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RESEARCH ARTICLE

Comparison of the Companies on the BIST Sustainability Index with Other Listed Companies in the Context of Earnings Manipulation

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Abstract
The concept of sustainability has been gaining importance all over the world. Concerns of consumers, investors, fund providers and governmental organizations about sustainability motivate companies to take action for a more sustainable world. Stock exchanges have also created sustainability related indices. The starting point of this study is the assumption that companies in the sustainability index are more respectful to the environment, society and economy and therefore, they are also more trustworthy when presenting their earnings. Earnings manipulation was detected by using the Beneish Model (1999). The M-scores of BIST non-financial firms were calculated for the years 2017 (262 firms) and 2018 (261 firms). The results showed that nearly half of the sample firms were possibly manipulators in both years. Additionally, nearly 40 percent of the firms on the sustainability index were manipulators. Although the percentage of manipulating firms in the sustainability index is lower compared to the percentage of manipulators in all firms, according to the results of statistical tests, there is no significant difference between the earnings manipulation behaviours of companies in the sustainability index and those not in the index.

Keywords

Sustainability, Sustainability index, BIST, Earnings manipulation, Beneish model

Introduction

Financial reports are the means for communicating the financial success or the failure of companies and are very important in investment decisions. Having correct financial reports that do not include manipulated information is crucial for external parties to make better decisions. However, for reasons such as increasing stock prices, decreasing borrowing costs, decreasing taxes payable, and increasing management bonuses, accounting information providers have some motivation to make manipulations.

There have been many corporate accounting scandals in the last decades and these have led researchers to develop models to detect earnings manipulation. One of the most famous

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models belongs to Beneish (1999). It is based on ratio analysis and finding anomalies. There have been lots of studies conducted in different markets that have proved the success of the Beneish model when detecting earnings manipulation.

Socially responsible investment funds actually highlight the companies that are engaged in social and environmental responsibility. Some examples for the motivations behind companies adapting and internalizing sustainability practices are having access to green funds, which means cheaper credit sources, the risk of losing customers who care about social and environmental sustainability, and the possibility of fines for pollution.

It is assumed that the population of the whole planet will increase to 9 billion people by 2050. Non-renewable resources are rare and definitely not cheap to acquire. Therefore, companies, governmental representatives and organizations need to focus on sustainability as their main priority. Clear and more widely-adopted indexes and dimensions in order to calculate the level of social performance of a company are necessary (Henao et al., 2018). A sustainability index represents a level to which companies are engaged in social and environmental responsibility according to criteria determined by s tock e xchanges. These emerged in the 1990s, with the Domini 400 Social Index, and in 1999, the New York Stock Exchange introduced the Dow Jones Sustainability Index (Orsato et al., 2015).

Companies listed on the Sustainability-index are the main focus of this study. Because these companies claim that they care about society, the environment and the economy, we assume that they are also respectful to society while providing their financial information, that they present correct and true financial amounts and do not manipulate their earnings. In order to detect earnings manipulation, we used the Beneish model and calculated the M-scores of BIST companies for 2017 and 2018 and then compared the companies in the sustainability index with those not in the sustainability index. Part 2 summarises the related literature. In part 3, hypotheses and samples of the current study, the results of the statistical analyses and the findings are presented. Concluding remarks and the limitations of the study are presented in parts 4 and 5.

Literature Review

Sustainability and Firm Performance

In the related literature, studies generally show a positive relationship between sustainability practices and firm profitability. Based on a sample of US companies from the food and beverage sector, Jackson et al. (2015) found that companies having high scores in environmental rankings do better financially than lower ranked ones. Moreover, financial performance and size can be drivers of an improvement in sustainable reporting. Profitability is a

driver for engagement in corporate environmental sustainability (CSR) initiatives (Mohd et al., 2015). Based on a sample of 348 manufacturing companies in Italy, Cantele et al. (2018) found a positive effect of social, economic and formal sustainability aspects on competitiveness as a key to financial performance success. Also, customer satisfaction, organizational commitment and corporate reputation positively influence firm performance.

The primary motivations for retailers to engage in corporate environmental sustainability (CES) actions are anticipated economic benefits such as cost savings that come from reduced resource usage. Additionally, internal and external stakeholder pressure influences the producers of retail products in the entire value chain. Many retailers focus on CES strategies to enhance resource usage and environmental performance (Naidoo et al., 2018).

When a company internalizes sustainability, thereby improving economic performance, managers should focus on maintaining good relationships with suppliers. Managers should try to get suppliers involved in environmentally-oriented products by providing them knowledge, policies and initiatives (Ferri et al., 2018). Interestingly, Luzzini et al. (2015) found that although the inter-firm collaborative capabilities which come from sustainability involvement improve company performance, intra-firm collaborative capabilities do not have a positive influence on performance.

One of the main motivations of companies is to create a reputational value, so they make a lot of effort to be listed in the sustainability index. According to Orsato et al (2015), being in the sustainability index brings reputational gain, ease of fundraising, knowledge about social and environmental issues and competitive advantage. The relationship between social responsibility and the stakeholder-focus approach is very strong and positive. The stakeholder-focus approach stresses social and environmental issues and so it improves the customer-brand relationship which eventually turns into better financial performance (Mena et al., 2019). A study on 155 automotive firms from 20 different countries between 2010-2018 showed that there is a positive significant relationship between firm size and sustainability reporting and a negative significant relationship between financial leverage and sustainability reporting in the automotive industry (Kaya and Akbulut, 2019).

By analysing the financial information of 162 companies listed on the Frankfurt Stock Exchange between 2007-2016, Przychodzen et al. (2018) found that firms with green information technology have higher return on assets ratios and market-to-book values. Alexopoulos et al. (2018) found that there is a strong and positive relationship between corporate environmental performance and financial performance.

However, there are also some studies which didn't find evidence to support a positive relationship between sustainability and firm performance. For example, Santis et al. (2016) proposed that the economic and financial performance of a company depends on sectoral

classification rather than investing in sustainable initiatives. Based on the German stock market, Oberndorfer et al. (2013) found that sustainability index inclusion is not rewarded by the market.

Sustainability and Earnings Manipulation

In the related literature, there are also many studies that search for earnings manipulation in the companies listed on sustainability indices or the companies that prepare corporate social responsibility (CSR) reports. The study of Mohd et al. (2015) showed that sustainability reporting practices of Islamic product suppliers in Malaysia resulted in improved financial performance. They found an insignificant relationship between earnings management and sustainability reporting quality. Additionally, sustainability reporting is not used to manipulate earnings.

Hand-collected data of 580 non-financial firms that make voluntary disclosures showed that earnings quality influences publishing non-financial disclosures. Also, companies with better earnings quality and lower proprietary costs deliver more non-financial disclosures. There is a two-way association between non-financial disclosure and sustainability performance (Rezaee and Tuo, 2019).

Generally, earnings management is accepted as unethical because it is misleading of stakeholders. When a company is involved in socially responsible actions, it shows its concern for social well-being rather than making profit (Mohd et al., 2015). Hong et al. (2011) showed that socially responsible companies have higher accrual quality and less earnings management.

Companies with positive corporate social responsibility engagement are not aggressive in financial reporting and have a more transparent approach. On the contrary, companies that are socially irresponsible have a more aggressive approach in financial reporting and are less transparent (Chepurko et al., 2018). Governments should encourage businesses to enact sustainability practices and reduce earnings management activity. Alexopoulos et al., (2018) stated that actions of both government and corporations are required to bring sustainable corporate performance in the long run. Governments should take actions to motivate managers to focus on non-financial targets.

Earnings response coefficient (ERC) is useful in measuring the relationship between unexpected stock returns and unexpected earnings. There have been many studies analysing the relationship between sustainability and ERC. Halbrook (2013) researched the relationship between ERC and CSR where the CSR score was divided in two groups: CSR strengths and CSR concerns. The results showed that CSR concerns were negatively related to ERC, and CSR strengths were statistically insignificant. Also, Kim et al. (2018) analysed Korean companies in the early stages of sustainability development from 2010 to 2014. The authors

found a negative association between ERC and CSR. CSR reporting can be very aggressive and managers can overestimate the potential benefits of CSR expenditures.

Manchiraju and Rajgopal (2017) analysed a sample consisting of Indian companies. According to a new rule enforced by the government in 2013, companies have to spend at least 2% of their net incomes on CSR. Despite investing in CSR, these companies saw a drop in their stock prices. The authors concluded that companies need to independently decide on the optimal level of CSR spending in order to maximize their value.

Chen et al. (2019) argued that the income smoothing behaviour of socially responsible companies depends on how supply chain partners react to sustainability. Results showed that companies which have higher levels of CSR performances and greatly depend on the supplier-buyer relationships engage in income smoothing less frequently. Companies do not make their CSR budget unless their supply chain partners pay enough attention to CSR. Gras-Gil et al. (2016) studied Spanish firms and found a negative relationship between CSR activities and earnings management. Chih et al. (2008) also found that companies with better CSR performances engage in income smoothing less frequently.

Contrary to the findings of most researchers, Gargouri et al. (2010) found a positive association between corporate social performance and earnings management. They argued that because the process of sustainability engagement causes additional costs, it causes a decline in financial performance and an increase in the incentives of managers to manage earnings. Prior et al. (2008) stated that managers are sometimes involved in CSR just in order to have a favourable image, respect from the community and less scrutiny from investors and employees. Guerard (1997) did not find a big and significant difference between the performances of socially responsible investments and those which were not socially responsible.

The Results of Empirical Studies using Beneish Model

A large number of empirical studies have been conducted all over the world and most of them have proved the Beneish Model's reliability in detecting earnings manipulation. One of them belongs to Özcan (2018). He conducted a study in Turkey and used a sample of 174 companies to test the usefulness of the Beneish model. 87 companies, which prepared fraudulent financial statements and were determined to have committed fraud by the Capital Markets Board, were matched with 87 non-fraudulent companies based on the asset size and sector. 85.63% of all cases were classified accurately by the model.

Another study, using the Beneish Model and analysing the firms traded in Borsa İstanbul, belongs to Erdoğan and Erdoğan (2020). Their sample was composed of 40 firms listed in the BIST-50 index and covered the period between 2015-2017. According to M-scores, the number of manipulating firms were 9 in 2015, 3 in 2016 and 1 in 2017. Cikrikci and Ozye-

sil (2018) investigated the earnings manipulation behaviour of 41 firms making seasoned equity offerings between 2010 and 2015. According to some criteria, such as being punished or warned by the Capital Markets Board or BIST, 20 of those 41 firms were classified as manipulators. The results of the study showed that the firms were manipulating earnings before SEOs and most of the manipulation tools used were income increasing. Kara, et al. (2015) researched 132 BIST firms operating in the Manufacturing Industry in the period of 2010-2012, and 66 firms were classified as manipulators. Güner and Kurnaz (2020), using the financial statement data of 24 companies listed in the BIST chemical, petroleum and plastic sector, found that 3 of them may be doing accounting manipulation, 6 of them have significant evidence of accounting manipulation and 8 of them have very significant evidence of accounting manipulation. Toplu et al. (2021), based on the analysis of 104 BIST companies, concluded that 94% of the companies manipulate financial information.

Tarjo (2015) analysed the companies that committed fraud according to the Database of Sanctions of Issuer Cases Public Companies released by the Financial Services Authorities from 2001 to 2014. The results showed that the Beneish model is a successful tool in the discovery of fraud. The Beneish model was successful in detecting fraud in 77. 1%, or in 27 out of 35 companies that engaged in fraud. Additionally, from companies that were not involved in fraud, it accurately found 28 out of 35 non-manipulation companies, or 80% of them. Kamal et al., (2016) researched 17 public-listed companies that were prosecuted by the Security Commission Malaysia for fraud commitment from 1996 to 2014. The Beneish model successfully detected 14 out of 17 companies, or 82% of them. These results strongly support the reliability of the Beneish model.

Warshavsky (2012) analysed the Enron fraud scandal that happened in 2001. Enron was seventh on the Fortune 500 list. Prior to its downfall announcement, there were some warning signs of its bankruptcy, such as its poor earnings quality. Using the Beneish model on Enron's financial statements, the study showed that Enron started manipulation in 1997. Ofori (2016) made a similar study and argued that Enron's financial fraud could be identified in 1998.

Franceschetti and Koschtial (2012) established bankrupt and non-bankrupt groups and tested 30 small and medium-sized companies. The results showed that in the year prior to default, managers, who were employed in bankrupt companies, tended to make income-decreasing accounting changes. The bankrupt sample showed that those companies were prone to inflate revenues. Dimitrijevic et al. (2018) analysed 42 companies in Serbia. The risk of fraud was not high; however, manufacturing companies and financial institutions tend to have a higher risk of fraud compared to trade and service companies.

Talab et al. (2018) researched the earnings manipulation of banks listed on the Iraqi stock exchange in the years 2014 and 2015. The results showed that 15 banks out of 23 (65. 2%) distorted earnings quality by manipulating earnings.

Kokić et al. (2018) researched 13 Super League sport clubs in Serbia and checked whether they engaged in earnings manipulation or not. Results revealed that there was a significant number of clubs that disclosed some misstatements. Repousis (2016) used a dataset of 25,468 companies from Greece in 2011-2012. Results showed that 8,486 companies, or 33 percent of the sample, obtained M-scores greater than -2.2, proving companies' likelihood of being manipulators.

One interesting study which researched the strength of the Beneish model in determining manipulator firms belongs to Lotfi and Chadegani (2017). Their study included 137 firms listed on the Tehran Stock Exchange between 2005 and 2015. The results showed that 20.67% of fraudulent financial reporting was detected accurately by the Beneish model. Therefore, they concluded that the Beneish model is not appropriate for the evaluation of Iranian firms.

The Current Study

The Purpose of the Current Study

The purpose of this study is to calculate Beneish M-scores of non-financial companies listed on Borsa Istanbul and compare the M-scores of companies listed in the sustainability-index (SI) with companies that are not listed in SI. Because firms which care about the sustainability of the economy, environment and society are included in the sustainability index, we expect them to be more respectful to financial information users and present higher quality financial reports.

Hypothesis Development

In light of related literature and findings of previous studies, we assume that the companies listed on the SI, while implementing sustainability into their businesses and while satisfying the decision criteria to be listed on the index, provide more reliable and correct financial information. We expect that those companies have a higher level of earnings quality and lower level of manipulation in their financial statements than other companies have. Therefore, we propose that they do not manipulate their earnings or they manipulate them less.

H_1: There is a difference between earnings manipulation scores (M-scores) of the companies listed on the BIST Sustainability-index and the companies not in the Sustainability-index.

In addition to that main hypothesis, we also developed some other hypotheses in order to compare manipulating firms of the sustainability-index with other manipulators, non-manipulating firms of the sustainability-index with other non-manipulators and all manipulator firms and all non-manipulator firms.

While developing the second hypothesis, we assume that although both groups are classified as manipulators, the M-scores of the companies in the sustainability index may be signi-

ficantly lower than the M-scores of manipulators not in the sustainability index. For the non-manipulators, we expect that the M-scores of the non-manipulators in the SI may be better than M-scores of other non-manipulators. In order to check the significance level of the difference between all manipulators and all non-manipulators, we developed the fourth hypothesis.

H_2: There is a difference between the M-scores of manipulator firms on the sustainability-index and other manipulators.

H_3: There is a difference between the M-scores of non-manipulator firms on the sustainability-index and other non-manipulators.

H_4: There is a difference between M-scores of all manipulator firms and all non-manipulator firms.

The Model Used

As explained in the literature review, the Beneish Model has been used by many researchers all over the world and provided good results in the detection of earnings manipulation. Özcan (2018) performed the Beneish model on a sample of Turkish firms and tested the reliability of the Beneish model. He found that the total accuracy of the Beneish model in detecting manipulators is 85. 63%. The model accurately classifies 82. 97% of manipulators and 88. 75% of non-manipulators. Because Özcan's study proved that the model is also a good tool and a valid model for the investigation of Turkish firms, we decided to employ it in the current study.

Messod D. Beneish (1999) analysed 74 companies that manipulated earnings in the period of 1982-1992. The companies with manipulated reporting were subject to the SEC's accounting enforcement actions or the media represented them as manipulators. The author detected the model of earnings manipulation from the sample of manipulators and industry-matched companies. A WESML probit and unweighted probit estimations were used. A two-year period of data is enough to find the manipulation. Therefore, SEC, investors and auditors can use it to screen potential manipulators. The Beneish model is also a tool for forensic accountants to examine financial statements.

There are 7 indices and one ratio in the Beneish model and they are explained in the following part:

Days' Sales in Receivables Index (DSRI)

$$\frac{Receivables(t)/Sales(t)}{Receivables(t-1)/Sales(t-1)}$$

Disproportionate increase in receivables relative to sales may mean a change in credit policy and application of longer terms in account receivables or the companies persuade their regular customers to purchase earlier. Thus, Beneish assumes that a higher DSRI is related to the likelihood of overstated revenues and earnings.

Gross Margin Index (GMI)

$$\frac{(Sales(t-1) - Costs\ of\ goods\ sold(t-1))/Sales(t-1)}{(Sales(t) - Costs\ of\ goods\ sold(t))/Sales(t)}$$

GMI is found by dividing gross margin in year t-1 to the gross margin in year t. So, if the ratio is less than 1, this means that the company is in a better position and its gross margin is higher in the current year compared to its previous year. A ratio more than 1 indicates bad prospects of a company and so it will have more motivation to manage and distort the quality of earnings.

Asset Quality Index (AQI)

$$\frac{[1 - (Current\ assets(t) + PPE(t))]/Total\ assets(t)}{[1 - (Current\ assets(t-1) + PPE(t-1))]/Total\ assets(t-1)}$$

It is calculated by dividing noncurrent assets other than property, plant and equipment (PPE) to total assets. Non-current assets include goodwill, long-term receivables and long-term investments. This area is more open to manipulation. Therefore, if the ratio is more than 1, then the manipulation area is higher than the previous year, the subjective evaluation area is bigger and it might indicate manipulation.

Sales Growth Index (SGI)

$$\frac{Sales(t)}{Sales(t-1)}$$

This ratio compares the sales in year t to sales in year t-1. Beneish states that growth itself does not need to imply manipulation but growing companies are willing to commit fraud in financial statements. If the ratio is more than 1, manipulation might happen as growing companies are more likely to participate in it.

Depreciation Index (DEPI)

$$\frac{Depreciation(t-1)/(Depreciation(t-1) + PPE(t-1))}{Depreciation(t)/(Depreciation(t) + PPE(t))}$$

This ratio is calculated by dividing depreciation in year t-1 to the depreciation in year t. Change in the depreciation amount may happen because of a method change or new fixed assets. Higher depreciation to fixed assets indicates more expenses. A ratio of more than 1 indicates that depreciation expenses have decreased from year t-1 to year t and less depreciation expenses cause an increase in net income, so it is accepted as a sign of manipulation.

Sales, General, and Administrative Expenses Index (SGAI)

$$\frac{Sales, general\ and\ administrative\ expenses(t)/Sales(t)}{Sales, general\ and\ administrative\ expenses(t-1)/Sales(t-1)}$$

There is an assumption that an increase in SGA expenses, for example by 10 %, leads to a 10 % increase in sales. If the index is more than 1, it indicates manipulation because sales, general, and administrative expenses increase disproportionately by the sale in year t compared to the same ratio in the previous year. So, an index higher than 1 should be interpreted as a negative sign.

Leverage Index (LVGI)

$$\frac{(LTD(t) + Current\ liabilities(t))/Total\ assets(t)}{(LTD(t-1) + Current\ liabilities(t-1))/Total\ assets(t-1)}$$

The index higher than 1 indicates that the company has more debt and it is weaker financially. Therefore it might be more motivated to manipulate earnings.

Total accruals to total assets (TATA)

$$\frac{\Delta Current\ assetst - \Delta Casht - \Delta Current\ liabilitiest - \Delta Current\ maturities\ of\ LTDt - \Delta Income\ tax\ payablet - Depreciation\ and\ Amortizationt}{Total\ assets}$$

Beneish suggests the computation of total accruals as the change in working capital accounts (other than cash) less depreciation relative to total assets. A higher share of non-cash items is an indicator of a high manipulation risk. If the current year's accruals are bigger than the previous year's accruals then the calculation of this variable gives a positive result. This shows that the company has a bigger area for manipulation in the current year and so, there is a higher possibility of earnings manipulation.

By using manipulator and non-manipulator groups, which were determined according to the SEC's actions and by using above indices, Beneish created a probabilistic model which detects companies that probably manipulated earnings. The model is as follows:

M-Score = −4.84 + 0.92 × DSRI + 0.528 × GMI + 0.404 × AQI + 0.892 × SGI + 0.115 × DEPI −0.172 × SGAI + 4.679 × TATA − 0.327 × LVGI

The eight indicators of every single company are put in the regression of Beneish and the M-scores of each company were calculated. The benchmark is -2. 22, a greater value than that identifies a company as a manipulator.

The Beneish model successfully detected 76% of earnings manipulation companies that were subject to accounting enforcement by the United States Securities and Exchange Commission. This analysis needs the financial statements' data of at least two periods, however; in order to identify the trend, it needs the data for five years.

One difference in the current study's model from the Beneish model is the calculation of the TATA ratio. Because of the data collection problems and because we think that there is a better measure for the total accruals in the literature [Tucker and Zarowin (2006), Ngo and Varela, (2012), Khalil and Simon, (2014), Gao and Zhang (2015), Petrík (2016), Al-Baidhani et al., (2017), Barua et al., (2019)], we decided to use the following formula to calculate Total Accruals.

Total Accruals = Net Income – Cash Flow from Operations

Additionally, some researchers who used the Beneish model in their studies such as Christianto and Budiharta (2011), and Petrík (2016), preferred to change TATA as follows:

$$\frac{(Net\ Income\ (t) - Cash\ flow\ from\ operations(t))}{Total\ assets\ (t)}$$

Therefore, we also decided to use the above formula to calculate TATA because we agree that it is a better measure for total accruals, and the data of net income and cash flows from operations is available.

The Sample of the Study and Method of Data Collection

The BIST Sustainability index was first established in November 2014 and included just 15 firms. The index included 44 companies in 2017, and 50 companies in 2018. Because the number of the firms in the index was very limited before 2017, this study focused on the years 2017 and 2018. Additionally, the model is more appropriate for non-financial firms and therefore financial institutions were eliminated from the study. Finally, the sample of the study included 35 sustainability-index companies in 2017 and 39 in 2018.

In order to calculate the M-scores of the sample firms for those two years, we needed to collect data of Net Sales, Cost of Goods Sold, Net Receivables, Total Current Assets, Net Pro-

perty, Plant and Equipment, Depreciation, Depletion and Amortization, Total Assets, Selling, General and Administrative Expenses, Net Income, Cash Flow from Operating Activities, Total Current Liabilities, and Long-term Debt.

In order to calculate the M-scores, the model requires the starting amounts of the variables. Therefore, we collected the data from year-end financial statements of 2016, 2017 and 2018. Initially, the data was extracted from Thompson Reuters for 386 firms. After extracting the data from Thompson Reuters, some missing values were manually collected from the Public Disclosure Platform in order to have a complete dataset. The second step was screening to check if all the necessary data were obtained for each company. After eliminating companies with missing values, we ended up with 265 companies. However, there were some companies from which we were only able to collect data for one year's M-score calculation, so the number of the sample firms was 262 for 2017 and 261 for 2018. For some variables, the result was zero, which could cause a problem when calculating indexes. In such situations, we followed Beneish's methods and rather than deleting those companies, we put the value at 1 while making calculations.

Findings

First of all, the M-scores of all companies were calculated in Excel and manipulator and non-manipulator firms were determined. The following table shows the industries of the sample firms and number of manipulators and non-manipulators in 2017 and 2018.

Table 1

Industry Distribution of Sample Firms

Industries	Total number of companies	Companies on Sustainability-index	Manipulator companies (2018)	Manipulator companies (2017)
Alternative energy	1	0	1	0
Automobiles and parts	13	2	5	7
Beverages	6	2	2	1
Chemicals	16	5	7	11
Construction and Materials	32	3	12	17
Electricity	8	3	5	6
Electronic and Electrical Equipment	7	0	2	5
FixedLineTelecommunications	1	1	0	1
Food and Drug Retailers	6	1	5	2
FoodProducers	25	2	14	11
Forestry and Paper	2	0	2	2
Gas, Water and Multiutilities	1	1	0	1
General Industrials	13	2	7	8
General Retailers	6	1	0	3
Healthc are Equipment and Services	4	0	3	2
Household Goods and Home Construction	12	1	6	9

Industries	Total number of companies	Companies on Sustainability-index	Manipulator companies (2018)	Manipulator companies (2017)
Industrial Engineering	14	2	6	9
Industrial Metals and Mining	13	1	7	7
Industrial Transportation	6	1	3	2
Leisure Goods	2	2	0	1
Media	5	0	1	1
Mining	1	0	1	1
Mobile Telecommunications	1	1	0	0
Oil and Gas Producers	3	2	2	3
Personal Goods	28	0	12	14
Pharmaceuticals and Biotechnology	3	0	3	2
Software and Computer Services	3	1	2	1
Support Services	7	1	4	4
Technology Hardware and Equipment	9	2	4	6
Travel and Leisure	15	2	11	6
Unclassified	2	0	-	2
Total	265	39	127	145

Nearly half of the sample firms were determined as manipulators in both years, and nearly 40% of the companies listed on the SI were determined as manipulators. As expected, the percentage of manipulators in the SI was lower but it was not significantly different. The following table gives information about the number of manipulator and non-manipulator firms from each group for 2017 and 2018.

Table 2

Classification of Firms into manipulators and non-manipulators

All firms in 2018 (261 Firms)			
Non-manipulators (134 Firms) (51%)		Manipulators (127 Firms) (49%)	
Firms listed on Sustainability-Index (39 Firms)		Other firms (222 Firms)	
SI-non-manipulator firms (23) (59%)	SI -manipulator firms (16) (41%)	Other-non-manipulator firms (111) (50%)	Other-manipulator firms (111) (50%)
All firms in 2017 (262 Firms)			
Non-manipulators (133 Firms) (51%)		Manipulators (129 Firms) (49%)	
Firms listed on SI (35 Firms)		Other firms (227 Firms)	
SI-non-manipulator firms (21) (60%)	SI -manipulator firms (14) (40%)	Other-non-manipulator firms (112) (49%)	Other-manipulator firms (115) (51%)

Using SPSS, first we tested the normality of our data and the Kolmogorov-Smirnov and Shapiro-Wilk test showed that our data was not normally distributed. Therefore, we couldn't perform an Independent Sample T-test but rather the Mann Whitney U test, which is a non-parametric test used to compare samples which are not normally distributed. The tests were repeated to compare M-Scores of different matches for the two years. The following table shows the compared groups and significance levels.

Table 3

Results of the comparisons of M-scores

YEAR 2018 – M-Scores Comparison		**Asymp Sig. (2-tailed)**
Sustainability-index (SI) firms (39)	Others (222)	0.818
SI Firms-Manipulators (16)	Others-Manipulators (111)	0.581
SI Firms-Non-Manipulators (23)	Others-Non-Manipulators (111)	0.212
All Manipulators (127)	All Non-manipulators (134)	**0.000**
YEAR 2017 – M-Scores Comparison		
Sustainability-index (SI) firms (35)	Others (227)	0.579
SI Firms-Manipulators (14)	Others-Manipulators (115)	0.655
SI Firms-Non-Manipulators (21)	Others-Non-Manipulators (112)	0.121
All Manipulators (129)	All Non-manipulators (133)	**0.000**

The results of the tests showed that there was a significant difference between the M-scores of Manipulators and Non-manipulators in 2018 and 2017. Therefore, only the fourth hypothesis was accepted and the first three hypotheses were rejected. Although the percentage of manipulator firms in the sustainability-index was lower compared to the other group, we couldn't find a significant difference.

We also repeated the tests for all indices, other than M-scores. There were only significant differences again between Manipulators and Non-manipulator firms. The following table shows the results of the comparisons of all indices of Manipulators and Non-manipulators.

Table 4

Test statistics of manipulators and non-manipulators for 2018 and 2017

Test statistics 2018	m-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Sig	**0. 000**	**0. 000**	0. 218	**0. 000**	**0. 000**	**0. 034**	**0. 001**	0. 077	**0. 000**
Test statistics 2017	m-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Sig	**0. 000**	**0. 000**	**0. 000**	**0. 000**	0. 165	0. 340	0. 156	0. 161	**0. 000**

Conclusion

The concept of sustainability has been gaining importance all over the world. Companies are more and more concerned about green products, a healthier environment, climate change,

social welfare and the quality of human life. Societies, consumers, investors and fund raisers also apply an invisible pressure on companies to take action and practice sustainable activities. Being listed on the sustainability indices of stock exchanges improves a company's image and increases the opportunity to reach cheaper funds. Therefore, companies are eager to show how much they respect environmental, social and economic sustainability.

The starting point of this study is that if the firms listed on the SI are respectful to society, they should also be trustworthy when providing their financial information and should not manipulate their earnings. In order to detect earnings manipulation, we used the Beneish model. We calculated M-scores and compared firms listed on the SI and other non-financial BIST firms by using statistical tests.

Results of the study showed that nearly 50% of all companies and 40% of companies listed in the SI are classified as manipulators by the Beneish model in 2017 and 2018. The statistical tests didn't show any significant difference between companies listed on SI and other companies. The only significant difference was between all manipulators and all non-manipulators.

Our literature review showed that most of the studies using the Beneish model either tried to understand the likelihood of manipulation in financial information or focused on the exploratory power of the model. There have also been a large number of studies including corporate social responsibility concepts; however, the studies connecting sustainability and earnings manipulation are very rare. Our study contributes to the literature by integrating the concept of sustainability and evaluating manipulative behaviour from another perspective.

Limitations of the Study and Suggestions for the Further Research

The BIST Sustainability Index is a newly established index and does not include a large number of firms. Having a small sample restricted the statistical tests that can be conducted. Additionally, we want to state again that the Beneish model is a probabilistic model which means it cannot detect earnings manipulation in 100% of cases. Beneish's research (1999) showed that the model accurately identifies manipulators in 76% of cases and inaccurately identifies non-manipulators in 17.5% cases. Therefore, this fact should be kept in mind while evaluating the results of the study.

Future studies may have larger samples and may include firms other than BIST Companies, such as small and medium enterprises. Industry-wide comparisons might be made and some other variables might be included, such as sustainability report quality.

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