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THE EFFECT OF FUTURES CONTRACTS ON THE STOCK MARKET VOLATILITY: AN APPLICATION ON ISTANBUL STOCK EXCHANGE

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ABSTRACT

The deregulation and financial liberalization have caused the increase of price volatility, interest and exchange rate risks. Managers and investors have started using derivatives to manage their risks. Since derivatives markets interact continuously with spot markets, the effect of derivatives markets on spot market volatility has become an important research topic. In this study, the impact of the derivatives markets on the Turkish spot market volatility and liquidity has been examined from January 2001 to December 2014 period. For this purpose, the impact of these futures contracts on spot market volatility and liquidity has been examined using EGARCH model and ARMA model respectively. It is found that derivatives markets reduce the spot market volatility and that they do not have a significant effect on the volume of the spot market. Furthermore, it is found that while an unexpected future trading volume increase the spot market volatility, an expected future trading volume does not have a significant impact on the spot market volatility.

Keywords: Futures market, spot market volatility, EGARCH Model, ARMA Model
JEL Classification: G13

1. INTRODUCTION

Foreign exchange rates and interest rates in international financial markets showed little change from 1945 to the early years of the 1970s. Since the mid-1970s, the international economic relations and trading have grown with the shrinking borders and the development of communications technology. As a consequence of the expansion of the economics relations and trading, free movement of capital began and in the financial markets excessive price volatility has occurred. The increase of volatility has raised the inflation and the exchange risk. During the same period, fluctuations in interest rates on the international market and fixed interest rate increase in the variable interest rate debt as well as borrowing trends, and consequently has brought the interest rate risk. In order to reduce the negative effects of inflation, interest rates and foreign exchange risk on the operators and investor, new financial techniques have been needed and then the derivatives markets was established. Derivatives markets are in continual relation with spot market due to the fact that derivatives provide some functions such as price discovery and risk management. Investors can hedge the risk that arises in the spot market and protect an actual position in the spot market by taking an opposite position on derivatives markets (Kolb and Overdahl, 2003:70). Also the market followers, with the price on the futures market, are able to get an estimated value on future price of an asset on the spot market the increasing importance of futures markets and their constant interaction with the spot market have attracted the attention of the market experts, academicians, practitioners and investors to know in which way the futures markets can influence the spot market volatility. The main purpose of this study is to provide the empirical evidence of the ongoing debate about the impact of futures market on the spot market volatility. Most of the previous studies

done in the Turkish market, where generally, focused on the impact of the futures market on the spot market volatility. In contrast to the other studies, the specific objectives of this study are as follow:

a- To examine the effect of introduction of futures contracts on spot price volatility.
b- To examine whether there is a presence of the leverage effect on the volatility after the introduction of futures contracts.
c- To examine whether the spot market volatility is affected by the trading activities (volume) of the futures market.
d- To investigate if there is any significant change on the spot market volume after the introduction of the futures contracts. In other word this study examines the impact of the futures contracts on the spot market liquidity.

The plan of this paper is as follow: In the second section, the literature review is presented. The third section describes the data and methodology. Findings are presented in the fourth section. Finally in the last section, we conclude the paper with some remarks.

2. LITERATURE REVIEW

The first research on the effect of the futures contracts on the volatility on the underlying spot market have be done on the United States market. After that, various researches relative to the subject have been carried across both the other developed and the emerging markets and led to three different views. The first view is that the futures contracts increase the volatility of the spot markets. The alternative view is the decrease of the spot market volatility after the inclusion of futures contracts. And the third one is that futures contracts had no effects on spot price volatility. Among those studies, different methods are used. Some group of researchers has investigated the impact of futures contracts on spot price volatility by comparing the change of volatility before and after the introduction of futures contracts. Others have examined whether the spot price volatility is affected by the futures trading activity (volume and open interest).

Many studies have investigated the impact of futures contracts on spot price volatility by comparing the return of the spot market before and after the introduction of the futures contracts. These can be grouped into three categories according to their conclusions.

Some studies claim that the volatility of the spot market decrease after the inclusion of the futures contracts. Researchers argue that the main cause of destabilization on the underlying spot market is a result of high degree of leverage and the presence of speculative uniformed traders in the futures markets (Cox(1976), Stein (1987), Antonious and Holmes (1995). The detail of studies that supports the destabilization hypothesis are presented below. Antonius and Holmes (1995), examined the impact of the FTSE 100 index futures on the spot price market using an GARCH model and found that the FTSE 100 index volatility increased after the introduction of the futures trading on the index. In addition, they found that the futures have improved the quality and the rate of information flow on the spot market rate. Bae, Know and Park (2004), studied the effect of the introduction on the index futures on the volatility of the underlying market in the South Korea market using the regression. They found that futures contracts led to an increase of volatility. Kumar and Mukhopadyay (2007), in the İndian market, studied the volatility of the NSE Nifty index after the inclusion of the futures contracts using the GARCH model. Results show that after the introduction of futures contracts, new information are reflected in the price more quickly and thereby increased the spot market volatility. For the same market, Mallikarjunappa and Afsal (2007), found evidence that futures contracts on S&P CNX IT have increased the volatility of the spot S&P CNX IT. Robanni and Bhuyan (2004), studied the impact of the Dow Jones Industrial Average (DJIA) on the spot market volality and trading volume, they found that the increase of the spot market volatility and a significant increase of it trading volume. Yu (2001) investigated any possible change in the volatilty of the underlying indexes with the inclusion of futures contracts to the US, England, Hong Kong, Japan and Australia using a GARCH(1,1)-MA(1). He found that except the England and Hong-Kong market, after the introduction of futures contracts, the volatility of stock returns increased in the other markets.

For the Chinese market, Arısoy (2008) used a GARCH and EGARCH model, to test the impact of the FTSE Xinhua A50 index futures contracts on the spot market. Results show an increase of the spot market volatility.

Furthermore, futures contracts led to an increase of the spot market volume. On the contrary, some studies claim that the introduction of futures trading decrease the spot market volatility. Some researchers argued that the main reason of this stabilization effect is the increase in liquidity. They argued that speculative activity migrates from the spot price volatility to the futures market due to the lower cost of transactions relative to futures market (Nikolaos et al., 2012; Galloway and Miller, 1997). The following studies found a reduction of the stock market volatility after the inception of futures trading.

Reyes (1996), investigated the impact of the futures contracts in the volatility of two stock markets (France and Danmark) using a MA-EGARCH(1,1) model. They observed that the introduction of futures contracts had led to diminish the volatility of the two stocks markets. Galloway and Miller (1997), researched the impact of S&P MidCap 400 index futures on the spot market volatility and trading volume. They found that a decrease in volatility of the stock market and an increase of it trading volume. McKenzie, et al (2001) investigated the impact of the introduction of futures trading on stock index into Australia stock market using a TGARCH model. He found that the introduction of futures had induced the reduction of stock market volatility. Bandivadekar ve Ghosh (2003) found decreased stock market volatility for the S&P CNX and BSE Sensex Nifty and an increase of the market efficiency after the introduction of the stock index futures contract. Alekais (2007) using a GJR-GARCH model, found that FTSE/ASE 20 index contracts had led to a reduction of the conditional volatility of the underlying market. Matanovic and Wagner (2012) researched on the DAX index in Germany stock market using an ARCH/GARCH model and found that the introduction of futures contract had reduced the conditional variance of the underlying market. Diesteldorf, et al., (2014), investigated the effect of the introduction of CSI 300 index futures in the volatility of the China, Hong-Kong and Singapore. He observed a reduction of the volatility of the three stock markets after the inception of futures contracts.

Regarding to the Turkish stock market, Kasman ve Kasman (2008) examined the effect of the introduction of BIST 30 index futures on the spot price volatility. They found that the introduction of futures contracts has reduced the spot price volatility using an EGARCH model. Çağlayan (2011) also find a decrease of the stock market volatility after the introduction of the BIST 30 index futures contracts using an GARCH(1,1), EGARCH, GJR-GARCH, APARCH model. Finally some empirical studies provide evidence that the introduction of futures trading on stock index had no significant impact on the volatility of the underlying market. The details of those studies are presented below:

Spyrou (2005), investigated the impact of the index futures contracts on the Greek spot market volatility. Using an EGARCH and GARCH models, they found that futures contracts has no effect on the spot market volatility. Debasish (2009) also found that the NSE index futures contracts did not influence the Indian spot market volatility. Gökbulut et al., (2009) observed that the introduction of the BIST 30 index futures contracts, has no significant impact on the spot market volatility. Xie and Huang (2014), found also the same evidence after examined the impact of the futures contracts on the China stock exchange.

3. DATA AND METHODOLOGY

3.1. Data

In order to investigate the impact of futures markets on the spot market volatility and liquidity, BIST-30 daily closing price and trading volume are used. The analysis was conducted over the sample period of January 2001 to December 2014. Since the BIST -30 index futures have been introduced on 4 February 2005, and in order to compare the structure of volatility and the difference of spot market trading volume of the spot, the sample is divided into pre- futures and post-futures. The BIST-30 daily close price and the trading volume are used from the period of 2 January 2001- 3 February 2005 (pre- futures period) and 4 February 2005 - 31 December 2014. Daily close price and trading volume for the BIST-30 index were obtained respectively from **www.borsaistanbul.com** and **www.finnet.com.tr.**

Also, data of the BIST -30 index futures are used over a period of 4 February 2005 - 31 December 2014, in order to test whether the price volatility of BIST-30 index is affected by the futures trading activity. Data were obtained from the Turkish derivatives market which are under the Istanbul Stock Exchange. The results of our analysis were obtained on the basis of R_t and V_t which are respectively the rate of return R and volume V in

period t computed in the logarithm Rt = ln(Pt/Pt-1) *100 and Vt = ln(vt/vt-1) *100. Pt and vt are respectively the values of BIST-30 index daily price an trading volume at the end of period t. The descriptive statistics of the BİST30 stock index are presented in the Table 1.

Table 1: **Descriptive Statistics of BIST 30 Return and Trading Volume**

Statistic	BİST30 Return	BİST30 Volume
Mean	0.0006	20.525
Median	0.022	0.846
Maximum	0.140	22.510
Minimum	-0.200	17.980
Skewness	-0.197	-0.490
Kurtosis	8.730	2.693
Jarque-Bera [p-value]	4728.8 [0.000]	153.80 [0.000]
***Q*(20)**	47.983 [0.000]	46536.9 [0.000]
***Q*$_s$(20)**	951.14 [0.000]	46759.1 [0.000]
LM(5)	70.129 [0.000]	4418.9 [0.000]
ADF	-58.781***	-12.805***
PP	-58.781***	-32.463***
KPSS	0.036***	0.214***

Table 1 indicates that the daily mean return is positive (0.06%) and the average standard deviation is 0.022. The average trading volume, in the period is 20,525 and the standard deviation is 0,846. The skewness and kurtosis values for both the returns and trading volume series determined whether the series are normally distributed. The highly significant Jarque Bera statistics reject the hypothesis that the daily returns and volume series of both BIST-30 index are normally distributed. The Box-Pierce statistic shows that the mean and the variance of the time series are autocorrelated. Also, the Lagrange multiplier (LM) tests to detect whether an ARCH effect exists. The LM statistics are significant for both of the two time series at the 5 percent level and then implies that there is significant ARCH effect in stock return and trading volume. All these results indicate that the stock returns and volume series are heteroscedastic. From this point, the use of GARCH will be more accurate for both the return and volume series. We find a time series to be stationary if the ADF, KPSS and PP tests are statistically significant at the 5% level. Results showed that both the stock returns and trading volume are stationary. This study is limited by the use BIST-30 index futures. Currencies, commodities and financial futures contracts are not included in the scope of this research. This is due to a very low of the trading volume of those contracts and the lack of trading volume some days.

3.2. Methodology

To analyze the effect of the introduction of futures contracts on spot price volatility, both GARCH and EGARCH models are employed. Both of those models are used in order to check the most appropriate models for our time series.

3.2.1. GARCH (p,q)

Developped by Bosselver and Taylor (1986), GARCH(p,q) model is used to capture better the tendency of returns to exhibit volatility clustering of financial series. In this model, positive and negative past values have a symmetric effect on the conditional variable (Jorion, 2005:358). GARCH model is represented as follow.

$$r_t = \alpha_{o+}\alpha_{1xt+}\epsilon_t \quad (1)$$

$$\sigma^2_t = \alpha_o + j=1q\beta j\sigma 2t\text{-}j + i=1p\alpha i\epsilon 2t\text{-}i \quad (2)$$

where $\alpha_o \geq 0$, $\beta j \geq 0$ and $(ai+ \beta i) < 1$

(1) and (2) are respectively the mean and conditional equation. r_t is the daily return on the BIST-30 index. σ^2_t is the conditional variance (volatility) at the time t, α_o is a constant, α_i is a coefficient that relates the past value of the squared residuals to current volatility. βi is a coefficient that relates current volatility to the last period volatility.

3.2.2. EGARCH (p,q)

Contrary to GARCH model which investigates the symmetric of volatility to positive and negative shocks, the EGARCH model is used to test the asymmetric response (Nelson, 1991:349). On the stock market, it has been proved that negative news affected the volatility of financial series more than positive news. This asymmetric response refered to a leverage effect. The leverage effect can be described as the effect of loss of shareholder value that lead to an increase of financial risk of the firm in the presence of bad news (decline of stock return) (Sahalia vd, 2011:2). The EGARCH (p,q) model proposed by Nelson (1991) is given by the equation

$$\log(\sigma^2_t) = \alpha_o + j=1q\beta j\log\ (\sigma 2t\text{-}j) + i=1p\alpha i\ |\epsilon t\text{-}i\sigma t\text{-}j| + k=1r\gamma k\epsilon t\text{-}k\sigma t\text{-}k \qquad (3)$$

γk indicates the leverage effect and refers to the presence of asymmetries. If $\gamma k < 0$, then negative shocks generate more volatility than positive shocks. If $\gamma k < 0$, then negative shocks have a stronger impact on the volatility than positive shocks. If $\gamma k > 0$, then negative shocks generate less volatility than positive shocks. This model is used both to account the presence of the leverage effect; while testing whether the introduction of futures contracts has an impact of spot volatility.

Models with dummy variable : In order to investigate the effect of futures contracts on the spot price volatility; a dummy variable which take the value 0 and 1 respectively before and after the introduction of futures contracts. If the coefficient of the dummy variable is statistically significant then the introduction of futures contracts has changed the spot market volatility of the BIST-30 index. The GARCH and EGARCH models with the dummy variable are presented below.

GARCH(p,q) model

$$\sigma^2_t = \alpha_o + j=1q\beta j\sigma 2t\text{-}j\ +\ i=1p\alpha i\epsilon 2t\text{-}i\ +\gamma D\ D_f\ \boldsymbol{\epsilon_{t-1}} \qquad (4)$$

EGARCH (p,q) model

$$\log(\boldsymbol{\sigma^2_t}) = \boldsymbol{\alpha_o} + j=1q\beta j\log\ \ (\sigma 2t\text{-}j) + i=1p\alpha i|\epsilon t\text{-}i\sigma t\text{-}j|\ +\ k=1r\gamma\epsilon t\text{-}k\sigma t\text{-}k\ +\ \gamma D\ D_f \qquad (5)$$

In case that the coefficient of the dummy variable γD is positive, then the introduction of stock index futures has increased the volatility of spot market. Conversely, if the coefficient is negative; there has been a decrease of volatility. If the coefficient is equal to zero, that means that the index futures have no significant impact on spot price volatility.

Furthermore, we test if there is any relationship after the inception of futures on the Turkish stock market between the level of futures trading volume and the volatility of the underlying index. Following the approach used by Bessembinder and Seguin, we use an ARMA (p,q) model to decompose the time series of the futures trading volume into expected and unexpected component. The unexpected trading volume represents a sudden change in the trading volume within day to information shocks, while the expected component is considered as the natural activity in futures market. We include those additional variables in the condition variance equation of EGARCH model

$$\log(\sigma^2_t) = \alpha_o + j=1q\beta j\log\ \ (\sigma 2t\text{-}j) + i=1p\alpha i|\epsilon t\text{-}i\sigma t\text{-}j|\ +\ k=1r\gamma\epsilon t\text{-}k\sigma t\text{-}k\ +\ \gamma D\ D_f + \ \ \delta_1 UNEXVOLt + \delta_2 EXVOLt \quad (6)$$

where UNEXVOLt is the unexpected component and EXVOLt the expected components of futures trading volume. δ_1 and δ_2 represents respectively the coefficients which show the effect of the unexpected. If the coefficients are statistically significant then the futures trading volume have an impact on spot market volatility. The sign of those coefficients will indicate whether there is an increase impact (positive) or a decrease impact (negative).

Using an ARMA model, we also split up the spot trading volume in two sub categories: The spot trading volume before the introduction of futures contracts and the spot trading volume after the inclusion. We include a coefficient γd in the mean equation in order to investigate its statically significance. If the coefficient is statistically significant then there is difference of the spot market volatility after the introduction of the futures contract, on the contrary case there is no difference.

3. FINDINGS AND DISCUSSIONS

In this section, the results of our analysis will be presented.

3.1. Effect of Futures Contracts on Spot Price Volatility and Leverage Effect

In table 2, the results of GARCH and EGARCH models are reported. The first column shows the GARCH model result, the second column, the leverage effects with the EGARCH model result and the last column show the extended EGARCH model result which represents the EGARCH model after the inclusion of the dummy variable. The results showed that the EGARCH model is the best model to estimate the volatility, since the log-likelihood value of the EGARCH model (8729,493) is superior to the log-likelihood value of the GARCH model (8727.171). According to the result, ARMA(9,8) is the most appropriate model to estimate the average of the return series.

Table 2: **Effect of Futures Trading on Spot Market Volatility and Leverage Effect**

	GARCH		**EGARCH**		**EXTENDED EGARCH**	
M	0.0001		0.0001		0.0001	
AR(1)	-1.224		0.944***		-0.690	
AR(2)	-1.375		-0.127		-0.647	
AR(3)	-1.056		-0.282		-0.905	
AR(4)	-0.966		0.295*		-0.284	
AR(5)	-0.734		-0.572***		-0.758**	
AR(6)	-0.519		0.521*		-0.288	
AR(7)	-0.031		-0.273		0.012	
AR(8)	0.030		-0.114		-0.202	
AR(9)	-0.002		0.001		-0.002	
MA(1)	1.224		-0.944***		0.691	
MA(2)	1.374		0.126		0.646	
MA(3)	1.054		0.282		0.904	
MA(4)	0.963		-0.295*		0.283	
MA(5)	0.731		0.573***		0.757**	
MA(6)	0.516		-0.523*		0.284	
MA(7)	0.027		0.273		-0.017	
MA(8)	-0.034		0.116		0.198	
Ω	0.0001***		-0.363***		-0.416***	
A	0.086***		0.185***		0.175***	
B	0.903***		0.970***		0.959***	
Γ	-		-0.056***		-0.064***	
N	1.112***		1.133***		1.142***	
γ_D	-		-		-0.031***	
Q (70)	67.023	[0.093]	67.839	[0.082]	66.707	[0.098]
Q_s (70)	52.466	[0.094]	63.768	[0.709]	58.693	[0.830]
LM(1)	0.172	[0.678]	0.074	[0.784]	0.000	[0.996]
Ln(L)	8727.171		8729,493		8733.029	

The results shows that, the coefficient of the dummy variable which measures the impact of the futures trading on spot market is negative γD(-0.031) and is significant at the %1 level. Therefore, there is a decrease in spot price volatility associate with the introduction of futures. Our findings demonstrate compliance with those of Bologna and Cavallo (2002); Kasman and Kasman (2008); Caglayan 2011); Diesteldorf et al., (2014). Also the table provides the results of the EGARCH model which has investigated the presence of leverage effect after the inception of futures trading on spot market volatility. The coefficient γ which captures this presence is negative γ (-0056) and statistically significant at the %1 level. Therefore negative shocks have a greater impact on volatility than good news.

3.2.Effect of Futures Trading Activity on Spot Market Volatility

The results of the impact of futures trading activity (volume) on the volatility of the spot market are presented in Table 3. Firstly The first column in the table reveals the GARCH results, the second column , the results of EGARCH models and the last column the extended EGARCH model which take place as a result of addiction of expected and unexpected trading volume variable in the EGARCH conditional variance equation .

Firstly, we used the GARCH and EGARCH models to know which model is appropriated to our times series. We found that the log-likelihood of EGARCH model(6144,94) is greater than the log-likelihood of GARCH model (6138,216). These results indicated that the EGARCH model provides the best fit of the stylized fact of stock returns. That is why we choose the EGARCH model to investigate the effects of futures trading activity (volume) on spot market volatility.

Table 3: Effect of Futures Trading Activity on Spot Market Volatility

	GARCH		**E-GARCH**		**Extended E-GARCH**	
μ	0.001***		0.001***		0.001***	
AR(1)	0.429***		0.355***		-0.087***	
AR(2)	-0.398***		1.019***		-0.459***	
AR(3)	0.392***		0.620***		0.338***	
AR(4)	-0.382***		-0.930***		0.022	
AR(5)	0.407***		0.272***		0.812***	
AR(6)	-0.901***		-0.875***		0.314***	
AR(7)	0.003		0.000		0.005	
MA(1)	-0.424***		-0.341***		0.103***	
MA(2)	0.408***		1.033***		0.463***	
MA(3)	0.383***		-0.627***		-0.345***	
MA(4)	0.394***		0.944***		-0.024	
MA(5)	-0.403***		-0.281***		-0.807***	
MA(6)	0.881***		0.874***		-0.336***	
ω	0.0001***		-0.445***		-0.654***	
α	0.077***		0.163***		0.177***	
β	0.898***		0.960***		0.927***	
γ	-		-0.076***		-0.105***	
ν	1.410***		1.435***		1.485***	
δ_1	-		-		0.420***	
δ_2	-		-		-0.003	
Q (70)	62.334	(0.292]	58.318	(0.427]	64.391	[0.234]
Q_S (70)	67.422	(0.565]	66.435	(0.599]	97.231	[0.017]
LM(1)	0.001	(0.968]	0.838	(0.359]	1.978	[0.159]
Ln(L)	6138.216		6144.97		6164.863	

Results show that, the estimated coefficient of unexpected trading futures volume is positive δ_1(0.420) and significant at the 1%level. This indicates that unexpected futures trading volume has positive and significant effect on stock market volatility. In other words, a sudden change in a trading volume of futures contracts, increases the spot market volatility. This result concur with those of Bessembinder and Seguin (1992)'s, and Kamaiah Sakthivel (2009). Furthermore, although that the estimated coefficient of expected trading futures volume is negative δ_2(-0.003), it is not significant at the 1%level. Then, when a expected trading volume occurred in the future market, it has no significant impact of the volatility of the spot market. This finding is in line with those of Shembaragaman (2003) and Illueca ve Lafuente (2003).

3.3.Effect of Futures Contracts on Spot Market Liquidity

The results of the impact of futures contracts on spot market trading volume are presented in Table 4. ARMA (9,8) is the most appropriate model to estimate the trading volume series according the Akaike information criterion.

Table 4: Effect of Futures Contracts on Spot Market Liquidity

	ARMA	
μ	23.689***	
γ_0	-0.039	
AR(1)	0.968***	
AR(2)	-0.762***	
AR(3)	1.044***	
AR(4)	-0.134	
AR(5)	0.643***	
AR(6)	-0.719***	
AR(7)	0.645***	
AR(8)	-1.070***	
AR(9)	0.385***	
MA(1)	-0.385***	
MA(2)	0.572***	
MA(3)	-0.668***	
MA(4)	-0.234***	
MA(5)	-0.688***	
MA(6)	0.228***	
MA(7)	-0.510***	
MA(8)	0.687***	
ADJ.R²	0.871	
F-ist	1312.477	[0.000]
DW-ist	2.011	
***Q*(70)**	59.804	[0.242]
***Q*$_s$(70)**	785.40	[0.000]

Results presented in Table 4 show that the coefficient of dummy variable indicates the difference of the spot market trading volume after the inclusion of futures contracts is negative but was no statistically significant. According to this result, the introduction of futures contracts has not made a significant difference on the spot market trading volume. Therefore the introduction of BIST index futures contract has not created a difference on the liquidity of Istanbul Stock Exchange.

5. CONCLUSION

This study examines the impact of futures markets on the spot market volatility and liquidity in the Turkish stock market. Using an EGARCH, we firstly investigate whether there is a change on the spot price volatility before and after the introduction of BIST-30 index futures. The evidence suggests that the introduction of

futures contracts had caused a significant decrease of the spot price volatility. One reason of this stabilization effect is an increase of the level of available information of participants, and the speculation activity that migrates from the spot to the futures market. In addition, futures markets provide the spot market liquidity and directly a decrease of the spot market volatility is expected (Antonio and Holmes, 1995; Edwards, 1998; Pilar and Rafael, 2002). However the last results of this research does not support this view since it had not found a statistically significant difference in the Turkish Stock market after the introduction of BIST 30 index. We further tested with the EGARCH whether there is a presence of leverage effect on the spot market volatility, after the introduction of futures contracts. The results indicate a presence of the spot market volatility, in other words bad news that flow in the market, increase the volatility more than the good news. This can be explained by the fact that investors overreacted to bad news more than good news. Besides, we investigated whether the futures market trading volume affect the spot price volatility. Using both GARCH and EGARCH model, we examine the effect of the expected and unexpected BIST-30 index futures trading volume on the underlying spot market. In our test, EGARCH has been found to be the best model to estimate the volatility. Results show that there is no significant impact of the expected futures trading volume in the spot price volatility. However, when an unexpected future trading volume took place in the market place, there is an increase of spot price volatility. Unexpected trading volume may have been caused by speculative activity. Speculators in futures markets, suddenly by changing their position, lead to a change of the trading volume. Unexpected trading volume may also result from the entrance of new uniformed traders in the market. In both cases, the negative perception of the unexpected trading volume in the futures market may lead to the increase of the spot market volatility. Finally using an ARMA model, we test whether the inclusion of BIST-30 index futures lead to an increase or a decrease of the spot market trading volume. Our results indicate there is no statistically significant difference of the level of the spot market trading volume after the introduction of futures markets. The reason of this behavior is the low level of trading volume in the Turkish derivatives market and those markets do not have impact of the spot market trading volume.

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