



Business, Management and Economics Research

ISSN(e): 2412-1770, ISSN(p): 2413-855X

Vol. 2, No. 11, pp: 180-185, 2016

URL: <http://arpgweb.com/?ic=journal&journal=8&info=aims>

Abnormal Returns after Large Increases in Stock Prices. A Comparison between Turkish Sport Index and Turkish Banks

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Abstract: Large price changes can generate abnormal returns owing to under-reaction and over-reaction behavior of individuals. This behaviors result in price continuation or price reversal in short term. The effects of large price changes can be observed in Post-shock period with abnormal returns. The aim of the study is to explore the abnormal returns after positive large price changes in Turkish stock market. Turkish sport index is investigated due to its relative negligence in literature. Turkish banking sector is also analyzed in order to compare results. The large price shocks indicates price changes which exceed two standard deviation which is calculated from windows prior the event. The abnormal returns are calculated by means which are the averages of returns of windows days prior the market shocks. The findings of the study show that the sport index support under-reaction theory and provide price continuation with average 2.5% positive cumulative abnormal returns in post event period. However, banking sector stocks support efficient market behavior and only two of seven banks can generate positive returns at the end of post event period with average 0,6 % and 0.1% which are highly small when compare to the post-event abnormal returns of the Borsa Istanbul sport index.

Keywords: Price shocks; Under-reaction; Turkish banks; Large stock changes; Borsa Istanbul sport index.

1. Introduction

Bondt and Thaler (1985) suggest that dramatic and unexpected events can produce over-reaction and affects stock price behavior with price reversals. Bernard and Thomas (1989) emphasize delayed price response regarding post announcement drift which can be called as under-reaction. Daniel *et al.* (1998) explain that under-reactions and over-reactions based on investor over-confidence and biased self-attribution. These academic studies show that the returns of financial assets follow certain patterns after large market price changes. Price patterns can be price continuation and price reversal. Post-shock period can generate profitable abnormal returns. Fama (1998) notes that when under-reaction and over-reactions do not randomly split, the view of market efficiency can be false and states that markets cannot be efficient when long term anomaly returns are so large.

The objective of the study is to evidence the abnormal returns following positive large price changes in Turkish stock market. The results provide implications regarding market behavior which can show market efficiency, under-reaction and over-reaction. Sport index is examined in the study with the events of peaks which occurred in sport index and general stock market index. Sport index of Turkey consist of football clubs. Borsa Istanbul Sport Index is chosen due to the fact that the literature related to Turkish sport index is small. However, existing studies evidence that sport index can provide abnormal returns and produce prosperous investment opportunities by using behavioral finance anomalies like sport sentiment. The study also investigate post event abnormal returns of banking sector firms in order to compare results with post event sport index abnormal returns.

The number of the papers which study stock market performance of the sport index is limited. These studies mostly emphasize on game performance of the clubs and stock price reactions following the games. Avşarlıgil *et al.* (2015) test Value at Risk methods on sport clubs stocks in Turkey. The study determines appropriate method of measuring Value at Risk sport shares. Parametric method seems to produce significant results while other methods become irrelevant. Ozdurak and Ulusoy (2013) analyze Turkish football stocks reaction to sportive and non-sportive news. The findings provide the fact that unexpected wins significantly affects stock returns. Non-sportive news like player transfers and match fixing cases also generate significant impact on stock returns. Demir and Danis (2008) stress on price reaction of Turkish soccer clubs to match results. The findings provide that possible abnormal returns can be earned and associated with match score. Wins are likely to produce increasing returns and losses are result in

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negative stock returns. [Berument et al. \(2006\)](#) investigate stock market returns of Turkish Football teams. A relationship which indicates high market returns after winning against foreign rival is suggested by the analysis. It is also documented that the day of the week effect is valid for sport shares of Turkish football teams. [Berument et al. \(2009\)](#) examine soccer success and stock market returns in Turkish market. The association of higher returns with wins is highlighted. The study relates the findings with fanaticism level of investors.

In our study, sport index is evaluated with abnormal returns and cumulative abnormal returns which are calculated for ten days post-shock event periods. The results demonstrate that large price rises in sport index can generate price continuation and positive abnormal returns which reach average %2.5 cumulative abnormal returns after ten days from the events. The effect of large positive price changes in general stock market index on sport index is also examined. Abnormal returns and cumulative abnormal returns are different in the events of positive shocks in general market index. Average return calculations point out that sport index reacts negatively to the general market shocks and produces negative cumulative abnormal returns on all days of the post event period. Findings of the study presents comparisons of sport index with banking industry. It is pointed out that the banking sector companies cannot demonstrate high positive post event abnormal returns when it is compared to the sport index. Banking sector results support efficient market behavior due to the fact that long term large abnormal returns cannot be observed. The fact that sport index reactions generate positive abnormal post-event returns indicate an under-reaction behavior and price continuations in short term. It can be implicated that sport index returns are short term predictable after large price appreciations of this index.

2. Literature Review

The literature provide findings of abnormal returns after large price changes of stocks and explain this behavior with market anomaly theories. [Wong \(1997\)](#) determines one day advances and declines in some Asian financial markets and documents one-day, 10-day and 20-day cumulative abnormal returns. The findings are not consistent with over-reaction hypothesis due to the fact that the prices tend to rise after an advance and fall after a decline. [Lasfer et al. \(2003\)](#) examine short term investor reaction to major price changes with 39 developed and emerging economies' market indexes. The research results indicate that the market reacts positively to positive shocks and generates abnormal returns. Negative price shocks result in return losses. These effects can be explained by short term under-reaction hypothesis. The study compares developed markets and emerging market patterns. It is seen that emerging market shocks have larger magnitudes. Cumulative abnormal returns following these shocks are higher if the direction is positive in the emerging market. Short term prediction of positive post-shock returns is also possible for developed markets with lesser degree. [Mazouz et al. \(2009\)](#) investigate UK stocks' reaction to large one day price changes. Under-reaction to the positive shocks is documented. Price continuation after these positive shocks is exist. However, large capitalization stocks are not affected by large price shocks. It is also stated that the reason of return continuation can be the conservativeness of investors due to insufficiently updating prior beliefs. Another explanation is about portfolio rebalancing costs. These costs are cannot be neglected when the price shocks are large. Myopia of investors is also important determinant of price continuation because of the fact that investors likely to put too much weight on the latest positive events. [Kassimatis et al. \(2008\)](#) study extreme market-moving events of international government bond returns. It is explained that the events are proxy of unobservable information. The finding of the research shows price momentum for 10 days period and price reversal after 50 days. Significant excess profits for traders can be obtained according to the conclusion. However, the reason of this behavior is not clear. Changing risk premia, information flow patterns and microstructure influences are potential factors. [Amini et al. \(2013\)](#) research large prior price changes with reviewing literature. It is stated that most of the literature suggests short term return predictability after large price shocks. These papers employ different methodologies and make it difficult to draw general implications. The explanations are different in papers and cannot show exact determinants. Possible determinants are market microstructure, response of investors to risk changes and behavioral anomalies. The papers which are examined in the study proves price continuations and price reversals after large market shocks. [Pritamani and Singal \(2001\)](#) analyze predictable price patterns following large price shocks. Price continuation after the shocks is evidenced with the condition of accompanying public announcement. If the large price change is related to the news about the firm, price continuation is likely to occur. Volume increases are also accepted as important factor of the events which result in price continuation. Otherwise, market can follow a price reversal. Positive events with support of public announcement can generate +3.5% returns. The findings indicates 20-day abnormal returns with 1-1.5% profits after transaction costs which can be earned by investors. [Zawadowski et al. \(2006\)](#) explore intraday large price changes in liquid stocks of NYSE and NASDAQ. The study focused on large 60 minutes price changes. It is suggested that intraday contrarian strategies are profitable due to shock overreaction which covers subsequent 30-60 minutes. It means an intraday reversal puzzle which can be originated from behavioral trading or interactions between informed and uninformed traders. [Bremer et al. \(1997\)](#) probe Nikkei 300 index stock returns and provide a pattern which shows significantly positive stock prices after large decreases. The study suggest that investors try to make profits form large price drops. However, transaction costs, tick-size bounce and other market restrictions can reduce the positive returns following negative shocks. The effect that follows large positive price movements is little evidenced. [Lin et al. \(2007\)](#) examine periods of large market movements. The findings suggest that high share turnover, small size and high return volatility stocks are likely to move together with market when market increase sharply. The study concludes that herding behaviors of individual stocks dependent to firm characteristics. [Savor \(2012\)](#) investigates major price changes of stocks with analyst reports proxy. It is

evidenced that price drifts are highly possible if the event is accompanied by information. It is required that price direction and recommendation have the same sign for drift. [Mehdian et al. \(2008\)](#) emphasize on favorable and unfavorable events which affect national stock indexes of turkey. It is documented that post event cumulative abnormal returns are in relationship with uncertain information hypothesis. Investors set prices according to the unexpected changes in risk. The study suggests that stock prices of Turkey are set efficiently. Finally, it is explained that short term trading strategies like contrarian trading rule do not produce any abnormal returns. [Angelovska \(2016\)](#) tests the effect of large share price movements on 10 firms of Macedonian stock market with both positive and negative two standard deviation shocks. It is suggested that the market has overreaction characteristics and shows a tendency of price reversal. However, price continuation can be possible after positive price shocks. The explanation of this behavior cannot be explained by efficient market theory of finance. It is suggested that investors exhibit herding patterns. [Lu \(2009\)](#) focuses on weekly shocks and analyze largest 49 stocks in Hong Kong. Declines and increase events are determined according to the value of 10 % change and investigated through 8 year period includes 1999 – 2007. It is documented that significant return reversals for both shocks persist only one week subsequent period. It becomes evidence of overreaction. The reversal effect of large increases tends to continue two or three weeks. Under-reaction theory also seems relevant for large declines owing to the fact that declines follows price decreases in long run.

3. Materials and Methods

The analysis of the study aims to detect patterns of sport index stock returns after large price changes in sport the index and general market index. The abnormal returns reaction of banking sector companies to their large price changes is also examined. The seven prominent banks of Turkey are analyzed in the study. Data of the research is obtained from DataStream. The data consists of daily returns of sport stock market index and general market index returns and chosen banking sectors firms' returns. Returns data exist between 1.1.2011-3.31.2015 time period. Large price shocks and its effects are calculated from the date beginning 4.1.2011 due to the fact that measurement requires prior calculations.

A methodology which is similar to [Lasfer et al. \(2003\)](#) is followed. Large price changes are determined according to returns exceeding two standard deviation. Standard deviation is obtained from periods of -60 to -11 day relative the shock day. Sport index experienced 32 large positive price changes and general market index passed 35 large positive price movements. The effects of these price shocks are measured as abnormal returns and cumulative abnormal returns for ten days period after the event. Abnormal returns indicate the return minus 50 days average of that return. Abnormal returns are calculated from -60 to -10 windows by average return model:

$$AR_{it} = R_{it} - E(R_{it})$$

Where

AR_{it} = Post-shock abnormal returns

R_{it} = Daily return on the index

$E(R_{it})$ = Average return from -60 to -10 day window

Summed daily AR_{it} is calculated and presented as CAR_{it} which shows cumulative abnormal returns. [Armitage \(1995\)](#) call the model as *average return model*. This model assume that the security yields the same return as it does on average during a prior estimation period or around the test period.

[Corrado \(2011\)](#) defines event studies as analyzing economic structures with assessing single security and after event date combination. This assessment can be easily made by comparing prior control period return and the after event date returns. Thus, significant impact of the event can be demonstrated. However, the market wide and idiosyncratic news can effect significance of the returns after the event. [Konchitchki and O'Leary \(2011\)](#) state that event study methodology is based on efficient capital markets theory. Theory explains security prices includes all available information related to the market values. [McWilliams and Siegel \(1997\)](#) stress that statistically significant results in event studies can evidence abnormal returns. They underline assumptions which support to clearly understand the role of the analyzed event in security pricing. Firstly, efficient market characteristics should be effective. Secondly, the market participants should not foresee the event. Finally, event window days should not be harmed by other important news.

4. Results

The Turkish sport index and seven prominent banks are analyzed in the research. [Table 1](#) shows the number of positive shocks in the research period, daily mean of calculated abnormal return series and standard deviation of the daily returns. It is evidenced that number of positive shocks are more than thirty in five year research period for analyzed series. Mean of daily abnormal returns are small and negative. Standard deviation of the series are approximately same and changes around 0.02 for daily return observations.

Table-1. Number of Positive Shocks, Mean of Abnormal Returns and Standard Deviation

| Descriptive statistics | Number of Positive Shocks | Mean of Abnormal Returns | Standard Deviation of Returns |
|------------------------|---------------------------|--------------------------|-------------------------------|
| Sport Index | 32 | -0.000113 | 0.022038 |
| Ak bank | 41 | -0.000064 | 0.022277 |
| Is Bank | 39 | -0.000052 | 0.020614 |
| Vakif Bank | 34 | -0.000183 | 0.022863 |
| Halk Bank | 31 | -0.000102 | 0.022793 |
| Yapi Kredi Bank | 31 | -0.000108 | 0.022084 |
| Garanti Bank | 56 | -0.000061 | 0.022298 |
| Finans Bank | 34 | -0.000067 | 0.023289 |

Table 2 shows the result of post event period analysis which produce average abnormal returns and cumulative abnormal returns of sport index after the events of large price rises in sport index. Cumulative abnormal returns and abnormal returns are positive after positive price shock. These results explains that a pattern of price continuation in sport index is occurred after positive changes in sport index. It is also demonstrates the result of post event period analysis which consist average abnormal returns and cumulative abnormal returns of sport index after the events of large price rises in general index. Cumulative abnormal returns and abnormal returns are mostly negative after positive price shock in the general market index. These results explains that sport index react negatively after positive general market index shocks. Wilcoxon Signed Rank Test explains the result of the effects of sport index and general market index shocks on sport index. There is a significant difference between sport index returns earned after large sport index and general market changes.

Table-2. Reactions of Turkish Sport Stock Index to Large Price Appreciations in Turkish Sport Index and General Market Index.

| Event Window | Reaction of Turkish Sport Stock Index to the Turkish Sport Index Positive Shock | | Reaction of Turkish Sport Stock Index to General Market Index Positive Shock | | Wilcoxon Signed Rank Test |
|--------------|---|--------|--|----------|---|
| | AR | CAR | AR | CAR | |
| 1 | 0.0040 | 0.0040 | -0.0001 | -0.0001 | AR 0.022** Reject the H0 Hypothosis CAR 0.005*** Reject the H0 Hypothosis **Significant at 5% level ***Significant at %1 level |
| 2 | 0.0017 | 0.0057 | -0.0029 | -0.0030 | |
| 3 | 0.0041 | 0.0098 | 0.0024 | -0.0006 | |
| 4 | 0.0006 | 0.0105 | -0.0027 | -0.0032 | |
| 5 | 0.0009 | 0.0114 | -0.0017 | -0.0049 | |
| 6 | 0.0053 | 0.0167 | 0.0027 | -0.0022 | |
| 7 | 0.0047 | 0.0214 | -0.0025 | -0.0047 | |
| 8 | 0.0012 | 0.0225 | -0.0026 | -0.0073 | |
| 9 | 0.0007 | 0.0232 | 0.0026 | -0.0047 | |
| 10 | 0.0023 | 0.0255 | 0.0046 | -0.00004 | |

The analysis of the study includes comparisons with banking sector firms and sport index abnormal returns. Table 3. demonstrates average abnormal returns of Turkish banks after an event of their large price changes. First day after the event generates negative abnormal returns for six of seven banks. This is the same for last event window. Most positive returns are occurred at the fifth day of event window. Number of negative return is thirty nine while positive returns are thirty one. The abnormal returns are weak when it is compared to the sport index post-event abnormal returns which are positive for ten days.

Table-3. Post-Event Abnormal Returns Of Banking Sector Firms

| AR | Ak bank | Is Bank | Vakif Bank | Halk Bank | Yapi Kredi Bank | Garanti Bank | Finans Bank |
|----|----------|----------|------------|-----------|-----------------|--------------|-------------|
| 1 | -0.00329 | -0.00311 | -0.00198 | -0.00068 | -0.00529 | -0.00331 | 0.005596 |
| 2 | 0.00454 | -0.00027 | 0.004129 | 0.000786 | -0.001 | 0.003991 | -0.00811 |
| 3 | -0.0009 | 0.001385 | 0.000871 | -0.0039 | -0.0061 | -0.00098 | 3.58E-05 |
| 4 | 0.000563 | -0.00278 | -0.00174 | 0.001184 | 0.001232 | -0.00158 | -0.00745 |
| 5 | 0.000651 | 0.001851 | 0.004145 | 0.003054 | 0.007532 | 0.000905 | -0.00525 |
| 6 | 0.001101 | -0.00045 | -0.00243 | 0.006854 | -0.00089 | 0.000686 | -0.00591 |
| 7 | -0.00188 | 0.000617 | 0.000745 | 0.004028 | 0.006276 | -0.00261 | -0.00436 |
| 8 | 0.000566 | -0.00046 | -0.00074 | 0.004436 | -0.00155 | -0.00382 | 0.002069 |
| 9 | -0.00228 | 0.003465 | -0.00176 | -0.00075 | 0.000705 | -0.00182 | -0.0035 |
| 10 | -0.00776 | -0.00488 | -0.00257 | -0.00842 | 0.000819 | -0.00426 | -0.00185 |

Cumulative abnormal returns of the Turkish banking sector is presented at table 4. The last day of event window indicates two positive abnormal returns with 0,6% and 0.1% percent. The maximum positive cumulative abnormal return among banks is 1.57% which can be produced after eight day for halk bank. Other banks yield lower positive

returns which is maximum 0.3% percent. Negative cumulative abnormal returns are higher than positive returns. Finansbank generates negative cumulative abnormal returns which reach maximum value (-2.8%) after ten day. It is followed by yapi kredi banks with -1.2% which turns positive after sixth day. The cumulative abnormal returns of Turkish banking Sector is different than the Turkish sport index. Cumulative abnormal return of the sport index is more satisfying than banking returns. The sport index has increasing cumulative abnormal returns and reaches 2.5% after ten days.

Table-4. Post-Event Cumulative Abnormal Returns Of Banking Sector Firms

| CAR | Ak bank | Is Bank | Vakif Bank | Halk Bank | Yapi Kredi Bank | Garanti Bank | Finans Bank |
|-----|----------|----------|------------|-----------|-----------------|--------------|-------------|
| 1 | -0.00329 | -0.00311 | -0.00198 | -0.00068 | -0.00529 | -0.00331 | 0.005596 |
| 2 | 0.001246 | -0.00339 | 0.002152 | 0.000102 | -0.00629 | 0.000677 | -0.00251 |
| 3 | 0.000347 | -0.002 | 0.003023 | -0.0038 | -0.01239 | -0.0003 | -0.00248 |
| 4 | 0.00091 | -0.00478 | 0.001278 | -0.00262 | -0.01116 | -0.00188 | -0.00992 |
| 5 | 0.001561 | -0.00293 | 0.005423 | 0.000437 | -0.00363 | -0.00098 | -0.01517 |
| 6 | 0.002662 | -0.00338 | 0.002992 | 0.007291 | -0.00452 | -0.00029 | -0.02108 |
| 7 | 0.000785 | -0.00276 | 0.003736 | 0.011319 | 0.001756 | -0.00291 | -0.02544 |
| 8 | 0.001351 | -0.00322 | 0.003001 | 0.015755 | 0.000203 | -0.00672 | -0.02337 |
| 9 | -0.00093 | 0.000245 | 0.001241 | 0.015007 | 0.000909 | -0.00854 | -0.02687 |
| 10 | -0.00869 | -0.00463 | -0.00133 | 0.006585 | 0.001728 | -0.0128 | -0.02873 |

The findings of the study show that sport index stock positively react their large price appreciations while large general market index increases cannot result in same effect on sport index stock. The analysis is also compares sport index with banking sector firms regarding post-event period returns after stocks' own large positive price changes. It is evidenced that negative abnormal returns exceed positive abnormal returns for seven prominent banks of Turkey in post-event windows.

5. Conclusion

The aim of the study is to manifest proof of the abnormal returns following positive large price changes in Turkish stock market. For that purpose, sport index is analyzed with the events of sharp rises which experienced in sport index and general stock market index. The study examines sport index with abnormal returns and cumulative abnormal returns which are calculated for ten days post-shock event periods. The analysis also consist Turkish banks reaction to their own shocks in order to make comparisons with sport stock index results. The findings of the study provides information regarding to short term predictability of the Turkish sport index and suggest implications regarding marker behaviors.

Cumulative abnormal returns and abnormal returns of sport index reacts positively to the positive large price changes in sport index. These results explains that a pattern of price continuation in sport index is occurred after positive changes in sport index. However, cumulative abnormal returns and abnormal returns of sport index are mostly negative after positive price shock in the general market index. These results explains that general market index shocks cannot produce positive effect in sport index.

The findings implicate that large price shocks in sport index can generate price continuation and positive abnormal returns. The cumulative abnormal returns reach average the return of %2.5 after ten days from the events. Investor firms and individuals can earn profit from sport index reactions to large price changes with following 10 days after 2 standard deviation shocks. This result support the under-reaction Hypothesis and a market inefficiency in Turkish stock market.

The analysis of the study investigate Turkish banks in order to compare the sport index findings. The sport index stock returns can yield satisfying positive abnormal returns while analyzed banks provide mostly negative abnormal returns in post-event periods. Stock market investments in Turkey concentrate on banks and has very high amount of volumes than sport index investments. The abnormal return results suggest that the banking sector shows more efficient market behavior owing to their low abnormal returns in post-event days.

Future studies can emphasize on different event study methodologies and indexes in order to proof evidences of abnormal returns in Turkish stock market. The market instruments other than stock market indexes can be evaluated. Obtained cumulative abnormal returns can be compared with certain factors. Therefore, factors that are related to cumulative abnormal returns following large price changes can explain reasons behind this effects. Related factors also can be used to predict the direction and magnitude of post-shock movements.

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