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Has Borsa Istanbul been conceded Goals by Fenerbahçe and Trabzonspor?

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Abstract

This study investigates match fixing accused 2011 Turkish football league's Fenerbahce, Galatasaray, Besiktas and Trabzonspor football clubs matches and their share performance at Borsa Istanbul (BIS). If there is match fixing gossips, some investors could beat the market. If some club members throw a game, they also could beat the market. So we could claim there was insider trading.

To undertake this assessment, daily data of the football clubs Fenerbahce, Galatasaray, Besiktas and Trabzonspor shares closing prices and volumes were collected on the Borsa Istanbul (BIS) for the period from 03 January 2005 to 30 September 2011. To investigate differences between accusation and non-accusation periods, we calculated returns and applied descriptive statistics, and the Kolmogorov Smirnov, Kruskal-Wallis and logistic regression tests.

Although this study cannot claim there was match fixing and insider trading for FB and TS, it can be said there was a suspicious.

JEL classification numbers: G02, G14.
Keywords: Turkish Football League, Match fixing, Kruskal-Wallis test, Kolmogorov-Smirnov (K-S) test, Logistic regression

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1 Introduction

Fully reflection of available information, which is related with the market prices, could be cut to the bone by some investors who get information from inside of the company. The theory on this subject was improved by Fama[3] (1970: 383-417) and divided market efficiency into the Weak Form Efficiency, Semi-Strong Efficiency and Strong Form Efficiency. Then he categorized strong form efficiency as "tests for private information"[4] Fama (1991: 1575-1617). This category is directly related insider trading.

It has been known that insider traders can beat the market. The most observed insider trading type is acquisitions. Bris[5] (2000: 1-47) indicated the en evidence in favour of insider trading profitability. The researcher investigated 5.099 acquisitions for 56 different countries and reported insiders purchase shares at the prevailing price and hold them until the public announcement. Insider trading laws do not stop to insider trading but reduce it. Bhattacharya and Daouk[6] (24.02.2012: 1-47) investigated whether insider trading law wipe it out. They reported that 87 countries that insider trading law exist were being investigated. The law could not be wipe it out but reduced.

On the other hand, knowledge of specific and economically-significant information and its usage duration is differing from type of the insider trading. For example, it could take two years for accounting related information disclosure in bankruptcy situations. Ke et all. (2002; 315-346) [7] claim that the timing of trades in relation to the informational event appears to be importantly affected by variation in the risks of legal action and adverse publicity attending trade. They also reported that knowledge of specific and economically-significant forthcoming accounting disclosures as long as two years prior to the disclosure. Stock sales by insiders increase three to nine quarters prior to a break in a string of consecutive increases in quarterly earnings. Seyhun and Bradley (1997: 189-216)[8] reported in their study results as corporate insiders engage in significant sales of their firms' stock in the months and even years preceding a bankruptcy filing and thereby avoid significant capital losses. They reported they found that insider selling begins 5 years before the filing date and builds toa crescendo up to the announcement month.

Insider trading is not covered by only insiders such as officers, directors and employees but also outsiders too. The Court in United States v. O'Hagan, persons "outside" the issuing corporation can likewise violate insider trading laws (Section 10(b) and Rule 10b-

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[3]Fama, Eugene F. ″Efficient Capital Markets: A Review of Theory and Empirical Work″*Journal of Finance*, May 1970, *25* (2), pp. 383-417.

[4]Fama, Eugene F. ″Efficient Capital Markets: II″*Journal of Finance*, December 1991, *46* (5), pp. 1575-1617.

[5]BrisArturo, "Do InsiderTradingLawswork?", EFA 2001 Barcelona Meetings; *Yale ICF Working Paper No. 00-19*; Yale SOM Working Paper No. ICF - 00-19, (http://papers.ssrn.com/sol3/papers.cfm?abstract_id=248417)

[6]Bhattacharya Utpal and Hazem Daouk, "The World Price of Insider Trading, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=249708 (Quoted at 24.02.2012)

[7]Ke Bin, Steven Huddartand, Kathy Petroni, "What insiders know about future earnings and how they use it: evidence from insider trades", March 2002, http://www.sciencedirect.com/science/article/B6V87-4938PMM-1/2/31f5b1baaf94921d67a48eb08debdf53.

[8]Seyhun H. Nejat ad Michael Bradley, "CorporateBankruptcyandInsiderTrading", *TheJournal of Business*, Vol. 70, No. 2 (April 1997), pp. 189-216, http://www.jstor.org/stable/10.1086/209715 .

5) M. Donna (2009: 1317)[9]. So, if a sport team shares traded at a stock exchange and match fixed, persons outside could beat the market with applying this non-public information. It could be accepted as an insider trading and should be investigated. In this type of insider trading, duration of insider trading action could be shorter than one observed in the literature.

Even there are some arguments if the Efficient Market Hypothesis (EMH) has persuasive evidences on insider trading because of joint hypothesis and testing model constraints, Fama (1991: 1604)[10] says;

"...One should use formal asset-pricing models when the phenomenon studied concerns the cross-section of expected returns (e.g., tests for size, leverage, and E/P effects). But when the phenomenon is firm-specific (most event studies), one can use firm-specific "models," like the market model or historical average returns, to abstract from normal expected returns without putting unnecessary constraints on the cross-section of expected returns..."

Duque and Ferreira (2005:1-38) [11] have searched the relationship between positive sporting results in football and share price performances on the stock exchange. The researchers have given evidence on there is correlation between positive match results and share price performances on the Portugal stock exchange. A similar research has been done by Ashton et all (2003:783-785)[12] and they found a statistically significant relationship between the performance of the English national football team and the change in the price of shares traded on the London stock exchange. In the broadest of terms, good (bad) performances by the national team are followed by good (bad) market returns.

Kaplanski and Levy (2008: 1-27) [13] analysed the influence of the World Cup on the U.S. market and found that the aggregate effect is an exploitable predictable effect. The researchers reported that the World Cup effect is large, highly significant and long lasting. From 1950 to 2007, the average return on the U.S. market over the World Cup's effect days is −2.58%, compared to +1.21% for all days over the same period length. Even the researchers have not declared, it could be claimed that the reason of -2.58% is investors are football lover and during World Cup matches they do not interested so much investments. Ehrmann and Jansen (2012:1-35) [14] analysed the fluctuations in investor attention during 2010 FIFA World Cup in South Africa using minute-by-minute trading data for fifteen international stock exchanges. They reported that when the national team was playing, the number of trades dropped by 45%, while volumes were 55% lower, market activity was influenced by match events and the co-movement between national

[9]Nagy Donna M. "Insider Trading and the Gradual Demise of Fiduciary Principles" www.law.uiowa.edu/journals/ilr/Issue%20PDFs/ILR_94-4_Nagy.pdf, 2009, pp.1317.

[10]Fama, 1991, pp.1604.

[11]Duque Joao and Nuno Alexandre Abrantes Ferreira, "Explaining Share Price Performance of Football Clubs Listed on the Euronext Lisbon", 2005, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=675633

[12]Ashton J. K., B. Gerrardy and R. Hudson, Economic impact of national sporting success: evidence from the London stock exchange, Applied Economics Letters, 2003, 10, 783–785.

[13]Kaplanski Guy and Haim Levy, "Exploitable Predictable Irrationality: The FIFA World Cup Effect on the U.S. Stock Market", 2008, http://ssrn.com/abstract=1081286.

[14]Michael Ehrmann and David-Jan Jansen, "The Pitch Rather Than The Pit Investor Inattent,on During FIFA World Cup Matches", 2012, European Central Bank Working Paper, ISSN 1725-2806 (online), www.ecb.int/pub/pdf/scpwps/ecbwp1424.pdf, pp.1-35.

and global stock market returns decreased by over 20% during World Cup matches, whereas no comparable decoupling can be found during lunchtime.

Berument and Yucel (2005:842-861) [15] have also contributed the literature with their research. They have used the success of Fenerbahçe, one of the most popular Turkish football teams, as a proxy for the well-being of workers in Turkey and find positive feedback from workers' morale on industrial performance. They claimed that the magnitude of this positive feedback increases in the monthly rate of industrial growth for the games won by Fenerbahçe in European cups. However, similar feedback from Fenerbahçe's success on industrial performance is not observed for domestic games in a statistically significant manner.

Coates and Humpreys (2002:291) [16] have searched similar subject for Super Bowl and found in the city that is home to the winning team from the Super Bowl, real per capita personal income is found to be higher by about $140, perhaps reflecting a link between winning the Super Bowl and the productivity of workers in cities.

There are some contradictory evidences on the relation between World Cup matches and stock exchanges relation. For example, Tufan (2004:1-8) [17] investigated whether the 2002 World Cup Turkish National Team football matches affect the Borsa Istanbul (BIST). He reported there is no statistically significant effect on BIS index returns during World Cup 2002, and it should be added more variables (may be minute by minute trading data) to detailed research. Adrain et al. (2009:1-29) [18] suggested that financial markets do react to match results when pricing football stocks, but in a fairly crude fashion. The finding that unexpected football results affect share returns over the closed market period supports the view that football results are price sensitive information and that the stock market is semi-strong form efficient.

Fenerbahce and Trabzonspor are two of four biggest and most supported football clubs in Turkey. Trabzonspor quoted its shares at the BIS at 10.04.2005 while Fenerbahce at 20.02.2004. Two clubs are being accused of match fixing by a Turkish court. The accusing process has started with a German court's match fixing allegations both in German and Turkish football leagues in 2009. Then a Turkish court started to investigation the situation at 12.12.2011. The prosecutor accuses these two football team's club chairmen's to match fixing in 2011 football league season. By taking all these events discussed also significantly in Turkish football media into account, this paper studied the 2011 Turkish football league's Fenerbahce and Trabzonspor football clubs matches and searched whether some investors who take into consider match fixing gossips beat the market. We wonder if there was a match fixing for these clubs, there could be insider traders.

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[15]Berument Hakan and Eray M. Yucel, "Long live Fenerbahçe: Production Boosting Effects of Soccer in Turkey", Journal of Economic Psychology 26, 2005,pp. 842–861.

[16]Coates Dennis and Brad R. Humprey, "The Economic Impact of Postseason Play in Professional Sports", Journal of Sports Economics 2002, 3, p. 291 (Online version http://jse.sagepub.com/content/3/3/291)

[17]Tufan Ekrem, "Do World Cup Football Matches Affect Istanbul Stock Exchange?", 2004, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=705343

[18]Adrian Bell, Chris Brooks, David Matthews and Charles Sutcliffe, "Over the Moon or Sick as a Parrot? The Effects of Football Results on a Club's Share Price", 2009, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1428452

The research has been carried out by following section arrangements: In the Introduction section, the importance of the subject was argued based on the finance theory with review of existing literature. In the second section, data and methodology has been explained, while in the third section, results of the analysis and empirical results were delivered and discussed.

2 Data and Methodology

Match fixing accusation broken out with a German prosecutor's investigation and extension to Turkish football league in 2009. After this Turkish police prepared a report about the match fixing and send to Turkish prosecutor. Fenerbahce football club became champion in Turkey in 2011 season and Turkish prosecutor has focused on mainly this year and Fenerbahce football team's matches.

To undertake this assessment daily data of Fenerbahce, Galatasaray, Besiktas and Trabzonspor football clubs shares closing prices and volumes was collected on the Borsa Istanbul (BIS) for the period from 03 January 2005 to 30 September 2011. To investigate differences between accusation and non-accusation periods we calculated returns. The clubs return observations are calculated as follows:

$$R_{t1}= (V_t-V_{t-1})/V_{t-1} \quad (1)$$

Where V_t, V_{t-1} and R_{t1} denote Fenerbahce, Galatasaray, Besiktas and Trabzonspor football clubs shares daily closed prices on t and t-1, respectively. All clubs data set has been investigated by naked eyes and observed some patterns.

The data was reorganized and used for dummy variables before and after five days of official assertion of match fixing days returns. Before and after five days of match fixing days' returns which officially asserted have been assigned "1" whiles others "2".

Initially, the descriptive statistics for the Fenerbahce, Galatasaray, Besiktas and Trabzonspor football club shares returns are recorded. Because all datasets have been found not normally distributed, it has been applied non-parametric tests such as Kolmogorov Smirnov and Kruskal Wallis tests.

The second stage of the assessment involves testing whether the four teams share prices differs from each other. The statistical analysis consists of the Kolmogorov-Smirnov Test (K-S Test) which provides a means of testing whether a set of observations are from some completely specified continuous distribution, $F_o(X)$ (1967:399) [19]. To compare the teams share closing prices and trading volumes with accusation and non-accusation periods probability distribution, we applied one-sample Kolmogorov-Smirnov (K-S) test.

The Kruskal-Wallis test as a nonparametric method is widely used to compare three or more independent groups, when an ordinal or interval level of data is available, especially when the assumptions of analysis of variance (ANOVA) are not met (2012:130) [20].

[19]Lilliefors W. Hubert, "On the Kolmogorov-Smirnov Test for Normality with Mean and Variance Unknown", Journal of the American Statistical Association, Vol. 62, No. 318 (Jun., 1967), pp.399.

[20]Liu Yuewei, " A SAS Macro for Testing Differences among Three or MoreIndependent Groups Using Kruskal-Wallis and Nemenyi Tests", Huazhong University of Science and Technology and Springer-Verlag Berlin Heidelberg , 32-1, 2012, pp.130

To search if negative or positive returns of the accused team FB effects on other team returns, the Logistic Regression test was applied.

3 Results of the Analysis

Results presented in Table 1 record that GS has the highest return (0.11) while highest risk (standard deviation (4.57)) belongs to BJK return series. No club return series distribution observed as normally distributed. So, it has been applied non-parametric tests to investigate average returns differences.

Table 1: Descriptive Statistics

		N	Min.	Max.	Mean	StD.	Skew.	Kurt.	Tests of Normality	
									K-S	*P**
BJK	**Return**	1685	-81.6754	24.2718	0.083344	4.57295	-2.673	65.689	0.174	0.000
	Volume	1685	8749.40	189231094	4838727	12484749	6.524	61.078	0.349	0.000
FB	**Return**	1685	-0.1937	0.2282	0.001318	0.02935	0.689	15.222	0.172	0.000
	Volume	1685	5469.50	267671572	8471999	27707292	5.946	40.120	0.380	0.000
GS	**Return**	1685	-18.05	19.30	0.1169	2.8559	0.664	9.860	0.144	0.000
	Volume	1685	2671.5	89722436	2441221	7113188	5.955	46.435	0.366	0.000
TS	**Return**	1614	-0.19469	0.23037	0.001351	0.03198	0.846	10.215	0.149	0.000
	Volume	1614	329.85	111607028	3096395	8978386	5.529	41.201	0.365	0.000

*Because P<5%, return and volume series are not normally distributed.

All teams return and trading volume series were not characterised with the normality (K-S>*P*). The lowest and the highest returns have been observed at BJK return series (-81,6754 and 24,2718). And If we take into consider to average return, the lowest return has been observed at FB (0,001318) and TS return (0,001351) series while the highest return observed at GS return series (0,1169). On the other hand, BJK has the highest risk (4,57295) while FB the lowest (0,02935). In addition to this FB shares have the highest volume transactions (267.671.572) while TS the lowest (329,85). According to average trading volume, GS has the lowest trading volume (2.441.221) while BJK the highest (4.838.727). To search return differences for before and after match fixing accusation periods Kolmogorov-Smirnov Z Test applied.

Table 2: Differences Test for Return and Trading Volumes of the Teams Shares

	Match fixing accusation	N	Mean	Std. Deviation	Kolmogorov-Smirnov Z	Sig.
BJK Return	No	1623	0,082683	4,5798341	0,765	0,602
	Yes	62	0,100631	4,4249949		
BJK Volume	No	1623	4487743,1	12287951,0	5,383	0,000***
	Yes	62	14026586,1	14105987,4		
FB Return	No	1623	0,001507	0,0292316	1,504	0,022*
	Yes	62	-0,003631	0,0321538		
FB Volume	No	1623	7471897,6	27061365,5	6,042	0,000***
	Yes	62	34652095,1	31586418,8		
GS Return	No	1623	0,1142	2,86000	1,326	0,059
	Yes	62	0,1884	2,76802		
GS Volume	No	1623	1936370,4	6178333,4	6,576	0,000***
	Yes	62	15656930,3	14054441,3		
TS Return	No	1552	0,0016712	0,03171270	1,859	0,002**
	Yes	62	-0,0066536	0,03743118		
TS Volume	No	1552	2818563,4	8796770,0	6,338	0,000***
	Yes	62	10051156,4	10624969,9		

(*) Significant at the 0.05 level
(**) Significant at the 0.01 level
(***) Significant at the 0.001 level

It has been observed a significant difference between returns before and after match fixing accusation periods for TS and FB while GS and BJK not. Before and after match fixing accusation periods, FB and TS returns observed lower for accused periods than other periods. Regarding trading volume, it has been observed a significant difference between match fixing accused and non-accused periods for all teams. So, all teams' trading volumes are explicitly increasing during match fixing accusation periods. Here "1" indicates Non-match fixing accusation period while "2" indicates one week before and after accusation period.

It has been applied Kruskal Wallis Test to investigate if returns and trading volumes differs from days of the week. To search if there are differences between days of the week, it has also been applied Kolmogorov-Smirnov Z Test. The results could be seen at Table 3.

Table 3: Days of the Week Effect for the Teams Returns and Volumes

	Days	N	Mean	Std. Deviation	Chi-Square; p	Different days	Kolmogorov-Smirnov Z; Sig.
BJK Return	Mon	338	0,003064	6,7246158	3,618 0,460		
	Tue	340	,135806	3,6813155			
	Wed	335	-,225991	3,9606755			
	Thu	334	,271981	4,0467802			
	Fri	338	,231035	3,7086072			
	Total	1685	0,083344	4,5729564			
BJK Volume	Mon	338	4663305,7	10472871,7	0,704 0,951		
	Tue	340	5662070,5	17135885,5			
	Wed	335	4607715,4	11069190,9			
	Thu	334	4923654,4	12078625,9			
	Fri	338	4330973,1	10353196,1			
	Total	1685	4838727,2	12484749,2			
FB Return	Mon	338	0,001338	0,0350933	0,240 0,993		
	Tue	340	0,002219	0,0260142			
	Wed	335	0,000871	0,0278058			
	Thu	334	0,000824	0,0301310			
	Fri	338	0,001321	0,0269733			
	Total	1685	0,001318	0,0293498			
FB Volume	Mon	338	7989027,4	23899867,8	0,951 0,917		
	Tue	340	9003688,3	30881832,8			
	Wed	335	9347214,1	31930076,5			
	Thu	334	7935318,7	27215567,3			
	Fri	338	8083021,6	23697548,2			
	Total	1685	8471999,9	27707292,2			
GS Return	Mon	338	0,1724	3,44333	9,901 0,042*	1 and 4	1,49; ,024
	Tue	340	0,3043	2,92943		2 and 3	1,478; 0,025
	Wed	335	-0,2528	2,35424		3 and 4	1,768; 0,004
	Thu	334	0,2357	2,55320		3 and 5	1,474; 0,026
	Fri	338	0,1217	2,85389			
	Total	1685	0,1169	2,85590			
GS Volume	Mon	338	2076645,7	5071737,6	1,077 0,898		
	Tue	340	2831666,9	8981680,1			
	Wed	335	2577490,1	7810403,2			
	Thu	334	2443817,4	7003595,3			
	Fri	338	2275419,2	6058430,9			
	Total	1685	2441221,9	7113188,2			
TS Return	Mon	324	0,0026121	0,03929604	10,709 0,030*	1 and 2	1,585; ,013
	Tue	325	-0,0008221	0,02678132		1 and 3	1,621; 0,010
	Wed	321	-0,0006978	0,02721415		1 and 4	1,380;0,044
	Thu	320	0,0014715	0,03182079		2 and 4	1,452; 0,030
	Fri	324	0,0041826	0,03302470		2 and 5	1,713; 0,006
	Total	1614	0,0013514	0,03197790			
TS Volume	Mon	324	3267529,5	8496086,3	0,570 0,966		
	Tue	325	3245373,5	9688090,7			
	Wed	321	2769527,8	7158626,4			
	Thu	320	3060383,7	10122851,3			
	Fri	324	3135231,3	9170118,0			
	Total	1614	3096395,3940	8978386,77778			

*It indicates statistically significant at 5%.

As it could be seen in Table 3 there are differences between GS and TS's returns ($P<0.05$) in days of the week while volumes not ($P>0.05$). The highest GS returns were observed on Tuesdays while the lowest on Wednesdays. Wednesdays are unique days that have negative return. The highest TS returns were observed on Fridays while the lowest on Tuesdays. On the other hand, all teams trading volume series have no differences between days of the week ($P>0.05$).

It has only been observed differences between days of the week for GS and TS. The highest GS returns on Tuesdays while the lowest were on Wednesdays. The highest returns have been observed on Fridays while the lowest were on Tuesdays for TS.
To search if negative or positive returns of the accused team FB effects on other teams returns, all return series have been reorganised. In this case, 0 (zero) indicates zero and negative returns of FB while 1 indicates positive returns and included Logistic Regression Model as a dependent variable. In the model, 1 indicates match fixing accused days returns while 2 other days' returns and added as an accused day returns variable. Other teams (GS, BJK and TS) returns were added the model as continuous variable.
In this model, FB returns probability of being positive calculated as Exp(β). As a result, other team returns increase has a contribution to FB returns positive probability. In this regard, it could not be said that match fixing accusation days returns (accusation day returns variable) and regression model constant have not been found statistically significant (P>0.05). Results can be seen at Table 4.

Table 4: Results of Logistic Regression

	B	**S.E.**	**Wald**	**df**	**Sig.**	**Exp(B)**
BJK Return	0,069	0,014	23,328	1	0,000*	1,072
GS Return	0,145	0,022	41,815	1	0,000*	1,156
TS Return	4,750	1,841	6,654	1	0,010*	115,593
Accused days (1)	-0,116	0,274	0,180	1	0,671	0,890
Constant	-0,289	0,269	1,155	1	0,282	0,749

*It indicates statistically significant at 1%.

As it could be seen in the Table 4, one unit increasing of BJK return contribute to 7.2% increase of FB returns while GS returns 15.6% and TS returns 115.59%.

Table 5: Results of Logistic Regression with Considering Days of the Week

	B	**S.E.**	**Wald**	**df**	**Sig.**	**Exp(B)**
Accused days returns (1)	-0,119	0,274	0,187	1	0,666	0,888
BJK Return	0,069	0,014	23,427	1	0,000*	1,072
GS Return	0,145	0,022	41,968	1	0,000*	1,156
TS Return	4,780	1,847	6,697	1	0,010*	119,155
Days			0,272	4	0,992	
Monday	-0,025	0,166	0,022	1	0,882	0,976
Tuesday	0,013	0,165	0,007	1	0,935	1,013
Wednesday	0,059	0,165	0,129	1	0,720	1,061
Thursday	0,004	0,165	0,001	1	0,979	1,004
Constant	-0,298	0,288	1,073	1	0,300	0,742

*It indicates statistically significant at 1%.

It has been added days of the week to the model and investigated days of the week effect on FB returns. As a result it could be claimed that there is no days of the week effect on returns (P>0.05). The results are shown above.

4 Conclusion

Because match fixing accusations we derived daily closing prices and trading volumes of Fenerbahce, Galatasaray, Besiktas and Trabzonspor football clubs where traded in the Borsa Istanbul (BIS) for the period from 03 January 2005 to 30 September 2011. Our main hypothesis was if there is match fixing, someone could beat the market. If a member of any club does it, this could be named as insider trading.

If match fixing official written accusation be taken into consider, all clubs return series seem to have patterns. Because of this the data reorganized and used dummy variables before and after three days of official assertion of match fixing days returns. To compare the teams share returns and trading volumes with accusation and non-accusation periods probability distribution (one-sample K–S test) we applied Kolmogorov-Smirnov and Kruskal Wallis Tests. The Kruskal-Wallis Test as a nonparametric method is widely used to compare three or more independent groups when an ordinal or interval level of data is available (Yuewei:130) [21].

On the other hand, to search if negative or positive returns of the BJK, GS and TS returns effects on accused team FB, the Logistic Regression Test was applied. The three teams' positive returns have positive effect on FB returns. The most effecting team is TS which was second runner in league.

Even it cannot be claimed match fixing and insider trading for FB and TS shares trading, it can be said there is a suspicious. There is a significant difference between non-accused days and accused days returns which non-accused day returns are lower than accused day returns. This result is current just for FB and TS not for BJK and GS. We should remind that the prosecutor accused just the 2011 football champion FB and first runner up team TS.

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