The Effects of Trading at Sustainability Index on Stocks' Abnormal Returns: Evidence from BIST Sustainability Index in Turkey

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Abstract:

The main purpose of this study is to evaluate the performance of stocks that quoted on Borsa Istanbul Sustainability Index (BIST SURD) and to explain its other possible effects on these stocks. In the first stage of research, stock returns of BIST SURD and BIST 100 Index -that represents the market- have been calculated to determine abnormal stock return. In the second stage, Wald Wolfowitz Test (W-W), Kolmogorov-Smirnov (K-S) Test and Levene Test have been implemented to confirm statistical significance of results. In the third stage, correlation matrix has been calculated to determine the relationship between BIST SURD and BIST 100 Index.
These results show that, there is a price anomaly in Turkey stock market to the contrary of efficient market hypothesis. Trading at BIST SURD Index has no significant influence on companies' performance. Thus, trading at BIST SURD for companies, creates an intuitional effect for investors

Key Words: Sustainability, Abnormal Returns, Financial Performance

1. Introduction

The concept of Socially Responsible Investment (SRI) is related to investors' considerations for the non-financial aspects of corporate performance based on sustainability screening (Consolandi et al. 2009:185). Correspondingly, sustainability indexes are being constituted on boards to promote companies' environmental, social and governance (ESG) implementations and to attract SRI to the market.As trading at sustainability index, price changes could be shown when securities were added to the index or new index. This situation can be explained by the means of some following hypothesis;According to *the efficient market hypothesis*, security prices reflect alleffects of publicly available information. *The imperfect substitutes hypothesis* explains that if a new company is included to the security index, substantial part of stocks in circulation are bought by index funds and price of these stocks reaches to a high level permanently. For the *price pressure hypothesis*, index fund operations unbalanced stock prices temporarily, based on variance of index composition. (Harris and Gurel, 1986; 815).Price changes and anomalies could be encountered within sustainability indexes and these changes could reflect to stock performances of companies.

2. Literature Review

Jones et al. (2007) analyzed the association between levels of sustainability disclosure and abnormal stock returns at ASX top 100 listed companies. Their results suggested that a negative relationship over all period, researched in their analysis. Kempf and Osthoff (2007) used KLD ratings data which covered all stocks of S&P 500 and DS 400 and they explained that portfolios which consist of specific ESG dimensions have been led to positive abnormal returns over long periods.

Consolandi et al. (2009) examined socially responsible investment incentives at Dow Jones Sustainability Stoxx Index. They analyzed a positive sign of cumulative abnormal return continued until the date of effective index change so they remarked a probable price pressure effect of on the market. Supporting that evidences, Manescu (2011) observed in a long panel which took place from large publicly traded United States firms and she stated that environmental, social and governance (ESG) attributes are not efficiently incorporated stock prices.

Oberndorfer et al. (2013) researched the effects of German corporations' inclusion into the Dow Jones Sustainability Stoxx Index and Dow Jones Sustainability World Index on stock performance. They found that a firm was penalized by German stock market because of its inclusion to the sustainability indexes. They also remarked that if a firm is included to a sustainability index, average cumulative abnormal returns are shown insignificantly.Stekelenburg et al (2015) examined the relationship between corporate' financial and sustainability performance on Dow Jones Sustainability Europe Index that stocks were added to or deleted from this index, by using abnormal stock returns. They stated that there is no significant but temporary impact on stock returns, supporting price pressure hypothesis.

It couldn't be encountered to a study related to abnormal returns of stocks in BIST SURD index. But Altın (2016) analyzed the mutual funds' performances by using abnormal stocks and determined a relationship between mutual funds and BIST100 index. He stated that there is a co-integration relationship between mutual funds and BIST100 index in the long term. Similarly Altın and Caba (2016) found price anomaly on participation indexes by using abnormal stocks in Borsa Istanbul (BIST).

3. The Aim and Scope of this Study

The main purpose of this study is to evaluate the performance of stocks that quoted on Borsa Istanbul Sustainability Index (BIST SURD) and to explain its other possible effects on these stocks. This study additionally aims to analyze abnormal returns of stocks that have been dimidiated into two groups.BIST SURD has been founded at 03.11.2014 with intent to encourage companies for enhancing their ESG implementations. Therefore two different periods have been classified as the years of 2013 (before BİST SURD) and 2015 (after BIST SURD) with daily data and 29 stocks that quoted on BIST SURD in 2015, have been examined in the research that has realized on three stages. This study has some limitations. The first limit of the study is to change the numbers of companies that were traded at index by years. The second is a divergence of trading dates in index for every company.

4. Research Model

The research of this study has realized on three stages. In the first stage of research, stock returns of BIST SURD and BIST 100 Index -which represents the market- have been calculated and compared with each other to determine abnormal stock return. Then adjusted returns have been determined by way of calculating the difference between BIST 100 index and every stock returns. If stock returns is greater than BIST 100, abnormal return can be found. This means that stock beats the market.In the second stage, Wald Wolfowitz Test (W-W), Kolmogorov-Smirnov (K-S) Test and Levene Test have been implemented to confirm statistical significance of results. W-W and K-S Tests have being used to test H_0 that both samples belong to same ranged universe. Levene Test has stated in the model to determine whether variances ($\sigma 2$) were equal or not. In the situation of variance equality, t- Test for Equal Variances which is suggested by literature, have being used. In the third stage, correlation matrix has been calculated to determine the relationship between BIST SURD and BIST 100 Index. The main reason of no using an econometric model is high multiple correlation problem between variables.
The following methods and formulas have being used to calculate stock returns (Lina and Hsub, 2008; Shi at al., 2008; Ritter, 1991):

$$(r_{it}) = P_{i,t-1} / P_{i,t} - 1 \quad (1)$$

$$(r_{mt}) = P_{mt} / P_{m(t-1)} - 1 \quad (2)$$

$$ar_{i,t} = r_{i,t} - r_{m,t} \quad (3)$$

Statistical notations of these tests and hypothesis are:

(W-W) and (K-S) Tests:
H_0: Both samples belong to same ranged universe.
H_1 : Both samples belong to different ranged universe.

Statistical Notation
H_0: D = 0
H_1 : D ≠ 0
(Levene Test):
H_0: The variances of universe are equal.
H_1 : The variances of universe are not equal.
Statistical Notation
H_0: $\sigma^2 = 0$
H_1 : $\sigma^2 \neq 0$

5. Analysis of Model

The first stage of model analysis is to obtain descriptive statistics related with companies that quoted in BIST SURD by years.There are five variable at the table of descriptive statistics. These variables are respectively; companies' codes mean, standard deviation, minimum and maximum values which stated in Table 1. In the second stage of analysis, companies' abnormal returns have being constituted that is shown in Table 2. There are four variables in this table of abnormal returns. These variables are respectively; companies' codes, abnormal return, statistical significance and relation with market/BIST 100.

In Table 1, comparative descriptive statistics of 29 companies' stocks at the period of 2013 (before BIST SURD index) and 2015 (during BIST SURD index) has been summarized. According to Table 1 three companies that have obtained abnormal returns mostly (in other words they could beat the market) in 2013 are respectively; TAVHL (%0, 31), TOASO (%0, 24) and OTKAR (%0, 22) stocks. In 2015, these stocks have changed as ASELS %22, GLYKO %0, 18 and TOASO %0, 17.

In 2013, three stocks that have defeated to the market are respectively; AKSEN (-% 0,14) YKBNK (-%0,07) and MGROS (-%0,05) and in 2015 these are TKFEN (- %0,07), YKBNK (-%0,07) and CCOLA (-%0,04). According to Table 1, three stocks that have yield the highest daily earnings to their investors in 2013 are VESTL (%18, 88), OTKAR (%18, 32) and TOASO (%14, 01). In 2015 these stocks have changed as VESTL (%18, 88), GLYHO (%15, 16) and OTKAR (%10, 43).In 2013, the largest daily loss have been found on TKFEN (- %16), TOSASO (- %16) and DOAS (- %14) stocks. In 2015 it has shown on GLYHO (-%20), DOAS (-%15) and VESTL (-%12) stocks.Otherwise, the most risky asset has been OTKAR with %3, 77 in 2013 and VESTL with %3, 45 in 2015 when value of variability for every company has been considered. The most risk-free asset in 2013 and 2015 has been YKBNK with %0, 88 and %0, 87.

Table 1: Descriptive Statistics

Company Codes at BISTSURD	Mean		Standard Deviation		Minimum		Maximum	
	2013	2015	2013	2015	2013	2015	2013	2015
AEFES	0,0003	0,0002	0,0297	0,0188	-0,1044	-0,0465	0,0934	0,0613
AKBNK	-0,0003	-0,0002	0,0299	0,0096	-0,0921	-0,0258	0,0953	0,0266
AKSEN	-0,0014	0,0003	0,0297	0,0164	-0,1353	-0,0523	0,0750	0,0539
ARCLK	0,0009	0,0006	0,0316	0,0143	-0,1023	-0,0428	0,0914	0,0433
ASELS	0,0009	0,0022	0,0290	0,0173	-0,1153	-0,0340	0,1297	0,0971
BRISA	0,0005	0,0002	0,0251	0,0166	-0,1063	-0,0594	0,1042	0,0902
CCOLA	0,0021	-0,0004	0,0297	0,0153	-0,0722	-0,0414	0,0898	0,0439
DOAS	0,0001	0,0009	0,0372	0,0257	-0,1421	-0,1500	0,1361	0,0852
EREGL	0,0015	-0,0002	0,0247	0,0167	-0,0806	-0,0581	0,0788	0,0587
FROTO	0,0012	0,0006	0,0315	0,0155	-0,1396	-0,0524	0,0798	0,0534
GLYHO	0,0007	0,0018	0,0279	0,0332	-0,1181	-0,2006	0,0912	0,1516
KCHOL	0,0006	0,0005	0,0275	0,0122	-0,0785	-0,0713	0,0841	0,0472
MGROS	-0,0005	-0,0002	0,0279	0,0134	-0,1047	-0,0341	0,0792	0,0455
OTKAR	0,0022	0,0011	0,0377	0,0212	-0,1339	-0,0540	0,1832	0,1043
PETKM	0,0006	0,0013	0,0255	0,0141	-0,0871	-0,0762	0,0905	0,0616
SAFGY	0,0012	0,0003	0,0251	0,0190	-0,0617	-0,0708	0,1036	0,0898
SAHOL	0,0003	0,0001	0,0289	0,0126	-0,1105	-0,0643	0,0799	0,0560
TAVHL	0,0031	0,0009	0,0340	0,0185	-0,1215	-0,0603	0,1029	0,0543
TCELL	0,0005	0,0001	0,0228	0,0151	-0,0731	-0,0642	0,0840	0,0462
THYAO	0,0015	-0,0002	0,0314	0,0161	-0,1385	-0,0921	0,1096	0,0587
TKFEN	-0,0005	-0,0007	0,0285	0,0137	-0,1670	-0,0638	0,0861	0,0491
TOASO	0,0024	0,0017	0,0346	0,0174	-0,1665	-0,0400	0,1401	0,0635
TSKB	0,0006	0,0003	0,0277	0,0141	-0,0970	-0,0382	0,1114	0,0351
TTKOM	-0,0002	-0,0001	0,0146	0,0146	-0,0378	-0,0378	0,0478	0,0478
TUPRS	0,0017	0,0016	0,0149	0,0149	-0,0494	-0,0494	0,0497	0,0497
ULKER	0,0009	0,0006	0,0177	0,0177	-0,0499	-0,0499	0,0903	0,0903
VAKBN	-0,0002	-0,0002	0,0125	0,0125	-0,0599	-0,0599	0,0650	0,0650
VESTL	0,0007	0,0006	0,0347	0,0345	-0,1245	-0,1245	0,1888	0,1888
YKBNK	-0,0007	-0,0007	0,0088	0,0087	-0,0310	-0,0310	0,0475	0,0475

In Table 2, the abnormal returns of companies' stocks in 2013 and 2015, has been summarized.According to this table, 22 companies in 2013 and 20 companies in 2015 have earned abnormal return and 7 companies in 2013 and 9 companies in 2015 have stated below the market return level.

Table 2: Abnormal Returns

	Abnormal Return		Direction of BIST100 Association	
Company Codes at BISTSURD	**2013**	**2015**	**2013**	**2015**
AEFES	√	√	+	+
AKBNK	X	X	+	+
AKSEN	**X**	√	+	+
ARCLK	√	√	+	+
ASELS	√	√	**+**	**-**
BRISA	√	√	**-**	**+**
CCOLA	√	**X**	**-**	**+**
DOAS	√	√	+	+
EREGL	√	**X**	**-**	**+**
FROTO	√	√	**-**	**+**
GLYHO	√	√	+	+
KCHOL	√	√	+	+
MGROS	X	X	+	+
OTKAR	√	√	**-**	**+**
PETKM	√	√	**+**	**-**
SAFGY	√	√	**-**	**+**
SAHOL	√	√	+	+
TAVHL	√	√	-	-
TCELL	√	√	+	+
THYAO	√	**X**	**-**	**+**
TKFEN	X	X	+	+
TOASO	√	√	-	-
TSKB	√	√	+	+
TTKOM	X	X	+	+
TUPRS	√	√	-	-
ULKER	√	√	+	+
VAKBN	X	X	+	+
VESTL	√	√	+	+
YKBNK	X	X	+	+

√=There is an abnormal return**X**=There is no abnormal return
Bold codes= Changed abnormal returns before and during BIST SURD

All results are statistically significant. Otherwise, the statistically significance could show different results in regard to use different methods and period. The most important reason of this is; Turkey stock market could indicate different specialties related to specific fixed and random effects. Regarding this, some evidences have presented in App. 1 and App.2.

In Table 2, it has been found that 19 stocks have moved in the same direction with the market and 10 stocks have reacted to the market. But it has changed at 2015 that 24 stocks played along with and 5 stocks showed adverse movement with the market.

6. Conclusion and Recommendations

This study presents two important theoretical results. First, price anomaly has been analyzed in Turkey stock market contrary with the Efficient Market HypothesisThus, it can be asserted that, Turkey stock market has not been efficient in this period. Second, the relationship with a stock and the market is calculated by beta factor and it equals to 1 ($\beta = 1$). Because an averaged risky stock plays along with the market to the direction of up and down. But then, some stocks could be encountered -fairly seldom- that they had negative beta and moved to opposite direction from market In spite of this, trading at BIST SURD and fulfilling its criteria had no important effect on companies' performance. It is compatible with literature (Manescu, 2011; Oberndorfer et al., 2013; Stekelenburg et al., 2015). This result can be defined by way of Price Pressure Hypothesis that, a temporary price changing could be monitored when a stock add to or delete from in an index. Thereby, it can be expressed that trading at BIST SURD index creates an intuitional effect for investors.

It can be recommended to the next studies that the relationship between index performance of BIST SURD companies and sustainability performances could be examined with their sartorial distribution. Because companies' sustainability performance is directly associated with their area of activity. Comparative analysis with BIST SURD and international sustainability indices can be carried out. Increasing number of companies in this index can enable to make alternative researches soon.

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Appendix 1: Analyze Results of 2013

Null Hypothesis	Test	Significance	Decision
Both samples belong to same ranged universe.	In two independent groups Wald Wolfowitz Test	0,044*	Null hypothesis is rejected.
Both samples belong to same ranged universe	In two independent groups Kolmogorov Smirnov Test	0,003*	Null hypothesis is rejected.
The variances of two samples are equal.	In two independent groups t- Test for Equal Variances (Levene Test)	0,000*	Null hypothesis is rejected.

* It is significant at 0,05 level.

Appendix 2: Analyze Results of 2015

Null Hypothesis	Test	Significance	Decision
Both samples belong to same ranged universe.	In two independent groups Wald Wolfowitz Test	0,909	Null hypothesis is accepted.
Both samples belong to same ranged universe	In two independent groups Kolmogorov Smirnov Test	0,203	Null hypothesis is accepted.
The variances of two samples are equal.	In two independent groups t- Test for Equal Variances (Levene Test)	0,00*	Null hypothesis is rejected.

* It is significant at 0,05 level.

Appendix3: Corporate Names

AEFES: ANADOLU EFES BİRACILIK VE MALT SANAYİİ A.Ş.
AKBNK: AKBANK T.A.Ş.
AKSEN: AKSA ENERJİ ÜRETİM A.Ş.
ARCLK: ARÇELİK A.Ş.
ASELS: ELEKTRONİK SANAYİ VE TİCARET A.Ş.
BRISA: BRİSA BRIDGESTONE SABANCI LASTİK SANAYİ VE TİCARET A.Ş.
CCOLA: COLA İÇECEK A.Ş.
DOAS: DOĞUŞ OTOMOTİV SERVİS VE TİCARET A.Ş.
EREGL: EREĞLİ DEMİR VE ÇELİK FABRİKALARI T.A.Ş.
FROTO: FORD OTOMOTİV SANAYİ A.Ş.
GLYHO: GLOBAL YATIRIM HOLDİNG A.Ş.
KCHOL: KOÇ HOLDİNG A.Ş.
MGROS: MİGROS TİCARET A.Ş.
OTKAR: OTOKAR OTOMOTİV VE SAVUNMA SANAYİ A.Ş.
PETKM: PETKİM PETROKİMYA HOLDİNG A.Ş.
SAFGY: SAF GAYRİMENKUL YATIRIM ORTAKLIĞI A.Ş.
SAHOL: HACI ÖMER SABANCI HOLDİNG A.Ş.
TAVHL: TAV HAVALİMANLARI HOLDİNG A.Ş.
TKFEN: TEKFEN HOLDİNG A.Ş.
TOASO: TOFAŞ TÜRK OTOMOBİL FABRİKASI A.Ş.
TCELL: TURKCELL İLETİŞİM HİZMETLERİ A.Ş.
TUPRS: TÜPRAŞ-TÜRKİYE PETROL RAFİNERİLERİ A.Ş.
THYAO: TÜRK HAVA YOLLARI A.O.
TTKOM: TÜRK TELEKOMÜNİKASYON A.Ş.
TSKB: TÜRKİYE SINAİ KALKINMA BANKASI A.Ş.
VAKBN: TÜRKİYE VAKIFLAR BANKASI T.A.O.
ULKER: ÜLKER BİSKÜVİ SANAYİ A.Ş.
VESTL: VESTEL ELEKTRONİK SANAYİ VE TİCARET A.Ş.
YKBNK: YAPI VE KREDİ BANKASI A.Ş.