-0.007	0.041	-0.967	0.340

* significant at %5 level.

According to the results shown in Table 5, there are statistically significant abnormal returns one day before (0.005) and three days after (-0.005) the introduction of IFCs at a 5% significance level. It can be seen that there are no statistically significant cumulative abnormal returns. Average AR and CAR values are illustrated in graph 3.

Graph 3. Average AR and Cumulative Average AR values in (±3)

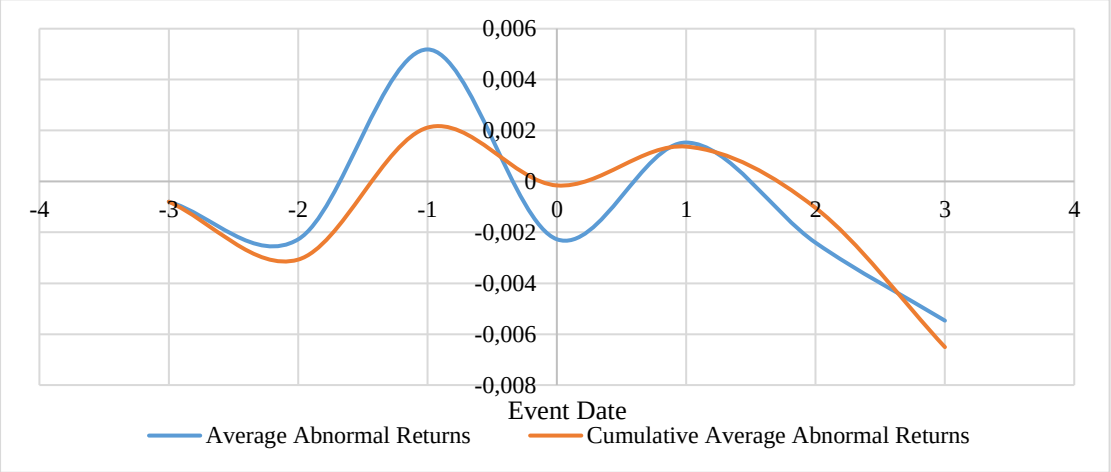


Table 6. Abnormal and Cumulative Abnormal Return Statistics for event window (±4)

Days	AR (N=37)				CAR (N=37)			
	Mean	Standard Deviation(σ)	t statistics	Sig. (2-tailed)	Mean	Standard Deviation(σ)	t statistics	Sig. (2-tailed)
-4	0.002	0.015	1.015	0.317	0.002	0.015	1.015	0.317
-3	-0.001	0.016	-0.289	0.774	0.002	0.022	0.473	0.639
-2	-0.002	0.015	-0.950	0.349	-0.001	0.026	-0.134	0.894
-1	0.005	0.015	2.158	0.038*	0.005	0.026	1.094	0.281
0	-0.002	0.018	-0.771	0.446	0.002	0.033	0.438	0.664
1	0.002	0.014	0.677	0.503	0.004	0.037	0.636	0.529
2	-0.002	0.015	-0.983	0.332	0.002	0.042	0.216	0.830
3	-0.005	0.014	-2.317	0.026*	-0.004	0.042	-0.565	0.576
4	-0.002	0.016	-0.676	0.503	-0.006	0.048	-0.721	0.476

* significant at %5 level.

The results of the 4th event window (±4) shown in Table 6 are very similar to the (±3) event window. There are statistically significant abnormal returns one day before (0.005) and three days after (-0.005) the introduction of IFCs at a 5% significance level. It can be seen that there are no statistically significant cumulative abnormal returns.

Graph 4. Average AR and Cumulative Average AR values in (±4)

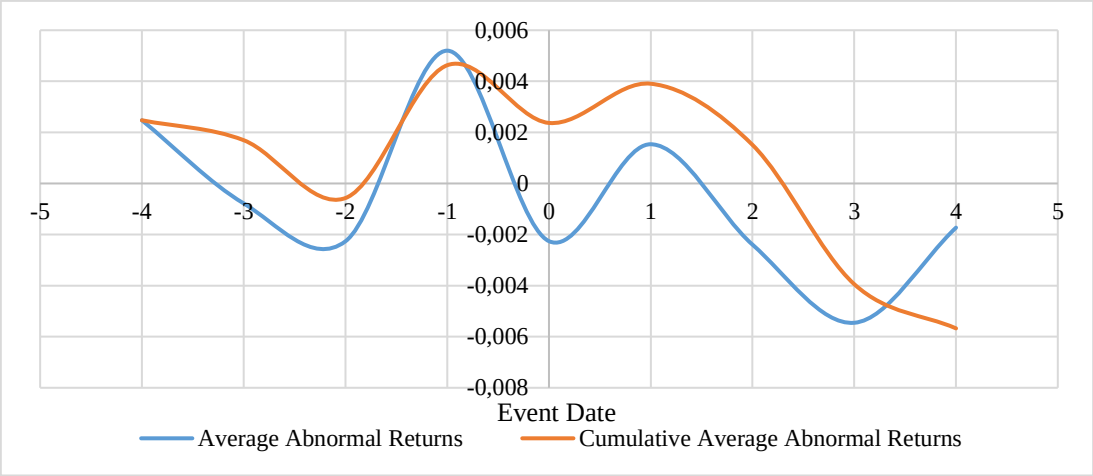


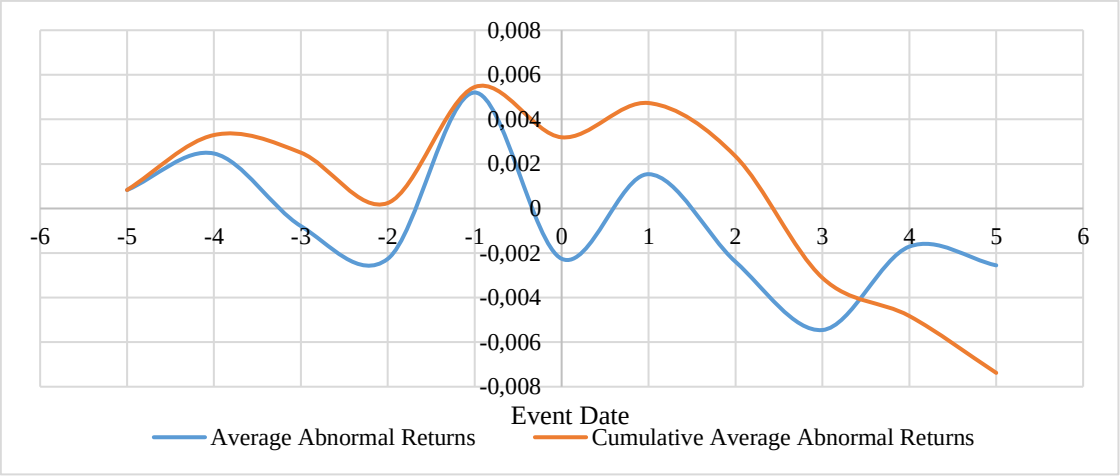
Table 7. Abnormal and Cumulative Abnormal Return Statistics for event window (±5)

Days	AR (N=37)				CAR (N=37)			
	Mean	Standard Deviation(σ)	t statistics	Sig. (2-tailed)	Mean	Standard Deviation(σ)	t statistics	Sig. (2-tailed)
-5	0.001	0.019	0.263	0.794	0.001	0.019	0.263	0.794
-4	0.002	0.015	1.011	0.319	0.003	0.028	0.723	0.474
-3	-0.001	0.016	-0.293	0.771	0.003	0.032	0.470	0.641
-2	-0.002	0.014	-0.948	0.349	0.000	0.034	0.045	0.965
-1	0.005	0.015	2.157	0.038*	0.005	0.034	0.962	0.343
0	-0.002	0.018	-0.770	0.446	0.003	0.039	0.499	0.621
1	0.002	0.014	0.678	0.502	0.005	0.043	0.668	0.508
2	-0.002	0.015	-0.983	0.332	0.002	0.046	0.307	0.761
3	-0.005	0.014	-2.322	0.026*	-0.003	0.045	-0.416	0.680
4	-0.002	0.016	-0.667	0.509	-0.005	0.051	-0.576	0.568
5	-0.003	0.018	-0.881	0.384	-0.007	0.049	-0.924	0.361

* significant at %5 level.

Table 7 shows the results of the largest event window (±5). Similar to the previous event windows, there are statistically significant abnormal returns one day before (0.005) and three days after (-0.005) the introduction of IFCs at a 5% significance level. It can be seen that there are no statistically significant cumulative abnormal returns within the five days before and five days after the introduction of IFCs.

Graph 5. Average AR and Cumulative Average AR values in (±5)



5. CONCLUSION

In this paper, we try to analyze the introduction of individual future contracts (IFCs) effects on abnormal returns of underlying stocks and make a general assessment of the Turkish stock market efficiency with event study analysis. In this context, as of June 2020, all 37 stocks traded in the futures market are included in the study. The first trading day of each contract in the futures market is accepted as an "event" and the abnormal returns of the underlying stocks are analyzed in five different event windows. According to the empirical results, there are statistically significant positive abnormal returns especially one day before the event. It means that the investors can get an abnormal return in the spot market one day before the first trading date of IFCs. In conclusion, the empirical results show that the introduction of IFCs has statistically significant impacts on the abnormal returns of underlying stocks traded in BIST. When the study is evaluated within the framework of the EMH, the presence of statistically significant abnormal returns suggests the violation of semi-strong form efficiency. Thus, it is possible to say that the Turkish stock market is not an efficient market in the semi-strong form. To the best of our knowledge, there is no empirical study focusing on the immediate stock price response to the introduction of IFCs in the Turkish spot market. This is where this study attempts to contribute to the literature.

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