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ORIGINAL ARTICLE

STOCK MARKET REACTION TO NATIONAL SPORTING SUCCESS: CASE OF BORSA ISTANBUL

Abstract

The aim of this study is to investigate whether the sporting success of Turkish national football team affects Borsa Istanbul (BIST) stock index returns. The link between the results of football matches and stock returns has been investigated by many researchers, and the findings of some of these studies revealed a relationship between them. In this study, the effects of Turkish national football team's match results on BIST-100 index returns are investigated by using GARCH analysis. The analysis covers all the football matches played by Turkish national football team between 04.01.1988-25.05.2011. According to the findings, the wins of the national team are not affecting the BIST-100 index return, whereas the failures (losses and draws) have a negative effect.

Anahtar Kelimeler: Behavioural finance, Sporting success, stock market returns, GARCH analysis

Özet

Bu çalışmanın amacı, Türk milli futbol takımının sportif başarısının Borsa İstanbul (BIST) -100 endeksi getirisi üzerinde etkili olup olmadığını ortaya koymaktır. Futbol maçlarının sonuçları ve hisse senedi getirileri arasındaki ilişki birçok kişi tarafından araştırılmış olup, bu çalışmalardan bazılarında ikisi arasında istatistiksel bir ilişki olduğu saptanmıştır. Bu makalede GARCH analizi kullanılarak Türk milli futbol takımı maç sonuçlarının BIST-100 endeks getirisi üzerindeki etkileri araştırılmıştır. Analiz 04.01.1988-25.05.2011 tarihleri arasında oynanılan tüm futbol maçlarını kapsamaktadır. Bulgulara gore, Türk milli futbol takımının kazandığı maçlar endeks getirisini etkilemezken, kaybettiği veya berabere kaldığı maçlar ise negatif bir etkiye sahiptir.

Keywords: Davranışsal finans, sportif başarı, hisse senedi getirileri, GARCH analizi

INTRODUCTION

Sports events can have important psychological, social and economic impacts and analysis of these impacts has drawn attention of many researchers in the academic world. In sports economics and finance literature there is a growing body of papers especially about the impacts of the sports events on the economy and on the stock market. According to the efficient market theory of the standard finance, security prices reflect all available information (Fama, 1991). This theory assumes investors are "rational", that is they never make cognitive errors and always control themselves perfectly. However, behavioral finance argues that investors are "normal" people (Statman, 1995). That means when deciding which stock to buy they can make cognitive errors which can lead to irrational movements in stock prices. Based on this argument many researchers have investigated if the psychological state of the investors influences the stock market prices and the results that have been reached by most of them imply that, market prices respond to factors and events other than those indicated by economic fundamentals (Boyle and Walter, 2003). Sports events are one of the factors that are thought to influence the mood of the investors and consequently the stock prices. Among the sports events, especially football matches have received great attention in sports economics and finance literature, because as Bell et al. (2012) argues, it is one of the most popular games on earth. Moreover the results of the football matches can have both an economic effect (Bell et al., 2012) and a mood effect (Boido and Fasano, 2007). Therefore the effects of the football games' results have been investigated by several researches from different perspectives. Some of these studies have focused on the effects of the individual football teams' matches (Renneboog and Vanbrabat ,2000; Palomino et al., 2005; Stadtmann, 2006; Boido and Fasano, 2007; Scholtens and Peenstra, 2009; Bell et al., 2012) and the others have focused on examining the impacts of national football teams' match results (Ashton et al., 2003; Boyle and Walter, 2003; Edmans et al., 2007; Klein et al. (2009a); Kaplansky and Levy, 2010; Ashton et al., 2010; Gerlach, 2011).

The research stream, which has focused on individual teams' results, investigated the results of the football games mostly on these publicly traded teams' stock prices. Wins and losses of these teams can affect the financial condition of the firms which create a real economic channel for a teams' performance in games to affect its stock price (Gerlach, 2011). At the same time, they can affect the mood of the investors who are fans of these football teams (Edmans et al., 2007; Boido and Fasano, 2007), and can have an indirect effect on stock

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prices. Although the results of the matches of publicly traded football teams can have a direct economic effect on stock returns, Gerlach (2011) argues that there is no similar direct channel for national football teams' performances to affect aggregate stock returns and claims that this effect is likely to occur through its impact on investor sentiment. However that does not mean that the national teams' game results do not have any economic impacts. Apart from the "feel good" factor the expectations of potential economic benefits to be derived from the national teams' successes can cause stock market react positively (Ashton *et al,* 2003). At the same time missed opportunities from expected economic benefits of national sporting success can impact stock market downwards (Boyle &Walter, 2003). Thus, the impact of national teams' match results on stock market can grow out of the mood of the investors or result from the expectation of or lost economic benefits expected from the wins of a national team.

According to Edmans *et al.* (2007), a mood variable must satisfy three characteristics to rationalize studying its link with stock returns. First, the variable must drive mood in a substantial and unambiguous way, second it must impact the mood of a large proportion of the population, and third the effect must be correlated across the majority of individuals within a country. They also argue that international football matches satisfy these three criteria. Considering the popularity of football in Turkey, the aim of this study is to investigate the results of the Turkish national football teams' matches on Borsa Istanbul- 100 (BIST-100) returns by using Generalized Autoregressive Conditional Heteroskedasticity (GARCH) Analysis. The effects of three major teams' match results (Fenerbahçe, Galatasaray and Beşiktaş) on stock prices of these public football teams have been investigated in previous studies (Berument et al., 2006; Aygoren et al., 2008; Berument et al., 2009; Dogru, 2010). However, there is only one study that has examined the effect of Turkey's national football team's match results on BIST index and in that study only the World Cup matches of Turkish football team in 2002 have been taken into account (Tufan, 2004). Thus, this study may contribute to the literature by analyzing the effect of national football team's successes by searching the effects of all matches played between 1988 and 2011 on BIST-100 index return. In the rest of the paper, the relevant academic literature is reviewed firstly and next the empirical evidence is given by describing the data, the model and the findings.

Literature Review

The link between sports events and stock returns has been investigated in sports economics and finance literature especially in the past decade. In an early study by Ashton et al. (2003), event study analysis was applied to share index movements on London stock exchange following international matches by the England's national football team and they quantified 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. Following this study a number of other studies have been carried out searching the link between international sporting results and stock returns.

Boyle and Walter (2003) found no evidence of relationship between the successes of New Zealand national rugby team (rugby is the single dominant sport in that country) and stock market return behavior. They concluded that irrational investor reaction to sporting contest results were transitory at best. Even if Boyle and Walter did not find any significant relationship between national sporting success and stock market index return, Edmans et al. (2007) have found a strong negative stock market reaction to losses by national football teams in a study which considered 49 nations and four sports. They also found a statistically significant but smaller loss effect for international cricket, rugby, and basketball games, and no evidence of a corresponding reaction to wins in any of the sports including football. Inspired by the work of Edmans et al. (2007), Kaplansky and Levy (2010) tried to develop a practical method to examine the asymmetric characteristics of the football sentiment effect. They considered FIFA World Cup football results since 1950 to 2007 and found that the average return on the US market over the World Cup effect days was -2,58%, compared to +1,21% for all days over the same period length. As a result they argued that the link between world cup football results and stock market returns can be employed within successful trading strategies.

Although above studies except Boyle and Walter (2003) have found significant relationship between sport results and stock market returns, Klein et al. (2009a) argued that such relationships should be analyzed carefully. In a replication study where they have rebuilt the study of Ashton et al. (2003), they said that they detected some inconsistencies in Ashton et al.(2003)'s event study set up. After correcting these inconsistencies they end up with no significant relationship between national sporting success of English football team and

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London stock exchange index return. As a response to Klein et al. (2009a), Ashton et al.(2010) reassessed the link between international football results and stock market returns within their original work in 2003 by using larger dataset, employing an extended range of tests and allowing for outliers. Contrary to the findings of Klein et al.(2009a), they reported that the link between international football results and stock market prices does indeed exist particularly within the sample period 1984-2002 used in the original paper. However when they extended the dataset until 2009, they found that the effect on stock market returns has declined in importance.

As well as the replication study mentioned above, Klein et.al. (2009b) tested for a relation between match results and the specific national stock index returns during the period 1990-2006 by extending again the study of Ashton et al.(2003) and integrating as many European national football teams as possible. This time they used two different event study methodologies and as a result found no connection between a specific national football team's wins or loss and stock index prices. Like Klein. et al. (2009b), the findings of a recent study by Gerlach (2011) also implied that changes in investor sentiment following national team matches has no effect on stock market returns. According to him, the correlation between international sports and stock market returns is not caused by national team performances.

The studies that are mentioned above have all investigated the impact of national teams' successes or failures on stock market index returns. Some other studies have searched for individual teams' match results on individual companies' stock prices or on the whole stock market returns. Renneboog and Vanbrabat (2000) used event study to find if the share prices of football clubs listed in London Stock Exchange and alternative investment market are influenced by the football teams' performances, and they found a positive abnormal return following the football teams' wins and negative abnormal returns after defeats or draws. Also Stadtmann (2006) has reached a close link between the sporting success of Borussia Dortmund, a German football club, and subsequent changes in the stock market. Palomino et al. (2005), examined stock market reactions to betting odds and game results of 16 publicly listed British football clubs, and found that there was no market reaction to betting odds, but observed a positive abnormal return over the first trading day subsequent to the games. Another study has analyzed the effect of eight football teams' match results and concluded that stock market reaction is positive for wins and negative for defeats (Scholtens & Peenstra, 2009). Recently, Bell et al. (2012) considered the impact of match results on the stock returns

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of English football clubs and found that match result impact the stock prices. They also concluded that this impact is more for important matches than for matches of lesser importance (Bell et.al., 2012).

Apart from football, Coates and Humphreys (2008) investigated the relationship of on-field success by baseball teams in Nippon Professional Baseball and the share prices of the companies that own these professional baseball teams, and found that some companies' stock prices were influenced from the teams' successes and failures, but the others were not.

There is also number of studies examining the effect of individual Turkish football teams' match results on stock prices. An early study was carried out by Berument et al. (2006) which assessed the effect of three major Turkish football teams' (Beşiktaş, Fenerbahçe and Galatasaray) successes on stock market returns. According to their findings only Beşiktaş's wins against foreign rivals had a positive effect on the BIST 100 index return. Another study which examined the three major Turkish football teams' wins on the returns of the BIST-100 index by using transfer function analysis indicated that stock market returns increased following Beşiktaş's wins against foreign rivals, whereas no similar effect was reported for Fenerbahçe and Galatasaray (Berument et al., 2009). Both of these studies about three major football teams suggested the statistically significant effect of Beşiktaş's wins on the stock market , and the findings of both studies are supported by the view and the facts that Beşiktaş fans have a high rate of fanaticism. However, in a study by Berument and Yücel (2005) which analyzed the production boosting effect of football by using transfer function analysis, it is found that the monthly industrial growth rate increases by 0,26% with the number of games won by Fenerbahçe in European cups.

In another study, the results of four big Turkish football teams' (Fenerbahçe, Beşiktaş, Galatasaray and Trabzonspor) derby and European cup matches on these clubs' publicly traded companies' stock prices were examined using event study methodology, and the findings suggested that there existed abnormal returns in event window regardless of the match results in European Cup matches. They reported an abnormal return on the day after match only for defeats in case of derby matches (Aygoren et al., 2008). Finally, Doğru (2010) investigated the relationship between football match results of Galatasaray club and stock prices of Galatasaray Sportif A.Ş. whose stocks are traded in BIST, but found no significant effect of Galatasaray's wins or losses on its stock prices.

All the studies mentioned above have focused on the effects of major Turkish football clubs' matches on stock returns or on productivity, none of them searched the effects of Turkish national football team's successes or failures. To the best of our knowledge there is only one study investigating the effect of Turkish National football team's World Cup match results on BIST-100 index return. In his study Tufan (2004) has used hourly values of BIST-100 index from May 31, 2002 to June 28, 2002. He divided the data set into two groups as match hours and non-match hours returns and used Mann-Whitney U Test, but found that 2002 World Cup football matches do not affect BIST-100 Index returns. The matches played by Turkish football team other than 2002 World Cup were not taken into account in Tufan (2004)'s study, but this study is analyzing the effects of Turkish national football teams' wins or losses between 04.01.1988 and 25.05.2011 on the stock market and the findings are compared to the results of studies regarding other countries.

Emprical Analysis

In this section, the effects of Turkish football team's match results on BIST-100 index return will be investigated. First the methodology used in the analysis will be explained, after giving information about the data and model, the findings will be presented.

METHODOLGY

GARCH model, which is widely used for the analysis of financial time series, is used in this study to investigate the effects of national football matches on stock index returns. Financial time series are different from other time series because of the element of uncertainty they contain. For example the volatility of stock return series is not directly observable. As a result several methods, like ARCH/GARCH models, have been developed to consider these uncertainty factors contained in financial time series. To take the volatility of the financial time series into account by using these models, will also lead to more efficient parameter estimation (Tsay, 2005). Thus, GARCH model is preferred in this study to model the effects of match results played by Turkish national football team on stock index returns.

Bollersev (1986) has introduced GARCH model, which is the extension of the ARCH (Autoregressive Conditional Heteroskedasticity) model introduced by Engle (1982). Different from OLS (Ordinary Least Squares), which is used widely in parameter estimation, ARCH and GARCH models treat heteroskedasticity as a variance to be modeled. One of the

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assumptions of OLS is homokedasticity which assumes the expected value of all error terms when squared is the same in any given point. However most of the time financial times series data suffer from heteroskedasticity, because the variances of the error terms are not equal and the error terms may not be reasonably expected to be larger for some points or the ranges of the data than for others (Engle, 2001).

To analyze the financial time series data by ARCH or GARCH model, first of all the regression model developed by these data should be tested to see if there exist any ARCH effects. The Lagrange multiplier test of Engle (1982) is widely used in the literature for this purpose. If ARCH effects are found statistically significant as a result of this test, it would be suitable to use ARCH or GARCH models (Tsay, 2005).

In GARCH (p,q)   process, which is introduced by Bollersev (1986),   conditional variance, h_t, is modelled as follows;

$$\varepsilon_t \backslash \Psi_{t-1} \sim N(0, h_t), \tag{1}$$

$$h_t = \alpha_0 + \sum_{i=1}^{q} \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^{p} \beta_i h_{t-i} \tag{2}$$

where;

ε_t : a real-valued discrete-time stochastic process

Ψ_t: information set of all information through time t

$p \geq 0$, $q > 0$; $\alpha_0 > 0$, $\alpha_i \geq 0$, I=1,……q

$\beta_i \geq 0$,   i= 1,……,p,

By letting the ε_t be innovations in a linear regression GARCH (p,q) regression model is obtained as follows Bollersev (1986),

$$\varepsilon_t = y_t - x_t' b \tag{3}$$

Where y_t is the dependent variable, x_t' a vector of explanatory variables, and b a vector of unknown parameters.

Data and Model

The data consist of a daily closing stock market index of BIST-100 and Turkish national football team's match results from 04.01.1988 to 25.05.2011. The values of BIST-100 daily closing index is taken from Borsa Istanbul's statistical database, and the daily closing index data given in this database starts from the year 1988. The match results of

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Turkish national football team are downloaded from Turkish Football Federation's web site. Between these dates Turkish A National Football Team has played 239 matches, and 102 of these matches were won, 76 matches were lost and 61 matches were drawn. In these 239 matches both private and tournament matches are involved. If we exclude private matches, national football team of Turkey played 138 tournament matches including World Cup and European Cup (also FIFA Confederation Cup played in 2003) between these dates. 65 tournament matches were won, 44 were lost and 29 were drawn.

To model the BIST-100 index return, USD based stock index data is used in order to take the effect of inflation under control. The stock market return used in the analysis is calculated as the logarithmic first difference of USD based BIST-100 index as:

R_t= log (USD based BIST-100$_t$)

(USD based BIST-100$_{t-1}$)

To be able to determine the effect of match results on R_t, the following regression model is developed:

$$R_t= \gamma_0+ \gamma_1 R_{t-1}+ \gamma_2 R_{t-2}+ \gamma_3 W_{t-1}+ \gamma_4 LD_{t-1}+ \gamma_5 M+ \gamma_6 T+ \gamma_7 Th+ \gamma_8 F+\varepsilon_t$$
(4)

The definition of variables in the model is as follows:

R_{t-1}, R_{t-2}: First two lagged values for stock market return

W_{t-1}: Dummy variable that takes the value of "1" when match at t-1 was won and "0" when match at t-1 was lost/drawn or no match was played at t-1.

LD_{t-1}: Dummy variable that takes the value of "1" when match at t-1 was lost or drawn and "0" when match at t-1 was won or no match was played at t-1.

M,T,Th,F: Dummy variables for Monday, Tuesday, Thursday and Friday for the day of the week effect.

Since all trading days from 04.01.1988 to 25.05.2011 were used in the model both W_{t-1} and LD_{t-1} could be included without the problem of collinearity. Also R_{t-1}, R_{t-2} were included in order to account for autocorrelation, and M,T,Th,F dummies were used for the day of the week effect. To avoid from the collinearity problem Wednesday is not used as a dummy to account for day of the week effect.

The above model was first estimated by OLS and Lagrange Multiplier (ARCH-LM) test was run to see if ARCH effect exists. The result of the ARCH-LM test with 4 lags is as follows:

Table 1: ARCH-LM test results

Lags (p)	χ2	Degree of freedom	p-value
4	170.209	4	0.000

Source: Author's calculations.

According to the ARCH-LM test there exists a strong ARCH effect so it would be more appropriate to use ARCH-GARCH models. To select the order (p,q) of GARCH models one of the widely used information criteria is Akaike Information Criteria (AIC). Generally, the model with minimum AIC is selected to be analyzed (Tsay, 2005). The model that best meets AIC[1] in this study is found to be GARCH (1,1) model[2], so to estimate Equation (4) GARCH(1,1) model is used.

RESULTS

Table 2 reports the estimates of Equation (4) with GARCH (1,1) model for the sample period between 04.01.1988 and 25.05.2011.

Table 2: GARCH (1,1) Regression Results for All Matches

Mean Specification			
	Coefficient	**Std.Error**	**p-value**
Constant	0.002	0.008	0.004*
W_{t-1}	-0.001	0.003	0.985
LD_{t-1}	-0.005	0.003	0.065**
R_{t-1}	0.133	0.011	0.000*
R_{t-2}	-0.043	0.009	0.000*
Monday	-0.002	0.001	0.075**
Tuesday	-0.003	0.001	0.004*
Thursday	0.001	0.001	0.726
Friday	0.001	0.001	0.719

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[1] AIC value for GARCH (1,1) is -24,814.3; for GARCH (2,1) is -24,812.43; GARCH (2,2) is -24,812.58

[2] The variance equation in GARCH (1,1) is as follows under the constraints of $\alpha_0 > 0$, $\alpha_1 > 0$, $\beta_1 > 0$ and $(\alpha_1 + \beta_1) < 1$;

$$h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 h_{t-1}$$

Variance Specification			
	Coefficient	**Std.Error**	**p-value**
Constant	0.001	0.001	0.180
ε_{t-1}^2	0.294	0.017	0.000
h_{t-1}	0.653	0.032	0.000

*significant at 1%, **significant at 10%; Number of obs. = 5835; Wald chi2(8)=158.55; Prob > chi2 = 0.000

Source: Author's calculations.

According to the findings of above model, the win dummy W_{t-1} is not significant, but the loose/draw dummy LD_{t-1} is significant at 10% level with a negative coefficient, which means that although the wins of Turkish national football team does not have any impact on the returns of BIST-100 index returns, losses and draws have a negative impact. Also, R_{t-1}, the first lagged return on the stock market index has a significant (1% level) positive coefficient, revealing the positive relationship of BIST-100 index return with the return on previous day. Among the dummies used for day of the week effect, only Monday and Tuesday are significanct at 10% and 1% level respectively and both have negative signs, parallel to the findings of Berument et al. (2006).

Table 2 also reveals that estimated coefficients of variance specifications (α_1 and β_1) are positive which satisfies the non-negativity constraint of the variances. Moreover, the sum of α_1 and β_1 is smaller than 1 (0,947). This means that the model also satisfies the non-explosiveness of the variance specifications.

Even if the findings of GARCH (1,1) regression does not support the argument that the national sporting success may affect stock market returns, they reveal that when Turkish national football team loses or draws, the stock market return on the first trading day after the match diminishes by 0,5%. In fact, this result is parallel to the findings of Edmans et al. (2007) which indicated the consistent influence of national teams' losses on stock returns for 49 nations. But in their study the loss effect was much stronger. According to the psychology literature there is a significant difference in the behaviour of fans after losses and wins. Although an increase in heart attacks, crimes, and suicides was shown to accompany sporting losses, there was no evidence of improvements in mood of a similar magnitude after wins (Edmans et al., 2007). Thus the findings of this study are also consistent with the psychology literature as the losses of Turkish national football team are found to be affective on the stock market return. The other possible reason of this finding can be missed benefits those are

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expected to be derived from the victory of national football team. Because the winning country also can have some economic benefits especially in FIFA World Cup and European Cup, as well as the country hosting the event.

When we compare the results of this study to the findings of the studies regarding the effects of football matches on stock returns in Turkey, it is observed that our findings are mostly parallel to Aygoren et al. (2008)'s findings. In their study, they suggested that investors pay more attention to losses of the three biggest football clubs, because of the abnormal returns observed one day after the defeats of these teams in derby matches. However Berument et al.(2006) and Berument et al. (2009) revealed that only Beşiktaş football club's wins are affecting the stock returns positively. They found no effect of losses or draws on stock market index returns. But, it is important to note that these studies focused on the effects of the football matches played by individual football clubs like Fenerbahçe, Beşiktaş and Galatasaray. In Tufan (2004)'s study effects of the football matches, that were played by Turkish national football team in World Cup 2002, on stock market index returns were examined and no effects were found. However, in his study Tufan (2004) has only considered the matches played in World Cup 2002.

CONCLUSIONS AND DISCUSSION

The aim of this study was to explore the effect of sporting success of Turkish national football team on BIST-100 stock market index return. According to the GARCH analysis made for all matches of Turkish national football team between 04.01.1988-25.05.2011, sporting success does not have a statistically significant effect on BIST-100 index return. However, losses and draws are found to have a negative effect on stock market return, which can be observed by a 0,5% decrease in stock market return on the first trading day after the match. As mentioned before, the reason of this negative reaction of stock market to the failures of national football team can result from either the negative mood of football fans or missed economic opportunities expected after a success.

Although the aim of this study is not to explore whether the reaction of stock market stems from psychological factors or not, if we consider the structure of investors in BIST, this negative reaction can be linked to loss of expected economic benefits from the wins of national football team, because, almost more than the half of investors (about 60% according to BIST statistical database) are foreign investors. However, when we think that football is a

very popular sport in Turkey and the mood of the people is observed to be affected really much from the results of the football matches, it can also be concluded that the loss effect is probably because of the psychological state of the investors. Since in most of the games played especially in World Cup and European Cup, Turkish national football team is not being seen as a favourite one, potential benefits to be derived from successes of the national football team may not be so influential. Even if the national football team of Turkey was successful in 2002 World Cup, it was not so successful in previous and later ones, even not being able to pass the elimination matches and join in the tournament. Thus relating this stock market reaction to losses and draws to economic rationale may not be so meaningful, because we cannot see any statistically significant effect of wins on stock market return.

Turkish people are really sensitive people and nationality sense can be very strong in these kinds of international events like football tournaments. Depending on this factor one can also expect positive stock market reaction to the victories of national football team but the findings of this study do not support this kind of expectation. However as mentioned before, according to the psychology literature, the mood of sports fans are much more influenced in the case of losses than wins, which supports the findings of this study. In further studies explanations for the loss effect can be investigated by the methodology used by Edmans et al. (2007).

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