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SOSYAL BİLİMLER ENSTİTÜSÜ
İNGİLİZCE İŞLETME
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COMPARISON OF EARNINGS QUALITY OF BIST SUSTAINABLITY INDEX COMPANIES WITH BIST COMPANIES OUT OF SUSTAINABILITY INDEX

Yüksek Lisans Tezi

IVA KOVAČEVIĆ

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Danışman: DOÇ.DR. ASUMAN ATİK YILDIRIM

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TEZ ONAY BELGESİ

İŞLETME (İNGİLİZCE) Anabilim Dalı MUHASEBE FİNANSMAN (İNGİLİZCE) Bilim Dalı TEZLİ YÜKSEK LİSANS öğrencisi IVA KOVACEVİC'nın COMPARISON OF EARNINGS QUALITY OF BIST SUSTAINABILITY INDEX COMPANIES WITH BIST COMPANIES OUT OF SUSTAINABILITY INDEX adlı tez çalışması, Enstitümüz Yönetim Kurulunun 11.07.2019 tarih ve 2019-21/11 sayılı kararıyla oluşturulan jüri tarafından oy birliği / ~~oy çokluğu~~ ile Yüksek Lisans Tezi olarak kabul edilmiştir.

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Iva Kovačević

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Özet

İlgili literatürde genel olarak kabul edilmiş bir kazanç kalitesi tanımı yoktur ve bunu ölçmek için birçok farklı yöntem vardır; tahakkuklar kalitesi, finansal tablo düzeltmeleri, kazanç sürekliliği, kazanç istikrarı, hedefi gerçekleştirebilme kabiliyeti gibi. Ancak bu tezde kazanç kalitesi "manipüle edilmemiş bir kazanç" olarak kabul edilmiştir. Çevreye, topluma ve ekonomiye daha saygılı olduğu düşünülen sürdürülebilirlik endeksi şirketleri ile bu endeks dışındaki şirketler arasında kar kalitesi açısından bir fark olup olmadığını kontrol etmek için Beneish modeli (1999) kullanılmıştır. Bu model finansal tablolarda kazanç manipülasyonunu tespit etmeye yarar. 2017 ve 2018'deki firmaların manipülatif davranışını ölçmek için, Beneish modelinin gerçekleştirilmesi için 2 yıllık veriye ihtiyaç duyulması nedeniyle 2016, 2017 ve 2018'e ait verileri toplanmıştır. Analizlerin sonuçları, birçok sürdürülebilirlik endeksi şirketinin kazancı manipüle ettiğini göstermiştir ve bu nedenle sürdürülebilirlik endeksi şirketleri ile aynı endekste bulunmayan şirketler arasında kazanç kalitesi açısından bir fark olmadığı sonucuna ulaşılmıştır.

GENERAL KNOWLEDGE

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Abstract

There is no widely accepted definition of earnings quality in the related literature and there are many different proxies to measure it; like accruals quality, restatements, earnings persistence, earnings smoothness, target beating. However in this thesis, earnings quality is accepted as "being free from manipulations". In order to check if there is a difference in earning quality of sustainability-index companies, which are thought to be more respectful to the environment, society and economy, and those out of the same index, we performed Beneish model (1999). This model serves to detect earnings manipulation in financial statements. In order to measure manipulative behaviour of the firms in 2017 and 2018, we collected the data for 2016, 2017 and 2018 since Beneish model needs 2-years period data for performing the model. The results of the analyses showed that many sustainability-index companies manipulate earnings and therefore we conclude that there is no difference in earnings quality between sustainability-index companies and those out of same index.

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Abbreviations

AAER-Accounting and Auditing Enforcement Releases ICW-Internal Control Weakness
AEM-Accrual-based earnings management
AIM-Alternative Investment Market
ALRT-Asymmetric Loss Recognition timeliness
AQI-Asset Quality Index
BIST-Borsa Istanbul
CEO-Chief Executive Office
CES-Corporate Environmental Sustainability
CFO-Chief Financial Officer
COGS-Cost of Goods Sold
CPA-Certified Public Accountant
CSP-Corporate Sustainability Performance
CSR-Corporate Social Responsibility
DA-Discretionary accruals
DD-Dechow and Dichev
Dep-Depreciation
DEPI-Depreciation Index
DJSI-Dow Jones Sustainability Index
DSRI-Days' sales in receivable index
DTE-Deferred tax expenses
EM-Earnings Management
EQ-Earnings Quality
ERC-Earnings Response Coefficient
ESI-Environmental Sustainability Index
FASB-Financial Accounting Standard Board
FP-Financial Performance
FTSE-Financial Times Stock Exchange
GAAP-General Accepted Accounting Principles
GFC-Global Financial Crisis
GIT-Green Information Technology
GMI-Gross Margin Index
IAS-International Accounting Standards
IFRS-International Financial Reporting Standards
ISE-Corporate Sustainability Index
ITC-International Trade Commission
LVGI-Leverage Index
PPE-Property, Plant and Equipment
R&D-Research and Development
RM-Reverse Merger
ROA-Return on asset
ROE- Return on equity
SDG- Sustainable Development Goals
SEC-Securities and Exchange Commission
SEO-Seasoned equity offering
SGAI-Sales, General and Administrative Expenses Index

SGI-Sales Growth Index
SI-Sustainability-index
SOA-Sarbanes-Oxley Act
SPSS-Statistical Package for the Social Sciences
SRI-Socially Responsible Index
SSCP-Sustainable Supply Chain Practice
TATA-Total accruals to total assets

1. INTRODUCTION

Earnings quality has been studied since 1934 and it detects the ability of company to present and report earnings in its true form. Earnings quality is also related to stability of reported earnings. It actually focuses on how much the reported net income deviates from its true value. So, if an over-time review of earnings is considered, then the analysts would look for its future consistency and repeatability to reveal its quality (Warshavsky, 2012, p. 16). In other words, we would expect that earnings do not drastically change over time.

A concept of earnings quality is elementary in accounting and financial economics but there are many different discussions on how to define and measure it. Accruals, persistence, investor responsiveness, loss avoidance, smoothness and external indicators like SEC enforcement releases and restatements and many others have been used as different proxies of earnings quality. When earnings are persistent and sustainable, it is supposed to predict cash flows in future. But predicting future earnings is not the same as predicting future cash flows. Earnings quality measures how the company's reported earnings can reflect its real and true earnings, so that based on the current earnings people can predict future earnings. Earnings quality is also related to the persistence, stability and no variability in reported earnings (Lassaad et al., 2012). In short, the true reflection of earnings quality is shown in financial statements where all interested stakeholders can take a look from and decide to test its true value.

Regarding many scandals such as Enron and WorldCom, who were involved in some kind of accounting fraud, the U.S. responded to these events through issuance of the Sarbanes-Oxley Act in 2002 (SOA). Bernstein et al. (1979) agree that, if company has a liberal policy, it is likely that it will lead to lower earnings quality. Earnings figures should not be a result of manipulation, but they should rather be reliable and represent earnings power of company. According to Bernstein et al. (1979) professional investors know that earnings numbers can be a subject of many different accounting treatments.

Due to high importance of earnings quality and possibility that earnings have been manipulated in financial statements, investors should be careful when deciding about investment in public companies. Therefore, if the financial statements are not of high quality, it will mislead investors. As a result, it will be too costly for investors not to notice it. The detailed information about proxies to measure earnings quality is explained in the literature review part.

Sustainability-index companies, which take into account global warming, employment and security at work, natural resources, are main attention in this thesis. As these companies care about society, environment and economy, we examined if they are also respectful to the society while providing their financial information. We expect sustainability-index companies to present correct and true amounts of their financial performance and less earnings management.

1.1. RESEARCH OBJECTIVE

The main objective of this thesis is to compare earnings quality of sustainability-index companies with the companies out of the sustainability-index. According to the literature review, we expected that sustainability index companies, as having higher level of involvement in economy, environment and society protection, do not tend to distort earnings quality of financial reports. Using Beneish model, we measured earnings quality of sample companies.

1.2. THE STRUCTURE OF THE STUDY

Firstly, the literature review helped us to better understand the nature of earnings quality and importance of sustainability involvement. Secondly, after careful analysis of all possible proxies of earnings quality, we decided to imply Beneish model which turned to be highly successful in detection of companies' manipulators. There are studies that showed that even prior to collapse of Enron and Z-Best, using Beneish model would help to find out its misstatements years before they announced a downfall. Thirdly, after deciding the model, all needed data has been collected from Thompson Reuters regarding Turkish market. Also, sustainability-index firms that appeared in Borsa Istanbul were separated for analyses and comparison with non-sustainability

index firms. Last step was implementation of the model by using collected data on the statistical program SPSS.

2. LITERATURE REVIEW

In this chapter, we made a deep literature review on earnings quality, sustainability and sustainability-index firms. After that, the connection between earnings quality and sustainability-index firms has been made. We also made a research on earnings quality difference between implementation of GAAP and IFRS and what is the quality of earnings during financial crisis and after it.

The results of literature part are fruitful and it gives us the general knowledge of the topic. It helped us to understand the earnings quality and sustainability issues better. Earnings quality and sustainability connection is equally important and analysis of both gives important conclusions for financial information users.

2.1. EARNINGS QUALITY

There has been an argument in literature whether earnings quality is related to either earnings persistence or level to which earnings reflect economic reality. Artificially smoothed earnings probably can be more persistent and therefore of high quality but without a reflection of business volatility in a company. Managers mostly see concerns in quality of audit and extent to which responsibility is given to them (Nelson et al., 2013). CFOs presume that quality earnings are "sustainable and predictive of future cash flow and earnings" (Bernstein et al., 1979). Moreover, earnings of high quality are those with high level of persistence, lower level of earnings management, less volatility, more-timely, more predictable option and/or higher accrual quality.

When earnings quality is poor, degree of information asymmetries can be high. Therefore, it is too costly for company to attract external capital rising. As a result, it may tend to hold larger amount of reserves of cash to prevent cash shortages in the future that can happen in case of capital expenditures or future losses. Also, from the perception of investors in case of low quality earnings, the firm may want to present it as a "comfortable financial position" where high cash reserve amount attracts investor's confidence and thus reduce the cost of capital. This was proven as a negative relation between earnings quality and cash reserves in the analysis made by Farinha et al. 2018.

Information asymmetry impacts corporate cash holding due to its affection on managerial behaviour and possibility of stakeholders to realize behaviour of managers. Therefore, companies hold less cash in case of higher information asymmetry. Additionally, earnings quality remarkably and negatively influences cash reserves for profitable but not for companies that make a loss (Chung et. al., 2015). Earnings quality is a more significant cash reserve determinant for Main Market than for Alternative Investment Markets (AIM) firms. Cash balances are positively altered by higher information asymmetries coming from poor earnings quality. Companies that have a higher level of earnings opacity benefit from higher cash holdings in order to prevent from costly external funding dependence. AIM companies seem to hold more cash than Main Market companies. The reason can be behind less stringent listing requirements, unfixed regulatory oversight and lower level of financial disclosure that influence firms to obtain less external financing from investors. So, earnings quality is a more important determinant in terms of cash reserve level for Main Market than for AIM companies (Farinha et al., 2018).

The desired level of earnings can be accomplished through accounting choice from among GAAP and operating decisions (economic earnings management). The first one is related to the wish of accepting new accounting standard early (voluntary) or two years after adoption of new standard obligation for all companies. Operating decision is related to the choice of program implementation which increases sales at the end of the period (quarter) in case a revenue target is not achieved or new equipment investment choice or decision of hiring additional employee(s). Operating decisions are occasionally named as economic earnings management since company tends to manage its cash flows and therefore alter revenues and expenses (McKee, 2005). Additionally, raising or reducing discretionary expenses can be a way to manipulate earnings level. No replacement of obsolete fixed assets or cutting some advertisement costs can increase income. Moreover, costs can also be discretionary and they are important factors of success or failure of a company. Earnings over or understatement happens due to many reasons. If revenues are recognized improperly, like prematurely, it will make earnings overstated and lower its quality. A firm may depreciate a machine over the period used by its competitors which will lead to overoptimistic earnings (Bernstein

et al., 1979). On the other hand, earnings can be increased by manipulation of revenue recognition (recognised before complete sale, before delivery of a product or at a time when buyer can yet end or postpone the sale), record errors in purpose "within a defined percentage ceiling", unrealistic assumptions for liabilities estimation (for items as sales returns, loan losses or warranty costs, "big bath") restructuring charges ("big bath" is a "clean-up of balance sheet" in terms of big charges for restructuring of firms), creative acquisition accounting (especially when some acquirers are using stock as an acquisition currency, easily get involved into "creative" accounting) (Levitt,1998).

A long polemics exist on how to process accounting in order to produce quality earnings. The main question is whether to follow income statement or balance sheet orientation. The income statement perceives earnings quality as the results of expenses that are deducted from revenues so that the quality of earnings will be dependent on matching quality. The income statement orientation was noticeable as far as the early 1980s with a current support of investment community. On opposite, a balance sheet orientation is associated with the assets and liabilities valuation, so quality earnings depend on quality valuation (Bernstein et al., 1979).

2.1.1. Financial crisis and earnings quality

The Global Financial Crisis (GFC) happened in 2008 showed that managers may have an incentive to provide better image of how the firm's business is operating and what is its financial position. Persakis et al. (2015) divided a research into three clusters depending on investor protection like: strong shareholder protection and legal enforcement, better legal enforcement systems and weak investor protection and legal enforcement systems. The finding indicates that earnings quality is reduced in the financial crisis. Managers prefer conservatism that is more aggressive in case of financial crisis. Their research indicates that all clusters show higher conservatism in the GFC period (ex post and ex ante), higher loss avoidance, lower value relevance, higher earning predictability, lower earnings persistence. Additionally, the level of crisis influence on cluster depends on investor protection level. If earnings quality is higher, then the level of investor protection is high too. In case of GFC period, ex post

conservatism is greater than in the years before it. It leads to significant reduction of quality of earnings (lower accruals quality) in GFC period. Firms use more accruals to push down earnings during GFC period. Earnings quality is far lower throughout financial crisis in comparison of other period no matter of the investor protection regime quality. Therefore, in case of economic downturns, across all countries, companies tend to manipulate earnings figures to a larger extent (Zhonget al., 2017).

A reduced earnings' standard deviation during crisis leads to higher earnings predictability. In case a company needs an external financing and have liquidity problems such as in a crisis, the companies have very strong motives to make their financial reporting of better quality to pull up investors. However, as in crisis, incentives for earnings management exist, results showed that quality of financial reporting is hence damaged (Kousenidis et al., 2013). Eliwa et al. 2016 detected that in a crisis period, investors put attention on earnings quality as a risk measure. Also, authors state that relationship is not found between discretionary component and the cost of equity. They explained it as investors do not show their concern about managerial choices but they rather focus on external company's environment and business model. Therefore, risk coming from managerial reporting choice is not a matter of interests for investors. They rather focus on information regarding business fundamentals.

2.1.2. GAAP/IFRS and earnings quality

Financial reports serve to reduce information asymmetry between company and stakeholders. It provides information through balance sheet, income statement, notes, reports of managers, which needs to be in accordance with generally accepted accounting standards. GAAP has many accounting choices that can be used to manipulate and manage earnings. Since companies make many daily operating and accounting choices, managers can get involved into some form of earnings management "by default".

According to Cornell et al. (2003) companies actually define earnings in different way so it becomes very difficult to compare figures between different

companies. That is why analysis needs to be based on some measures of pro-forma earnings rather than GAAP. Authors state that GAAP may lead to misstatement of persistent earnings. According to them, it happens due to the write-offs in case of mergers and restructuring, one time charges or cut prices and special offer to urge sales which belong to non-accounting economic reasons.

A sample taken from the German market companies that used different accounting standards in period from 1994 to 2005 discussed different effects on earnings quality. The international financial reporting standards (IFRS) and US Generally Accepted Accounting Principles (USGAAP) are found to be rarely used until 1998. In 1998, it has been found a strong increase of IFRS and USGAAP usage, with slightly more companies that chose IFRS. After 2002, there was an increase of IFRS usage with a decrease in USGAAP application. Actually, IFRS reporting does not improve earnings quality compared to GAAP reporting, but rather has a negative effect (Watrin et al., 2012).

Differences between principles-based IAS/IFRS and relatively rule-based USGAAP was analysed by Liu et al. (2014). They compared discretionary R&D, discretionary deferred tax expense and discretionary accruals (DA) to test if GAAP or IFRS are used to alter earnings quality. As a result, they found that companies using IAS/IFRS tend to manage earnings with real EM approach through R&D more than companies using relatively rules-based US GAAP. The data revealed that companies exercising either the US GAAP or IAS/IFRS keep on using DA to smooth income.

The interview and large-scale survey disclosed that half of earnings quality is set by innate factors such as macroeconomic condition, business model and industry. According to Dichev et al. (2013) CFOs believe that earning quality stay mostly the same across public and private companies. CFOs have an aversion to accounting changes inducing adoption and compliance of high costs, need for understanding, guiding, explaining. They prefer that USGAAP and IFRS converge into single IFRS or a possibility for decision between the two systems. CFOs presume that GAAP rules restrict quality earnings production.

Moreover, application of GAAP cannot help company to report "many of the underlying economic events" and it presents distraction into the U.S. accounting system by dealing with "portrayal of the events that GAAP does permit companies to report". GAAP's "power to stabilize income reporting is much greater than the power individual issuers have to do so. Those concepts are "the main engines driving earnings management today" (Paul Rosenfeld, 2000). IFRS caused a decrease in the frequency of accrual-based earnings management (AEM), because the rules of standards limited managerial discretion and the possibility for EM based on accruals manipulation. IFRS adoption focused on reduction of accounting quality (Ferentinou et al., 2016).

Persakis et al. (2017) examined correlation of investor protection, IFRS adoption and earnings quality on cost of capital. They found that cost of equity capital in Euro zone countries is lower in companies that have higher earnings quality after the IFRS adoption. But the opposite result is obtained for Asian countries. The result showed a negative correlation between cost of capital (measured by cost of equity capital or cost of debt) and IFRS adoption in both Euro zone and Asian countries. Additionally, cost of capital is lower in companies that have a strong investor protection and high earnings quality in both Euro zone and Asian countries. Also, authors state that the cost of debt in Euro zone and Asian countries is negatively related with both IFRS dummy variable and earnings quality index.

2.2. SUSTAINABILITY

In order to understand the connection between sustainability and earnings quality, firstly, we need to know what sustainability actually means, why it is important, what is its influence on micro and macro level, what sustainability-index mean. After all that, we can examine relationship between sustainability and earnings quality.

The population of whole planet is assumed to increase up to 9 billion people until 2050. Non-renewable resources are rare to find and definitely not cheap to acquire day by day. Therefore, companies, governmental representatives and organizations need to focus and engage into sustainability as a main priority. It is also needed to have a clear and more widely-adopted indexes and dimensions in order to calculate the level of

social performance of a company (Henao et al., 2018). Sustainability has a basic principle which is the connection between survival of people and natural environment (United States Environmental Protection Agency).

The UN General Assembly's Open Working Group on Sustainable Development Goals (2012) gave some set of goals that Assemble should consider in order to save lives of future generations and make it far better than today. This proposal involves 17 goals with 169 targets. The goals are related to stop poverty, hunger, improve health, ensure good education, reach gender equality, have sustainable water management, make access to sustainable energy, advertise sustainable economic growth, promote sustainable industrialization, make inequality less between countries and within a country, make cities safe, make consumption and production sustainable, take actions to deal with climate change, sustainable use of oceans and seas, promote sustainable use of terrestrial ecosystems, make access to justice, make partnership for engagement in sustainable development at global level.

The caution for eco-friendly products have great power to convince companies to take care of environment during the whole action rather than on the social feature. When a company tends to improve economic performance, managers should be focused on running good relationship with suppliers. Therefore, managers tend to get suppliers involved into environmentally-oriented products by providing them knowledge about it, policies and initiatives (Ferri et al., 2018). Companies that are involved in sustainability should encourage its suppliers to cooperate by sharing all the possible benefits of comparative advantage in sustainability. Interestingly, authors found out that inter-firm collaborative capabilities will improve performance of the companies. Additionally, intra-firm (among companies) collaborative capabilities that come from sustainability involvement, does not positively influence performance (Luzzini et al., 2015).

2.2.1. Sustainable index

A sustainability index represents a level to which companies are engaged in social and environmental responsibility (Orsato et al., 2015). Socially responsible investment funds actually highlight the companies that are engaged in social and environmental responsibility. It started in the 1990s, with the Domini 400 Social Index, and in 1999, the New York Stock Exchange introduced the Dow Jones Sustainability Index (DJSI) (Orsato et al., 2015). In order to make sustainability clear to managers, the Dow Jones Sustainability Index has been made to embrace all the dimensions of sustainability such as economic, environmental and social. Sustainability is often seen as a requirement of regulators but there have been many companies that have implemented these initiatives due to the reduced operating costs and enhanced revenues. Many firms have not developed the system for measuring the influence of sustainable development on financial performance (Epstein et al., 2003). Then in 2001, the market capitalization-weighted indexes supported by the FTSE Group Financial Times Stock Exchange (FTSE4good) appeared in London, after that the Socially Responsible Index (SRI) in Johannesburg in 2003 and the Corporate Sustainability Index (ISE) in the Sao Paulo Stock Exchange in 2005. Managers consider that Corporate Sustainability Index (ISE) membership in Brazil is a powerful sustainability asset (Orsato et al., 2015).

Finance and management literature debates sustainability performance usually regarding continuity of financial performance, long-term competitiveness and corporate strategy. Operation research literature focuses on the ranking, the way of measurement, policy guidance and decision-making based on many different sustainability impacts. However, sustainability indices manage to transfer information to those who need to take a decision, showing a need for merging accounting and assessment methods. But composite sustainability indices depend on the imperfect assumption that a low performance of indicator can be counterbalanced by indicator that performs better (Büyüközkan et al., 2018).

The Environmental Sustainability Index (ESI) is used to measure global sustainable development trends. The pilot ESI was developed by the Yale Centre for Environmental Law and Policy, the Global Leaders for Tomorrow's Environment Task Force and Columbia University's Centre for International Earth Science Information

Network. It was about sustainability, concept of measurement, a way of weighting sustainability components, how to create an index and what drives sustainability policy (Fuhs, 2000).

Sustainable Development Goals (SDG) index and dashboards measure how far a country is from achieving the Sustainable Development Goals. It reports countries ranking based on aggregate SDG Index of overall performance. In 2018, Sweden, Denmark, and Finland, had a top global SDG Index ranking, yet all of them have some remaining challenges in achieving the SDGs. According to their analysis, it is said that there is no country that will achieve all the goals by 2030. Even though Sweden, Denmark, and Finland are the top of 2018 SDG Index, they need to achieve some goals, including Goal 12 (Sustainable Consumption and Production) and Goal 13 (Climate Action). Regarding an example of Turkey, its SDG Global rank is 79 out of 156 with challenges in quality of education, inequalities, responsible consumption and production, climate action, life below water and on land, poor partnerships for the Goals (SDG Index and Dashboards, 2018).

Based on German stock market, authors found out that sustainability stock index inclusion, as an indicator of CSR, higher corporate environmental or social performance, which brings higher reputation gains and cost savings, were not rewarded by market (Oberndorfer et al., 2013). Others say that sustainability-stock index contributes to reputation gains and therefore can attract new customers, who value sustainability engagement. These new customers may cause higher sales and improved profitability (Oberndorfer et al., 2013).

2.2.2. Motivation for sustainability

Sustainability is both important on micro and macro level. Companies have different motivation to engage into sustainability. All of them are equally important to pay attention to.

2.2.2.1. Macro level sustainability motivations

According to Sustainable Development Commission [1] in UK, sustainable development is not just focused on environment, it is far beyond it. It is about whole society who should live in a healthy environment, with people living inequality and wellbeing, taking care of current and future generations and making social cohesion and inclusion. "Sustainable development is about finding better ways of doing things, both for the future and the present. We might need to change the way we work and live now, but this doesn't mean our quality of life will be reduced". In order to achieve sustainability, the Government needs to take some serious steps (UK Sustainable development commission). The analysis showed that stakeholder's pressure can enhance a chance of sustainable activities implementation. The Sustainable Supply Chain Practices (SSCP) leads to employee's welfare making them more productive and working in safe environment. Stakeholder influences a firm to develop capabilities needed for social sustainability which will lead to employee health and society consideration. Therefore, it has been found a positive relationship between an influence of stakeholder's pressure and SSCP level (Awan et al., 2017). The determination to merge environmental aspects into process of buying is associated to the need to respond to stakeholders' demands and avoid a negative impact from potential scandals (Ferri et al., 2018).

2.2.2.2. Micro level motivations

A primary motivation for retailers to engage in corporate environmental sustainability (CES) actions are the anticipated economic benefits appearing as cost savings that come from reduced resource usage. Thus, a need for a profit, environmental policy and pressure from outside that comes from various stakeholders, are the main reasons of CES adoption (Naidoo et al., 2018).

Also, Naidoo et al. (2018) agreed that, a leading driver of CES adoption is again internal and external stakeholder pressure as influence of retail products in entire value chain gets more widespread among stakeholders. Many of retailers focus on CES strategies. It helps them enhance resources usage and environmental performance of their internal operations.

[1] Sustainable Development Commission is the UK independent advisor of Government

Moreover, financial performance and size can be drivers of sustainable reporting improvement. Profitability is a driver for engagement in CSR initiatives (Mohd et al., 2015). Based on the sample of 348 manufacturing companies in Italy, it has been found a positive effect of social, economic and formal sustainability aspects on competitiveness, as a key of financial performance success. Also, satisfaction of customers, organizational commitment and corporate reputation influence firm performance. This competitive advantage as a "second-stage mediator positively contribute to financial performance"(Cantele et al., 2018).

As the main driver of companies is to create a reputational value, they invest a lot of effort to participate in index selection because it brings them new competencies. It brings reputational gain, easiness of fundraising, social and environmental issues knowledge, competitive advantage (Orsato et al., 2015).

A relationship between social responsibility and stakeholder-focus approach is strong and positive because a stakeholder's focus can stress social issue concerns and it can alter customer-brand relationship that will result in performance (Mena et al., 2019).

2.2.3. Sustainability reporting

The study of Mohd et al. 2015 showed that sustainability reporting practices of Islamic products supplying companies in Malaysia resulted in improved financial performance. Also, they came to insignificant results between earnings management and sustainability reporting quality. Moreover, it is found out that sustainability reporting is not used to manipulate earnings management practices.

A size of company is very important aspect of sustainability reporting which means that larger company is more prone to prepare a sustainability report. Therefore, larger companies will have benefits of economy of scale. Also, manufacturing sectors have a higher likelihood to prepare sustainability reports compared to service sectors. Therefore, industry has an impact on sustainability report practice in the example of Turkish firms. Also, those companies that have weak environmental performance are more likely to publish environmental information because of the need for legitimacy. Leverage does not have a strong relation to sustainability reporting but it is negative

relation in its nature which means that larger leverage firms will not tend to publish sustainability reports. Additionally, considering current ratios, higher liquidity firms do not tend to prepare sustainability reports. Other factors like profitability, free cash flow, ownership structure, growth opportunity do not alter publishing of sustainability reports (Kuzey et al., 2017).

Hand-collected 580 voluntary non-financial firms' disclosure has showed that earnings quality influences publishing non-financial disclosures. Also, companies with better earnings quality and lower proprietary costs deliver more non-financial disclosures. Also, there is a two-way association between non-financial disclosure and sustainability performance (Rezaee et al., 2017).

2.3. SUSTAINABILITY AND EARNINGS QUALITY

Earnings management is observed as unethical behaviour due to managerial discretion of accounting numbers. It can lead to misleading of financial information that stakeholders have. But, when a company is involved in socially responsible actions it shows its concern for the social well-being rather than profit making (Mohd et al., 2015).

Brammer et al. (2006) analysed a relation between stock returns and performance of socially responsible companies. Authors assumed that sustainability-responsible companies can yield a higher stock return than other firms. But results showed that higher social performance scores tend to obtain lower returns while companies that had CSP score of zero outperformed the market.

Hong et al. (2011) showed that socially responsible companies have higher quality of accruals and less activity-based EM. They both have influence on quality of financial reporting. So, authors found evidence that companies involved in CSR are less prone to manage earnings. Companies ensure all financial information in order to raise equity capital or debt and to obey regulations of government. Based on the assessment of investors that involves timing, amount and certainty of cash flow in future, the investment decision is made.

Companies with positive corporate social responsibility (CSR) engagement are not aggressive in financial reporting and have more transparent approach. On contrary, companies that are socially irresponsible have more aggressive approach in financial reporting and are less transparent (Chepurko et al., 2018).

Sustainability should be merged into business and reduce earnings management activity by government engagement who should tend to solve it out. Alexopoulos et al. (2018) stated that actions of both government and corporations are required to bring sustainable corporate performance in long run. Government needs to motivate managers to focus on non-financial targets. Moreover, national and European regulations should follow the need of market. When there is a high level of pollution intensity, companies that invest in environmentally-friendly production should have a financial support.

Sustainability disclosure quantity is positively correlated with innate earnings quality and negatively correlated with discretionary earnings quality. Also, quality of sustainability disclosure, corporate structure and prior sustainability performance are very important in order to explain how quantity of voluntary sustainability disclosure affects earnings quality. In case a firm's prior-year sustainability performance is controlled, discretionary earnings quality and sustainability disclosure will show a negative relationship. Discretionary choices in management are not getting decreased even after having good achievements in sustainability implementation in the previous year (Rezaee et al., 2017).

Earnings response coefficient (ERC) is useful to measure the relationship between unexpected stock returns and unexpected earnings. There are many studies done on the analysis of relationship between companies which engage in sustainability and ERC. Halbrook (2013) tested a relationship between ERC and CSR where CSR score was divided in two groups such as CSR strengths and concerns. The result showed that CSR concerns are negatively related to ERC while CSR strength is statistically insignificant. Also, Kim et al. (2018) analysed Korean companies in the early stage of sustainability development from 2010 to 2014. Authors found a negative association between ERC and CSR in the early stage of CSR development. CSR reporting can be

very aggressive and managers can overestimate the whole potential benefits coming from CSR expenditures.

Manchiraju and Rajgopal (2017) analysed a sample consisted of Indian companies. In 2013 they had a new rule of government that companies need to spend at least 2% of net income on CSR. As a result, forced companies had a drop in stock price by investing in CSR. So, authors stated that companies need to decide alone on optimal level of CSR spending in order to maximize their company's value.

Chen et al., (2019) argued that the income smoothing behaviour of socially responsible companies depend on how supply chain partners react on sustainability. Result showed that companies, that have higher level of CSR performance and greatly depend on the supplier-buyer relationship, are likely to be engaged in lower level of income smoothing. So, companies do not make their CSR budget unless their supply chain partners pay enough attention to CSR. Chih et al. (2008) also agreed that companies, with increase in CSR, limits earnings smoothing.

2.3.1. Financial performance and Sustainability

Analysing 162 companies from Frankfurt Stock Exchange in period 2007-2016, it has been found that firms with Green Information Technologies (GIT) have higher subsequent returns on assets and the market-to-book values of assets ratios. GIT solutions coming from a given firm strongly and negatively alter current financial performance measured by operating margin (OM), cost of goods sold to net sales (COGSS), return on assets (ROA) and market to-book value of total assets (MV/BV). Also, companies that focus on GIT implementation, while daily running operating activities, have positive benefits in terms of higher ROA and MV/BV. Therefore, managers should make their activities more visible and reap long-term benefits from GIT solution implementation. Actually, researchers found that GIT implementation does not boost operating and cost management efficiency. These GIT solutions are likely to be associated to companies with lower operating margins and higher costs of goods sold in net sale (Przychodzen et al., 2018).

Based on a sample of companies from the US in a sector of food and beverage, it has been found out that companies having high score in environmental rankings do better financially than lower ranked ones. Thus, companies operating in the food and beverage supply chain can surpass at the same time on both green and financial initiatives. Companies that have green practices might bear a risk of public criticism of being involved in green washing in case their supply chain is not stick to "generally acceptable green principles". As a result, green companies want all entities from supply chain to be involved in green practices (Jackson et al., 2015).

Based on the Greek manufacturing factories, it is found out that there is strong and positive relation between corporate environmental performance (CEP) and financial performance (FP). This result confirms a Friedman's aversion to deviation from the main corporate target as the production method changes. The result showed that financial performance enhancement skip "green" investments because of the long and uncertain payback period, high costs and few advantages taken from ethical corporate image (Alexopoulos et al., 2018).

Miroshnychenko et al. (2017) analysed 3490 publicly-traded companies that consist of 58 countries in period from 2002 to 2014. Authors showed that green practices are associated to profitability and company's future market values. Thus, internal green practices (pollution prevention and green supply chain management) initiate financial performance. Also, external green practices (green product development) as secondary important part defines financial performance. Moreover, ISO 14001 adoption seem to alter negatively financial performance.

Santis et al., (2016) found out that economic and financial performance of the company depends on sectorial classification rather than investment in sustainable initiatives. Findings showed that companies have no initiatives to engage into sustainable practices because it does not improve financial performances compared to those firms who do not follow sustainability strategies. General Liquidity ratios of 2012 and 2013 indicated that sustainability firms have a higher ratio between long-term assets and long-term liabilities than other firms. The idea behind can be that sustainability initiatives have a long-term perspective, that influences a capital structure of companies.

Green initiatives directly influence firm performance and green initiatives are positively related to sustainable development, whereas a firm's performance, as a green initiatives outcome, has the direct relationship with sustainable development. On other hand, the firms' performance, which is not the result of green initiatives, do not have a positive relationship to sustainable development. Therefore, the company, that is not running green initiatives, has no or very low contribution to the sustainable development (Kushwaha et al., 2016). The company's intrinsic financial incentives for social and environmental performance improvement will get reduced as the financial effect of Corporate Sustainability Performance (CSP) is getting minimized (Xiao et al., 2018).

Energy efficiency improvement and renewable energy source usage will not notably alter corporate financial performance. A sustainable energy implementation system has just a significant influence on corporate performance at short run. Pilar and Ballester (2017) think that the reason might be found in key performance indicators that help firm to detect production process failure. In the same time, it helps to improve short-term financial performance. Therefore, adopting renewable technology serves for cost cutting and even though renewable technology can be affordable for all companies it does not provide a competitive advantage so its usage has not been noticed by investors in long run (Pilar and Ballester, 2017).

3. EARNINGS QUALITY PROXIES

Earnings quality measures can cover accounting and market-based measures. Accounting-based measures tend to employ accounting earnings and its components while market-based measures prefer to use accounting earnings and market returns. Accounting-based measures are presented through time-series of earnings, its inconstancy and accounting accruals' unexpected part while most used market-based measure is value relevance shown through earnings response coefficient (Perotti and Wagenhofer, 2014).

Dechow et al. (2010) organized earnings quality into three groups. These three main groups include:

- Properties of earnings,

  -Earnings persistence

  -Abnormal accruals and modelling the accrual process

  -Earnings smoothness

  -Asymmetric timeliness and timely loss recognition

  -Target beating

- Investor responsiveness to earnings (Direct and indirect evidence on ERC, the relation between ERCs and non-earnings information and a final caution about ERCs as a proxy for EQ)
- External indicators of earnings misstatements

  -Firms subject to SEC enforcements (AAERs)

  -Restatements

  -Internal control weaknesses

3.1. PROPERTIES OF EARNINGS

Based on the literature review, earnings properties are the most common proxy of earnings quality. Earnings properties are determined by fundamental performance and accounting system (Dechow et al., 2010). They include five following proxies: earnings persistence, abnormal accruals and modelling the accrual process, earnings smoothness, asymmetric timeliness and timely loss recognition and target beating.

3.1.1. Earnings persistence

Persistence is very important measure to check the level of which current earnings persist in future. In order to have auto regressive model to measure earnings persistence, time series model should have a long history of earnings (Mahjoubet al., 2013). Dechow et al. (2010) stated main streams in research of earnings quality. They state that more persistent earnings tend to have higher quality than less persistent earnings and cash flows or "sustainable earnings" are "better inputs to equity valuation model".

Earnings persistence can be specified as (Freeman et al. 1982):

$$Earnings_{t+1} = \alpha + \beta * Earnings_t + \varepsilon_t$$

Earnings are mostly scaled by assets. Higher β indicates more persistent earnings stream, more sustained earnings. It is estimated using both a single pooled regression and industry specific regressions. The company A, which has a more persistent stream of earnings than company B, will have current earnings as more helpful overview of future performance and its current earnings annuitization will tend to have less valuation errors (Dechow et al., 2010).

Sloan (1996) used a modified formula as follows (assuming that earnings performance ascribed to the accrual component is less persistent compared to the cash flow component of earnings):

$$Earnings_{t+1} = \gamma 0 + \gamma 1 Accruals + \gamma 2 Cash\ Flow_t + \upsilon_{t+1}, \text{ where } \gamma 1 < \gamma 2.$$

In this formula, coefficient on accruals should be smaller relative to coefficient on cash flows in order to reflect the lower persistence of earnings. Sloan (1996) stated that lower earnings persistence exist due to less reliable accruals. He also claimed that in case investors focus on the earnings, they will face problems related to identification of the cash and accrual components.

International accounting Standards Board aims to supply reliable accounting information to all capital market participants that can be well used in decision making process. So, there are many studies that explored the relationship between accounting information and its effects on investors pricing.

3.1.1.1. Empirical studies on earnings persistence

Sloan (1996) in his research used persistence of earnings as a proxy of earnings quality and he showed that persistence of earnings performance is dependent on the values of the cash and accrual earnings components. After analysis of earnings quality, author found that investors fail to spot different properties of these two components of earnings which are reflected in stock price. Dawar (2014) analysing six years data through fixed-effect panel data regression on the sample of Indian companies, also agreed that only abnormal earnings and book value are relevant in explanation of market value of equity while earnings components such as accruals and cash flows keep little value relevance for investors. So investors, while making decisions, do not consider cash flow and accruals components of earnings. As a result, earnings components such as accruals and cash flows do not tend to show persistence and power of forecasting of the next period abnormal earnings.

Baber et al. (1998) analysed a cash compensation of CEOs in the sample of 713 companies and found CEOs compensation sensitivity to earnings depend directly on earnings persistence. They run a regression of compensation (in terms of cash salary and bonus, cash plus stock based compensation and stock based compensation determined as a value of stock options, or stock appreciation rights or etc., cash

bonuses) on companies return, unexpected earnings per share before extraordinary items, firms persistence. Different compensation components are tested to see if they are structured differently. As a result, persistence of earnings seemed to affect compensation. Also, earnings persistence is greater for CEOs whose retirement is getting closer.

Auditing is very important process which brings a report as a final product. Vichitsarawong et al. (2015) examined if different audit opinion is related to earnings persistence of companies. Assuming that auditors modify their audit report when they face disagreement on accounting application, authors take this issue as something that will likely reduce earnings quality and lower earnings persistence. So, taking a sample from listed companies in Thailand from 2004 to 2008 and collecting audit opinions manually from their reports, authors concluded that companies, whose auditors 'opinions were subject of change, will tend to have lower earnings persistence. Moreover, companies, examined from qualified auditors', tend to have earnings persistence lower compared to company that received an opinion from unqualified auditors.

Hogan et al. (2015) find that focusing on socially responsible employee customer relationship will not result in higher earnings persistence. Using a KLD assessment of a strength in the qualitative areas of "Employees Relation" and "Product quality" and alignment of strategy of a company and KLD assessment of strength, it is found that higher earnings persistence is rather related to companies that are oriented to socially responsible value drivers. As earnings persistence is very appreciated by customers, non-financial measures help understanding progressive financial reporting aspects.

Doukakis (2010) analysed if the adoption of IFRS influenced persistence, explanatory power of earnings and earnings components two years before and after IFRS adoption. ROEt was regressed on operating income, non-operating income, extraordinary charge and extraordinary credit (Extracharge(t)/extracredit(t)=Extraordinary Expenses/Revenues, Extraordinary Losses/Gains, Prior period's Expenses and Revenues, Provisions for Extraordinary

Losses/Gains, Losses/Gains on Sales of Fixed Assets, etc.). Results showed that current ROE has "information content for future ROE". Earnings components showed that differential persistence of earnings components may successfully predict future profitability. Moreover, they found that IFRS adoption does not affect earnings and earnings components to be persistent for future profitability. Their analysis resulted in low persistence in both operating and non-operating income.

R&D expenses can make company differentiate from its competitors. Asthana et al. (2006) used a sample of non-financial, non-utility companies for a period from 1982 to 2001 to test whether companies, that have a higher R&D intensity, tend to have abnormal earnings in more persistent way. They disassemble R&D intensity into industry average R&D intensity and companies' R&D intensity and found its both means of industries' and companies' R&D intensity are positively associated with persistence of abnormal earnings.

Dechow et al. (2010) wonder if earnings persistence is a good proxy for earnings quality. Authors discussed that earnings in next period does not reflect future cash flow stream that company can generate. Actually, current cash flow may better serve to predict future cash flow that is expected but with less accuracy of earnings prediction in the next period. Proxies for earnings quality, involving earnings, have accrual-based earnings number that has been altered by fundamental performance of the company and performance measurement. When evaluating the future, the difference between performance and measurement of performance should be clear and recognized in order to help determine how accounting measurement system contributes to earnings quality report (Dechow et al., 2010).

3.1.2. Abnormal accruals and modelling the accrual process

High earnings followed by large accruals lead to low earnings quality that has low future returns. Earnings and cash flow do not need to be matched due to the timing and magnitude of revenues and expenses and they are not based on cash inflow and outflow. Revenues can be recognized as current earnings, although cash has not been received yet. Also, depreciation is no real cash outflow but still it is a deduction from

revenues. Specifically, accruals are triggered by the working capital change which will lead to the sale increase (Chan et al., 2006).

Accruals involve operating performance information while market has sometimes been triggered slowly. Accruals' components such as receivables, payables and changes in inventories are seen as a business condition indicator. Having high accruals do not mean that a company is facing a financial distress. The component of accruals reveals a slowdown of sales growth (Chan et al., 2006).

Earnings quality is information risk measurement and they are defined in terms of precision "mapping of current accruals into current, last year, and next year cash flows" (Ecker et al., 2006). Accountants and regulators consider revenues that are overstated or pre-maturely recognized as a way of manipulation of earnings (Chan et al., 2006).

Accruals can be separated into discretionary and non-discretionary. Discretionary accruals can contribute to return predictability even though they are seen as will of managers to manipulate earnings. On the other hand, non-discretionary accruals do not help in predicting returns (Chan et al., 2006).

"Quality of accruals and earnings is decreasing in the magnitude of estimation error in accruals". The characteristics of company can be used as a tool for accrual quality such as accruals and earnings instability. Accrual quality measure is positively related to earnings persistence. Accruals are good proxies for accrual and earnings quality measure. Accruals that are big in magnitude show low earnings quality and earnings that are less persistent (Dechow and Dichev, 2002). Actually, estimates of discretionary accruals may be triggered by opportunistic accounting choice of management or „artefact of used model". The factors that contributed to the popularity of earnings quality (EQ) are SEC's allegations of earnings management by public firms, acceptance of Jones model as a proxy for EQ and internationally accepted accounting rules implementation (DeFond, et al., 2010).

Zhu et al. (2015) examined the way of Chinese reverse merger (RM) companies that use accrual-based and real activities manipulation strategies to trade off

and perform income-increasing earnings management. In order to detect accrual-based earnings management they used a model from Kothari et al. from 2005. Authors added an additional control of return-on-asset (ROA) because without it they got results similar to those in the performance-matched approach Kothari et al. (2005) model. Authors discovered that accruals manipulation is more costly relative to real activities management in the short term. The reason is that it predicts changes in post-acquisition operating performance.

There are many research papers that focus on extracting abnormal accruals from total accruals which has been used as proxy of earnings quality. Researchers use many different models to do so. Literature review states that there is no perfect model.

3.1.2.1. The Healy Model

Healy (1985) tests compares mean total accruals (scaled by lagged total assets) across the EM partitioning variable. Healy's study forecasts systematic earnings management in each period. Earnings are expected to be run upwards in one group and downward in the other two groups.

$NDA\tau = \sum TAt/ T$

Where:

NDA is estimation of nondiscretionary accruals,

TA is total accruals scaled by lagged total assets

T is 1,2,... T a year subscript for years included in the estimation period and

τ is a year subscript showing a year in the even period

3.1.2.2. The DeAngelo Model

DeAngelo (1986) examines EM by calculating first differences of accruals and by supposing that the first differences tend to have zero value under null hypothesis of no EM. The nondiscretionary accruals measure is last period's total accruals. Therefore, nondiscretionary accruals in the DeAngelo model are as following:

NDATt=TAt-1

The DeAngelo Model can be considered as case of the Healy Model, where estimation period for nondiscretionary accruals is limited to the previous year's observation. Both Healy and DeAngelo Model calculate total accruals in estimation period and use it to proxy for expected nondiscretionary accruals.

3.1.2.3. The Industry Model

It was proposed by Dechow and Slow (1991). They set a model which relaxes a hypothesis that nondiscretionary accruals are constant over the time. It is supposed that variation in the determinants of nondiscretionary accruals is regular over companies belonging to the same industry.

NDATt = y1 +y2medianI (TAt)

Where,

Median (TA,) = the median value of total firms in the same 2-digit SIC code.

3.1.2.4. Jones model 1991

The most famous accrual model is Jones model in 1991. In her study she tried to analyse what happens throughout import relief investigation by the United States International Trade Commission (ITC) and if companies have benefits from giving import relief (tariff increases and quota reduction). Import relief was given in order to reduce earnings. She conducts a cross-sectional analysis to analyse if discretionary accruals (like residuals taken from estimated expectation model) endeavour to be income-decreasing throughout relief investigation period. Discretionary accruals were considered as measure of manager's earnings manipulation throughout import relief investigations.

Total assets were calculated as deduction of total depreciation expenses from the change in noncash working capital before income taxes payable. The change in noncash working capital before taxes is set as current assets other than cash and short-

term investments change less current liabilities other than current maturities of long-term liabilities and income taxes payables.

Jones model assumes that revenues are nondiscretionary. If earnings considered discretionary revenues, then Jones model would eliminate earnings part that belongs to discretionary accruals proxy. Jones (1991) tends to control for the effect of change in a firm's economic circumstances on nondiscretionary accruals.

Author relaxes expectation of change in discretionary accruals that influence difference between current and previous year accruals. It actually relaxes nondiscretionary accruals to be constant between periods. Due to that, author uses expectation model for total accruals in order to control for changes in the economic circumstances.

$TAit/Ait\text{-}1=ai(1/Ait\text{-}1)+\beta 1i(\Delta REVit/Ait\text{-}1)+\beta 2i(PPEit/\ Ait\text{-}1)+\upsilon it$

α_1, α_2, α_3= specific parameters of company.

TA_{it} = total accruals for company i, in year t;

ΔREV_{it} = revenues change between year t and year t - 1 for company i;

PPE_{it} = gross property, plant, and equipment in year t for company i;

A_{it-1} = total assets in year t -1 for company i;

υ_{it} = error term in year t for company i;

i=1,...,N company index;

t = 1, ... ,Ti, year index for the years included in the period for company i.

The above formula assumes that there is a relation between the explanatory variables and non-discretionary accruals. ai, $\beta 1i$, $\beta 2i$ are estimated using ordinary least squares. As we see from the model, all variables are scaled by legged assets to reduce heteroscedasticity.

This model supposes that the association between non-discretionary accruals and explanatory variables is stationary. The prediction error is calculated in the following way:

uip= TAip/Aip-1-(ai[l/Aip-1] + b1i[ΔREVip/Aip-1] + b2i(PPEip)Aip-l])

where p = year index for years included in the prediction period. The prediction error, uip, is the level of discretionary accruals at time p.

3.1.2.5. Modified Jones model

It was proposed in 1995 by Dechow P., Sloan R. G., Sweeney A. P. It is actually a modified version of Jones model (1991). The model is made to constrain likelihood of the Jones model to measure discretionary accruals with error in case "discretion is exercise over revenues". They proposed modified-Jones model to decompose total accruals into normal or expected portion and abnormal or unexpected portion. Dechow et al. (1995) stated that Jones model and modified-Jones model perform the best.

Non-discretionary accruals are evaluated in the event period:

NDAt= a1(l/Aip-1) + a2 (ΔREVt-ΔRECt) + a3(PPEt)

Where:

ΔREVt change of net receivables between the year t and year t-1 scaled by total assets at t-1.

The only difference is that change in revenues is adjusted for the receivable change in the event period. So, modified Jones model supposes that all changes related to credit sales in the event period stem from earnings management. From other side, original Jones model supposes that "discretion is not exercised over revenues in either the estimation period or event period". This model planned to reduce discretionary accruals measurement error in case discretion is applied over sale. Compared to other models,

authors found that this model is far efficient than Healy DeAngelo and standard Jones and industry model.

Total accruals are calculated as follows:

$TA=(\Delta CA - \Delta CL - \Delta Cash + \Delta STD – Dep)/At\text{-}1$

Where:

ΔCA = change in current assets

ΔCL = change in current liabilities

$\Delta Cash$ = change in cash/cash equivalents

ΔSTD = change in debt included in current liabilities

Dep = depreciation and amortization expense

So, discretionary accruals are calculated as:

$DAPit=TAit\text{-}NDAPit$

3.1.2.6. Kothari model (2005) “performance-matched model“

Kothari et al. (2005) introduce a performance-matched model. It is just an adjusted modified Jones model. This model is considered to be robust to detect earnings management.

Authors found that adding ROA or ROAt-1 to Jones or Modified Jones model “yields erratic performance improvement“. Adding ROA on either Jones or modified Jones model is the best way of dealing apart from “high sales growth or low cash flow as a percent of total assets“. Inclusion of constant term limits model misspecification.

Model looks as follows:

$TAit=\beta 0+ \beta 1(1/Assett\text{-}1)+ \beta 2\ (Salesit-\Delta ARit)+ \beta 3PPEit+ \beta 4ROAit(orit\text{-}1)+\upsilon it$

It is evaluated cross-sectional for each year from same industry. Authors believe that matching on ROAt works superior than on ROAt-1. According to them, matching on ROAt tend to produce misspecified tests to a smaller extent.

$TAit/Ait\text{-}1=\beta0+ \alpha1[1/ Ait\text{-}1]+ \beta1i [(\Delta REVit-\Delta ARit)/Ait\text{-}1]+ \beta2i[PPEit/Ait\text{-}1]+ \beta4ROAit+\varepsilon it$

The coefficients of above equation are used to get amount of NDA below:

$NDAit=\alpha1(1/ Ait\text{-}1)+ \beta1[(\Delta REVit-\Delta ARit)/Ait\text{-}1]+ \beta2[PPEit/Ait\text{-}1]+ \beta3iROAit$

$Ait\text{-}1$ = Total assets in year t-1

$\Delta ARit$ = accounts receivable change between the year t and year t-1 for company i

PPEit= Property, plant and equipment of the firm

ROAit= Return of assets of the company in year t

A1 β2 β3 β4= Estimated parameters

The coefficients are assessed by running cross-sectional regressions by industry and by year. This methodology removes the restrictions of fixing the coefficients in these regressions over time or over all industries.

Lastly,

$DACit=TAit-NDACit$

$TA = \Delta NCCA-\Delta CL-DEPAM$

Where,

$\Delta NCCA$- non-cash current assets' change

ΔCL- liabilities' change

DEPAM-depreciation and amortization expenses

3.1.2.7. Dechow and Dichev (2002) approach

Accrual framework was built as earnings that equals cash flows plus accruals, E = CF + Accruals.

Cash flows for any period t can be classified in three groups:

-CFtt-1Cash Collections or Payments of Amounts Accrued at t-l (net)

-CFtt Current Cash Flows (net)

-CFtt+1 Cash Flows Deferred to t+1 (net)

For example, CFtt-1 is related to the cash flow that has been received after the matching amount is recorded in earnings (e.g., collection of an accounts receivable). CFtt is related to cash flows received or paid in the same period as the cash flows are recognized in earnings. Finally, CFtt+1 reflect cash that is collected or given before the revenue or expense is recorded in earnings, such as cash payments for inventory.

Total cash flow for period t is:

CFt = CFtt- 1+CFtt+ CFtt+1 (1)

The formula:

$\Delta WC=\alpha+\beta1*CFOt-1+\beta2*CFOt+\beta3*CFOt+1+\varepsilon t$

It measures earnings quality as the residual standard deviation.

As we see, DD takes into account just cash flows from the operations that are realized in period but recorded in multiple periods which makes us conclude that their empirical specification has error in the independent variables, bringing distorted coefficient that are one-side (biased).

The residuals' standard deviation is a proxy of earnings quality. Authors state that companies having larger standard deviation tend to have less persistent earnings, more volatile cash flows, larger accruals. Additionally, this model is not proper for identification of distortion triggered by long-term accruals.

3.1.2.7.1. Empirical studies results on accruals

Papanastasopoulos (2017) tested accrual abnormality in the U.K. stock market that depends on activities of equity financing. Their analysis showed that companies with higher future performance and return with low accruals are those that repurchase equity. Also, companies having poorer future performance and return, consisting of high level of accruals, issue equity.

Liu and Schneible (2017) tested if discretionary accruals can help financial analysts' over-optimism in earnings prediction and what kind of experience may limit this problem when there are high discretionary accruals. As a result, they conclude that high discretionary accruals can lead to exaggerated optimism of analysts' to predict earnings. Authors analysed four types of experience: general, industry-related, firm-related and task-related experience (task is related to analyst's experience in forecasting cash flows which authors used to assume it would help analysts to understand accrual quality and limit their optimistic prediction bias related to high discretionary accruals). So, industry-related experience limits over-optimistic forecasting associated to high discretionary accruals. When there is a high level of discretionary accruals, task-related experience helps analysts to predict more accurate cash flows. General experience limits overoptimistic forecasting associated with high non-discretionary accruals. There is no evidence of firms' specific experience that limits overoptimistic forecasting.

Lazzem et al. (2018) analysed the effect of leverage level of a company on opportunistic managers' behaviour. Having a sample that consists of French companies, from 2006 to 2012, authors found a positive influence of leverage on earnings management. So, in case of leverage increase, managers' incentives are getting higher to manipulate earnings. There was found a significant positive relation between leverage and absolute value of discretionary accruals.

Xu et al. (2017), based on a sample of Chinese companies from 2007 to 2013, tested bond under-pricing with accruals quality after controlling for companies and bond-specific characteristics. They found that accrual quality is negatively associated with extent of bond under-pricing and the influence of low accrual quality on under-pricing is counterbalanced by underwriters with high reputation. In order to reduce bond under-pricing, accrual quality is more effective than reputable underwriters. In case of secondary bond offerings, authors found no significant association between accruals quality, underwriters and bond under-pricing. Additionally, authors claimed that companies with low accrual quality have more restrictive requirements such as strict covenants and big collaterals.

Lewellen et al. (2019) taking a sample from 1970 to 2015, examined accruals and future profitability relation based on the way companies' sales, profits and accruals react to supply and demand shocks in product market. So, results of analysis showed that accruals lead to drop in profit, not just in profitability and higher accruals tend to lead to reduced subsequent earnings and increase in future competition because accruals are correlated with abnormally high and in equilibrium "transitory-true profitability that attracts new entrants to the industry".

Barua et al. (2019), by using the level of discretionary accruals, examined three earnings threshold: avoiding losses, earnings decline and negative earnings surprise. So, results revealed that accruals in the highest amount are used to avoid earnings reduction and least amount is used for negative earnings surprise. Overall, a rank of earnings thresholds is as follows: avoid earnings reduction, avoid losses and avoid negative earnings surprise. Authors claimed that managers will be prone to regulate discretion in financial reporting. They want to keep earnings level that will decrease a volatility in earnings and stock returns and transfer future growth signals.

3.1.3. Earnings smoothness

Managers smooth their earnings because they want to retain their high positions, reputation, increase compensation, influence the reduction of political intervention and signal their ability to the capital market (Khalil et al., 2017). Using

accruals to smooth earnings can hide the real fundamental performance changes. Managers want to show more smooth earnings with less volatility in earnings. Skinner and Sloan (2002) said that managers avoid a situation where investors would be disappointed of not well-maintained high earnings. High investors' expectations are associated to previous year increase in earnings so if the company does not maintain high earnings, it will be punished by market. Ngo et al. (2012) think that smooth earnings may add a value to company and it gives a picture of future performance of a company. So, higher level of earnings smoothness leads to higher ROA and earnings per share (p.835). Also, involvement in socially-responsible actions can sometimes determine level of smoothness of a company. Companies with no corporate social responsibility will smooth earnings in order to hide bad news while corporate social responsible companies will not smooth earnings (Al-Baidhani et al., 2017, Gao and Zhang, 2015). Smoothness will not always be rewarded by market, sometimes smoothness does not turn into higher value of a company (Gao et al., 2015). On other hand, Habib et al. (2011) found a positive association between stock returns and smoothing, stating that it is beneficial to be involved in smoothing because stable earnings stream will bring accurate prediction of future payoffs.

There is no clear finding on smoothness as a proxy of earnings quality. There should be measures of smoothness that make difference between artificial smoothness and smoothness of fundamental performance (Dechow et al. 2010).

Smoothing can be calculated as the ratio of earnings' standard deviation over the standard deviation of cash flow from operations (Ngo et al., (2012), Khalil et al., (2014), Bouwman (2014), Gao et al., (2015)). It can also be measured as correlation of accruals and cash flow from operations (Bouwman, 2014). Greater values of both above formulas indicate lower smoothness.

3.1.3.1. Empirical studies' results on income smoothing

Khalil et al. (2014) used a sample that consists of 438 companies found on Egyptian Exchange from 2005 to 2007. Those companies belong to non-financial group of companies. Authors measured earnings smoothing as the ratio of standard deviation

of both operating income and operating cash flow (both scaled by lagged total assets). They found that managers smooth the reported earnings by accruals. The study conducted on whether discretionary accruals can be explained by income smoothing in Egypt, showed that income smoothing explains cross-sectional variation in managerial choices. So, managers are prone to increase/decrease earnings in case earnings are low/high respectively, in order to reduce reported earnings variability. Al-Baidhani et al. (2017) stated that earnings smoothness is the reflection of opportunism in financial reporting where poor performance will be hidden in current period for good performance prediction in the future.

Di and Marciukaityte (2015) used a sample counted for 2,201 open-market share repurchases. The analysed period was 1989-2008. Authors tested discretionary accruals and cash flows around open-market share repurchases. They showed a positive relationship between pre-repurchase discretionary accruals and post-repurchase changes in operating cash flows. So, they found out that companies smooth their earnings before share-repurchases which will permit companies to uncover some details on future performance.

Ngo et al. (2012) examined the relation between SEO under-pricing and earnings smoothing on sample of more than 3000 SEOs from 1989 to 2009. The result proved that earnings smoothing resulted in less SEOs under-pricing with holding this result regardless of measures of SEOs under-pricing, estimation techniques. As a result, authors concluded that companies which are confident about the future earnings and smooth earnings are also relevant to suppose that they are aggressive in offer prices. Moreover, Bouwman (2014) examined the influence of optimism of CEO on earnings smoothing and earnings surprise on the sample of 477 large companies listed in the U.S. from 1984 to 1994. The result showed that optimistic managers tend to smooth earnings more than rational managers.

3.1.4. Asymmetric timeliness and timely loss recognition

Conservatism can be understood in terms of the relation between current reported earnings and previous/current period value changes. Accounting with

conservatism would record only part with a positive current-period value changes (Dietric et al., 2007). Loss recognition timeliness indicates a reflection speed of poor economic events in both income statements and balance sheets, which is actually a characteristic of earnings quality (Ball et al., 2005).

Basu (1997) tested sensitivity of earnings to negative returns and found that companies' sensitivity of earnings is two to six times that of earnings to positive returns. He also predicted and found that negative earnings changes will be less persistent than positive earnings changes. Capitalized value of bad news are reported as losses, so bad news are more timely and less persistent, while good news are more persistent and less timely.

Basu (1997) used regression for timely loss recognition as follows:

$X_{it}/P_{it-1}=\alpha_0+\alpha_1 D_{it}+\beta 0 Ret_{it}+\beta 1 D_{it} * Ret_{it}$

X_{it} is the earnings per share for company i in fiscal year t

Pit-1 is the price per share at the beginning of the fiscal year

Retit is the return of company i 9 months before fiscal year and t to three months after fiscal year end t (stock return for the company cumulated over its fiscal year)

D_{it} is a dummy variable $D_t=1$ if $Ret_t<0$, so when the losses are made, then it is assumed that the market is efficiently reflecting it in returns (Ret).

The slope coefficient β will be higher for bad news sample because earnings are more sensitive to unexpected returns. A slope coefficient for negative returns is assumed to be higher than for positive returns because unrealized losses (bad news) will be likely recognized instantly under conservative accounting. A higher β1 equals more timely recognition of made losses in earnings. Author made one more measure with no return base approach by pooled OLS regression:

$\Delta NI_t=\alpha_o+\alpha_1 NEGDUM_{t-1}+\alpha_2 \Delta NI_{t-1}+\alpha_3(NEGDUM_{t-1} \text{ x } \Delta NI_{t-1})+\varepsilon_\tau$

Where:

ΔNI_t is income change between year t-1 and t that is scaled by book value of total assets

$NEGDUM_{t-1}$ as indicator variable that equals to 1 in case a ΔNI_{t-1} is negative. If there is a bad news that is stated as more-timely basis compared to good news, then negative earnings changes will be less persistent and will be prone to reverse more than positive earnings changes.

In the efficient market, stock returns reflect all publicly news. So, author found that earnings sensitivity on negative returns is two to six times as large as the earnings on positive returns. Greater timeliness of earnings relative to cash flow is because of "the more timely recognition of bad news through accruals". Also, they showed that positive earnings' changes are prone to persist while negative earnings' changes have "marked tendency to reverse".

3.1.4.1. Empirical studies' results on Asymmetric timeliness and timely loss recognition

Dietric et al. (2007) regressed earnings on stock returns in order to test if bad news is embodied into earnings on more-timely basis than good news. They concluded that all previous studies based on asymmetric timeliness are due to biased test statistics and therefore cannot be conservatism proof.

Ball et al. (2005) analysed a sample of UK public and private companies because public and private companies have different regulation on auditing, taxes and accounting standards. Authors stated that public companies have larger loss components in book income compared to private companies. Analysis showed that private companies tend to have lower quality earnings with less asymmetry in the timely recognition of gains and losses. Therefore, income reduction in private company is far less transitory, but income-increases are far more transitory. Coelho et al. (2017) also analysed the determinants of asymmetric loss recognition timeliness (ALRT) for both private and public companies in Brazil prior to adoption of IFRS. Unlike the UK, Brazil does not show significant difference in ALRT for private and public companies.

In the study of Srivastava et al. (2015) it is found that timely loss recognition influences "real" economic decisions and provides economic benefits. They had two groups of companies in which one is control group with similar investment opportunities and which make public profitable projects. So, authors tested if sample of companies that had announced the end of projects had more effectively timely loss recognition in the three preceding years than the control group. Termination of unprofitable projects was analysed using a proxy of companies' reporting of discontinued operations. Result showed that in the three years proceeding reported discontinuations, sample companies have timelier loss recognition compared to the group of control companies.

3.1.5. Target beating

Manager's choice to run earnings is determined by trade-off in the present value of expected future net benefits related to that choice. When the discount rates are high, managers increase accrual-based and real earnings management so that earnings quality will be presented as lower earnings management. If there is a zero earning target, a one percentage-point increase in the discount rate is related to 0.14 percentage-point increases in abnormal accruals to total assets (Haga et al., 2018). When a company targets a small profit or small loss avoidance it shows a dimension of earnings quality (Dechow et al. 2010).

Managers can make some "permanent book-tax differences". They also can make actions that alter operating cash flows which will influence later both book and taxable income. But on the other hand, these actions can increase income taxes payable so it will not detect earnings quality distortion by using deferred tax expenses (Phillips et al. 2003). Their research state that expense increase in deferred tax will lead to increase of likelihood of earnings management to skip a loss report. Increase in deferred tax expense will increase a likelihood of engaging in earnings decline avoidance. The same authors posted a pooled cross-sectional model using probit regression:

$$EM_{it}=\alpha+\beta_1 DTE_{it}+\beta 2 AC_{it}+\beta 3 \Delta CFO_{it}+\beta j \sum j Ind_{it}+\varepsilon_{it}$$

EM_{it}=1 if company's i's net income change from year t-1 to t divided by the market value of equity at the end of the year t-2 is ≥0 and <0.01, and 0 if the change in net income is ≥-0.01 and <0

DTE_{it}=company i's deferred tax expense in year t, scaled by total asset at the end of year t-1

AC_{it}=total accruals

CFO_{it}= the change in company i's cash flows from continuing operations from year t-1 to t, scaled by total assets at the end of the year t-1

Ind_{it}= 1 if the company is within the industry in year t

ε_{it}= the error term

If the coefficient on DTE is positive and significant, it shows probability of earnings management avoidance of reporting a loss increases with scaled deferred expenses.

3.1.5.1. Empirical studies' results on target beating

Mindak et al. (2016) analysed weather or not firms are managing their earnings up or down. Firstly, they developed heuristics "assigns each company's annual earnings to a specific threshold". After, they assumed that managers will choose greatest target as the threshold. So, according to the results, they found that companies that beat or meet targets are doing so by engaging in earnings management upward. Companies that hardly meet targets, 67.1% manage earnings upward, while 14.2% manage earnings down.

3.2. INVESTOR RESPONSIVENESS TO EARNINGS

In this area, mostly earnings response coefficient (ERC) has been studied. Earnings-return model that is also popular as R2 measures investor response to earnings. ERC is a "the size of stock return response to the size of the earnings management". The importance of ERC research comes from requisite to improve a

confidence of company's stakeholders in particular equity investors group so that they can make a decision based on stock information (Al-Baidhani et al., 2017).

ERC is a return sensitivity to earnings surprise. So, unexpected earnings are calculated as the difference between realized and forecasted earnings (Mahjoubi and Abaoub, 2015). ERC can be studied from two views: the event studies (reaction of the stock price to the earnings announcement) and as relationship between stock price and earnings over a long period (Easton et al., 1992).

3.2.1. Empirical studies' results on Investor responsiveness to earnings

The commonly used determinants of informational responsiveness (measured by ERCs) include various effects of companies' fundamentals, leverage, accounting methods, audit quality and governance (Dechow et al., 2006). Basu (1997) stated that earnings response coefficients (ERCs) tend to be higher for positive earnings changes than for negative earnings changes.

Basu (1997) searched how size, earnings growth and earnings persistence influence ERC. They found out a positive relation between ERC and company's size. Additionally, there is a positive and significant relationship between earnings growth and ERC while there is no significant relationship between earnings persistence and ERC. Moreover, bigger companies reveal more information that what capital market needs. Thus, shareholder will react for it and alter a stock return. So, as the company is larger it will have more ERC. According to Teoh et al. (1993), ERC increases with growth and persistence, relation of the ERC with firm's risk is weak and negative.

Teoh and Wong (1993) researched if some auditors are generating earnings report with high credibility so that they have higher earnings quality. They tested two groups of B8 and NB8 clients by using a regression of abnormal stock returns on earnings surprise. The result showed that big eight (B8) clients have statistically significantly larger ERCs than non-big eight (NB8) client which proved an assumption that larger auditors generate more precise earnings.

3.2.2. The relation between ERCs and non-earnings information

This part is related to non-earnings information that can affect ERCs. Dechow et al. (2010) state that the nature of this relation is "disclosure-specific". Authors claimed that use of ERC, as an earnings quality proxy, can have some problems in case a determinant in hypothesis is in correlation with a disclosure choice of company or information environment of company.

Baber et al. (2006) made a study about a reaction of security prices to quarterly earnings announcement on whether companies are disclosing additional balance sheet or/and cash flow information. Authors examined a group of companies that disclose this information from those which do not do it. So, the result showed that a negative relation between EM indicators and security price reaction are stronger in case supplementary BS/CF information is disclosed than when it is not disclosed.

Lougee and Marquardt (2004) analysed characteristics of company that issue pro-forma earnings statement and if this is useful information for investors. According to the analysis, the companies, which will probably issue a pro-forma earnings statement, are those who have less informative GAAP earnings. Additionally, authors found that pro-forma earnings are beneficial to investors in case GAAP earnings informativeness is low or when there are no strategic considerations.

Dechow et al. (2010) consider that ERCs misses variation of "equity markets to reflect fundamental values". They also declared that return variation affect R, a component of the ERC, but it is unrelated to the earnings, a component of ERC, making ERC as earnings quality proxy inappropriate.

3.3. EXTERNAL INDICATORS OF EARNINGS MISSTATEMENTS

External indicators of earnings misstatements includes 1) SEC Accounting and Auditing Enforcement Releases (AAERs), 2) Restatements, and 3) Internal controls.

3.3.1. Firms subject to SEC enforcements: Accounting and auditing enforcement releases (AAERs)

SEC mostly accuses managers of initial misstatements of financial statements which is counted as a fraud. AAER samples tend to discover companies that have problems in earnings quality in either identification of misstatements or abnormal accruals (Dechow et al, 2010). Authors explained many determinants of AAER such as managerial compensation, capital market incentives, debt covenants, corporate governance.

SEC often worries about accounting issues such as current account validity and revenue recognition. Most of AAERs include account receivables and inventory overstatements. Also, SEC is prone to punish smaller companies more often than larger companies (DeFond and Smith, 1991). The SEC exists to maintain the disclosure system's credibility and control and prevent reporting problems. SEC often punishes overstatements such as accounts receivables and inventories coming from late write-offs and premature revenue recognition (Feroz, 1991, p. 108).

Beneish (1999, a) investigated penalties from earnings overstatements and he stated that managers, having overstated earnings, are prone to put on the sale their equity holdings prior to discovery of the overstatements at still inflated price. So therefore, shareholders will lose significant wealth.

3.3.2. Restatements

The restatement is exogenous signal that transmit information “to the competitor about its projects unknown payoff“. Restatements coming from other companies are informative to competitors because in restatements there are inputs important for investment decision of competitors (Durnev and Mangen, 2009). Also, audit quality's most objective indicator is restatement (Lobo and Zhao 2013, p.1411).

Demerjian et al. (2013) researched a relationship between earnings quality and managerial ability. By using restatements, persistence, bad debt provision errors and the mapping of accruals into cash flows, as a proxy for earnings quality, showed that managers can easily alter earnings quality by their judgements and estimates. So, those restatements that are associated with judgment and estimate of management are associated with managerial ability.

Durnev and Mangen (2009) examined the information that is transmitted from the restatements of the financial reports. The analysis showed that announcement of restatements triggers beliefs of competitors, who can modify their decision of investment according to the information from restatements. So, when restatements occur, competitors will tend to reduce investments in the beginning year compared to benchmark firms. Also, during restatements announcement, changes in competitors' investment decision will be related to restatement amount, abnormal returns of restatement firms and abnormal return of competitors.

3.3.3. Internal control weaknesses (ICW)

Internal control weakness is a proxy of misstatements in the post-Sarbanes Oxley (SOX) regime (Dechow et al., 2010). Good internal control leads to more reliable financial information and internal control is supposed to detect errors that may produce misstatements in financial statements. Weak control environment may allow biased accruals by using earnings management or unintentional accrual errors happened due to the lack of experience (Doyle et al., 2007). When absolute discretionary accruals measure earnings quality it is notably associated with voluntary disclosure of internal control weaknesses (ICWs). Based on analysis of internal control reporting in China, Ji et al. (2017) found that both accounting-related and non-accounting-related ICW influence quality of earnings.

Kothari et al. (2015) examined if the industry audits would compensate for ICW and limit the risk of financial misreporting by their clients. They used a regression model that consists of absolute discretionary accruals as dependent variable in order to test the gradual influence of the industry specialist audits over non-specialist audits.

Their results showed that in the regulatory post-SOX period, Big 4 auditors tend to have higher quality audits if they have industry expertise. Authors tested internal control weaknesses by classifying companies into reporting either company-level ICW or both the company-level and account-specific ICW. Therefore, ICW companies with company-level control weaknesses tend to record earnings quality of higher level (such as smaller performance-adjusted discretionary accruals and higher accruals quality) in case Big 4 industry specialists are auditing.

Doyle et al. (2007) tested a relationship between internal controls and accruals quality from 705 companies that published at least one material weakness from 2002 to 2005. Authors considered material weakness as the most severe internal control deficiency. The results showed that weaknesses are associated with poorly estimated accruals. So, companies, having weak internal control, tend to have accruals of lower quality.

3.4. BENEISH MODEL

Messod D. Beneish (1999, b) defines a model which can identify a manipulation prior to public discovery and it distinguishes manipulated and non-manipulated reporting. His sample consists of 74 companies that manipulated earnings from 1982 to 1992. The companies with manipulated reporting were subject of the SEC's accounting enforcement actions or media represented them as manipulators. Author made a detection model of earnings manipulation from sample of manipulators and industry-matched companies. A WESML probit and unweighted probit estimation were used. Author declares that just 2 year period of data is enough to found out the likelihood of manipulation. Therefore, SEC, investors and auditors can use it to screen potential manipulators. Beneish model is a tool for forensic accountants to analyse financial statement accounts.

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

Days' sales in receivables index (DSRI)

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

It is a ratio of day's sales in receivables in the current year to the corresponding previous year. Beneish assumes that a large DSRI increase is related to high likelihood of overstated revenues and earnings. So, the ratio is examining receivables and revenues in two successive years. Disproportionate increase in receivables relative to sales may mean that companies are calling regular customers to make sales earlier and distribution later as a change in credit policy. Also, consumers might not buy the products or services in cash anymore and they might not pay in short period, so they need longer period to pay it. Thus, ratio higher than 1 indicate fictitious sales on account.

Gross margin index (GMI)

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

It divides a gross margin in year t-1 to the gross margin in year t. So, if the ratio is less than 1, then the company is in a better position, its gross margin is higher in the current year compared to its previous year. Ratio more than 1 indicates bad prospects of company and more motivation to manage and distort quality of earnings.

Dimitrijevic et al. (2018) state that GMI deterioration influence company's future negatively. Additionally, it can be expected that companies that do not have bright future prospects, are more prone to be involved in manipulation.

Asset quality index (AQI)

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

It is calculated as the ratio of noncurrent assets other than property, plant and equipment (PPE) to total assets. Asset quality is compared in year t to year t-1. Author states that PPE has its future benefits certain so we need to deduct it from uncertain and more risky area such as noncurrent assets. In the balance sheet non-current assets include goodwill, long-term receivables and long-term investments. This area is more open to manipulation because the fair value is used. Future cash flow and future interest

rates are used to find a present value so, as judgemental values, they are prone to be higher and manipulation is easier. Therefore, if the ratio is more than 1, then manipulation area has increased from previous year, subjective evaluation area is big and it might indicate manipulation.

Sales growth index (SGI)

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

This ratio compares the sale in year t to sales in year t-1. Beneish states that growth itself does not need to imply manipulation but growth companies are willing to make fraud in financial statement. Author states that in case growth companies have large stock-price losses at the slowdown then they can intend to manage earnings more than non-growth companies. So, if the ratio will be more than 1, manipulation might happen as growth companies are more likely to participate in it.

Growing companies have incentives to make a fraud arising from its financial position and need to attract capital (Dimitrijevic et al., 2018). Petrík (2016) states that many companies face with pressure to meet earnings targets and they often distort quality of earnings to achieve it.

Depreciation index (DEPI)

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

This ratio measures depreciation rate in year t-1 to the corresponding year t. Depreciation change can happen because of used method or new fixed assets. Higher depreciation to fixed assets indicates more expenses. A ratio more than 1 indicates that depreciation expense has been increased from year t-1 to year t and more depreciation expense leads to income increase, hence manipulation is considered to be higher.

Sales, general, and administrative expenses Index (SGAI)

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

This index measures Sales, general and administrative expenses in year t to sales in year t relative to the corresponding ratio in year t-1. There is an assumption that increase in sales for example by 10% will lead to increase in SGAI expenses by the same percentage. So, if the index is more than 1, it will indicate manipulation because sales, general, and administrative expense increase disproportionately against the sale in year t compared to the same ratio in previous year. For example, sales, general and administrative expenses increased double from previous year and sales increased by less than 50% in current year. That means that the sales, general and administrative expense increased disproportionality against the sale which will alter net income decline due to the higher expenses. So, index higher than 1 should be interpreted in terms of strength, such as that financial strength is assumed to be low.

Leverage index (LVGI)

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

This index measures total debt to total assets in year t to corresponding year t-1. The logic behind is as follows: the index higher than 1 indicates that company has more debt with no good financial strength, company is weaker financially, so therefore it is motivated to manipulate earnings more.

Total accruals to total assets (TATA)

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

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

By using manipulators and non-manipulators group, which were determined according to SEC's actions and by using above indexes, Beneish created a model which will detect companies that manipulated earnings. The model is as follow:

$$\text{M-Score} = -4.84 + 0.92 \times \text{DSRI} + 0.528 \times \text{GMI} + 0.404 \times \text{AQI} + 0.892 \times \text{SGI} + 0.115 \times \text{DEPI} - 0.172 \times \text{SGAI} + 4.679 \times \text{TATA} - 0.327 \times \text{LVGI}$$

The eight indicators of every single company are put in the regression of Beneish and the results are showing if there was manipulation or not. Comparing to the benchmark of -2,22, a greater value than that will assign the company as manipulator.

According to Beneish model, each index in manipulators and non-manipulators area is as follows:

	Manipulators (N=50)		Non-Manipulators (N=1708)	
Characteristic	Mean	Median	Mean	Median
Days Sales in Receivables Index	1.465	1.281	1.031	0.996
Gross Margin Index	1.193	1.036	1.014	1.001
Asset Quality Index	1.254	1.000	1.039	1.000
Sales Growth Index	1.607	1.411	1.134	1.106
Depreciation Index	1.077	0.966	1.001	0.974
Sales, General, Administrative Expense Index	1.041	0.960	1.054	1.010
Leverage Index	1.111	1.030	1.037	1.000
Total Accruals to Total Assets	0.031	0.034	0.018	0.013

Table 3-1-Index type for each variable for manipulators and non-manipulators, Beneish, 1999

Beneish state that the likelihood of earnings manipulation increases with sales growth, accruals increase, gross margin deterioration, receivable unusual increase and asset quality decrease. All these indexes are not valuable individually but together it makes a model that can effectively detect financial fraud committed by companies.

Beneish model has been successfully used in many different industries to discover fraud in financial statements. The model successfully detected 76% of earnings manipulation companies that were subject to accounting enforcement by the United States Securities and Exchange Commission. Beneish used a probit model. It actually proves a systematic relationship between manipulation's likelihood and data in financial statements. Known as a cost effective tool, Beneish's weighted and unweighted probabilities of manipulation of earnings are related to the existence of fraud. 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.

3.4.1. The results of empirical studies' using Beneish model

A very comprehensive study of the m-score model was made across the globe and proved its reliability in detection of manipulation. Beneish model is different than other models because it focuses on financial statements of company. Distorting quality of earnings is initially motivated by making a positive influence at share price of the company (Talab et al., 2018).

Özcan (2018) used a sample of 174 companies from 2005 to 2017 to test the usefulness of Beneish model in the practice of forensic accounting. So, there were 87 companies from fraud group and 87 companies from non-fraud group in period from 2005 to 2017. Fraud companies were matched with non-fraud companies based on the assets size and sector. The author confirmed the strength of Beneish model in detecting financial statement fraud. Logistic regression analysis showed that companies with high days in sales receivable index (DSRI), gross margin index (GMI), asset quality index (AQI), sales growth index (SGI), depreciation index (DEPI), sales, general and administrative expenses (SGAI) and leverage index (LEVI) tend to falsify financial statements. Author also used a t-test to compare the means of the fraud companies and non-fraud companies. This independent sample t test indicates if company, that commits fraud, can be identified. The result of univariate analysis showed that days in sales receivable index (DSRI), gross margin index (GMI), asset quality index (AQI), sales growth index (SGI), depreciation index (DEPI) and leverage index (LEVI) have a significant influence on the predictability of financial statements frauds.

Franceschetti and Koschtial (2012) tested the sample of 30 companies that are small and medium size for each bankrupt and non-bankrupt group. The result showed that in year prior to default managers employed in bankruptcy companies tend to make income-decreasing accounting changes. The bankrupt sample showed that those companies are prone to inflate revenues confirming Beneish. Author's analysis showed that in the bankrupt sample SGI has higher values than the mean of manipulators in Beneish model. Both bankrupt and non-bankrupt companies tend to engage in cost deferral. Also, the red flags for AQI, DEPI, and TATA is higher for companies that belong to non-bankrupt sample. Sample was taken in period from 2009 to 2011 so authors assume that companies were prone to defer costs during financial crisis, to manage earnings on more aggressive manner, to make assets' useful lives upwards and /or to embrace new income increasing method of depreciation.

Dimitrijevic et al. (2018) analysed 42 companies in Serbia to test if there is a sign of fraud in financial statements and which category of business entities are engaging in highest fraud and what are its signs. Using Beneish model, the result showed that the fraud risk in general was not found but manufacturing companies and financial institutions tend to have higher risk of fraud compared to trade and service companies. The result showed that there is a moderate fraud risk which is related to borrowing activities of companies. Also, they found a general risk of manipulation in revenue recognition, accruals in general and depreciation in particular for significant number of companies even though the overall risk is not at high level. Additionally, increased share of administrative costs are high risk indication in significant number of companies.

Hassnain Talab et al. (2018) used M-score in detection of earnings manipulation at the sample of Iraqi stock exchange companies. Sample counted listed banks in the Iraqi stock exchange where 2014 and 2015 were taken as the base years. The results showed that 15 banks out of 23 (65,2%) tend to distort earnings quality by manipulation of earnings while other 34,8% do not manipulate earnings in their financial statements.

Warshavsky (2012) analysed Enron fraud scandal that happened in 2001. Enron was seventh on Fortune list of 500 largest companies. But, author states that prior to its downfall announcement, there were some warning signs of its bankruptcy visible in its poor earnings quality. Using Beneish model to Enron's financial statement analysis, author states that Enron started manipulation of its earnings back in 1997. As calculated, Enron's numbers were shocking because they were nearly or more than manipulators in three out of eight variables: Gross Margin Index (GMI), Asset quality index (AQI) and Sales growth index (SGI). Moreover, overall m-score was -1,87, which is more than -2,22 standard used to calculate manipulation. So, as a candidate for manipulation, using Beneish model, Enron would be detected as manipulator in 1997, before its fraud went public. Moreover, author examined ZZZZ Best Company (or also known as Z-Best Company) as successful red carpet cleaning and Restoration Company accused for Ponzi scheme. This company went public in 1986 and its founder Mr. Minkow three years after, was convicted to 25 years in prison for tax evasion, money laundering, security fraud and other charges. Days' sales in receivables for manipulators in Beneish model is 1,465 while Z-Best Company had 177,622. Asset quality index for manipulators in Beneish model is 1,254 while this company had 2,043 or 63 percent higher than the mean for manipulators in Beneish model. The Sales growth index for manipulators in Beneish model is 1,607 but this company had 3,905 or 143 percent more than manipulators mean. Also, total accruals to total assets index for manipulators is 0,031 while the company had 0,064 or more than 100 percent than mean of manipulators.

Kokić et al. (2018) researched a sample of 13 Super League sport clubs in Serbia and checked if they engaged in manipulation of earnings. Results revealed that there was significant number of clubs that disclosed some misstatements. As of example, results ranging from 2009 to 2016 detected 4 out of 13 sports clubs having median higher than m-score value of -2,22. Using Beneish model, it was found that there were some deviations in liquidity disclosure, profitability, write-off of assets, net earnings value turnover of business assets, income.

Tarjo (2015) made analysis of companies that committed a fraud according to the Database of Sanctions of Issuer Cases Public Companies released by the Financial Services Authorities from 2001 to 2014. Applying Beneish model, it was shown as successful tool in discover of fraud made by companies. Gross margin index, depreciation index of sales and general administrative burden and total accruals were significant in discover of financial fraud. On the other side, sales index, asset quality index and leverage index were not statistically significant in discover of financial fraud. Beneish model was successful in detecting fraud in 77,1% or in 27 out of 35 companies that engaged in fraudulence. Additionally, from companies that were not involved in fraud, it accurately found 28 out of 35 non-manipulation companies or 80% of them.

Christianto and Budiharta (2011) examined earnings manipulation using Beneish model and its influence on stock return in Indonesian listed companies in 2009 to 2011 in the sample of 75 companies. They wanted to test if earnings manipulation has negative influence on stock return. Using m-score as an independent variable and control variables such as leverage and book to market value, dependent variable was stock return as cumulative abnormal return. Stock price data were collected 3 days before, at the date and 3 days after financial report was published. Authors had 18 companies as manipulators because their score increase -2,22 benchmark for manipulators. Final result showed that earnings manipulation may explain stock return changes by 23,3% while other 76,7% is explained by other variables other than earnings manipulation. The negative relation between earnings manipulation and stock return shows that investors react negatively on manipulated earnings which will lead to lower stock return. As earnings manipulation can trigger market reaction then authors concluded that earnings have information content.

Repousis (2016) used a dataset of 25,468 companies from Greece in 2011-2012. Author showed that 8,486 companies or 33 percent of sample resulted in obtaining m-score greater than -2.2. It proves companies' likelihood of being manipulators. Additionally, for manipulators, using regression coefficient and t-statistics, days sales in receivable index (DSRI), asset quality index (AQI), depreciation index, selling, general and administrative expenses index (SGAI), total accruals to total

assets index and leverage index (LVGI) are found significant at 99 per cent confidence level in its effect on Beneish M-score. Also, it is important to mention a meaningful relationship between Beneish M-score and each one of variables, DSRI, AQI, GMI, SGI, SGAI and LVGI.

Goel (2014) examined the quality numbers that appear in statements. Also, he tested if the earnings were manipulated in the corporate companies. Sample is taken from India using Beneish model ranging from 2003-2004 to 2007-2008. The sample consisted of 12 companies in private sector with available market and public data. Results showed that probability of manipulation is increased by increasing accruals, sales growth, deteriorating gross margin, asset quality reduction and unusual receivable increase.

Kamal et al. (2016) made a research that consisted of 17 public-listed companies that were prosecuted by the Security Commission Malaysia for fraud commitment from 1996 to 2014. Beneish model successfully detect 14 out of 17 companies or 82% of listed companies charged for making an accounting fraud. This result proves and gives a strong support for Beneish model application. Authors state that this result can help to verify if the company is engaged in any inaccuracy before presenting it to Bursa Malaysia in order to skip future penalties. Results showed that 71% of companies (or 12 of them) have accruals score higher than threshold limit of 0,03. The second highest variable was Days sales Receivable Index where 6 companies or 35% detected exceeding. The third highest was Leverage Index and SGA index with 5 companies or 29 % of sample exceeding the threshold limit. Gross margin index was on the forth place with 4 companies or 24% of fraudulent companies. AQI, SGI and DEPI were with 3 companies exceeding the threshold limit accounting for 18% of sample.

3.4.2. Importance of fraud detection in financial statements

There have been many corporate accounting scandals. Rapid change in technology has limited the efficiency of traditional methods in revealing accounting frauds. Forensic accountants have performed in the areas of anti-money laundering

activities, detection of tax evasion, assessment of possible loss of the company, main reasons of the bankruptcy of the company, assessment of the litigation process of the company, giving opinion of the financial position of the company. Beneish model is widely acceptable technique used in investigation of forensic accounting. Actually this model helps to reveal a fraud made by company by looking at its financial statements. If financial statement misstatement is intentional or non-intentional it can cause collapse of the company that can lead to decline in financial efficiency and public trust. Companies that make financial fraud are motivated by stock price affection, inflation of the corporate earnings or constrain of tax burden. Moreover, it can lead to huge economic losses (Özcan 2018, p.57,58). Financial statements that are fraudulent can mislead financial users and therefore cause big losses to happen and break a confidence that exist in the financial reporting. So, detection of the fraud can prevent such serious losses. If there is a warning sign, then a further investigation is needed to happen. Fraudulent reporting has an aim to present financial position, cash flow and performance differently than its real amount. Frauds are hard to notice but the symptoms are "overlooked or misunderstood" (Dimitrijevic et al., 2018).

The accounting manipulation can be visible in the following cases: recording fictitious revenues, recording revenues so early or with questionable quality, failing to record liabilities and improperly reducing the shifting expenses in future period, increasing income with one-time gains, capitalizing otherwise currently recognizable expenses. Even though accruals do not always mean a manipulation, they need to be considered with more attention because it can assist in manipulation detection. Therefore, analysts need to observe purpose and magnitude of accruals. When measuring performance, cash flow statements should be considered more often because it will predict true earnings in better way. If there is a disparity between high net income of a company and its low cash flow, a further investigation needs to take a place (Warshavsky, 2012). It is principal to discover the fraud prior to collapse of business. Beneish model, based on ratio analysis, can be used for discovering anomalies. So, as it is understandable that fraud can have big consequences, preventing and detecting fraud is a duty (Aris et al., 2013). Fraud in financial statements should be seen from higher

perspective because it can lead to the job loss, it damages investors and creditors and it alters both customers and suppliers (Petrík, 2016).

4. CURRENT STUDY

This chapter focuses on the purpose of the research, hypothesis development, the research methodology and the model, method of data collection and analysis method. It will tend to explain the whole process of empirical work before we move to the analysis part. The research process itself is a systematic approach of high level of objectivity that tends to reach a conclusion based on gathered data for same analysis.

In literature review, popular and deep research on earnings quality topics was used to in order to gain more knowledge on a topic. Different articles from journals proved the complexity and diversity of earnings quality approach and therefore showed its importance of usage. Most of those articles belong to accounting or finance sphere. The purpose was to gain a deep knowledge on mentioned topic before engaging in its empirical analysis.

4.1. THE PURPOSE OF THE RESEARCH

Earnings quality is a concept not clearly explained and defined in the literature. In this thesis we accept earnings quality as "not manipulated earnings information". If the earnings amount of the company shows the actual results of financial operations and not changed intentionally by the management, we assume the quality of earnings information is high.

The purpose of the study is to measure earnings quality of BIST companies and compare earnings quality of sustainability-index companies with others. Because the firms, which care about the sustainability of economy, environment and society, are included in the sustainability index, we expect them to be more respectful to the financial information users and present higher quality earnings.

This thesis tries to measure;

- Earnings quality of BIST companies and

- Make a comparison of earnings quality of sustainability-index companies and others.

4.2. HYPOTHESIS DEVELOPMENT

Companies, which focus on sustainability issues, are very important nowadays and they attract big interest from customers, investors, government and other stakeholders. All these stakeholders are demanding higher level of financial information transparency. Thornton (2008) declares that not just big corporations need to engage into sustainability but it is mandatory for all kinds of business. CSR companies are rarely involved in earnings smoothing and earnings loss avoidance but more likely to be aggressive in managing accruals (Chih et al., 2008). Social involvement and environmental focus are beneficial to companies and they have more persistent earnings. These companies profit from higher number of customers and employee loyalty and do not have unexpected events (Mahjoub and Khamoussi, 2013). Kim et al. vidi ovooooo u ovom slucaju bez zareze(2011) tested if sustainability-engaged companies behave differently than other companies and if they present more reliable financial information to investors. Analysis showed that companies which are socially responsible are less involved in managing earnings by using discretionary accruals. Additionally, they found that CEOs/CFOs are rarely to be engaged in SEC investigations of GAAP violations. They used a method as a combination of surveys, financial statements, articles and academic journals to estimate the level of social performance of companies and Kothari model (2005) to measure discretionary accruals as a proxy of earnings quality in its absolute value. In short, sustainability-oriented companies are more responsible in operating decisions by providing high quality of financial reporting transparency (Kim et al., 2011). Sustainability enhances the reputation of a company so they will not be involved in socially unacceptable activities. They will tend not to damage their reputation (Linthicum et al., 2010).

Many managers try to maintain net income stability through managing the timing of some financial events or by choosing some accounting methods. Firms in general will tend to report a stable income growth with no profit volatility by maintaining income stability. If the current profits are at low level and future profits are

expected to be higher, managers can borrow those higher future profits for current period (Mahjoub, 2018). Lassaad and Khamoussi (2012) tested 250 French companies in period from 2005 to 2009 for its earnings persistence. Authors explained persistence as the extent to which current period earnings are reflective of future periods and current periods. Result of their study shows that socially-responsible companies have greater loyalty of employees and they are likely to have more persistent earnings.

We assume that sustainability index companies, while implementing sustainability into a business and in order to meet expectations of stakeholders, are likely to provide more reliable information, with high earnings quality. We expect that sustainability-index companies will have higher level of earnings quality than other companies. Therefore, we accept that they are not manipulating earnings at their financial statements.

H1: There is a difference between the earnings quality of BIST Sustainability-index firms and the earnings quality of the companies out of Sustainability-index.

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

H2: There is a difference between the m-scores of manipulating sustainability-index firms and others

H3: There is a difference between the m-scores of non-manipulating sustainability-index firms and others

H4: There is a difference between all manipulating firms and all non-manipulating firms.

4.3. THE RESEARCH METHODOLOGY AND THE MODEL USED

In this thesis, Beneish model was applied to detect possible earnings manipulation in the sample of Turkish companies. Because of the model's high

efficiency to signal manipulators, easy access to companies' financial data and model's successful implementation in practice, Beneish Model has been selected as a measure of earnings quality. According to the literature review, Beneish model was even effective in disclosing Enron's manipulation few years prior to its public announcement. All of these together make it a good reason to choose Beneish m-score model as a proxy of earnings quality.

Actually, Beneish model is consisted of 8 variables, that when they are put together form a model for manipulators' detection.

The model is as follows:

$$\text{M-Score} = -4.84 + 0.92 \times \text{DSRI} + 0.528 \times \text{GMI} + 0.404 \times \text{AQI} + 0.892 \times \text{SGI} + 0.115 \times \text{DEPI} - 0.172 \times \text{SGAI} + 4.679 \times \text{TATA} - 0.327 \times \text{LVGI}$$

If m-score is more than -2,22 then the company is considered to have high probability of earnings manipulation. On contrary, in case m-score is less than -2,22, the company is classified under non-manipulating group.

One difference of the current study's model from the Beneish Model is the calculation of TATA ratio. Because of the data collection problems and our assumption that there is a better measure for the total accruals in the literature, we decided to make some changes in the calculation.

Beneish TATA formula was as follows:

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

With that ratio, Beneish tries to measure the change in accruals. However, the studies which measure accruals use another definition and formula.

Total Accruals = Net Income – Cash Flow from Operations
((Tucker and Zarowin (2006), Ngo and Varela, (2012), Khalil et al. (2014), Khalil and Simon, (2014), Gao and Zhang (2015), Jaggi et al. (2015), Petrík (2016), Al-Baidhani et al. (2017), Abhijit Barua et al. (2019)).

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

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

Therefore, we also decided to use the above formula to calculate TATA.

Also, Özcan without A (2018), divided his sample into manipulators and non-manipulators group and his sample consisted from 174 firms, 87 manipulators and 87 non-manipulators. All these firms are matched according to asset size and sector. He found out that total accuracy of Beneish model in detecting manipulators in Turkish market is 85,63% which is high level. He also found that Beneish model on the sample of Turkish market, accurately classifies 82,97% of manipulators and 88,75% of non-manipulators.

4.4. REASONS OF CHOOSING BENEISH MODEL

This model is decided to be used to test earnings quality due to many reasons. First, according to Özcan, A. (2018), who performed Beneish model on the sample of Turkish market, on non-manipulators and already-known manipulators, found high probability of manipulation detection. As we collected the sample from Turkey too, we found it useful to know that such a high probability would detect manipulators in Sustainability-index firms and other group. Even though it is quite old model, on Turkish market it still can be performed as a valid model. Second, compared to other earnings quality proxies, Beneish model consists of eight variables that can detect manipulation, while other models usually use one variable and by analysing it, the level of earnings quality is measured. Therefore, Beneish model seems more reliable model to use. Third, all needed data is easily accessible in financial statements of companies and manipulation of earnings can be calculated in order to save interests of many interested investors.

4.5. METHOD OF DATA COLLECTION

A sample has information of population from which is coming. A good sample is needed for a research which will interpret theories and laws (Mujere, 2016, p.108). Taherdoost (2016) states that in few case a researcher will have enough time to collect all the data that belong to a population. Due to that, different sampling methods can be applied in order to obtained relevant sample. He explained steps to obtain a sample and those are: to define population of our target, to choose sample frame, its technique and size, then collect the data and make analysis. If the population is so big, we all know that it is so costly to collect all necessary data. In such a case, we need to select a sample. Banerjee and Chaudhury (2010) says that a world population does not refer to demographic meaning of all people living in specific geographical place while sample is just a part of population that will be specified based on time and needed resources for examination of the problem.

In order to start our analysis we needed to collect all data from Turkish companies that are listed in Borsa Istanbul. As we see from above definitions, the total population meaning should be related to total number of publicly listed companies in Borsa Istanbul. Extracting the data from Thompson Reuters we obtained the original number of companies from Turkish market as 386. The second step was screening if the all necessary data were obtained for each company. After eliminating observation with missing values we ended up with a number of 265 companies. Moreover, there are 7 companies that lack a data for one year so instead of elimination of those firms we decided to use the remaining year data for checking its possible earnings manipulation involvement. We included those 7 firms in 2017 or 2018 group according to their data availability. Some companies had a value of zero in their variables, which caused a problem when calculating indexes. Referred to Beneish model, we follow the same what author applied in such a case. Rather than deleting those companies, we put the value of 1 as the result of calculation if the data is missing or the denominator value is zero. Also, after extracting the data from Thompson Reuters, some missing values were manually collected from KAP in order to have a complete dataset for analysis imposed by Beneish.

Additionally, we searched for the companies listed in sustainability-index of Borsa Istanbul. The total number for 2018 was 50, but after collecting the data and eliminating the financial institutions, we ended up having 39 of them with full data. So as a result, we obtained 226 non-sustainable index companies and 39 sustainable index companies. For 2017, the total number in sustainability-index was 44, but after collecting the data, we ended up having 35 of them with full data.

Regarding the empirical part, data collection was based on secondary data taken from Thompson Reuters for 2016, 2017 and 2018. Beneish model, implied in this thesis, requires just 2-year period in order to give a result of companies' involvement in manipulation. In order to be able to calculate m-scores of firms for 2017 and 2018, we needed to collect 3 years data: 2016, 2017 and 2018. The data, that was taken from Thompson Reuters platform, counts for all publicly-listed companies' data. The data was extracted in an excel sheet for each company and it consists of following items:

-Net Sales,

-Cost of goods sold (COGS),

-Net Receivables,

-Total Current Assets,

-Net Property, plant and equipment (PPE),

-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

So, in order to obtain a result from Beneish m-score model, the above items needed to be collected.

Revenues, according to IAS 18 are gross income that comes from a company which perform in ordinary activities (for example sales of products, services and other assets that yields interests, dividends). Revenues are recognized when the economic benefit can be expected in future and it is measured at fair value.

COGS can be easily explained by amount paid to produce and deliver product or service in a certain period. But Northard, A. (CPA) states that it can be sometimes difficult to make a difference between COGS and "normal business expenses"(amynorthardcpa.com). COGS is visible on income statement and it usually includes direct costs of material used to make a product and labour needed to produce it.

Total assets are what a company has of value and what can be turned to cash. It exists in Balance Sheet and it consists of fixed and current assets.

Net receivables are amount of account receivables that company will collect from customers. So, it is money that customers owe to a company minus the part that will not be collected.

Total current assets show how the financial health of your company is in short-term. If those assets are higher than short-term liabilities then company is able to pay its short-term debts. Current assets include cash and its equivalents, account receivables, inventory, marketable securities, prepaid expenses.

Current liabilities are debts on company in short period of maximum 1 year or within the normal operating cycle. It usually consists of account payables, notes payables, accrual expenses and current maturities. In order to consider a company as in healthy financial position, current liabilities should be less than current assets.

Selling, administrative and general expenses include almost all items that are not included in COGS. Appeared under operating expenses it includes rents, utilities, insurance, salaries, sales and marketing expenses. It does not include finance costs and research and development costs.

Long-term debt is a debt for a period more than 12 months like a bank loan, mortgage bonds. Company is responsible to show long-term debt in a balance sheet together with interest rate that is mandatory to pay and maturity date.

Depreciation, depletion and amortization- Depreciation refers to tangible assets by reducing a value of it over certain period of time (like land). Depletion refers to natural resource supply that should be run down by time (like coal mining). Amortization refers to intangible assets value reduction over the time like a patent.

Cash flow from operation belongs to Statement of cash flow and it represents the cash amount that a company makes from its operating activities. In order to calculate it, it needs net income, non-cash items adjustment and working capital change. So, the formula for CFO is: NI+Non-CashItems+Increase in working capital.

On contrary, net income comes from accrual-based accounting approach. It is obtained by deducting all expenses from total revenues such as COGS, operating expenses, taxes from revenues.

Net income includes cash expenses like depreciation, amortization that are non-cash expenses giving a sign of how much a company actually earned in previous period.

Net PPE is defined as net of account depreciation. Not adding new equipment leads to net PPE reduction in value because of depreciation. PPE is fixed tangible asset not highly liquid.

4.6. ANALYSIS METHOD

First, all the variables are inserted in the model and m-scores of all companies have been calculated in Excel. Using SPSS, descriptive statistics has been performed with a mean, medium, minimum, maximum values and standard variation. Thus, the information presented in the tables could be easier to understand. After, we performed a Mann Whitney U-test to see if there is a significant difference between means of variables in manipulator and non-manipulator group and sustainability-index firms and

others. Also, correlation between dependent and independent variables is analysed and lastly, regression to check to which level independent variables explains dependent variable.

5. PRESENTATION AND ANALYSIS

5.1. DATA ANALYSIS

All data is selected from 27 different industries excluding financial institutions. In the table below, all industries are named and total number of firms that belong to that industry is calculated. We can see the number of manipulators according to Beneish model from each industry in both years.

Industries	Total Number of companies	Sustainability-Index companies (2017)	Sustainability-Index companies (2018)	Manipulators According to Beneish model (2017)	Manipulators According to Beneish model (2018)
Alternative energy	1	0	0		
Automobiles and parts	13	2	2	1	
Beverages	6	2	2		
Chemicals	16	5	5	3	3
Construction and Materials	32	3	3	1	1
Electricity	8	3	2	2	1
Electronic&Electrical Equipment	7	0	0		
FixedLineTelecommunications	1	1	1		
Food and Drug Retailers	6	1	1	1	1
FoodProducers	25	2	2	1	1
Forestry&Paper	2	0	0		
Gas,Water&Multiutilities	1	1	0		
GeneralIndustrials	13	2	1	1	2
GeneralRetailers	6	1	1		

HealthCareEquipment&Services	4	0	0		
HouseholdGoods&HomeContruction	12	1	1	1	
IndustrialEngineering	14	2	2		
IndustrialMetals&Mining	13	1	1		1
Industrial Transportation	6	1	1		
LeisureGoods	2	2	2	1	
Media	5	0	0		
Mining	1	0	0		
MobileTelecommunications	1	1	1		
Oil&GasProducers	3	2	2	2	1
PersonalGoods	28	0	0		
Pharmaceuticals&Biotechnology	3	0	0		
Software&ComputerServices	3	1	1		
SupportServices	7	1	0		1
TechnologyHardware&Equipment	9	2	2		2
Travel&Leisure	15	2	2		2
Unclassified	2	0	0		
Total	265	39	35	14	16

Table 5-1-Industries in analysis

As we see from the above table, the companies that are involved in Sustainability-index (SI) are 39 out of 265 analysed companies in 2018. Moreover, they operate in many analysed industries. Most of sustainability-index manipulator firms are from Chemicals industry, then from Travel&Leisure, TechnologyHardware&Equipment and GeneralIndustrials areas in 2018, while, in 2017, most Sustainability-index manipulator firms are from Chemical industry, Oil&GasProducers and Electricity.

The whole analysis part was based on the below table. We collected the data for all firms. Second, we divided them into sustainability-index firms and others. After, each of this group was separated into manipulators and non-manipulators group of companies according to the m-score from Beneish model.

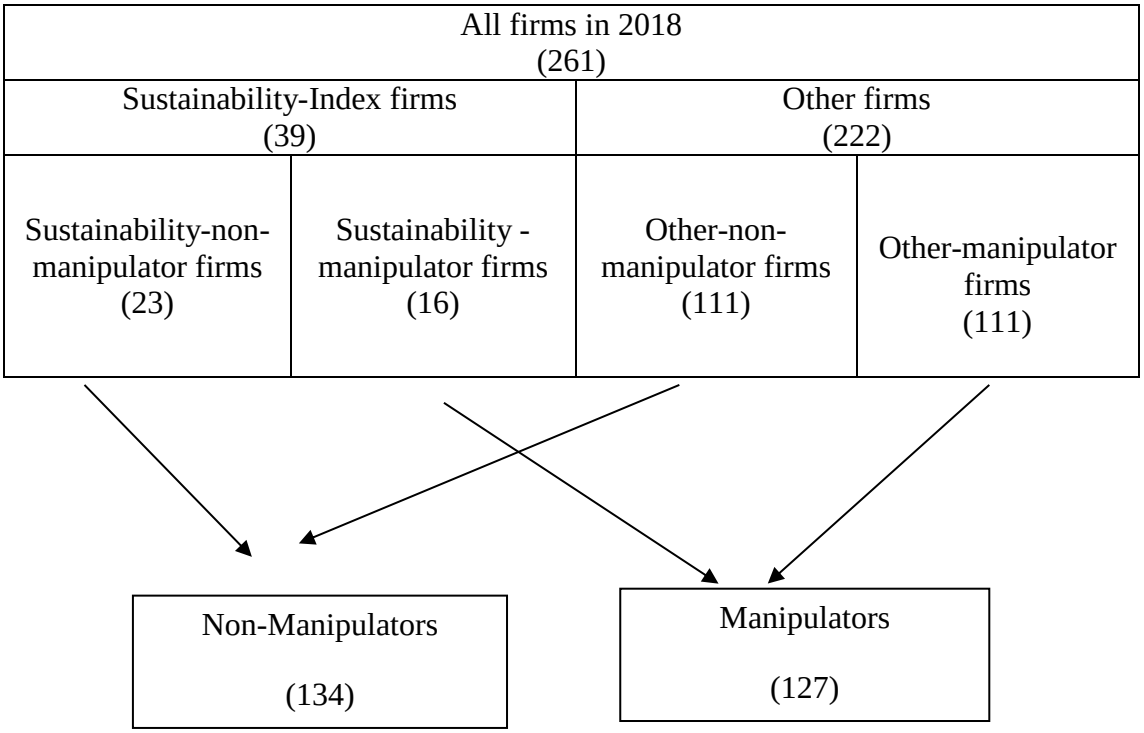

Table 5-2-Sample classification into manipulators and non-manipulators, 2018

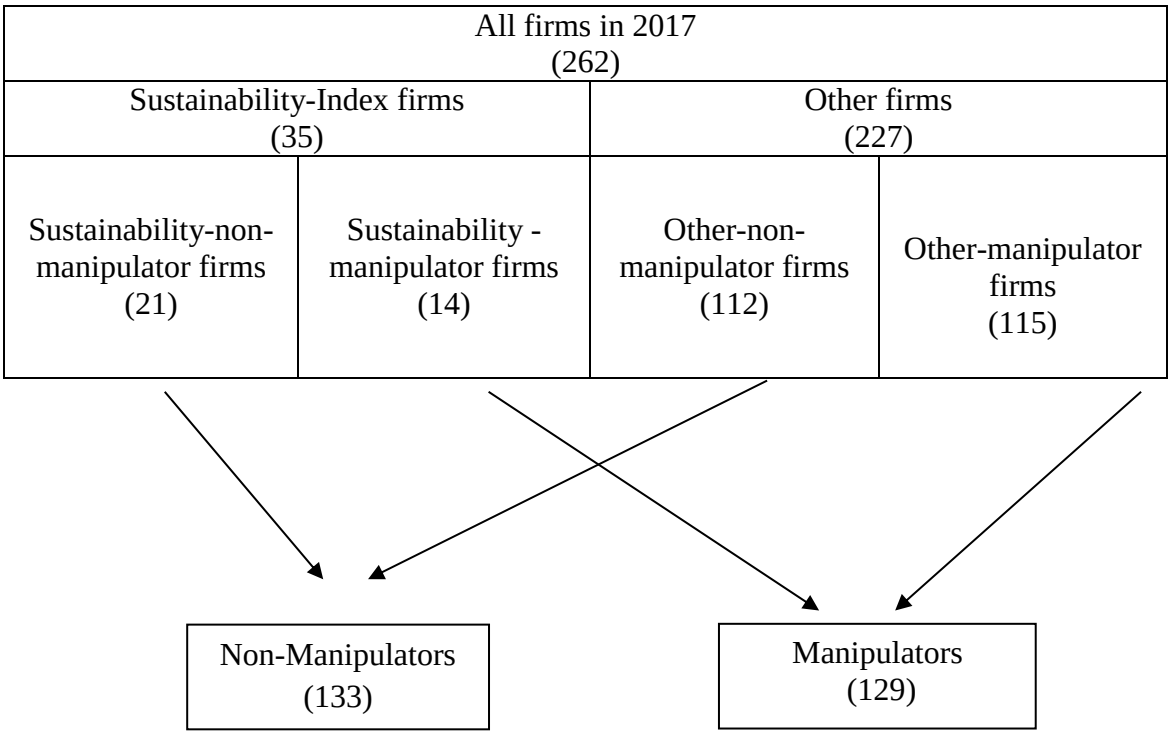

Table 5-3-Sample classification into manipulators and non-manipulators, 2017

After careful analysis and implementation of Beneish model, we calculated the number of manipulators and non-manipulator firms. Using the Beneish model, we concluded that sustainability-index companies manipulate earnings in financial statements in both 2018 and 2017 year. In 2018, 16 out of 39 companies (or 41,03%) turn out to be manipulators while in 2017, 14 out of 35 companies (or 40%) turn out to be manipulators. Therefore, we reject the hypothesis that sustainability-index companies differ from other companies in terms of earnings manipulation. Moreover, there were other authors who found similar results. Riahi-Belkaoui (2015), who relied on the sample of U.S. companies, actually showed that corporate social responsibility level is positively related to accounting earnings informativeness and discretionary accrual adjustment is significantly higher for higher level of social responsibility. So, managers can be more aggressive in accruals accounting and preferred discretionary accruals level if social responsibility is built on the basis of higher earnings. To put it simple, high level of sustainability provides additional incentive for discretionary accruals adjustments. Gargouri et al. (2010) found a positive association of corporate social performance (CSP) with earnings management. The results of analysis showed that environment and employees are positively related to managing earnings because the process of sustainability engagement requires costs to sponsor the whole process. It leads to financial performance decline and increase of managers' incentives to manage earnings. Managers can exercise discretion over earnings computation without violating GAAP. As a result, earnings can appear different than they are in reality. Prior et al. (2008) state that managers can sometimes involve in CSR just in order to get favourable image from media, respect from community and less scrutiny from investors and employees. They also agree that companies that have high level of earnings quality will tend to have less incentives to search for public exposure by promoting socially responsible activities. So, their study showed that managers manipulate earnings and therefore, lower earnings quality in order to gain some private benefits and hence damage stakeholders' interests. Also, Guerard (1997) did not find a big and significant difference between the performances of socially responsible investments and those which are not socially responsible.

According to the above grouping method, we calculated which indexes from Beneish model, turn to be mostly violated in each group.

The threshold for each index is shown below:

Index Type	Manipulators	Non-Manipulators
Days Sales in Receivables Index	1.465	1.031
Gross Margin Index	1.193	1.014
Asset Quality Index	1.254	1.039
Sales Growth Index	1.607	1.134
Depreciation Index	1.077	1.001
Sales, General, Administrative Expenses Index	1.041	1.054
Leverage Index	1.111	1.037
Total Accruals to Total Assets	0.031	0.018

If the index is more than Beneish manipulators index, it will show that the company manipulates index. For each group, we calculated which indexes were mostly violated. We have to highlight that companies whose total m-score was less than -2,22 and thus were not under manipulator group in Beneish model still had some indexes higher than Beneish manipulator index.

1) Other Group - manipulator firms

Based on the indexes proposed by Beneish (1999) and after collecting the data and calculating each index for each company, we obtained the number of manipulative companies (with m-score higher than -2,22) whose some of the indexes are greater than the Beneish manipulator index. The results are as following:

Other manipulator companies	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
2018-(111)	20	15	38	29	42	21	25	68
2017-(115)	23	28	39	14	44	23	43	66

Table 5-4-Number of Other group – manipulator companies whose indexes were higher than Beneish manipulator index, Beneish 1999

According to the table, the highest manipulative index frequency of non-sustainability manipulator companies' are seen in TATA DEPI and AQI in 2018, while TATA, DEPI and LEVI are the highest frequency manipulative indexes in 2017.

2) On the other hand, Sustainability-index manipulator companies, have also indexes higher than Beneish manipulator index in the following frequency:

Sustainability-index manipulator companies	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
2018-(16)	4	3	7	2	7	2	5	8
2017-(14)	4	4	3	2	5	2	3	4

Table 5-5-Number of sustainability-index manipulator companies whose indexes were higher than Beneish manipulator index, Beneish 1999

As seen from the above table, sustainability-index companies have their manipulative indexes mostly as TATA, DEPI and AQI in 2018, while the high frequency of manipulative indexes were in DEPI, DSRI, GMI and TATA in 2017.

As a result, the most manipulative indexes used by both manipulator groups (sustainability and non-sustainability index firms) for both years were TATA and DEPI.

3) Other group – non-manipulator index companies are those whose m-score results were not higher than -2,22. Even though they are not characterized as manipulators according to Beneish, they still have some index higher than Beneish manipulator index.

The frequencies of these companies' manipulative indexes are as following:

Other group non-manipulator companies	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
2018-(111)	7	15	16	6	27	42	40	11
2017-(112)	5	15	5	7	40	34	32	11

Table 5-6-Number of non-sustainability and non-manipulator companies whose index values were higher than Beneish manipulator index, Beneish 1999

As seen from the above table, non-manipulative and non-sustainability index companies have some indexes higher than Beneish manipulators index mostly seen in LEVI, SGAI in 2018, while in 2017, DEPI, SGAI and LEVI were the most frequent ones.

4) Sustainability-index and non-manipulator companies have the following manipulative indexes:

Sustainability-index and non-manipulator companies	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
2018-(23)	1	1	0	1	5	5	6	2
2017-(21)	0	3	3	1	3	4	4	1

Table 5-7-Number of sustainability-index companies whose indexes were higher than Beneish manipulator index, Beneish 1999

Sustainability-index and non-manipulator companies' manipulative indexes were mostly LEVI, DEPI and SGAI in 2018. In 2017, SGAI and LEVI index was mostly violated.

5.2. DESCRIPTIVE ANALYSIS

Looking at the Appendix 1. and 2. Descriptive analysis for all companies in 2018 and 2017, it is noticed that in general the total number of manipulators (129 companies) in 2017 was slightly higher compared to 2018 (128 companies). Mean of m-score for all companies were -2,09 and -2,35 in 2017 and 2018 respectively. In 2018, manipulator group has most indexes' mean higher compared to non-manipulator group

except SGAI, LEVI and TATA in 2018, while in 2017 just DSRI mean was higher in manipulator group. Manipulators in 2017 had higher mean m-score, while in the same year manipulators' DSRI, DEPI, SGAI, LEVI and TATA indexes were higher than the same ones in 2018.

	m-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Non-manipulator (2018)	-3,97	0,87	-0,57	0,36	1,21	0,997	1,27	1,21	-0,13
Manipulator (2018)	-0,66	1,18	2,15	1,51	1,48	1,13	0,90	0,97	0,065
Total (2018)	-2,35	1,024	1,03	0,92	1,34	1,06	1,09	1,09	-0,04
Non-manipulator (2017)	-2,97	0,95	0,86	0,31	1,22	1,11	0,99	1,06	-0,06
Manipulator (2017)	-1,17	1,40	1,24	1,32	1,44	2,14	1,15	1,18	0,07
Total (2017)	-2,09	1,17	1,04	1,05	1,33	1,61	1,07	1,12	0,14

Table 5-8-Descriptive statistics -Mean index of all companies

Non-sustainability companies have m-score mean -2,06 and -2,43 in 2017 and 2018 respectively while 2017 year represents higher number of manipulators in non-sustainability index firms' group (Appendix 3. and 4.). From 222 of total number of non-sustainability index companies, 111 were detected as manipulators and 111 as non-manipulators in 2018 according to Beneish model. On the other side, in 2017, 115 from 227 companies were detected as manipulators and 112 as non-manipulators. In 2018, we noticed that non-manipulators have a higher index mean in AQI, SGAI and LEVI in 2018 compared to 2017. Regarding 2018' manipulator, the mean indexes were higher in GMI, AQI and SGI, compared to the same indexes in 2017.

	m-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Non-manipulator (2018)	-4,18	0,86	-0,26	0,34	1,20	0,99	1,33	1,25	-0,15
Manipulator (2018)	-0,68	1,19	2,11	1,42	1,49	1,14	0,90	0,96	0,07
Total (2018)	-2,43	1,02	0,92	0,88	1,35	1,07	1,12	1,10	-0,04
Non-manipulator (2017)	-3,03	0,97	0,84	0,23	1,21	1,14	0,99	1,08	-0,06
Manipulator (2017)	-1,13	1,43	1,25	1,33	1,43	2,26	1,17	1,20	0,074
Total (2017)	-2,06	1,20	1,05	0,79	1,32	1,70	1,09	1,14	0,006

Table 5-9-Descriptive statistics- Mean indexes of non-sustainability index firms

In Sustainability-index firms' group, in 2018 and 2017 we have 39 and 35 companies respectively. In 2018, 16 were detected as manipulators, while 23 as non-manipulators. In 2017, 14 companies turned out to be manipulators and 21 to be non-manipulators. We noticed that non-manipulators have higher indexes' mean in DSRI, GMI, DEPI and LEVI in 2018 compared to 2017. The mean m-score for all sustainability-index companies is -1,86 and -2,23 in 2018 and 2017 respectively. In the group of all sustainability-index companies, mean index for manipulators such as GMI, AQI and TATA was higher in 2018 than in 2017 (Appendix 5. and 6.).

	m-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Non-manipulator (2018)	-2,86	0,92	0,96	0,49	1,26	1,01	0,95	1,06	-0,06
Manipulator (2018)	-0,42	1,18	2,56	2,19	1,38	1,04	0,88	1,04	0,05
Total (2018)	-1,86	1,02	1,62	1,19	1,31	1,02	0,92	1,06	-0,02
Non-manipulator (2017)	-2,68	0,86	0,94	0,76	1,28	0,96	0,93	0,98	-0,05
Manipulator (2017)	-1,56	1,21	1,21	1,22	1,53	1,11	0,93	1,01	0,01
Total (2017)	-2,23	1,00	1,05	0,94	1,38	1,02	0,93	0,99	-0,02

Table 5-10-Descriptive statistics-Mean indexes of Sustainability-index firms

5.3. MANN WHITNEY U TEST

In order to verify the hypotheses of this thesis, Mann Whitney U test will be conducted to compare the means of m-scores and other variables of SI firms and Other firms. According to our m-score results that our SI firms manipulate earnings, we impose a hypothesis that SI firms are different than other firms.

First, when we tested Normality of our sample, we obtained results which say that our sample has no normal distribution. The results come out as Kolmogorov-Smirnov and Shapiro-Wilk test. It is usually observed Shapiro-Wilk test and its significance. If its significance is less than 0,05 then we cannot assume our results to be normally distributed. As looking at Appendix No. 7-12, we see those results and therefore conclude that, in order to compare the means of our sample groups, we cannot perform Independent Sample T-test but rather Mann Whitney U test which is non-parametric test used to compare samples which are not normally distributed.

Using Mann Whitney U-test, for the hypothesis, we collected the data of two groups for all sustainability-index firms and all other firms. These tests are taken separately for 2018 and 2017 year. For 2018, we see in Test statistics Table that significance in each field is more than 0,05. Therefore, m-score mean of SI firms is not significantly different than mean m-score of other firms. Nor each variable mean of SI firms group is significantly different than mean of other firms. As a result, there is no significant difference between sustainability-index firms and others according to their m-scores and consequently according to their earnings quality (Appendix No. 13).

Test statistics 2018	m-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Sig	0,818	0,319	0,186	0,672	0,497	0,423	0,581	0,408	0,310

Table 5-11- Test statistics of SI and others, 2018

For 2017, in Appendix No. 14, we see in Test statistics Table that significance in each field is more than 0,05. Therefore, m-score mean of SI firms is not significantly lower than mean m-score of other firms. Nor each variable mean of SI firms group is

significantly different than mean of other firms. As a result, there is no significant difference between sustainability-index firms and others according to their m-scores and consequently according to their earnings quality.

Test statistics 2017	m-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Sig	0,579	0,270	0,229	0,799	0,100	0,389	0,753	0,087	0,068

Table 5-12-Test statistics of SI and others, 2017

According to the results in 2018, (Appendix No. 15) as significance of m-score is more than 0,05, we conclude that Manipulating sustainability-index firms' m-scores are not significantly different than other firm's m-scores and therefore we do not accept our second hypothesis. Also, other variables' significance is more than 0,05 so also, variables of Manipulating sustainability-index firms and others do not differentiate.

Test statistics 2018	m-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Sig	0,581	0,289	0,273	0,437	0,965	0,689	0,071	0,338	0,399

Table 5-13-Test statistics of Manipulating SI firms and Others, 2018

According to the results in 2017, (Appendix No. 16) we obtained the same results and we conclude the same which is manipulating sustainability-index firm's m-scores and variables are not significantly different than other firm's' m-scores in 2017

Test statistics 2017	m-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Sig	0,655	0,832	0,136	0,898	0,140	0,535	0,540	0,307	0,028

Table 5-14-Test statistics of Manipulating SI firms and Others, 2017

According to results, in 2018 m-scores' (Appendix No. 17) as significance of m-score is more than 0,05, we conclude that Non-Manipulating Sustainability-index firms' m-scores are not significantly different than other firm's m-scores and therefore

we reject our third hypothesis. Also, other variables' significance is more than 0,05 so, variables of Manipulating sustainable-index firms and others do not differentiate.

Test statistics 2018	m-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Sig	0,212	0,232	0,350	0,417	0,187	0,344	0,246	0,904	0,937

Table 5-15-Test statistics of Non-Manipulating SI firms and Others, 2018

According to results, in 2017 m-scores' (Appendix No. 18) as significance of m-score is more than 0,05, we conclude that Non-Manipulating Sustainability-index firms' m-scores are not significantly different than other firm's m-scores and therefore we reject the third hypothesis. Also, other variables' significance is more than 0,05 so, variables of Manipulating sustainable-index firms and others do not differentiate.

Test statistics 2017	m-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Sig	0,121	0,236	0,437	0,224	0,251	0,107	0,327	0,213	0,882

Table 5-16-Test statistics of Non-Manipulating SI firms and Others, 2017

For 2018, (Appendix No. 19), we obtained a significance less than 0,05 for m-score which means that m-scores of manipulating firms are significantly different than m-scores of non-manipulating firms. Therefore, we accept our fourth hypothesis that there is a difference between m-scores of manipulating firms and all non-manipulating firm's m-scores. Moreover, indexes such as DSRI, AQI, SGI, DEPI, SGAI and TATA are significantly different between manipulating firms and non-manipulating firms.

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

Table 5-17-Test statistics of manipulators and non-manipulators, 2018

For 2017, (Appendix No. 20), we obtained a significance less than 0,05 for m-score which means that m-scores of manipulating firms are significantly different than

m-scores of non-manipulating firms. Therefore, we accept our fourth hypothesis that there is difference between m-scores of manipulating firms and all non-manipulating firm's m-scores. Moreover, indexes such as DSRI, GMI, AQI and TATA are significantly different between manipulating firms and non-manipulating firms.

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

Table 5-18-Test statistics of manipulators and non-manipulators, 2017

5.4. CORRELATION

Correlation studies are important in order to make prediction. Correlation can or it does not need to lead to causal relationship. Pearson coefficient (p-value) is used to measure linear association between variables. It assumes a linear relationship between independent and dependent variable. It actually shows a degree to which independent variable and dependent variable are characterized by line. Pearson coefficient, in the coefficient table, ranges from -1 to 1. If it is -1, it means a negative relation between dependent and independent variable, so the increase in independent variable causes a decrease in dependent variable and vice versa. If the relationship is positive, then increase in independent variable causes increase in dependent variable. The relationship between variables should be significant with a p-value less than 0,01 or 0,05 depending on which level of significance is chosen. Otherwise, the positive or negative correlation is not significantly different than 0.

In regards to Appendix No. 21, in the sample of all firms for 2018, the results are as follows:

**Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Non-manipulators 2018

DSRI – 0,241 TATA**, 0,221 LEVI*

GMI – -0,769 SGI**

AQI – -0,251 DEPI**

SGI – -.769 GMI**, -0,187 SGAI*, 0,255 TATA**

DEPI – -0.251 AQI**, 0,246 SGAI**

SGAI – -0.187 SGI*, 0.246 DEPI**,-0,256 TATA**

LEVI –0.221 DSRI*, -0,405 TATA**

TATA – 0.241**DSRI, 0.255**SGI, -0.256 SGAI**, -0.405 LEVI**

Manipulators 2018

DSRI – 0,222 LEVI*

GMI – /

AQI – -0,194 TATA*

SGI – /

DEPI – 0,740 SGAI**, 0,471 TATA**

SGAI – 0.740 DEPI**, 0,221 LEVI*, 0,356 TATA**

LEVI – 0.222 DSRI*, 0.221 SGAI*

TATA – -0.194 AQI*, 0.471 DEPI**, 0.356 SGAI**

According to the results for 2018 on the sample of all firms, it is shown that DSRI has a significant positive correlation to LEVI in both manipulators and non-manipulators group. DEPI is also significantly positively correlated with SGAI in both groups. SGAI is significantly positively correlated to DEPI and TATA in both groups. LEVI is significantly positively correlated to DEPI and SGAI in both groups. TATA is significantly positively correlated to SGAI in both groups.

In regards to Appendix No. 22, in the sample of all firms for 2017, the results are as follows:

Non-manipulators 2017

DSRI – -0,360 GMI**, -0,444 SGI**, 0,713 SGAI**, 0,338 LEVI**, -0,332 TATA**

GMI – -0,360 DSRI**, -0,205 SGAI*,

AQI –-0,178 SGI*

SGI – -0,444 DSRI**, -0,178 AQI*, -0,620 SGAI**, 0,339 TATA**

DEPI – /

SGAI – 0,713 DSRI**, -0,205 GMI*, -0,620 SGI**, 0,206 LEVI*, -0,474 TATA**

LEVI –0,338 DSRI**, 0,206 SGAI*, -0,172 TATA*

TATA –-0,332 DSRI**, 0,339 SGI**, -0,474 SGAI**, -0,172 LEVI*

Manipulators 2017

DSRI – 0,299 DEPI**, 0,663 SGAI**, 0,394 LEVI**

GMI – /

AQI – 0,249 LEVI**, -0,418 TATA**

SGI – 0,329 LEVI**, 0,364 TATA**

DEPI –0,299 DSRI**, 0,488 SGAI**, 0,475 LEVI**

SGAI – 0,663 DSRI**, 0,488 DEPI**, 0,396 LEVI**

LEVI – 0,394 DSRI**, 0,249 AQI**, 0,329 SGI**, 0,475 DEPI**, 0,396 SGAI**

TATA – -0,418 AQI**, 0,364 SGI**

According to the results, DSRI is significantly positively correlated to SGAI and LEVI in both groups. SGI is significantly positively correlated to TATA in both groups. SGAI is significantly positively correlated to DSRI and LEVI in both groups. LEVI is significantly positively correlated to DSRI, SGI and SGAI in both groups. TATA is significantly positively correlated to SGI in both groups.

As we see from the results, on the example of 2018 and 2017 year, each variable is correlated to different variables in both years with different Pearson coefficient.

6. CONCLUSION AND LIMITATIONS

Analysis of earnings quality has important impact on investors since investors make decisions according to the financial statements reported by companies. High earnings quality does not contain earnings distortion and manipulation in financial

statements. Also, high earnings quality will not be intentionally overstated or understated for future benefits. In each report they need to be accurate and non-violated. Therefore, knowing the real quality of earnings does not misguide investors in their decisions. Literature accepts many different proxies as to measure earnings quality such as restatements, ERC, earnings persistence, smoothness, accruals quality, etc. In our study, we accepted earnings manipulation as a proxy for earnings quality because distorted earnings in financial statements will tend to distort quality of earnings information presented for all stakeholders.

Sustainability plays significant role in society because those companies are concerned about green products and more-healthy environment and they are aware of pollution and consequences of it. Sustainability-index companies take care of natural resources, quality of human life, technology development that will not destroy environment. Therefore, the main purpose of analysing both earning quality and sustainability-index companies was to understand if these companies are really what they present themselves in public. Financial reports should be free of managers' interests and relied on GAAP or IFRS principles. Companies have pressure to meet sales, profit, expenses and other expectations. Sometimes, in bad economic time, companies struggle with inflation, so its earnings quality is naturally poor. Therefore, external factors can affect earnings quality. As long as companies implement GAAP/IFRS principles, the earnings quality should be high.

Unfortunately, our results lead us to conclude that a big percentage of sustainability-index companies, operating in Turkey, are prone to manipulate earnings in both 2018 and 2017 year. According to Beneish model, in the group of non-sustainability index companies, 115 out of 227 companies have a high possibility to have manipulated earnings which is 50,66% in 2018. In 2017, 111 out of 222 companies, which is 50%, have a high possibility to have manipulated earnings. Also, sustainability-index companies are also found to have manipulated earnings. In 2018, 16 out of 39 or 41,03% have a high possibility to have manipulated earnings while in 2017, 14 out of 35 or 40% of companies have a high possibility to have manipulated earnings. Almost each industry group tend to have potential manipulators at least in one year.

Thus, we cannot say that they are more careful or different than those companies out of sustainability-index. Being involved in sustainability-index companies has many advantages since these companies have big reputation among all stakeholders. These companies might have more interested customers in their product because people who care about environment will prefer green product over others. Manipulators mostly manipulate TATA and DEPI index while non-manipulators according to Beneish model had also violated indexes mostly in LEVI and SGAI.

Also, we performed statistical test to see if the independent variables in Beneish model are significantly different between manipulators and non-manipulators. The result showed significance when the test is performed in all companies. We did not find significant difference between sustainability-index firms and others, non-manipulating sustainability-index firms and others or manipulating sustainability-index firms and others. The only significant difference was between manipulators and non-manipulators.

So, detection of earnings manipulation can be beneficial for a wide participant group. All interested parties can prevent the investment risk by making this analysis for a specific firm. But before implementing Beneish model, investors should be aware of potential drawbacks of model. First of all, companies' data taken from Thompson Reuters are public-listed companies that appear in Turkey. Therefore, there are not all existing companies that operate in Turkey. So, the sample is not fully representing the whole market. Second, some data needed for calculation of the earnings manipulation was not presented and therefore, they needed to be collected manually from KAP. When presenting financial reports, every company has its own frame to which it conducts the report. Next, the Beneish model is probabilistic model which means it cannot detect earnings manipulation in 100% cases. The model itself gives a probability of detection of earnings manipulation. Beneish excludes financial institutions from its model. Eventually, Beneish model accurately identifies manipulators in 58 to 76% cases, while inaccurately identifies non-manipulators in 7,6 to 17.5% cases. Moreover, these coefficients in model are made on the US example which might mean different coefficient for another market. Also, managers know the model so they can focus on

non-altering those indexes that are included in model. Therefore, this model cannot be completely efficient in detection of earnings manipulation.

Beyond the all analysis made in this thesis, in future studies we would recommend to use a larger sample and include the firms other than BIST companies so that the analyses would be more accurate. Also, in order to detect manipulation, more variables might be used as proxies in a new model.

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APPENDIX 1. DESCRIPTIVE STATISTICS ALL COMPANIES 2018

Report

ID		m-score 2018	DSRI 2018	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
non-manipulators	N	133	133	133	133	133	133	133	133	133
	Minimum	-54.3823518	.0638661707	-105.626800	-35.1448344	.0937660056	.0875035142	.2584445120	.3346328833	-3.48895587
	Maximum	-2.23938663	2.171772096	3.074380996	2.685578541	5.463455150	2.967784860	25.28075039	9.556670283	.2770388392
	Mean	-3.96979570	.8703554529	-.056775659	.3581664670	1.211879295	.9977583570	1.271825847	1.217500048	-.135486004
	Median	-2.77068307	.8484651421	.9390009856	.9620104010	1.199815169	.9727050452	.9612020386	1.034727112	-.050176573
	Std. Deviation	5.298471735	.3509870976	9.433378677	3.372314190	.4689181824	.3475927263	2.278328165	1.112870231	.3932730295
manipulators	N	128	128	128	128	128	128	128	128	128
	Minimum	-2.21429890	-1.66989166	-5.22074632	-2.46969709	-1.81190978	-1.01925553	-1.09113926	-1.84065526	-.188754445
	Maximum	64.73100756	7.107686422	128.7256370	16.07903942	11.80970455	9.572070524	4.333062121	1.765895125	.7627117062
	Mean	-.662870326	1.184204499	2.155801141	1.510489269	1.478791051	1.129396238	.9003181759	.9679786510	.0650975674
	Median	-1.67335906	1.018638093	.9624439560	1.109546299	1.371025292	.9993869580	.9139433310	.9936675257	.0490310732
	Std. Deviation	6.052717125	.8263069596	11.52975908	1.875664260	1.066127487	.8894903224	.4272254195	.3489952450	.1335619902
Total	N	261	261	261	261	261	261	261	261	261
	Minimum	-54.3823518	-1.66989166	-105.626800	-35.1448344	-1.81190978	-1.01925553	-1.09113926	-1.84065526	-3.48895587
	Maximum	64.73100756	7.107686422	128.7256370	16.07903942	11.80970455	9.572070524	25.28075039	9.556670283	.7627117062
	Mean	-2.34800854	1.024273759	1.028319477	.9232902933	1.342778547	1.062316398	1.089630514	1.095129401	-.037115517
	Median	-2.26966003	.9345091220	.9487149554	1.013638897	1.290959340	.9863908282	.9400726675	1.016014422	-.002944295
	Std. Deviation	5.906883851	.6486662288	10.55181396	2.797376144	.8274689922	.6724242018	1.661053260	.8389753823	.3119752422

APPENDIX 2.DESCRIPTIVE STATISTICS ALL COMPANIES 2017

Report

ID		m-score 2017	DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
non-manipulators	N	133	133	133	133	133	133	133	133	133
	Minimum	-12.9715362	.2218635212	-1.96410367	-25.2032735	.1992742680	.0480686269	.2152371330	.3684399706	-.514453101
	Maximum	-2.22214562	5.400546713	2.828237965	2.461066704	1.916704482	5.547670805	4.850207083	2.745461377	.0864721911
	Mean	-2.97321211	.9511442792	.8565123767	.3146088128	1.223820508	1.108974814	.9886009958	1.062378331	-.061194646
	Median	-2.72732932	.9193308214	.9447493816	.8767711018	1.232438891	.9791405107	.9341031816	1.009328893	-.036080283
	Std. Deviation	1.083057071	.4703292434	.5247319125	2.519270108	.2675441514	.7167601616	.4318293473	.2946367049	.0981091799
manipulators	N	129	129	129	129	129	129	129	129	129
	Minimum	-2.21709789	.2242299153	-2.11034949	-3.34193879	.0906319024	.1417942705	.0648518211	.3256794439	-.363976431
	Maximum	11.85381138	8.103717680	14.03285807	12.03110204	7.416666667	130.9230769	11.49930798	7.115282379	1.348783347
	Mean	-1.17315978	1.403680748	1.242512915	1.322732295	1.440634589	2.138216917	1.147189504	1.178752258	.0671109148
	Median	-1.72993715	1.083429515	1.019653551	1.100463447	1.268376459	.9967734494	.9194264720	1.044656321	.0395007893
	Std. Deviation	1.801880413	1.188568673	1.423639325	1.463279604	.9698283641	11.45229394	1.499369502	.8204629168	.1527646473
Total	N	262	262	262	262	262	262	262	262	262
	Minimum	-12.9715362	.2218635212	-2.11034949	-25.2032735	.0906319024	.0480686269	.0648518211	.3256794439	-.514453101
	Maximum	11.85381138	8.103717680	14.03285807	12.03110204	7.416666667	130.9230769	11.49930798	7.115282379	1.348783347
	Mean	-2.08692680	1.173958037	1.046566077	.8109749549	1.330572479	1.615739055	1.066684651	1.119676944	.0019787028
	Median	-2.22852700	.9890659384	.9831464174	1.001045635	1.243880146	.9840835664	.9241287056	1.023345474	-.004164526
	Std. Deviation	1.731616618	.9252425577	1.081941999	2.124832408	.7136315182	8.052754599	1.096877859	.6143565912	.1429803927

APPENDIX 3.DESCRIPTIVE STATISTICS NON-SUSTAINABILITY COMPANIES 2018

Report

ID		m-score 2018	DSRI 2018	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
non-manipulators	N	111	111	111	111	111	111	111	111	111
	Minimum	-54.3823518	.0638661707	-105.626800	-35.1448344	.0937660056	.0875035142	.2584445120	.3346328833	-3.48895587
	Maximum	-2.23938663	2.171772096	3.074380996	2.685578541	5.463455150	2.967784860	25.28075039	9.556670283	.2770388392
	Mean	-4.18412761	.8600148758	-.257642962	.3359348154	1.204488435	.9954431317	1.334576221	1.247759944	-.149202805
	Median	-2.77142736	.8301588906	.9230265061	.9654697671	1.181010833	.9653966174	.9680038954	1.046535411	-.044513360
	Std. Deviation	5.771552501	.3693823609	10.32164557	3.653399198	.5045256210	.3721457980	2.489983832	1.214363401	.4280008675
manipulators	N	111	111	111	111	111	111	111	111	111
	Minimum	-2.21429890	-1.66989166	-5.22074632	-2.46969709	-1.81190978	-1.01925553	-1.09113926	-1.84065526	-.188754445
	Maximum	64.73100756	7.107686422	128.7256370	9.951093749	11.80970455	9.572070524	4.333062121	1.765895125	.7627117062
	Mean	-.684466009	1.188214689	2.107114056	1.417314041	1.492972932	1.144291443	.9030030067	.9563133794	.0675810548
	Median	-1.67476607	1.010785477	.9573199479	1.104279314	1.368165275	.9941682934	.9069839503	.9919344594	.0557316838
	Std. Deviation	6.379786781	.8741020749	12.17120273	1.445385543	1.142700085	.9523663828	.4430725301	.3675830052	.1344769842
Total	N	222	222	222	222	222	222	222	222	222
	Minimum	-54.3823518	-1.66989166	-105.626800	-35.1448344	-1.81190978	-1.01925553	-1.09113926	-1.84065526	-3.48895587
	Maximum	64.73100756	7.107686422	128.7256370	9.951093749	11.80970455	9.572070524	25.28075039	9.556670283	.7627117062
	Mean	-2.43429681	1.024114783	.9247355471	.8766244280	1.348730683	1.069867287	1.118789614	1.102036662	-.040810875
	Median	-2.22684277	.9233984696	.9377333101	1.025182577	1.283746519	.9846530727	.9428523118	1.013953594	.0004769009
	Std. Deviation	6.317797271	.6893926216	11.32101717	2.824354172	.8930423570	.7252211784	1.797350714	.9069659081	.3346356440

APPENDIX 4.DESCRIPTIVE STATISTICS NON-SUSTAINABILITY COMPANIES 2017

Report

ID		m-score 2017	DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
non-manipulators	N	112	112	112	112	112	112	112	112	112
	Minimum	-12.9715362	.2218635212	-1.96410367	-25.2032735	.1992742680	.0480686269	.2152371330	.3684399706	-.514453101
	Maximum	-2.22214562	5.400546713	2.828237965	2.195692216	1.916704482	5.547670805	4.850207083	2.745461377	.0864721911
	Mean	-3.02722626	.9675727953	.8400085345	.2318124099	1.212674812	1.136398449	.9986557690	1.077199105	-.063980407
	Median	-2.75130534	.9387840493	.9260345023	.8387732733	1.228122587	.9883743427	.9417376188	1.017217797	-.034706027
	Std. Deviation	1.161434860	.5067536321	.5639938202	2.717357923	.2841110444	.7745474779	.4591896168	.3153663073	.1041053613
manipulators	N	115	115	115	115	115	115	115	115	115
	Minimum	-2.21709789	.2242299153	-2.11034949	-3.34193879	.0906319024	.1417942705	.0648518211	.3256794439	-.363976431
	Maximum	11.85381138	8.103717680	14.03285807	12.03110204	7.416666667	130.9230769	11.49930798	7.115282379	1.348783347
	Mean	-1.12654509	1.427552842	1.246542754	1.334964377	1.430157358	2.263853272	1.172967872	1.199422478	.0741780056
	Median	-1.72993715	1.080233151	1.000000000	1.100463447	1.255819906	.9967734494	.9134267859	1.060548076	.0459686154
	Std. Deviation	1.893162220	1.246677372	1.501776066	1.529213721	.9949303403	12.12870281	1.585940116	.8661819901	.1598987256
Total	N	227	227	227	227	227	227	227	227	227
	Minimum	-12.9715362	.2218635212	-2.11034949	-25.2032735	.0906319024	.0480686269	.0648518211	.3256794439	-.514453101
	Maximum	11.85381138	8.103717680	14.03285807	12.03110204	7.416666667	130.9230769	11.49930798	7.115282379	1.348783347
	Mean	-2.06432611	1.200602334	1.045961994	.7906779440	1.322853194	1.707576003	1.086963662	1.139118435	.0060117403
	Median	-2.18023813	.9993102867	.9757443572	1.000198014	1.234543512	.9907314369	.9260905148	1.031716614	.0005273192
	Std. Deviation	1.837771291	.9814410275	1.155581099	2.260927929	.7421882143	8.649706167	1.174700936	.6565468188	.1516977220

APPENDIX 5.DESCRIPTIVE STATISTICS SUSTAINABILITY-INDEX COMPANIES 2018

Report

ID		m-score 2018	DSRI 2018	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
non-manipulators	N	23	23	23	23	23	23	23	23	23
	Minimum	-5.23350730	.5933811528	.7426716786	-4.17112913	.8084869241	.6789782833	.6834211597	.8728413375	-.257712410
	Maximum	-2.20431389	1.647077211	1.318044026	1.178953227	1.622406200	1.617633580	1.340721236	1.553050848	.0898303219
	Mean	-2.85865119	.9176966472	.9608268246	.4939571522	1.257853598	1.006733477	.9513009383	1.064457619	-.063236955
	Median	-2.67052880	.9230138281	.9945202976	.9580817043	1.253438160	.9906138710	.9266417153	1.020322698	-.053652969
	Std. Deviation	.7126445657	.2328313746	.1402463011	1.223171213	.2159707933	.1801851627	.1575635900	.1719363115	.0808216084
manipulators	N	16	16	16	16	16	16	16	16	16
	Minimum	-2.17391805	.5210174887	.5561413134	.5106920961	.9265076194	.6150444596	.1330600979	.6059813984	-.161915139
	Maximum	11.32866966	1.988747361	25.93739481	16.07903942	1.664466905	1.413034891	1.629818609	1.410371616	.4760275760
	Mean	-.416710051	1.179684154	2.562567187	2.187945565	1.382272270	1.037448257	.8838967754	1.043381847	.0517071467
	Median	-1.58139208	1.156634228	.9750216397	1.181156762	1.356949793	1.073139694	.9179602354	1.027148728	.0347034959
	Std. Deviation	3.387346831	.4103966520	6.236773468	3.727749827	.1906965219	.1858727621	.3244913629	.1810189261	.1339043967
Total	N	39	39	39	39	39	39	39	39	39
	Minimum	-5.23350730	.5210174887	.5561413134	-4.17112913	.8084869241	.6150444596	.1330600979	.6059813984	-.257712410
	Maximum	11.32866966	1.988747361	25.93739481	16.07903942	1.664466905	1.617633580	1.629818609	1.553050848	.4760275760
	Mean	-1.85682918	1.025178701	1.617951076	1.188926757	1.308897156	1.019334412	.9236479484	1.055811149	-.016080400
	Median	-2.34317473	1.010186300	.9830602677	.9985387144	1.310005885	1.003928088	.9264177521	1.020322698	-.027391046
	Std. Deviation	2.510775340	.3389871535	4.000333354	2.657829813	.2126090828	.1807440253	.2388827200	.1736659818	.1189129694

APPENDIX 6.DESCRIPTIVE STATISTICS SUSTAINABILITY-INDEX COMPANIES 2017

Report

ID		m-score 2017	DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
non-manipulators	N	21	21	21	21	21	21	21	21	21
	Minimum	-3.57584363	.4950918029	.3652594760	-1.35572840	1.092233476	.7257262361	.6329056857	.7528244234	-.159153025
	Maximum	-2.23016441	1.078457575	1.260741589	2.461066704	1.610143992	1.507310384	1.754706076	1.178887792	.0691802289
	Mean	-2.68513667	.8635255267	.9445328680	.7561896281	1.283264222	.9627154237	.9349755391	.9833342023	-.046337251
	Median	-2.58180631	.9072572481	.9824018233	.9133168936	1.242475881	.9184008803	.9188743278	.9830829840	-.049435837
	Std. Deviation	.3896685910	.1586670182	.2054585562	.8147653452	.1415285672	.1856552618	.2385665706	.1148062237	.0556954688
manipulators	N	14	14	14	14	14	14	14	14	14
	Minimum	-2.20404232	.3487042195	.8375369110	.0175167720	.9979431489	.8798474190	.6858668564	.7351413852	-.060520775
	Maximum	-.352901936	2.509800798	2.514358309	3.339537002	4.076442840	2.008905062	1.320887702	1.210328871	.0718200480
	Mean	-1.55606610	1.207588545	1.209410664	1.222254479	1.526697559	1.106203996	.9354386302	1.008961171	.0090598120
	Median	-1.74978783	1.116065476	1.080045302	1.097509248	1.343928573	1.008319192	.9398823163	1.008105457	.0111314538
	Std. Deviation	.6013583750	.4837233130	.4205198418	.7506422172	.7559617449	.2908225623	.1569643792	.1179115459	.0387413073
Total	N	35	35	35	35	35	35	35	35	35
	Minimum	-3.57584363	.3487042195	.3652594760	-1.35572840	.9979431489	.7257262361	.6329056857	.7351413852	-.159153025
	Maximum	-.352901936	2.509800798	2.514358309	3.339537002	4.076442840	2.008905062	1.754706076	1.210328871	.0718200480
	Mean	-2.23350844	1.001150734	1.050483986	.9426155685	1.380637557	1.020110852	.9351607755	.9935849900	-.024178426
	Median	-2.34363138	.9497924935	1.003561918	1.012532590	1.273662534	.9506652768	.9204309261	.9931351035	-.027730147
	Std. Deviation	.7365733392	.3654062304	.3313293468	.8121593963	.4949035859	.2402092097	.2071212763	.1150277120	.0561849548

APPENDIX 7. Normality test - All firms 2018

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
m-score 2018	.322	261	.000	.314	261	.000
DSRI 2018	.201	261	.000	.696	261	.000
GMI	.437	261	.000	.123	261	.000
AQI	.323	261	.000	.338	261	.000
SGI	.275	261	.000	.406	261	.000
DEPI	.249	261	.000	.445	261	.000
SGAI	.375	261	.000	.173	261	.000
LEVI	.295	261	.000	.347	261	.000
TATA	.261	261	.000	.482	261	.000

a. Lilliefors Significance Correction

APPENDIX 8. Normality test - All firms 2017

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
m-score 2017	.194	262	.000	.676	262	.000
DSRI 2017	.274	262	.000	.515	262	.000
GMI	.280	262	.000	.431	262	.000
AQI	.294	262	.000	.420	262	.000
SGI	.275	262	.000	.464	262	.000
DEPI	.442	262	.000	.062	262	.000
SGAI	.364	262	.000	.295	262	.000
LEVI	.275	262	.000	.408	262	.000
TATA	.139	262	.000	.766	262	.000

a. Lilliefors Significance Correction

APPENDIX 9. Normality test - All Non-sustainability Index firms 2018

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
m-score 2018	.324	222	.000	.309	222	.000
DSRI 2018	.208	222	.000	.691	222	.000
GMI 2018	.437	222	.000	.123	222	.000
AQI 2018	.334	222	.000	.315	222	.000
SGI 2018	.281	222	.000	.414	222	.000
DEPI 2018	.249	222	.000	.456	222	.000
SGAI 2018	.381	222	.000	.180	222	.000
LEVI 2018	.303	222	.000	.359	222	.000
TATA 2018	.274	222	.000	.483	222	.000

a. Lilliefors Significance Correction

APPENDIX 10. Normality test - All Non-sustainability index firms 2017

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
m-score 2017	.205	227	.000	.681	227	.000
DSRI 2017	.284	227	.000	.520	227	.000
GMI	.278	227	.000	.440	227	.000
AQI	.299	227	.000	.419	227	.000
SGI	.278	227	.000	.463	227	.000
DEPI	.445	227	.000	.068	227	.000
SGAI	.370	227	.000	.306	227	.000
LEVI	.278	227	.000	.423	227	.000
TATA	.141	227	.000	.774	227	.000

a. Lilliefors Significance Correction

APPENDIX 11. Normality test - All Sustainability-Index firms 2018

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
m-score 2018	.317	39	.000	.548	39	.000
DSRI 2018	.121	39	.158	.933	39	.023
GMI	.487	39	.000	.180	39	.000
AQI	.371	39	.000	.410	39	.000
SGI	.078	39	.200*	.973	39	.455
DEPI	.125	39	.128	.943	39	.047
SGAI	.156	39	.017	.892	39	.001
LEVI	.164	39	.010	.899	39	.002
TATA	.135	39	.069	.864	39	.000

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

APPENDIX 12. Normality test - All Sustainability-Index firms 2017

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
m-score 2017	.149	35	.046	.950	35	.116
DSRI 2017	.210	35	.000	.811	35	.000
GMI	.206	35	.001	.749	35	.000
AQI	.214	35	.000	.848	35	.000
SGI	.282	35	.000	.442	35	.000
DEPI	.237	35	.000	.769	35	.000
SGAI	.157	35	.028	.849	35	.000
LEVI	.137	35	.097	.957	35	.187
TATA	.065	35	.200*	.978	35	.706

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

APPENDIX 13. Mann-Whitney U test- Sustainability-Index Firms and Others 2018

Statistics

sust index n others			m-score 2018	DSRI 2018	GMI 2018	AQI 2018	SGI 2018	DEPI 2018	SGAI 2018	LEVI 2018	TATA 2018
sustainability index firms	N	Valid	39	39	39	39	39	39	39	39	39
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-1.85682918	1.025178701	1.617951076	1.188926757	1.308897156	1.019334412	.9236479484	1.055811149	-.016080400
	Median		-2.34317473	1.010186300	.9830602677	.9985387144	1.310005885	1.003928088	.9264177521	1.020322698	-.027391046
	Skewness		4.121	.934	6.227	4.599	-.345	.822	-.417	.812	1.548
	Std. Error of Skewness		.378	.378	.378	.378	.378	.378	.378	.378	.378
	Minimum		-5.23350730	.5210174887	.5561413134	-4.17112913	.8084869241	.6150444596	.1330600979	.6059813984	-.257712410
	Maximum		11.32866966	1.988747361	25.93739481	16.07903942	1.664466905	1.617633580	1.629818609	1.553050848	.4760275760
other firms	N	Valid	222	222	222	222	222	222	222	222	222
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-2.43429681	1.024114783	.9247355471	.8766244280	1.348730683	1.069867287	1.118789614	1.102036662	-.040810875
	Median		-2.22684277	.9233984696	.9377333101	1.025182577	1.283746519	.9846530727	.9428523118	1.013953594	.0004769009
	Skewness		2.593	3.733	2.727	-9.512	7.870	7.804	11.751	7.027	-6.516
	Std. Error of Skewness		.163	.163	.163	.163	.163	.163	.163	.163	.163
	Minimum		-54.3823518	-1.66989166	-105.626800	-35.1448344	-1.81190978	-1.01925553	-1.09113926	-1.84065526	-3.48895587
	Maximum		64.73100756	7.107686422	128.7256370	9.951093749	11.80970455	9.572070524	25.28075039	9.556670283	.7627117062

Ranks

	sust index n others	N	Mean Rank	Sum of Ranks
m-score 2018	sustainability index firms	39	128.44	5009.00
	other firms	222	131.45	29182.00
	Total	261		
DSRI 2018	sustainability index firms	39	142.10	5542.00
	other firms	222	129.05	28649.00
	Total	261		
GMI 2018	sustainability index firms	39	145.74	5684.00
	other firms	222	128.41	28507.00
	Total	261		
AQI 2018	sustainability index firms	39	126.28	4925.00
	other firms	222	131.83	29266.00
	Total	261		
SGI 2018	sustainability index firms	39	138.56	5404.00
	other firms	222	129.67	28787.00
	Total	261		
DEPI 2018	sustainability index firms	39	139.92	5457.00
	other firms	222	129.43	28734.00
	Total	261		
SGAI 2018	sustainability index firms	39	124.85	4869.00
	other firms	222	132.08	29322.00
	Total	261		
LEVI 2018	sustainability index firms	39	140.23	5469.00
	other firms	222	129.38	28722.00
	Total	261		
TATA 2018	sustainability index firms	39	119.69	4668.00
	other firms	222	132.99	29523.00
	Total	261		

Test Statistics[a]

	m-score 2018	DSRI 2018	GMI 2018	AQI 2018	SGI 2018	DEPI 2018	SGAI 2018	LEVI 2018	TATA 2018
Mann-Whitney U	4229.000	3896.000	3754.000	4145.000	4034.000	3981.000	4089.000	3969.000	3888.000
Wilcoxon W	5009.000	28649.000	28507.000	4925.000	28787.000	28734.000	4869.000	28722.000	4668.000
Z	-.230	-.996	-1.323	-.423	-.679	-.800	-.552	-.828	-1.014
Asymp. Sig. (2-tailed)	.818	.319	.186	.672	.497	.423	.581	.408	.310

a. Grouping Variable: sust index n others

APPENDIX 14. Mann-Whitney U test- Sustainability-Index Firms and Others 2017

Statistics

company name			m-score 2017	DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
sustainability-index firms	N	Valid	35	35	35	35	35	35	35	35	35
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-2.23350844	1.001150734	1.050483986	.9426155685	1.380637557	1.020110852	.9351607755	.9935849900	-.024178426
	Median		-2.34363138	.9497924935	1.003561918	1.012532590	1.273662534	.9506652768	.9204309261	.9931351035	-.027730147
	Std. Deviation		.7365733392	.3654062304	.3313293468	.8121593963	.4949035859	.2402092097	.2071212763	.1150277120	.0561849548
	Skewness		.716	2.081	2.457	-.291	5.001	2.410	1.967	-.213	-.385
	Std. Error of Skewness		.398	.398	.398	.398	.398	.398	.398	.398	.398
	Minimum		-3.57584363	.3487042195	.3652594760	-1.35572840	.9979431489	.7257262361	.6329056857	.7351413852	-.159153025
	Maximum		-.352901936	2.509800798	2.514358309	3.339537002	4.076442840	2.008905062	1.754706076	1.210328871	.0718200480
other firms	N	Valid	227	227	227	227	227	227	227	227	227
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-2.06432611	1.200602334	1.045961994	.7906779440	1.322853194	1.707576003	1.086963662	1.139118435	.0060117403
	Median		-2.18023813	.9993102867	.9757443572	1.000198014	1.234543512	.9907314369	.9260905148	1.031716614	.0005273192
	Std. Deviation		1.837771291	.9814410275	1.155581099	2.260927929	.7421882143	8.649706167	1.174700936	.6565468188	.1516977220
	Skewness		2.223	4.395	7.038	-6.331	5.912	14.884	6.708	6.475	2.790
	Std. Error of Skewness		.162	.162	.162	.162	.162	.162	.162	.162	.162
	Minimum		-12.9715362	.2218635212	-2.11034949	-25.2032735	.0906319024	.0480686269	.0648518211	.3256794439	-.514453101
	Maximum		11.85381138	8.103717680	14.03285807	12.03110204	7.416666667	130.9230769	11.49930798	7.115282379	1.348783347

Ranks

	company name	N	Mean Rank	Sum of Ranks
m-score 2017	sustainability-index firms	35	124.89	4371.00
	other firms	227	132.52	30082.00
	Total	262		
DSRI 2017	sustainability-index firms	35	118.34	4142.00
	other firms	227	133.53	30311.00
	Total	262		
GMI	sustainability-index firms	35	145.83	5104.00
	other firms	227	129.29	29349.00
	Total	262		
AQI	sustainability-index firms	35	134.54	4709.00
	other firms	227	131.03	29744.00
	Total	262		
SGI	sustainability-index firms	35	151.11	5289.00
	other firms	227	128.48	29164.00
	Total	262		
DEPI	sustainability-index firms	35	121.23	4243.00
	other firms	227	133.08	30210.00
	Total	262		
SGAI	sustainability-index firms	35	127.74	4471.00
	other firms	227	132.08	29982.00
	Total	262		
LEVI	sustainability-index firms	35	111.11	3889.00
	other firms	227	134.64	30564.00
	Total	262		
TATA	sustainability-index firms	35	109.71	3840.00
	other firms	227	134.86	30613.00
	Total	262		

Test Statistics[a]

	m-score 2017	DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Mann-Whitney U	3741.000	3512.000	3471.000	3866.000	3286.000	3613.000	3841.000	3259.000	3210.000
Wilcoxon W	4371.000	4142.000	29349.000	29744.000	29164.000	4243.000	4471.000	3889.000	3840.000
Z	-.555	-1.104	-1.202	-.255	-1.645	-.862	-.315	-1.710	-1.827
Asymp. Sig. (2-tailed)	.579	.270	.229	.799	.100	.389	.753	.087	.068

a. Grouping Variable: company name

APPENDIX 15. Mann-Whitney U test- Manipulators of Sustainability-Index Firms and Others 2018

Statistics

ID			m-score 2018	DSRI 2018	GMI 2018	AQI 2018	SGI 2018	DEPI 2018	SGAI 2018	LEVI 2018	TATA 2018
manipulator sustainability index firms	N	Valid	16	16	16	16	16	16	16	16	16
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-.416710051	1.179684154	2.562567187	2.187945565	1.382272270	1.037448257	.8838967754	1.043381847	.0517071467
	Median		-1.58139208	1.156634228	.9750216397	1.181156762	1.356949793	1.073139694	.9179602354	1.027148728	.0347034959
	Std. Deviation		3.387346831	.4103966520	6.236773468	3.727749827	.1906965219	.1858727621	.3244913629	.1810189261	.1339043967
	Skewness		3.204	.188	3.992	3.915	-.511	-.303	-.252	-.089	2.081
	Std. Error of Skewness		.564	.564	.564	.564	.564	.564	.564	.564	.564
	Minimum		-2.17391805	.5210174887	.5561413134	.5106920961	.9265076194	.6150444596	.1330600979	.6059813984	-.161915139
	Maximum		11.32866966	1.988747361	25.93739481	16.07903942	1.664466905	1.413034891	1.629818609	1.410371616	.4760275760
manipulator other firms	N	Valid	111	111	111	111	111	111	111	111	111
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-.684466009	1.188214689	2.107114056	1.417314041	1.492972932	1.144291443	.9030030067	.9563133794	.0675810548
	Median		-1.67476607	1.010785477	.9573199479	1.104279314	1.368165275	.9941682934	.9069839503	.9919344594	.0557316838
	Std. Deviation		6.379786781	.8741020749	12.17120273	1.445385543	1.142700085	.9523663828	.4430725301	.3675830052	.1344769842
	Skewness		9.993	3.157	10.419	2.931	6.844	6.659	3.417	-3.944	1.645
	Std. Error of Skewness		.229	.229	.229	.229	.229	.229	.229	.229	.229
	Minimum		-2.21429890	-1.66989166	-5.22074632	-2.46969709	-1.81190978	-1.01925553	-1.09113926	-1.84065526	-.188754445
	Maximum		64.73100756	7.107686422	128.7256370	9.951093749	11.80970455	9.572070524	4.333062121	1.765895125	.7627117062

Ranks

	ID	N	Mean Rank	Sum of Ranks
m-score 2018	manipulator sustainability index firms	16	68.75	1100.00
	manipulator other firms	111	63.32	7028.00
	Total	127		
DSRI 2018	manipulator sustainability index firms	16	73.13	1170.00
	manipulator other firms	111	62.68	6958.00
	Total	127		
GMI 2018	manipulator sustainability index firms	16	73.44	1175.00
	manipulator other firms	111	62.64	6953.00
	Total	127		
AQI 2018	manipulator sustainability index firms	16	70.69	1131.00
	manipulator other firms	111	63.04	6997.00
	Total	127		
SGI 2018	manipulator sustainability index firms	16	63.63	1018.00
	manipulator other firms	111	64.05	7110.00
	Total	127		
DEPI 2018	manipulator sustainability index firms	16	67.44	1079.00
	manipulator other firms	111	63.50	7049.00
	Total	127		
SGAI 2018	manipulator sustainability index firms	16	64.31	1029.00
	manipulator other firms	111	63.95	7099.00
	Total	127		
LEVI 2018	manipulator sustainability index firms	16	72.25	1156.00
	manipulator other firms	111	62.81	6972.00
	Total	127		
TATA 2018	manipulator sustainability index firms	16	56.75	908.00
	manipulator other firms	111	65.05	7220.00
	Total	127		

Test Statistics[a]

	m-score 2018	DSRI 2018	GMI 2018	AQI 2018	SGI 2018	DEPI 2018	SGAI 2018	LEVI 2018	TATA 2018
Mann-Whitney U	812.000	742.000	737.000	781.000	882.000	833.000	883.000	756.000	772.000
Wilcoxon W	7028.000	6958.000	6953.000	6997.000	1018.000	7049.000	7099.000	6972.000	908.000
Z	-.552	-1.061	-1.097	-.777	-.044	-.400	-.036	-.959	-.843
Asymp. Sig. (2-tailed)	.581	.289	.273	.437	.965	.689	.971	.338	.399

a. Grouping Variable: ID

APPENDIX 16. Mann-Whitney U test- Manipulators of Sustainability-Index Firms and Others 2017

Statistics

ID			m-score 2017	DSRI 2017	GMI 2017	AQI 2017	SGI 2017	DEPI 2017	SGAI 2017	LEVI 2017	TATA 2017
manipulators sustainability-index firms	N	Valid	14	14	14	14	14	14	14	14	14
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-1.55606610	1.207588545	1.209410664	1.222254479	1.526697559	1.106203996	.9354386302	1.008961171	.0090598120
	Median		-1.74978783	1.116065476	1.080045302	1.097509248	1.343928573	1.008319192	.9398823163	1.008105457	.0111314538
	Std. Deviation		.6013583750	.4837233130	.4205198418	.7506422172	.7559617449	.2908225623	.1569643792	.1179115459	.0387413073
	Skewness		.957	1.254	2.634	1.637	3.370	2.551	.798	-.578	-.117
	Std. Error of Skewness		.597	.597	.597	.597	.597	.597	.597	.597	.597
	Minimum		-2.20404232	.3487042195	.8375369110	.0175167720	.9979431489	.8798474190	.6858668564	.7351413852	-.060520775
	Maximum		-.352901936	2.509800798	2.514358309	3.339537002	4.076442840	2.008905062	1.320887702	1.210328871	.0718200480
manipulators other firms	N	Valid	115	115	115	115	115	115	115	115	115
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-1.12654509	1.427552842	1.246542754	1.334964377	1.430157358	2.263853272	1.172967872	1.199422478	.0741780056
	Median		-1.72993715	1.080233151	1.000000000	1.100463447	1.255819906	.9967734494	.9134267859	1.060548076	.0459686154
	Std. Deviation		1.893162220	1.246677372	1.501776066	1.529213721	.9949303403	12.12870281	1.585940116	.8661819901	.1598987256
	Skewness		4.470	3.423	6.147	3.693	4.625	10.655	5.165	5.360	4.520
	Std. Error of Skewness		.226	.226	.226	.226	.226	.226	.226	.226	.226
	Minimum		-2.21709789	.2242299153	-2.11034949	-3.34193879	.0906319024	.1417942705	.0648518211	.3256794439	-.363976431
	Maximum		11.85381138	8.103717680	14.03285807	12.03110204	7.416666667	130.9230769	11.49930798	7.115282379	1.348783347

Ranks

	ID	N	Mean Rank	Sum of Ranks
m-score 2017	manipulators sustainability-index firms	14	60.79	851.00
	manipulators other firms	115	65.51	7534.00
	Total	129		
DSRI 2017	manipulators sustainability-index firms	14	67.00	938.00
	manipulators other firms	115	64.76	7447.00
	Total	129		
GMI 2017	manipulators sustainability-index firms	14	79.07	1107.00
	manipulators other firms	115	63.29	7278.00
	Total	129		
AQI 2017	manipulators sustainability-index firms	14	63.79	893.00
	manipulators other firms	115	65.15	7492.00
	Total	129		
SGI 2017	manipulators sustainability-index firms	14	78.93	1105.00
	manipulators other firms	115	63.30	7280.00
	Total	129		
DEPI 2017	manipulators sustainability-index firms	14	70.86	992.00
	manipulators other firms	115	64.29	7393.00
	Total	129		
SGAI 2017	manipulators sustainability-index firms	14	70.79	991.00
	manipulators other firms	115	64.30	7394.00
	Total	129		
LEVI 2017	manipulators sustainability-index firms	14	55.36	775.00
	manipulators other firms	115	66.17	7610.00
	Total	129		
TATA 2017	manipulators sustainability-index firms	14	44.21	619.00
	manipulators other firms	115	67.53	7766.00
	Total	129		

Test Statistics[a]

	m-score 2017	DSRI 2017	GMI 2017	AQI 2017	SGI 2017	DEPI 2017	SGAI 2017	LEVI 2017	TATA 2017
Mann-Whitney U	746.000	777.000	608.000	788.000	610.000	723.000	724.000	670.000	514.000
Wilcoxon W	851.000	7447.000	7278.000	893.000	7280.000	7393.000	7394.000	775.000	619.000
Z	-.447	-.212	-1.492	-.129	-1.477	-.621	-.613	-1.022	-2.203
Asymp. Sig. (2-tailed)	.655	.832	.136	.898	.140	.535	.540	.307	.028

a. Grouping Variable: ID

APPENDIX 17. Mann-Whitney U test- Non-Manipulators of Sustainability-Index Firms and Others 2018

Statistics

ID			m-score 2018	DSRI 2018	GMI 2018	AQI 2018	SGI 2018	DEPI 2018	SGAI 2018	LEVI 2018	TATA 2018
non-manipulators sustainability-index firms	N	Valid	23	23	23	23	23	23	23	23	23
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-2.85865119	.9176966472	.9608268246	.4939571522	1.257853598	1.006733477	.9513009383	1.064457619	-.063236955
	Median		-2.67052880	.9230138281	.9945202976	.9580817043	1.253438160	.9906138710	.9266417153	1.020322698	-.053652969
	Std. Deviation		.7126445657	.2328313746	.1402463011	1.223171213	.2159707933	.1801851627	.1575635900	.1719363115	.0808216084
	Skewness		-2.441	1.279	.288	-3.078	-.194	1.696	.662	1.583	-.817
	Std. Error of Skewness		.481	.481	.481	.481	.481	.481	.481	.481	.481
	Minimum		-5.23350730	.5933811528	.7426716786	-4.17112913	.8084869241	.6789782833	.6834211597	.8728413375	-.257712410
	Maximum		-2.20431389	1.647077211	1.318044026	1.178953227	1.622406200	1.617633580	1.340721236	1.553050848	.0898303219
non-manipulators other firms	N	Valid	111	111	111	111	111	111	111	111	111
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-4.18412761	.8600148758	-.257642962	.3359348154	1.204488435	.9954431317	1.334576221	1.247759944	-.149202805
	Median		-2.77142736	.8301588906	.9230265061	.9654697671	1.181010833	.9653966174	.9680038954	1.046535411	-.044513360
	Std. Deviation		5.771552501	.3693823609	10.32164557	3.653399198	.5045256210	.3721457980	2.489983832	1.214363401	.4280008675
	Skewness		-6.806	1.120	-9.924	-8.710	5.361	2.110	8.686	5.712	-5.668
	Std. Error of Skewness		.229	.229	.229	.229	.229	.229	.229	.229	.229
	Minimum		-54.3823518	.0638661707	-105.626800	-35.1448344	.0937660056	.0875035142	.2584445120	.3346328833	-3.48895587
	Maximum		-2.23938663	2.171772096	3.074380996	2.685578541	5.463455150	2.967784860	25.28075039	9.556670283	.2770388392

Ranks

	ID	N	Mean Rank	Sum of Ranks
m-score 2018	non-manipulators sustainability-index firms	23	76.70	1764.00
	non-manipulators other firms	111	65.59	7281.00
	Total	134		
DSRI 2018	non-manipulators sustainability-index firms	23	76.30	1755.00
	non-manipulators other firms	111	65.68	7290.00
	Total	134		
GMI 2018	non-manipulators sustainability-index firms	23	74.39	1711.00
	non-manipulators other firms	111	66.07	7334.00
	Total	134		
AQI 2018	non-manipulators sustainability-index firms	23	61.52	1415.00
	non-manipulators other firms	111	68.74	7630.00
	Total	134		
SGI 2018	non-manipulators sustainability-index firms	23	77.22	1776.00
	non-manipulators other firms	111	65.49	7269.00
	Total	134		
DEPI 2018	non-manipulators sustainability-index firms	23	74.48	1713.00
	non-manipulators other firms	111	66.05	7332.00
	Total	134		
SGAI 2018	non-manipulators sustainability-index firms	23	58.96	1356.00
	non-manipulators other firms	111	69.27	7689.00
	Total	134		
LEVI 2018	non-manipulators sustainability-index firms	23	68.39	1573.00
	non-manipulators other firms	111	67.32	7472.00
	Total	134		
TATA 2018	non-manipulators sustainability-index firms	23	66.91	1539.00
	non-manipulators other firms	111	67.62	7506.00
	Total	134		

Test Statistics[a]

	m-score 2018	DSRI 2018	GMI 2018	AQI 2018	SGI 2018	DEPI 2018	SGAI 2018	LEVI 2018	TATA 2018
Mann-Whitney U	1065.000	1074.000	1118.000	1139.000	1053.000	1116.000	1080.000	1256.000	1263.000
Wilcoxon W	7281.000	7290.000	7334.000	1415.000	7269.000	7332.000	1356.000	7472.000	1539.000
Z	-1.248	-1.195	-.935	-.811	-1.319	-.947	-1.159	-.121	-.080
Asymp. Sig. (2-tailed)	.212	.232	.350	.417	.187	.344	.246	.904	.937

a. Grouping Variable: ID

APPENDIX 18. Mann-Whitney U test- Non-Manipulators of Sustainability-Index Firms and Others 2017

Statistics

ID			m-score 2017	DSRI 2017	GMI 2017	AQI 2017	SGI 2017	DEPI 2017	SGAI 2017	LEVI 2017	TATA 2017
non-manipulators sustainability-index firms	N	Valid	21	21	21	21	21	21	21	21	21
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-2.68513667	.8635255267	.9445328680	.7561896281	1.283264222	.9627154237	.9349755391	.9833342023	-.046337251
	Median		-2.58180631	.9072572481	.9824018233	.9133168936	1.242475881	.9184008803	.9188743278	.9830829840	-.049435837
	Std. Deviation		.3896685910	.1586670182	.2054585562	.8147653452	.1415285672	.1856552618	.2385665706	.1148062237	.0556954688
	Skewness		-.939	-.987	-1.124	-1.186	.934	1.739	2.142	-.003	-.070
	Std. Error of Skewness		.501	.501	.501	.501	.501	.501	.501	.501	.501
	Minimum		-3.57584363	.4950918029	.3652594760	-1.35572840	1.092233476	.7257262361	.6329056857	.7528244234	-.159153025
	Maximum		-2.23016441	1.078457575	1.260741589	2.461066704	1.610143992	1.507310384	1.754706076	1.178887792	.0691802289
non-manipulators other firms	N	Valid	112	112	112	112	112	112	112	112	112
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-3.02722626	.9675727953	.8400085345	.2318124099	1.212674812	1.136398449	.9986557690	1.077199105	-.063980407
	Median		-2.75130534	.9387840493	.9260345023	.8387732733	1.228122587	.9883743427	.9417376188	1.017217797	-.034706027
	Std. Deviation		1.161434860	.5067536321	.5639938202	2.717357923	.2841110444	.7745474779	.4591896168	.3153663073	.1041053613
	Skewness		-5.962	6.142	-1.655	-7.740	-.852	4.231	5.676	2.019	-1.865
	Std. Error of Skewness		.228	.228	.228	.228	.228	.228	.228	.228	.228
	Minimum		-12.9715362	.2218635212	-1.96410367	-25.2032735	.1992742680	.0480686269	.2152371330	.3684399706	-.514453101
	Maximum		-2.22214562	5.400546713	2.828237965	2.195692216	1.916704482	5.547670805	4.850207083	2.745461377	.0864721911

Ranks

	ID	N	Mean Rank	Sum of Ranks
m-score 2017	non-manipulators sustainability-index firms	21	78.95	1658.00
	non-manipulators other firms	112	64.76	7253.00
	Total	133		
DSRI 2017	non-manipulators sustainability-index firms	21	57.86	1215.00
	non-manipulators other firms	112	68.71	7696.00
	Total	133		
GMI 2017	non-manipulators sustainability-index firms	21	73.00	1533.00
	non-manipulators other firms	112	65.88	7378.00
	Total	133		
AQI 2017	non-manipulators sustainability-index firms	21	76.38	1604.00
	non-manipulators other firms	112	65.24	7307.00
	Total	133		
SGI 2017	non-manipulators sustainability-index firms	21	75.86	1593.00
	non-manipulators other firms	112	65.34	7318.00
	Total	133		
DEPI 2017	non-manipulators sustainability-index firms	21	54.57	1146.00
	non-manipulators other firms	112	69.33	7765.00
	Total	133		
SGAI 2017	non-manipulators sustainability-index firms	21	59.43	1248.00
	non-manipulators other firms	112	68.42	7663.00
	Total	133		
LEVI 2017	non-manipulators sustainability-index firms	21	57.38	1205.00
	non-manipulators other firms	112	68.80	7706.00
	Total	133		
TATA 2017	non-manipulators sustainability-index firms	21	65.86	1383.00
	non-manipulators other firms	112	67.21	7528.00
	Total	133		

Test Statistics[a]

	m-score 2017	DSRI 2017	GMI 2017	AQI 2017	SGI 2017	DEPI 2017	SGAI 2017	LEVI 2017	TATA 2017
Mann-Whitney U	925.000	984.000	1050.000	979.000	990.000	915.000	1017.000	974.000	1152.000
Wilcoxon W	7253.000	1215.000	7378.000	7307.000	7318.000	1146.000	1248.000	1205.000	1383.000
Z	-1.549	-1.185	-.777	-1.216	-1.148	-1.610	-.981	-1.246	-.148
Asymp. Sig. (2-tailed)	.121	.236	.437	.224	.251	.107	.327	.213	.882

a. Grouping Variable: ID

APPENDIX 19. Mann-Whitney U test- Manipulators and Non-Manipulators of all firms 2018

Statistics

ID			m-score 2018	DSRI 2018	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
.	N	Valid	0	0	0	0	0	0	0	0	0
		Missing	1	1	1	1	1	1	1	1	1
non-manipulators	N	Valid	133	133	133	133	133	133	133	133	133
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-3.96979570	.8703554529	-.056775659	.3581664670	1.211879295	.9977583570	1.271825847	1.217500048	-.135486004
	Median		-2.77068307	.8484651421	.9390009856	.9620104010	1.199815169	.9727050452	.9612020386	1.034727112	-.050176573
	Std. Deviation		5.298471735	.3509870976	9.433378677	3.372314190	.4689181824	.3475927263	2.278328165	1.112870231	.3932730295
	Skewness		-7.428	1.090	-10.864	-9.241	5.508	2.172	9.503	6.247	-6.171
	Std. Error of Skewness		.210	.210	.210	.210	.210	.210	.210	.210	.210
	Minimum		-54.3823518	.0638661707	-105.626800	-35.1448344	.0937660056	.0875035142	.2584445120	.3346328833	-3.48895587
	Maximum		-2.23938663	2.171772096	3.074380996	2.685578541	5.463455150	2.967784860	25.28075039	9.556670283	.2770388392
manipulators	N	Valid	128	128	128	128	128	128	128	128	128
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-.662870326	1.184204499	2.155801141	1.510489269	1.478791051	1.129396238	.9003181759	.9679786510	.0650975674
	Median		-1.67335906	1.018638093	.9624439560	1.109546299	1.371025292	.9993869580	.9139433310	.9936675257	.0490310732
	Std. Deviation		6.052717125	.8263069596	11.52975908	1.875664260	1.066127487	.8894903224	.4272254195	.3489952450	.1335619902
	Skewness		10.164	3.245	10.648	4.827	7.321	7.111	3.292	-4.058	1.683
	Std. Error of Skewness		.214	.214	.214	.214	.214	.214	.214	.214	.214
	Minimum		-2.21429890	-1.66989166	-5.22074632	-2.46969709	-1.81190978	-1.01925553	-1.09113926	-1.84065526	-.188754445
	Maximum		64.73100756	7.107686422	128.7256370	16.07903942	11.80970455	9.572070524	4.333062121	1.765895125	.7627117062

Ranks

	ID	N	Mean Rank	Sum of Ranks
m-score 2018	non-manipulators	133	67.00	8911.00
	manipulators	128	197.50	25280.00
	Total	261		
DSRI 2018	non-manipulators	133	107.74	14329.00
	manipulators	128	155.17	19862.00
	Total	261		
GMI	non-manipulators	133	125.35	16672.00
	manipulators	128	136.87	17519.00
	Total	261		
AQI	non-manipulators	133	106.23	14129.00
	manipulators	128	156.73	20062.00
	Total	261		
SGI	non-manipulators	133	105.25	13998.00
	manipulators	128	157.76	20193.00
	Total	261		
DEPI	non-manipulators	133	121.31	16134.00
	manipulators	128	141.07	18057.00
	Total	261		
SGAI	non-manipulators	133	146.35	19464.00
	manipulators	128	115.05	14727.00
	Total	261		
LEVI	non-manipulators	133	139.10	18500.00
	manipulators	128	122.59	15691.00
	Total	261		
TATA	non-manipulators	133	90.67	12059.00
	manipulators	128	172.91	22132.00
	Total	261		

Test Statistics[a]

	m-score 2018	DSRI 2018	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Mann-Whitney U	.000	5418.000	7761.000	5218.000	5087.000	7223.000	6471.000	7435.000	3148.000
Wilcoxon W	8911.000	14329.000	16672.000	14129.000	13998.000	16134.000	14727.000	15691.000	12059.000
Z	-13.962	-5.075	-1.232	-5.403	-5.618	-2.114	-3.348	-1.767	-8.798
Asymp. Sig. (2-tailed)	.000	.000	.218	.000	.000	.034	.001	.077	.000

a. Grouping Variable: ID

APPENDIX 20. Mann-Whitney U test- Manipulators and Non-Manipulators of all firms 2017

Statistics

ID			m-score 2017	DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
non-manipulators	N	Valid	133	133	133	133	133	133	133	133	133
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-2.97321211	.9511442792	.8565123767	.3146088128	1.223820508	1.108974814	.9886009958	1.062378331	-.061194646
	Median		-2.72732932	.9193308214	.9447493816	.8767711018	1.232438891	.9791405107	.9341031816	1.009328893	-.036080283
	Std. Deviation		1.083057071	.4703292434	.5247319125	2.519270108	.2675441514	.7167601616	.4318293473	.2946367049	.0981091799
	Skewness		-6.299	6.530	-1.813	-8.239	-.926	4.588	5.823	2.202	-1.930
	Std. Error of Skewness		.210	.210	.210	.210	.210	.210	.210	.210	.210
	Minimum		-12.9715362	.2218635212	-1.96410367	-25.2032735	.1992742680	.0480686269	.2152371330	.3684399706	-.514453101
	Maximum		-2.22214562	5.400546713	2.828237965	2.461066704	1.916704482	5.547670805	4.850207083	2.745461377	.0864721911
non-manipulators	N	Valid	129	129	129	129	129	129	129	129	129
		Missing	0	0	0	0	0	0	0	0	0
	Mean		-1.17315978	1.403680748	1.242512915	1.322732295	1.440634589	2.138216917	1.147189504	1.178752258	.0671109148
	Median		-1.72993715	1.083429515	1.019653551	1.100463447	1.268376459	.9967734494	.9194264720	1.044656321	.0395007893
	Std. Deviation		1.801880413	1.188568673	1.423639325	1.463279604	.9698283641	11.45229394	1.499369502	.8204629168	.1527646473
	Skewness		4.680	3.570	6.429	3.785	4.565	11.285	5.485	5.680	4.731
	Std. Error of Skewness		.213	.213	.213	.213	.213	.213	.213	.213	.213
	Minimum		-2.21709789	.2242299153	-2.11034949	-3.34193879	.0906319024	.1417942705	.0648518211	.3256794439	-.363976431
	Maximum		11.85381138	8.103717680	14.03285807	12.03110204	7.416666667	130.9230769	11.49930798	7.115282379	1.348783347

Ranks

	ID	N	Mean Rank	Sum of Ranks
m-score 2017	non-manipulators	133	67.00	8911.00
	non-manipulators	129	198.00	25542.00
	Total	262		
DSRI 2017	non-manipulators	133	106.57	14174.00
	non-manipulators	129	157.20	20279.00
	Total	262		
GMI	non-manipulators	133	115.37	15344.00
	non-manipulators	129	148.13	19109.00
	Total	262		
AQI	non-manipulators	133	99.04	13172.00
	non-manipulators	129	164.97	21281.00
	Total	262		
SGI	non-manipulators	133	125.10	16638.00
	non-manipulators	129	138.10	17815.00
	Total	262		
DEPI	non-manipulators	133	127.11	16905.00
	non-manipulators	129	136.03	17548.00
	Total	262		
SGAI	non-manipulators	133	138.05	18360.00
	non-manipulators	129	124.75	16093.00
	Total	262		
LEVI	non-manipulators	133	125.04	16630.00
	non-manipulators	129	138.16	17823.00
	Total	262		
TATA	non-manipulators	133	88.35	11750.00
	non-manipulators	129	175.99	22703.00
	Total	262		

Test Statistics[a]

	m-score 2017	DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
Mann-Whitney U	.000	5263.000	6433.000	4261.000	7727.000	7994.000	7708.000	7719.000	2839.000
Wilcoxon W	8911.000	14174.000	15344.000	13172.000	16638.000	16905.000	16093.000	16630.000	11750.000
Z	-13.990	-5.407	-3.499	-7.041	-1.389	-.953	-1.420	-1.402	-9.360
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.165	.340	.156	.161	.000

a. Grouping Variable: ID

APPENDIX 21: Correlation-All firms 2018

Correlations[a]

		DSRI 2018	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
DSRI 2018	Pearson Correlation	1	.106	.004	-.166	-.141	.048	.221*	.241**
	Sig. (2-tailed)		.227	.959	.057	.106	.582	.011	.005
	N	133	133	133	133	133	133	133	133
GMI	Pearson Correlation	.106	1	-.011	-.769**	.070	.032	.063	-.041
	Sig. (2-tailed)	.227		.896	.000	.424	.714	.470	.637
	N	133	133	133	133	133	133	133	133
AQI	Pearson Correlation	.004	-.011	1	-.017	-.251**	-.016	-.018	-.007
	Sig. (2-tailed)	.959	.896		.848	.004	.853	.835	.936
	N	133	133	133	133	133	133	133	133
SGI	Pearson Correlation	-.166	-.769**	-.017	1	-.005	-.187*	-.120	.255**
	Sig. (2-tailed)	.057	.000	.848		.955	.032	.169	.003
	N	133	133	133	133	133	133	133	133
DEPI	Pearson Correlation	-.141	.070	-.251**	-.005	1	.246**	.031	-.074
	Sig. (2-tailed)	.106	.424	.004	.955		.004	.720	.396
	N	133	133	133	133	133	133	133	133
SGAI	Pearson Correlation	.048	.032	-.016	-.187*	.246**	1	.090	-.256**
	Sig. (2-tailed)	.582	.714	.853	.032	.004		.305	.003

	N	133	133	133	133	133	133	133	133
LEVI	Pearson Correlation	.221*	.063	-.018	-.120	.031	.090	1	-.405**
	Sig. (2-tailed)	.011	.470	.835	.169	.720	.305		.000
	N	133	133	133	133	133	133	133	133
TATA	Pearson Correlation	.241**	-.041	-.007	.255**	-.074	-.256**	-.405**	1
	Sig. (2-tailed)	.005	.637	.936	.003	.396	.003	.000	
	N	133	133	133	133	133	133	133	133

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

a. ID = non-manipulators

Correlationsa

		DSRI 2018	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
DSRI 2018	Pearson Correlation	1	-.034	-.026	-.050	.054	.172	.222*	.044
	Sig. (2-tailed)		.705	.767	.577	.547	.052	.012	.622
	N	128	128	128	128	128	128	128	128
GMI	Pearson Correlation	-.034	1	-.028	-.017	-.058	-.084	.052	-.145
	Sig. (2-tailed)	.705		.754	.845	.517	.346	.559	.102
	N	128	128	128	128	128	128	128	128
AQI	Pearson Correlation	-.026	-.028	1	-.085	.024	.131	.155	-.194*
	Sig. (2-tailed)	.767	.754		.338	.788	.141	.081	.028
	N	128	128	128	128	128	128	128	128
SGI	Pearson Correlation	-.050	-.017	-.085	1	.023	-.151	.162	-.075
	Sig. (2-tailed)	.577	.845	.338		.797	.088	.068	.398

	N	128	128	128	128	128	128	128	128
DEPI	Pearson Correlation	.054	-.058	.024	.023	1	.740**	.003	.471**
	Sig. (2-tailed)	.547	.517	.788	.797		.000	.970	.000
	N	128	128	128	128	128	128	128	128
SGAI	Pearson Correlation	.172	-.084	.131	-.151	.740**	1	.221*	.356**
	Sig. (2-tailed)	.052	.346	.141	.088	.000		.012	.000
	N	128	128	128	128	128	128	128	128
LEVI	Pearson Correlation	.222*	.052	.155	.162	.003	.221*	1	-.123
	Sig. (2-tailed)	.012	.559	.081	.068	.970	.012		.166
	N	128	128	128	128	128	128	128	128
TATA	Pearson Correlation	.044	-.145	-.194*	-.075	.471**	.356**	-.123	1
	Sig. (2-tailed)	.622	.102	.028	.398	.000	.000	.166	
	N	128	128	128	128	128	128	128	128

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

a. ID = manipulators

APPENDIX 22: Correlation-All firms 2017

Correlations[a]

		DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
DSRI 2017	Pearson Correlation	1	-.360**	-.029	-.444**	-.075	.713**	.338**	-.332**
	Sig. (2-tailed)		.000	.740	.000	.393	.000	.000	.000
	N	133	133	133	133	133	133	133	133
GMI	Pearson Correlation	-.360**	1	-.060	.017	.019	-.205*	.037	.052
	Sig. (2-tailed)	.000		.489	.846	.829	.018	.669	.550
	N	133	133	133	133	133	133	133	133
AQI	Pearson Correlation	-.029	-.060	1	-.178*	-.001	.120	-.163	-.073
	Sig. (2-tailed)	.740	.489		.040	.993	.168	.060	.406
	N	133	133	133	133	133	133	133	133
SGI	Pearson Correlation	-.444**	.017	-.178*	1	.024	-.620**	-.097	.339**
	Sig. (2-tailed)	.000	.846	.040		.788	.000	.265	.000
	N	133	133	133	133	133	133	133	133
DEPI	Pearson Correlation	-.075	.019	-.001	.024	1	-.073	-.108	.013
	Sig. (2-tailed)	.393	.829	.993	.788		.407	.217	.885
	N	133	133	133	133	133	133	133	133
SGAI	Pearson Correlation	.713**	-.205*	.120	-.620**	-.073	1	.206*	-.474**
	Sig. (2-tailed)	.000	.018	.168	.000	.407		.017	.000
	N	133	133	133	133	133	133	133	133
LEVI	Pearson Correlation	.338**	.037	-.163	-.097	-.108	.206*	1	-.172*

	Sig. (2-tailed)	.000	.669	.060	.265	.217	.017		.047
	N	133	133	133	133	133	133	133	133
TATA	Pearson Correlation	-.332**	.052	-.073	.339**	.013	-.474**	-.172*	1
	Sig. (2-tailed)	.000	.550	.406	.000	.885	.000	.047	
	N	133	133	133	133	133	133	133	133

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

a. ID = non-manipulators

Correlationsa

		DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
DSRI 2017	Pearson Correlation	1	.028	-.024	.011	.299**	.663**	.394**	.027
	Sig. (2-tailed)		.750	.787	.905	.001	.000	.000	.759
	N	129	129	129	129	129	129	129	129
GMI	Pearson Correlation	.028	1	.107	.134	-.029	.075	.168	-.099
	Sig. (2-tailed)	.750		.228	.130	.741	.399	.057	.267
	N	129	129	129	129	129	129	129	129
AQI	Pearson Correlation	-.024	.107	1	.065	-.080	-.036	.249**	-.418**
	Sig. (2-tailed)	.787	.228		.466	.368	.684	.004	.000
	N	129	129	129	129	129	129	129	129
SGI	Pearson Correlation	.011	.134	.065	1	-.105	-.034	.329**	.364**
	Sig. (2-tailed)	.905	.130	.466		.236	.701	.000	.000
	N	129	129	129	129	129	129	129	129
DEPI	Pearson Correlation	.299**	-.029	-.080	-.105	1	.488**	.475**	-.046

	Sig. (2-tailed)	.001	.741	.368	.236		.000	.000	.605
	N	129	129	129	129	129	129	129	129
SGAI	Pearson Correlation	.663**	.075	-.036	-.034	.488**	1	.396**	.013
	Sig. (2-tailed)	.000	.399	.684	.701	.000		.000	.883
	N	129	129	129	129	129	129	129	129
LEVI	Pearson Correlation	.394**	.168	.249**	.329**	.475**	.396**	1	-.011
	Sig. (2-tailed)	.000	.057	.004	.000	.000	.000		.899
	N	129	129	129	129	129	129	129	129
TATA	Pearson Correlation	.027	-.099	-.418**	.364**	-.046	.013	-.011	1
	Sig. (2-tailed)	.759	.267	.000	.000	.605	.883	.899	
	N	129	129	129	129	129	129	129	129

**. Correlation is significant at the 0.01 level (2-tailed).

a. ID = manipulators

APPENDIX 23: Correlation-All Non-Sustainability Index firms 2018

Correlations[a]

		DSRI 2018	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
DSRI 2018	Pearson Correlation	1	.107	.006	-.175	-.142	.054	.230*	.255**
	Sig. (2-tailed)		.265	.952	.067	.138	.575	.015	.007
	N	111	111	111	111	111	111	111	111
GMI	Pearson Correlation	.107	1	-.012	-.786**	.071	.035	.066	-.045
	Sig. (2-tailed)	.265		.899	.000	.456	.714	.489	.637
	N	111	111	111	111	111	111	111	111
AQI	Pearson Correlation	.006	-.012	1	-.015	-.254**	-.016	-.019	-.014
	Sig. (2-tailed)	.952	.899		.877	.007	.866	.841	.885
	N	111	111	111	111	111	111	111	111
SGI	Pearson Correlation	-.175	-.786**	-.015	1	-.017	-.186	-.122	.259**
	Sig. (2-tailed)	.067	.000	.877		.861	.051	.201	.006
	N	111	111	111	111	111	111	111	111
DEPI	Pearson Correlation	-.142	.071	-.254**	-.017	1	.253**	.038	-.077
	Sig. (2-tailed)	.138	.456	.007	.861		.007	.694	.423
	N	111	111	111	111	111	111	111	111
SGAI	Pearson Correlation	.054	.035	-.016	-.186	.253**	1	.087	-.254**
	Sig. (2-tailed)	.575	.714	.866	.051	.007		.365	.007
	N	111	111	111	111	111	111	111	111
LEVI	Pearson Correlation	.230*	.066	-.019	-.122	.038	.087	1	-.404**

	Sig. (2-tailed)	.015	.489	.841	.201	.694	.365		.000
	N	111	111	111	111	111	111	111	111
TATA	Pearson Correlation	.255**	-.045	-.014	.259**	-.077	-.254**	-.404**	1
	Sig. (2-tailed)	.007	.637	.885	.006	.423	.007	.000	
	N	111	111	111	111	111	111	111	111

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

a. ID = non-manipulators

Correlationsa

		DSRI 2018	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
DSRI 2018	Pearson Correlation	1	-.033	-.027	-.048	.058	.164	.229*	.066
	Sig. (2-tailed)		.729	.779	.614	.543	.086	.016	.495
	N	111	111	111	111	111	111	111	111
GMI	Pearson Correlation	-.033	1	-.027	-.016	-.060	-.084	.057	-.156
	Sig. (2-tailed)	.729		.781	.864	.532	.378	.555	.102
	N	111	111	111	111	111	111	111	111
AQI	Pearson Correlation	-.027	-.027	1	-.100	.050	.167	.181	-.131
	Sig. (2-tailed)	.779	.781		.298	.606	.080	.057	.171
	N	111	111	111	111	111	111	111	111
SGI	Pearson Correlation	-.048	-.016	-.100	1	.021	-.144	.171	-.089
	Sig. (2-tailed)	.614	.864	.298		.827	.131	.073	.351
	N	111	111	111	111	111	111	111	111
DEPI	Pearson Correlation	.058	-.060	.050	.021	1	.771**	.008	.495**

	Sig. (2-tailed)	.543	.532	.606	.827		.000	.937	.000
	N	111	111	111	111	111	111	111	111
SGAI	Pearson Correlation	.164	-.084	.167	-.144	.771**	1	.218*	.439**
	Sig. (2-tailed)	.086	.378	.080	.131	.000		.022	.000
	N	111	111	111	111	111	111	111	111
LEVI	Pearson Correlation	.229*	.057	.181	.171	.008	.218*	1	-.087
	Sig. (2-tailed)	.016	.555	.057	.073	.937	.022		.364
	N	111	111	111	111	111	111	111	111
TATA	Pearson Correlation	.066	-.156	-.131	-.089	.495**	.439**	-.087	1
	Sig. (2-tailed)	.495	.102	.171	.351	.000	.000	.364	
	N	111	111	111	111	111	111	111	111

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

a. ID = manipulators

APPENDIX 24: Correlation-All Non-Sustainability Index firms 2017

Correlations[a]

		DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
DSRI 2017	Pearson Correlation	1	-.371**	-.025	-.437**	-.080	.731**	.333**	-.338**
	Sig. (2-tailed)		.000	.795	.000	.399	.000	.000	.000
	N	112	112	112	112	112	112	112	112
GMI	Pearson Correlation	-.371**	1	-.072	.021	.021	-.212*	.042	.053
	Sig. (2-tailed)	.000		.452	.829	.822	.025	.663	.579
	N	112	112	112	112	112	112	112	112
AQI	Pearson Correlation	-.025	-.072	1	-.183	.005	.128	-.153	-.073
	Sig. (2-tailed)	.795	.452		.053	.958	.177	.107	.442
	N	112	112	112	112	112	112	112	112
SGI	Pearson Correlation	-.437**	.021	-.183	1	.035	-.636**	-.091	.351**
	Sig. (2-tailed)	.000	.829	.053		.714	.000	.343	.000
	N	112	112	112	112	112	112	112	112
DEPI	Pearson Correlation	-.080	.021	.005	.035	1	-.078	-.124	.025
	Sig. (2-tailed)	.399	.822	.958	.714		.413	.191	.795
	N	112	112	112	112	112	112	112	112
SGAI	Pearson Correlation	.731**	-.212*	.128	-.636**	-.078	1	.215*	-.513**
	Sig. (2-tailed)	.000	.025	.177	.000	.413		.023	.000
	N	112	112	112	112	112	112	112	112
LEVI	Pearson Correlation	.333**	.042	-.153	-.091	-.124	.215*	1	-.157

	Sig. (2-tailed)	.000	.663	.107	.343	.191	.023		.099
	N	112	112	112	112	112	112	112	112
TATA	Pearson Correlation	-.338**	.053	-.073	.351**	.025	-.513**	-.157	1
	Sig. (2-tailed)	.000	.579	.442	.000	.795	.000	.099	
	N	112	112	112	112	112	112	112	112

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

a. ID = non-manipulators

Correlationsa

		DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
DSRI 2017	Pearson Correlation	1	.028	-.027	.032	.300**	.665**	.398**	.020
	Sig. (2-tailed)		.764	.772	.734	.001	.000	.000	.830
	N	115	115	115	115	115	115	115	115
GMI	Pearson Correlation	.028	1	.110	.141	-.030	.075	.167	-.098
	Sig. (2-tailed)	.764		.243	.133	.754	.427	.074	.300
	N	115	115	115	115	115	115	115	115
AQI	Pearson Correlation	-.027	.110	1	.076	-.081	-.036	.252**	-.433**
	Sig. (2-tailed)	.772	.243		.420	.388	.704	.006	.000
	N	115	115	115	115	115	115	115	115
SGI	Pearson Correlation	.032	.141	.076	1	-.107	-.034	.345**	.386**
	Sig. (2-tailed)	.734	.133	.420		.254	.716	.000	.000
	N	115	115	115	115	115	115	115	115
DEPI	Pearson Correlation	.300**	-.030	-.081	-.107	1	.487**	.475**	-.051

	Sig. (2-tailed)	.001	.754	.388	.254		.000	.000	.590
	N	115	115	115	115	115	115	115	115
SGAI	Pearson Correlation	.665**	.075	-.036	-.034	.487**	1	.395**	.006
	Sig. (2-tailed)	.000	.427	.704	.716	.000		.000	.946
	N	115	115	115	115	115	115	115	115
LEVI	Pearson Correlation	.398**	.167	.252**	.345**	.475**	.395**	1	-.021
	Sig. (2-tailed)	.000	.074	.006	.000	.000	.000		.822
	N	115	115	115	115	115	115	115	115
TATA	Pearson Correlation	.020	-.098	-.433**	.386**	-.051	.006	-.021	1
	Sig. (2-tailed)	.830	.300	.000	.000	.590	.946	.822	
	N	115	115	115	115	115	115	115	115

**. Correlation is significant at the 0.01 level (2-tailed).

a. ID = manipulators

APPENDIX 25: Correlation-All Sustainability Index firms 2018

Correlations[a]

		DSRI 2018	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
DSRI 2018	Pearson Correlation	1	-.040	-.059	-.080	-.140	.107	.262	-.372
	Sig. (2-tailed)		.856	.789	.716	.524	.626	.227	.081
	N	23	23	23	23	23	23	23	23
GMI	Pearson Correlation	-.040	1	-.083	-.003	-.430*	-.200	.429*	-.135
	Sig. (2-tailed)	.856		.707	.988	.041	.360	.041	.538
	N	23	23	23	23	23	23	23	23
AQI	Pearson Correlation	-.059	-.083	1	-.086	-.175	.145	.169	.457*
	Sig. (2-tailed)	.789	.707		.696	.425	.509	.440	.028
	N	23	23	23	23	23	23	23	23
SGI	Pearson Correlation	-.080	-.003	-.086	1	.254	-.440*	.143	-.001
	Sig. (2-tailed)	.716	.988	.696		.243	.036	.515	.998
	N	23	23	23	23	23	23	23	23
DEPI	Pearson Correlation	-.140	-.430*	-.175	.254	1	.025	-.333	-.055
	Sig. (2-tailed)	.524	.041	.425	.243		.909	.121	.802
	N	23	23	23	23	23	23	23	23
SGAI	Pearson Correlation	.107	-.200	.145	-.440*	.025	1	-.181	.296
	Sig. (2-tailed)	.626	.360	.509	.036	.909		.409	.170
	N	23	23	23	23	23	23	23	23
LEVI	Pearson Correlation	.262	.429*	.169	.143	-.333	-.181	1	-.018

	Sig. (2-tailed)	.227	.041	.440	.515	.121	.409		.935
	N	23	23	23	23	23	23	23	23
TATA	Pearson Correlation	-.372	-.135	.457*	-.001	-.055	.296	-.018	1
	Sig. (2-tailed)	.081	.538	.028	.998	.802	.170	.935	
	N	23	23	23	23	23	23	23	23

*. Correlation is significant at the 0.05 level (2-tailed).

a. ID = non-manipulators

Correlationsa

		DSRI 2018	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
DSRI 2018	Pearson Correlation	1	-.059	-.069	-.232	-.361	.366	.057	-.311
	Sig. (2-tailed)		.829	.801	.387	.170	.163	.834	.241
	N	16	16	16	16	16	16	16	16
GMI	Pearson Correlation	-.059	1	-.088	-.077	.091	-.079	-.101	-.026
	Sig. (2-tailed)	.829		.747	.776	.737	.772	.711	.923
	N	16	16	16	16	16	16	16	16
AQI	Pearson Correlation	-.069	-.088	1	-.224	-.132	.096	.137	-.432
	Sig. (2-tailed)	.801	.747		.404	.627	.724	.612	.095
	N	16	16	16	16	16	16	16	16
SGI	Pearson Correlation	-.232	-.077	-.224	1	.174	-.827**	-.231	.314
	Sig. (2-tailed)	.387	.776	.404		.519	.000	.390	.237
	N	16	16	16	16	16	16	16	16
DEPI	Pearson Correlation	-.361	.091	-.132	.174	1	-.126	-.019	.283
	Sig. (2-tailed)	.170	.737	.627	.519		.641	.946	.288

	N	16	16	16	16	16	16	16	16
SGAI	Pearson Correlation	.366	-.079	.096	-.827**	-.126	1	.354	-.469
	Sig. (2-tailed)	.163	.772	.724	.000	.641		.178	.067
	N	16	16	16	16	16	16	16	16
LEVI	Pearson Correlation	.057	-.101	.137	-.231	-.019	.354	1	-.638**
	Sig. (2-tailed)	.834	.711	.612	.390	.946	.178		.008
	N	16	16	16	16	16	16	16	16
TATA	Pearson Correlation	-.311	-.026	-.432	.314	.283	-.469	-.638**	1
	Sig. (2-tailed)	.241	.923	.095	.237	.288	.067	.008	
	N	16	16	16	16	16	16	16	16

**. Correlation is significant at the 0.01 level (2-tailed).

a. ID = manipulators

APPENDIX 26: Correlation-All Sustainability-Index firms 2017

Correlations[a]

		DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
DSRI 2017	Pearson Correlation	1	.383	.083	-.580**	-.235	.149	.303	-.056
	Sig. (2-tailed)		.087	.720	.006	.304	.518	.183	.809
	N	21	21	21	21	21	21	21	21
GMI	Pearson Correlation	.383	1	.208	-.314	.288	.084	.243	-.098
	Sig. (2-tailed)	.087		.367	.165	.206	.717	.289	.672
	N	21	21	21	21	21	21	21	21
AQI	Pearson Correlation	.083	.208	1	-.344	.081	.018	-.307	-.252
	Sig. (2-tailed)	.720	.367		.126	.727	.937	.176	.270
	N	21	21	21	21	21	21	21	21
SGI	Pearson Correlation	-.580**	-.314	-.344	1	-.084	-.236	.014	-.003
	Sig. (2-tailed)	.006	.165	.126		.717	.303	.953	.989
	N	21	21	21	21	21	21	21	21
DEPI	Pearson Correlation	-.235	.288	.081	-.084	1	-.082	.194	-.248
	Sig. (2-tailed)	.304	.206	.727	.717		.723	.399	.279
	N	21	21	21	21	21	21	21	21
SGAI	Pearson Correlation	.149	.084	.018	-.236	-.082	1	-.176	.350
	Sig. (2-tailed)	.518	.717	.937	.303	.723		.446	.119
	N	21	21	21	21	21	21	21	21
LEVI	Pearson Correlation	.303	.243	-.307	.014	.194	-.176	1	-.449*

	Sig. (2-tailed)	.183	.289	.176	.953	.399	.446		.041
	N	21	21	21	21	21	21	21	21
TATA	Pearson Correlation	-.056	-.098	-.252	-.003	-.248	.350	-.449*	1
	Sig. (2-tailed)	.809	.672	.270	.989	.279	.119	.041	
	N	21	21	21	21	21	21	21	21

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

a. ID = non-manipulators

Correlationsa

		DSRI 2017	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
DSRI 2017	Pearson Correlation	1	-.001	.060	-.568*	.336	.543*	-.389	-.015
	Sig. (2-tailed)		.997	.840	.034	.239	.045	.170	.959
	N	14	14	14	14	14	14	14	14
GMI	Pearson Correlation	-.001	1	-.080	-.059	-.285	.026	.444	-.483
	Sig. (2-tailed)	.997		.786	.841	.323	.930	.112	.080
	N	14	14	14	14	14	14	14	14
AQI	Pearson Correlation	.060	-.080	1	-.173	-.375	-.385	-.144	.101
	Sig. (2-tailed)	.840	.786		.554	.187	.174	.624	.732
	N	14	14	14	14	14	14	14	14
SGI	Pearson Correlation	-.568*	-.059	-.173	1	-.166	.064	-.204	-.052
	Sig. (2-tailed)	.034	.841	.554		.572	.827	.484	.861
	N	14	14	14	14	14	14	14	14
DEPI	Pearson Correlation	.336	-.285	-.375	-.166	1	.261	-.486	-.137

	Sig. (2-tailed)	.239	.323	.187	.572		.367	.078	.641
	N	14	14	14	14	14	14	14	14
SGAI	Pearson Correlation	.543*	.026	-.385	.064	.261	1	-.504	.050
	Sig. (2-tailed)	.045	.930	.174	.827	.367		.066	.866
	N	14	14	14	14	14	14	14	14
LEVI	Pearson Correlation	-.389	.444	-.144	-.204	-.486	-.504	1	.002
	Sig. (2-tailed)	.170	.112	.624	.484	.078	.066		.994
	N	14	14	14	14	14	14	14	14
TATA	Pearson Correlation	-.015	-.483	.101	-.052	-.137	.050	.002	1
	Sig. (2-tailed)	.959	.080	.732	.861	.641	.866	.994	
	N	14	14	14	14	14	14	14	14

*. Correlation is significant at the 0.05 level (2-tailed).

a. ID = manipulators