



The Effect of Environmental Transparency on the Financial Performance of Publicly Traded Companies in Turkey

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The Effect of Environmental Transparency on the Financial Performance of Publicly
Traded Companies in Turkey

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A Thesis in the Field of Sustainability
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Abstract

In the developed world, the importance of sustainability for the competitiveness of companies is unquestionable. However, one of the components of sustainability, environmental transparency, is relatively hard to be prioritized, especially in a developing country like Turkey. Among a total of 509 publicly traded companies in Turkey, only around 10% have ever published a sustainability report and disclosed their greenhouse gas (GHG) emissions as of 2016. Recent data show a total of only 197 published sustainability reports encompassing 72 organizations, compared to 3.5 million companies in Turkey, of which 1.5 million are big corporations (TOBB, 2017; GRI, 2017). These facts indicate that most Turkish companies do not value environmental transparency. There is certainly a need for showing these companies the effect of environmental disclosure on their financial performance.

The main research question of this paper is: What is the relationship between financial performance and environmental transparency for publicly traded companies in Turkey? Environmental performance criteria used in this research were from published sustainability reports and disclosed GHG data through the CDP (formerly known as Carbon Disclosure Project; a global platform where companies voluntarily report their GHG emissions). Financial performance criteria used in this research were Tobin's Q ratio, market value to book value ratio (MV/BV), return on equity (RoE) and return on assets (RoA). I hypothesized that financial performance is predicted by environmental transparency performance. To test this hypothesis, regression analysis was used with

panel data of 60 publicly traded companies that were uninterruptedly listed in the BIST100 index for six years between 2012 and 2017. The analyses were run to determine effects in the same year and also two years later. Because the financial structures are very different, manufacturing and financial sector companies were analyzed separately.

The results of the research analyses showed only a limited effect of environmental transparency on financial performance; in some cases, transparency was negatively correlated with performance. In all the analyses of two major and two subsectors, the effect of sustainability reporting (SR) on the financial performance of BIST100 companies was found to be not significant both for the current year of reporting and after two years of reporting. CDP score was found to significantly and positively affect only the consumer discretionary subsector for the same year. On the other hand, CDP score was negatively correlated with MV/BV in the financial sector with 10% significance and Tobin's Q ratios in the manufacturing sector and banks subsector with 5% significance. Additionally, the RoE variable positively and significantly affected the CDP score in the manufacturing sector and accordingly in its subsector, consumer discretionary, in the two-year time lag analyses with 5% significance level. A positive significant effect of CDP score was also seen in the RoA variable in the banking sector in the two-year time lag analysis with 5% significance level. Interestingly, a negative significant effect on the CDP score was also shown by the MV/BV variable in the manufacturing sector over a two-year time lag analysis, at the 10% significance level.

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Definition of Terms

BIST: The Borsa İstanbul; stock exchange entity of Turkey

BIST100: The major listing index in the Borsa Istanbul, which consists of the biggest 100 listed firms and is updated quarterly

CDP: Formerly known as the Carbon Disclosure Project, is a global organization that runs the global environmental disclosure system

CGF: Corporate Governance Forum; an initiative of Sabancı University in Turkey.

CSR: Corporate Social Responsibility

Decarbonization: The process of removing carbon from the air

Environmental Transparency: Sharing one's environmental activities' (mainly GHG emissions) data with its stakeholders and the public

ESG: Three pillars of sustainability; Environmental, Social and Governance

ETS: Emissions Trading System

GRI: Global Reporting Initiative; creates standards for sustainability reports

MV/BV: Market Value / Book Value; A measure of the profitability of a business

Publicly Traded Company: A corporation whose ownership is dispersed among the general public in many shares of stock, which are freely traded on a stock exchange

RoA: Return on Assets; A measure of the profitability of a business

RoE: Return on Equity; A measure of the profitability of a business

SDD: Sustainability Disclosure Database; a global web portal of sustainability reports

SDG: Sustainable Development Goals of UN. The SDGs are a universal agenda of sustainable development, calling on all nations to pursue a holistic strategy that combines economic development, social inclusion, and environmental sustainability

TCFD: Task Force on Climate-related Financial Disclosures

Tobin's Q: A measure of the profitability of a business. The ratio of the market value of a company's assets divided by the replacement cost of the company's assets (book value)

Chapter I

Introduction

The existence of climate change shows itself more frequently and more harshly than ever (IFRC, 2018). Natural disasters, serious health problems and shrinking natural sources are all possible evidence of climate change. As it is highly probable that human actions are the major reasons for climate change, it is the responsibility of our species to bring an end to it. Decarbonization can mitigate the effects of climate change, but only if implemented on a global scale. Environmental responsibility should be internalized also in the developing world. Knowing how much carbon a company emits is the first step towards reducing it. Besides, reducing carbon emitting activities are proved to also improve financial environments worldwide (Alvarez, Segura, & Ferrero, 2015).

Management thinker Peter Drucker has a saying: “if you can’t measure it, you cannot improve it”. The Sustainable Development Goals (SDG) of the UN help governments and companies measure their performances towards achieving 17 goals across 169 specific targets (UN, 2017). Turkey is one of the countries that faces major challenges in meeting Goal number 13, which is Climate Change, as indicated by a red rating (SDG Index, 2018). To follow up and ultimately improve performance in these goals, one needs to measure its status periodically. Hence, measuring GHGs, proper reporting and accountability is very crucial for countries and companies.

Environmental transparency, i.e. sharing data of one’s environmental activities- mainly GHG emissions, is a critical issue for Turkish companies. As such, companies are

hesitant to share their environmental footprint with the public. GHGs were disclosed by only 43% of the 6,441 large public companies globally (Corporate Knights, 2017).

Among 509 public companies in Turkey, only around 10% publish sustainability reports and even less disclose GHG emissions. As of May 2018, only 120 organizations have published the 398 sustainability reports in the whole country, indicating that the majority does not care about environmental transparency (GRI, 2017).

Turkey scored 68.8 out of 100 in the SDG Index and Dashboards Report 2017 and ranked 67th among 157 countries. Turkey has not met its decarbonization targets and as a result earned the country a “red” rating (SDG Index, 2018). Still, succeeding in SDGs by itself does not encourage companies to decrease their GHGs. A developing country like Turkey needs another motivation for a low carbon economy. Companies are established and exist ultimately for financial profit. Every potential practice that will make them better financially will be of good value.

Logically, high carbon-emitting activities, like burning fossil fuels, are also sources of high cost for companies, since fossil fuels are not free. Carbon taxes, disclosure regulations, emission regulations and limitations, and carbon pricing and offsetting are all instruments for reducing carbon emissions and developing a low-carbon economy. Calculating and trying to reduce carbon emissions will ultimately result in cutting costs that originate from these activities. Being environmentally transparent will lead to a better cost-cutting strategy.

The importance of sustainability for the financial competitiveness of companies is not in question; a Harvard Business Review article phrases it in most basic terms as “companies are realizing significant cost savings through environmental sustainability-

related operational efficiencies” (Whelan&Fink, 2016). However, one of the components of sustainability, environmental responsibility, is relatively hard to prioritize, especially in a developing country like Turkey (REC, 2016; Luo, Tang & Lan, 2013).

Although the studies done in US and Europe show a positive correlation, there is currently no research on the impact of environmental transparency on the financial performance of companies in Turkey. The lack of data and research showing this relation causes companies to neglect the importance of sustainability and environmental transparency.

Research Significance and Objectives

This research is designed to further our understanding of the existence and magnitude of the impact of environmental transparency on the financial performance of companies in a developing country. Understanding the financial impact of environmental transparency will lead to more informed decisions about disclosing corporate environmental data in Turkey. Demonstrating a positive relationship could provide a model for other developing countries, where corporations mostly lack the sensitivity for sustainability issues. On the other hand, a negative or no relationship could also potentially lead to a lack of need for using decarbonization as a financial and marketing tool for companies. If this link is well understood, more research and academic support in this field can emerge in addition to motivating more companies to publish sustainability reports and their GHG emissions data.

The main objectives of this research were to:

- Further our understanding of the impacts of corporate sustainability and environmental transparency on the financial performance of companies
- Motivate companies to be more accountable for their environmental performance
- Promote more informed decisions about the transparency of corporate environmental data
- Illuminate non-disclosing companies about positive financial impacts of calculating and publishing their carbon emissions
- Create a stimulus for environmental transparency in the companies of developing countries

Some additional objectives were to:

- Support environmental non-governmental organizations (NGOs) in their efforts to encourage companies to disclose their GHG emissions data
- Bring out the need for research and education in corporate sustainability areas in Turkey
- Provide the first BIST100 database highlighting environmental and financial performance in Turkey, since there are few data on this issue
- Allow consumers who are sensitive about the environment to make more informed buying decisions

Background

The triple bottom line model of sustainability is founded on the circular relation between environmental, financial, and social issues. There is no doubt that effective sustainability practices related to each issue will also be good for the other two.

Development of a society can be determined by the widespread internalization of such practices. Applying this model in corporations is also beneficial in regards to “sustain”ing their existence and good performance. This model provides a long-term vision as well as long-term returns (Willard, 2012). In the developing world, however, corporations tend to value short-term returns and do not invest in long-term visions. Most of the Turkish companies do not incorporate environmental data in their strategies and decision making processes.

Corporate Sustainability in Turkey

In Turkey, there is little research on corporate sustainability. There is no single university offering a sustainability degree. There is not even any undergraduate course dedicated to sustainability in business administration faculties. Turkey lags behind the developed countries in this manner. The companies in Turkey also experience more short-term expectations by their shareholders than long-term returns. Financial performances of publicly traded companies are closely followed, but their sustainability performance is not a priority for shareholders. Environmental transparency, one of the indicators of a sustainability approach, is a concept that is adopted by only few Turkish companies (REC, 2016).

Main Indicators of Financial Performance and Environmental Performance

In Turkey, 509 companies were publicly traded in the Istanbul Stock Exchange (BIST) as of January 2018. The main index is the BIST 100 index, which consists of the 100 most valuable and traded companies. The financial performance indicators, such as profits/losses, book value, assets, etc. of these companies are provided in their balance sheets published in Public Disclosure Platform, and their market values are provided in BIST's Datastore web page (KAP, 2017; BIST, 2017a). Return on equity (ROE), return on assets (ROA), market/book value ratio, and Tobin's Q ratio reflect the relative financial performance of companies of different sizes from a comparative perspective.

The main indicators of a company's environmental transparency are the existence of sustainability reports and GHG data disclosure. CDP, formerly known as The Carbon Disclosure Project, is a global non-profit organization that builds the most comprehensive self-reported environmental database in the world, with more than 5600 companies from more than 90 countries reporting their GHG emissions data. CDP has existed in Turkey since 2011. Of the 509 publicly traded companies in Turkey, only 50 have disclosed their carbon emission data through the CDP as of the end of 2017; 38 of these are listed in the BIST 100 index. CDP Turkey publishes the list of companies as well as their disclosure levels and scores in their annual reports (CDP Turkey, 2011-2017). Companies in Turkey upload their sustainability reports to GRI's global database, the Sustainability Disclosure Database, and its Turkish version, the Kurumsal Sürdürülebilirlik Portal. In total, there are 739 known sustainability reports published since 2005 in Turkey (GRI, 2017; Kurumsal Sürdürülebilirlik, 2016).

European Union Emission Trading System (EU ETS)

The EU ETS is the first and biggest major carbon market in the world, and operates in 31 countries. It covers around 45% of the EU's GHG emissions and limits emissions from more than 11,000 heavy energy-using installations (power stations & industrial plants) and airlines operating between these countries (European Commission, 2018). The system puts limits on sectors and companies, so that companies can buy and sell emission allowances among themselves. The main aim of the system is reducing total GHG emission throughout the EU. ETS was set up in 2005, and has worked efficiently and transparently since then. The system is continuously developing in phases once the targets of the previous phases are met.

The carbon emissions data of each company are transparently published every year in the ETS. Organizations that conform or do not conform to the quotas can be easily identified through this system. Every investor, shareholder, stakeholder or environmental organization, and even customers of companies, can access these data online for free. There are some free online tools for easy access to ETS data, such as Sandbag (Sandbag, 2018). This is the ultimate reflection of environmental transparency.

Currently, Turkey is not one of the countries of the ETS. However, since it has targeted becoming an EU member country, since 2013 Turkey has been evaluating if it should be in the system through a World Bank supported project called “Partnership for Market Readiness”. The cement sector has served as a pilot sector for calculating and publicizing its carbon emission data since then (PMR, 2018). In 2018, the Ministry of Environment of Turkey started a regulatory impact analysis study for participating in the EU ETS.

Previous Research on Environmental Transparency and Financial Performance

Research results on the influence of sustainability practices on the financial performance of companies are controversial. The results differ according to the sustainability and financial performance indicators as well as the regions, country development status, and sectors in which the research takes place. Indeed, a study comparing companies in developing and developed countries on their tendency to report to CDP found that a shortage of resources in developing nations is one reason for the lack of commitment to carbon mitigation and disclosure (Luo, Tang & Lan, 2013). The time period the study encompasses also contributes to the difference in outcomes. It is expected if such an effect exists that environmental performance shows its positive effect on financial performance, not immediately but eventually after some time. A study of the Czech Republic found that “while the effect of environmental performance on financial performance is negative for environmental performance lagged by one year, it becomes positive for two years lag” (Horvathova, 2012). There was a strong positive association between environmental performance and financial performance during the years of a growing economy for Australian publicly traded firms, but not during the years of a financial crisis (Muhammad, Scrimgeour, Reddy & Abidin, 2015). These studies demonstrate the importance of the timing of the analysis. As such, longer periods will yield more accurate and robust results.

Sustainability reporting helped companies track several issues closely, and was positively tied to financial performance among US companies in a study exploring the relationship between transparency and performance of companies (Lydenberg, Rogers & Wood, 2010). Similarly, ranking high in the major US sustainability indices was found to

boost the most comparative market value indicator, the Tobin's Q ratio, among publicly traded US companies (Delmas, Etzion & Nairn-Birch, 2013).

Companies in the Dow Jones sustainability index showed a significant positive relation between US non-financial companies' corporate sustainable development strategies and practices and their market value as indicated by Tobin's Q ratio (Lo & Sheu, 2007). Non-financial publicly traded firms in Brazil, categorized in the Bovespa Corporate Sustainability Index, were found to be traded at a premium compared to other firms, indicating that sustainability practices have a positive impact on their Tobin's Q ratios (World Bank, 2008).

In a meta analysis of 64 outcomes from 37 empirical studies analyzing the relationship between environmental performance and financial performance, originating in Europe and US, it was found that underlying performance factors and the location of the study contribute to variances in results (Horvathova, 2010). In another meta analysis of 149 studies, a positive and partially bidirectional relationship between environmental performance and financial performance was found to be dominant. The findings also show that some studies demonstrated negative outcomes for this relationship (Endrikat, 2014).

An academic literature review on corporate sustainability, led by the University of Oxford, revealed that 90% of 200 analyzed studies concluded that good ESG standards lower the cost of capital; 88% showed that good ESG practices result in better operational performance; and 80% showed that stock price performance is positively correlated with good sustainability practices (Arabesque, 2017).

In a study exploring the empirical relationships between GHG emissions and an extensive range of business performance measures for UK FTSE-350 listed firms over time, a non-linear relationship was found between firm performance and GHG emissions, with the effect initially increasing with firm performance and then decreasing after firm performance reached a certain level (Broadstock, Collins, Hunt & Vergos, 2017). In a similar study done in Japan with 268 manufacturing firms from 2004 to 2008, GHG reduction practices are found to positively impact financial performance in the whole sample (Iwata, 2011).

Of 38 companies reporting to CDP from seven countries, 47% reported “identifying opportunities and managing risks” as the main benefit they get from measuring and reporting their GHG emissions, and 13% reported “cost savings” as the main benefit (Blanco, Caro & Corbett, 2017). This research indicates that more than half of the companies are motivated with financial expectations when reporting to CDP.

A study by the CDP with the S&P 500 industry leaders found that CDP reporting companies generate 67% higher average ROE than non-responders (CDP, 2014). This study further reinforces the positive impact of environmental transparency on the financial performance of publicly traded firms in the developed world.

However, contrary to these research results, no association between environmental disclosure (i.e., the depth of the data on the company’s sustainability report) and financial performance (i.e., five variables including ROE and Tobin’s Q ratio) was found in a sample of 60 European publicly traded industrial company groups (Dragomir, 2009). The research shows that the impact of environmental practices on financial performance may differ among different sectors.

Previous Research in Turkey

There are several research papers on the variables that may have an impact on Turkish companies' financial performance, such as corporate social responsibility practices and corporate governance practices (Alpaslan & Aygun, 2013; Ersoy, Bayrakdaroglu & Samiloglu, 2011; Kandir, Acaravci & Zelka, 2015). However, no research was uncovered that compared the impact of environmental transparency on financial performance. The related issues like corporate social responsibility (CSR) and corporate governance have been researched by different scholars and the results are in the same direction. Alpaslan and Aygun (2013) found a positive relationship between 117 publicly traded firms' CSR practices – donations to NGOs- and their financial performance as indicated by ROE and Tobin's Q ratio. Similarly, Ersoy, Bayrakdaroglu & Samiloglu (2011) found positive relationships between Tobin's Q ratio and corporate governance practices, such as independent management and diverse shareholding, amongst 50 publicly traded companies. Corporate governance indicators, such as the share of the biggest shareholder, proportion of publicly traded shares, size of the board of directors, and dual role of CEO as a member of board of directors, had a positive impact on 126 BIST listed manufacturing firms' financial performance, i.e., ROE and Tobin's Q (Kandir, Acaravci & Zelka, 2015). Corporate governance structure had a statistically significant effect on financial performance indicators such as ROE, ROA, and Tobin's Q ratios of BIST 30 companies in another study (Topaloglu, Coskun & Ozkan, 2016).

Summary of Previous Research

In summary, all of the reviewed research done in US and Brazil about the relationship between environmental transparency and financial performance suggests a positive correlation. In Europe, however, when the research was restricted to industrial sectors, no relationship was found. In several studies, a time lag effect was found between environmental disclosure activities and the financial results. In Turkey, there is not any previous research on the relationship between environmental transparency and financial performance. There are only few studies focused on corporate governance or corporate social responsibility and their impacts on financial performance.

These different results, in addition to a lack of specific research in Turkey, point to a need for analyzing the situation in Turkey. As previous studies mention different sectors and time lags in effects, there is also a need to conduct analyses for diverse sectors while incorporating and accounting for appropriate time lags.

Research Question, Hypotheses and Specific Aims

The main question this research investigates is: What is the relationship between financial performance and environmental transparency for publicly traded companies in Turkey?

The main hypothesis tested is that financial performance of BIST 100 companies is predicted by a company's willingness to publish sustainability reports, disclose environmental data through CDP, and its CDP score. This is evaluated through these specific research hypotheses:

- Companies that publish sustainability reports have higher ROE, ROA, MV/BV, and Tobin's Q ratios for the same year (and in two years) than those who do not publish
- CDP reporting companies have higher ROE, ROA, MV/BV, and Tobin's Q ratios for the same year (and in two years) than those who do not report
- Companies with higher CDP scores have higher ROE, ROA, MV/BV, and Tobin's Q ratios for the same year (and in two years) than those with lower CDP scores

Additional research hypotheses are:

- The ratio of women in the board of directors is positively correlated with reporting environmental data to the CDP.
- CDP reporting companies are evaluated based on their sustainability data by potential investors.

Specific Aims

To complete this research, I:

1. Defined a sample set from all BIST 100 listed companies
2. Compiled a database of this sample set regarding the industry type
3. Derived measures of financial performance for each year
4. Integrated the sustainability reporting and CDP reporting characteristics of all companies into the database
5. Analyzed the relationship between environmental and financial performances of these companies

Chapter II

Methods

The first step in this study was to quantify the corporate environmental disclosures and financial performance. In order to quantify corporate environmental disclosures, CDP was employed. CDP basically collects the companies' disclosures of their impacts on the environment via questionnaires. The existence and the scores companies received upon CDP reporting were utilized. SR, on the other hand, declares whether there is any environmental sustainability report or not.

As for financial performance assessment, return on equity (RoE), return on asset (RoA), market to book value (MVBV), and Tobin's Q ratios were utilized. All these four variables were frequently used in finance literature to properly reflect the companies' financial performances in a comparable manner.

The panel data consisted of environmental and financial indicators of 60 companies, who were listed in BIST100 index uninterruptedly between 2012-2017. To test the main hypothesis and the other hypotheses of this thesis, both quantitative and qualitative methods were used (Table 1). To test the main hypothesis, regression analyses based on six years (2012-2017) of panel data were utilized. Panel data were the data gathered from the measurements of multiple characteristics of the same sample over time. Several regression analyses based on panel data were used for testing the impact of two independent variables of environmental transparency (existence/score of CDP disclosure and sustainability reporting) and the four dependent variables of financial performance (ROE, ROA, MV/BV and Tobin's Q ratio).

Table 1. Quantitative analyses used and sources of data.

Type of Analysis:	Independent Variables	Dependent Variables	Sample Set
<i>Panel Regression Analysis</i>	Environmental Transparency (CDP Disclosure: 0/1/2/3) and (CDP scores: 0-100) and (Sustainability Reporting: Y/N) Source: CDP, GRI GDD	Financial Performance (ROE, ROA, MV/BV, Tobin's Q ratio) Source: BIST, KAP	BIST 100 companies (finance, manufacturing, banks, consumer)
<i>Panel Regression Analysis with two years Time lag</i>	Environmental Transparency (CDP Disclosure: 0/1/2/3) and (CDP scores: 0-100) and (Sustainability Reporting: Y/N) Source: CDP, GRI GDD	Financial Performance (ROE, ROA, MV/BV, Tobin's Q ratio) Source: BIST, KAP	BIST 100 companies (finance, manufacturing, banks, consumer)
<i>Correlation Analysis</i>	Environmental Transparency (CDP Disclosure: 0/1/2/3) Source: CDP	Women ratio in Boards (%) Source: CDP	BIST 100 companies

The analyses were run both for the impact of the current values and for the impact of values of two years later. The later analysis was applied to measure the effect of environmental transparency on the financial performance with time lag, and therefore used environmental transparency indicators of the years 2012-2015 and financial performance indicators of the years 2014-2017.

The regression analyses were run for two major sectors, manufacturing and financial, and two subsectors, banks and consumer discretionary, separately via Stata application. Analyses were run with the financial results of current years and with two-year time gaps after the environmental transparency had taken place. The financial sector was separated from the manufacturing sector in the analyses, because their financial

structures are very different and it would not be equitable to compare their financial performances. Also, because different subsectors may have different dynamics, banks and consumer discretionary subsectors were analyzed separately. These subsectors had the highest rates of CDP and sustainability reporting among all BIST 100 firms.

The values for environmental transparency indicators were taken from CDP office and CDP reports. CDP disclosure scores have been given on a 0-100 basis by CDP Turkey since 2012, but published since 2014. The 2012 and 2013 scores were requested and received from the CDP Turkey office. In 2016, a new scoring approach started, with number scores transformed into letters (from A to D-). CDP provided a graph to show how to compare these two scoring approaches (CDP, 2016). The letter scores of 2016 and 2017 were translated into approximate number scores based on the ranges they correspond to, as shown in CDP's graph (Figure 1). GRI's Sustainability Disclosure Database and Kurumsal Sürdürülebilirlik Database were used to track the existence of sustainability reports.

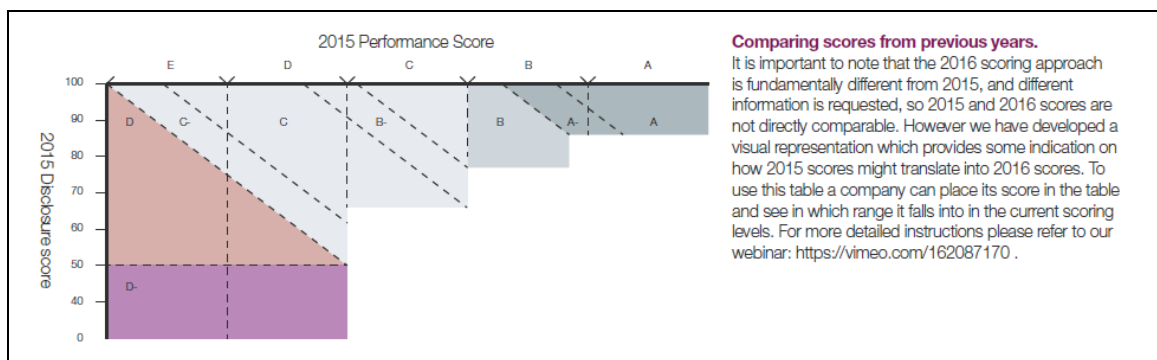


Figure 1. Translating CDP numerical scores and letter grades (CDP, 2016).

The figures of net profit, debts, equity, and assets of each company for the six years were pulled from their balance sheets (KAP, 2017). The market values for each company for the six years were pulled from the monthly evaluation tables of BIST Datastore. For consistency, December values for all years were chosen (BIST, 2017b).

Calculation of Financial Performance Indicators

The calculation of each indicator was as follows:

- ROE: Return on Equity was calculated by dividing annual net profit by equity ($ROE = \text{profit} / \text{equity}$)
- ROA: Return on Assets is calculated by dividing annual net profit by total assets ($ROA = \text{profit} / \text{assets}$)
- MV/BV: Market value to the Book value ratio is calculated by dividing the first working day of December of each year market value of a company by its book value for that year ($MV/BV = \text{market value} / \text{equity}$)
- Tobin's Q ratio: Tobin's Q Ratio is calculated by dividing the sum of first working day of December of each year market value of a company and its total debts for that year by its total assets for that year ($\text{Tobin's Q} = (\text{market value} + \text{debt}) / \text{assets}$)

Calculation of Environmental Transparency Indicators

The calculation of each indicator was as follows:

- Sustainability Reporting: 1 if the company has published a sustainability report for that year and 0 if it has not.

- CDP Disclosure: 1-3 if the company has reported its carbon emissions data (1 for Scope 1; 2 for Scope 1&2; 3 for Scope 1&2&3 emissions) to CDP for that year and 0 if it has not.
- CDP Score: 0-100 Disclosure scores given by CDP Turkey and letter grades translated to 0-100 scores.

Outputs and Analyses Carried

The first step in this research was compiling a list of the biggest 100 publicly traded companies in Turkey between 2012-2017, when on average 420 companies were listed in BIST annually for this period. Cumulatively, 139 companies were listed in the BIST100 index at least one time between 2012-2017. Some of them were merged, acquired or just bankrupted throughout this period. At the end, 66 companies were found to be listed in the BIST100 index uninterruptedly for six years. Of these, 60 had complete financial data public for all six years. The first output of this research was the analysis of these companies, 41 of which are from manufacturing sector and 19 from the financial sector. In order to compare their financial performances appropriately, the hypothesis was evaluated for the manufacturing and financial sector companies separately. The highest market value of the manufacturing companies was close to 9 billion USD and the highest market value of the financial companies was close to 12 billion USD for the yearend 2017. The complete list of companies used in this research is provided in Appendix 1.

The financial performance data of each company, i.e., ROE, ROA, MV/BV, and Tobin's Q ratios, were then calculated and added to this database. As seen from Table 2

and Table 3, average financial indicators for manufacturing and financial companies are not linear in years.

Table 2. Average financial indicators for manufacturing companies.

Year	ROE	ROA	MV/BV	Tobin's Q
2012	0.07	0.13	2.84	1.82
2013	0,06	0,12	2,42	1,59
2014	0,05	0,09	3,01	1,81
2015	0,04	0,05	2,48	1,50
2016	0,05	0,13	2,76	1,44
2017	0,06	0,13	2,64	1,55

Sources: BIST 2018, KAP 2018

Table 3. Average financial indicators for financial companies.

Year	ROE	ROA	MV/BV	Tobin's Q
2012	0.03	0.09	1.20	1.03
2013	0,02	0,09	0,98	0,97
2014	0,02	0,07	1,03	0,95
2015	0,01	0,07	0,76	0,88
2016	0,03	0,11	0,72	0,88
2017	0,03	0,11	0,86	0,93

Sources: BIST 2018, KAP 2018

The next step in this research was to compile an environmental transparency database of Turkish publicly traded companies. I coded the CDP disclosing level for each year on a scale of 0-3 (0=not disclosed, 1=disclosed only Scope 1 emissions, 2=disclosed both scope 1 and 2 emissions; 3= disclosed both scope 1,2 and 3 emissions) and also added the CDP scores out of 100. Thereafter, the existence of sustainability reporting for each analyzed year was added as another criterion to this database. Because the data

collection was completed by March 2018, only sustainability reports published by that date were taken into consideration. The number of companies that report to CDP and publish SR does not increase linearly in years (Table 4).

Table 4. Frequency of environmental disclosure of companies.

	Manufacturing Companies (41)		Financial Companies (19)	
Year	CDP	SR	CDP	SR
2012	12	8	5	5
2013	9	10	8	8
2014	14	16	5	7
2015	13	15	7	10
2016	16	21	8	9
2017	18	3*	5	5*

* as of March 2018

Sources: CDP 2011-2018, GRI 2017; Kurumsal Sürdürülebilirlik 2016

The regression analyses based on panel data aimed to find out the weighted impacts of the environmental transparency indicators as well as their separate impacts as predictors of each financial performance criterion.

For additional analysis, the women ratios in the Board of Directors of these companies were also added to the database; however, these annual data existed only since 2013 (CGF, 2017). Additional insight was gained by examining the correlation between the ratios of women in the board of directors and decisions regarding environmental transparency.

For the qualitative analyses component of this study, a few sustainability and investor relations department managers were interviewed. Investors are now believed to be able to track the high performers in sustainability and are “correlating better financial

performance with better ESG performance” (Arabesque (2017)). The goals of interviewing sustainability managers were to have a deeper understanding of investor interest in sustainability data, to understand whether they are correlating better financial performance with better sustainability performance and to find out whether sustainability and carbon reporting are a part of the company strategy or a marketing tool.

Chapter III

Results

In this study, the effect of corporate environmental disclosures together with the sustainability reports (SR) on corporate financial performance was investigated. The research question this study asked was whether corporate environmental disclosures and SR have any impact on corporate financial performance.

Manufacturing Sector Analysis

Before proceeding to examine the 41 companies in the manufacturing sector, the correlation between CDP score and CDP was examined to prevent multicollinearity. It turned out that the correlation coefficient of 0.98 indicated that both CDP score and CDP cannot enter into regression simultaneously. There was also somewhat high correlation between CDP and SR among the whole sample of 60 companies, with a correlation coefficient of 0.3, but this is too low to take them as a single variable. CDP score and SR were, therefore, used as independent variables in all the analyses of this study.

Results from the Hausman test determined whether to use fixed or random effect, so that in all the regressions below, a random effect was utilized (Table 5). The numbered columns show results of RoE, RoA, MVBV, and Tobin's Q used as dependent variables, respectively.

Table 5. Econometric results of manufacturing sector companies.

	(1)	(2)	(3)	(4)
Variables	RoE	RoA	MVBV	Tobin's Q
CDP Score	-0.000437	-0.000265	0.00511	-0.00314**
	(0.000401)	(0.000166)	(0.00413)	(0.00146)
SR	-0.0113	-0.00768	-0.0763	-0.0615
	(0.0279)	(0.0120)	(0.266)	(0.0937)
Constant	0.125***	0.0627***	2.582***	1.719***
	(0.0242)	(0.00913)	(0.372)	(0.135)
Observations	246	246	246	246
Number of	41	41	41	41

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Results revealed that CDP score and RoE do not have statistically significant association, although the negative estimated coefficient indicated that as CDP score decreases, RoE increases (Table 5). This does not conform to the general belief that sustainability practices have positive impacts on financial performances. The only statistically significant relation emerged in the fourth regression in which Tobin's Q is the dependent variable. To interpret; a 1-point increase in CDP score leads to 0.00314-point decrease in Tobin's Q (Table 5). This result also did not confirm the main hypothesis of this study.

On the other hand, SR had no statistically significant relationship with RoE, RoA, MVBV or Tobin's Q at conventional significance levels. In all four of these regressions the association between SR and dependent variables were negative, but the economic magnitude of the estimated coefficient of SR varied depending on the regressions. For instance, a 1-point increase in SR promotes a decrease of 0.0113-point in RoE, 0.00768-point in RoA, 0.0763-point in MVBV, and 0.0615-point in Tobin's Q (Table 5). This result also did not confirm the main hypothesis of this study.

Financial Sector Analysis

After examining the relationship between CDP score and financial performance in the manufacturing sector, the same association across 19 companies operating in the financial sector was analyzed. The correlation coefficient between CDP score and CDP was 0.99, indicating extreme multicollinearity. As in the manufacturing sector analysis, CDP score and SR were therefore used as independent variables in all four regressions.

Based on the Hausman test, a random effect is used in the second regression and a fixed effect model is employed in the first, third and fourth model (Table 6).

Table 6. Econometric results of financial sector companies.

	(1)	(2)	(3)	(4)
Variables	RoE	RoA	MVBV	Tobin's Q
CDP Score	0.000307 (0.000311)	3.62e-05 (0.000118)	-0.00248* (0.00148)	0.000241 (0.000602)
SR	-0.0166 (0.0199)	-0.00171 (0.00853)	-0.0720 (0.0947)	-0.0163 (0.0384)
Constant	0.0871*** (0.0121)	0.0234*** (0.00697)	1.019*** (0.0577)	0.940*** (0.0234)
Observations	114	114	114	114
Number of companies	19	19	19	19

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The financial sector analysis also revealed that CDP score had only a statistically significant impact on one dependent variable, but it is different from manufacturing sector analysis in that CDP score had a statistically significant relationship with MVBV (Table 6), not with Tobin's Q, and similar to that analysis, the estimated coefficient was negative and the magnitude is lower. A 1-point increase in CDP score fosters a decrease

of 0.00248 in MVBV (Table 6). The estimated coefficients of CDP score were positive in the first, second, and fourth regressions but not statistically significant.

Again, similar to the manufacturing sector analysis, SR had no statistically significant relation with any of the dependent variables. However, the estimated coefficients of SR were negative in all cases, which again did not confirm the main hypothesis of this study.

Banks Subsector Analysis

Seven banks were selected to explore the relationship between CDP score/SR and ROE, ROA, MVBV, and Tobin's Q (Table 7).

Table 7. Econometric results of banks.

	(1)	(2)	(3)	(4)
Variables	RoE	RoA	MVBV	Tobin's Q
CDP Score	-0,000122	-5.68e-06	-0.00559***	-0.000560**
	(0.000141)	(2.36e-05)	(0.00154)	(0.000227)
SR	-0,012	-0,00111	-0,121	-0,0224
	(0.00855)	(0.00160)	(0.0936)	(0.0138)
Constant	0.150***	0.0176***	1.380***	1.041***
	(0.00925)	(0.00202)	(0.101)	(0.0149)
Observations	42	42	42	42
Number of companies	7	7	7	7

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Result of this specific analysis revealed that CDP score had a statistically significant relation with the MVBV and Tobin's Q at 1% and 10% levels. This relation is

negative, indicating that a 1-unit increase in CDP score leads to a decrease in MVBV by 0.0055, which again does not confirm the main hypothesis of this study (Table 7).

Additionally, none of the estimated coefficients of SR showed a significant relation with the dependent variables.

Consumer Discretionary Subsector Analysis

Data from 14 consumer discretionary companies were analyzed to explore the relationship between CDP score/SR and ROE, ROA, MVBV, and Tobin's Q Table 8). A significant relation was found between CDP score and MVBV at 5% level when Consumer Discretionary firms were sorted out. Accordingly, 1-unit increase in CDP score leads to 0.0248 increase in MVBV (Table 8). But no relation was detected between SR and dependent variables.

Table 8. Econometric results of consumer discretionary subsector companies.

	(1)	(2)	(3)	(4)
Variables	RoE	RoA	MVBV	Tobin's Q
CDP Score	0,000113	-0,000104	0.0248**	-0,00231
	(0.000687)	(0.000171)	(0.0111)	(0.00287)
SR	0,0483	0,0123	-0,125	-0,0229
	(0.0488)	(0.0114)	(0.677)	(0.174)
Constant	0.0888*	0.0481***	2.749***	1.875***
	(0.0467)	(0.0138)	(0.467)	(0.120)
Observations	84	84	84	84
Number of companies	14	14	14	14

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Manufacturing Sector Analysis with Two-Year Lagged Values

Forty-one manufacturing companies were included in the analysis to explore the relationship between CDP score/SR of current year and ROE, ROA, MVBV, and Tobin's Q of two years later (Table 9). In the manufacturing sector analysis, two-year lagged values of CDP score revealed statistically significant association with the ROE and MVBV at 5% and 10% level, respectively. To interpret, a 1- unit increase in two-year lagged CDP score promotes the ROE by 0.0014 and retards MVBV by 0.0092 (Table 9). This result partly confirms the main hypothesis of this study since RoE increased two years after the CDP score; however, MVBV does the opposite. As for the two-year lagged value of SR, as in the finance sector, no statistical relation was found with the dependent variables, namely ROE, ROA, MVBV, and Tobin's Q.

Table 9. Econometric results of manufacturing sector companies with two-year lagged values.

	(1)	(2)	(3)	(4)
Variables	RoE	RoA	MVBV	Tobin's Q
l2_CDPScore	0.00147**	-0,00021	-0.00927*	-0,00206
	(0.000711)	(0.000225)	(0.00515)	(0.00193)
l2_SR	-0,00653	-0,0101	0,277	-0,0531
	(0.0455)	(0.0168)	(0.344)	(0.131)
Constant	0.0699***	0.0575***	2.844***	1.639***
	(0.0234)	(0.0105)	(0.386)	(0.128)
Observations	164	164	164	164
Number of company	41	41	41	41

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Finance Sector Analysis with Two-Year Lagged Values

Nineteen financial sector companies were included in the analysis to explore the relationship between CDP score/SR of current year and ROE, ROA, MVBV, and Tobin's Q two years later (Table 10). The estimated coefficients of two-year lagged CDP score and SR were not statistically significant for financial performance indicators (Table 10).

Table 10. Econometric results of financial sector companies with two-year lagged values.

	(1)	(2)	(3)	(4)
Variables	RoE	RoA	MVBV	Tobin's Q
l2_CDPscore	0,000452 (0.000379)	-5.48e-05 (0.000178)	-0,00268 (0.00216)	-0,000657 (0.000859)
l2_SR	0,0356 (0.0278)	0,00257 (0.0132)	-0,115 (0.146)	-0,00186 (0.0579)
Constant	0.0651*** (0.0169)	0.0244*** (0.00773)	0.950*** (0.0665)	0.929*** (0.0264)
Observations	76	76	76	76
Number of company	19	19	19	19

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Banks Subsector Analysis with Two-Year Lagged Values

For the sample of seven banks, the two-year lagged values of CDP score and ROA was positively related to ROA at 5% level, but the magnitude is the effect almost negligible (0.0000422) (Table 11), differing from results in the current year (Table 7).

Consumer Discretionary Subsector with Two-Year Lagged Values

Fourteen consumer discretionary companies were included in the analysis to explore the relationship between CDP score/SR of current year and ROE, ROA, MVBV, and Tobin's Q of two years later (Table 12). Similar to the two-year lagged values of

Table 11. Econometric results of banks with two-year lagged values.

	(1)	(2)	(3)	(4)
Variables	RoE	RoA	MVBV	Tobin's Q
l2_CDPScore	0,000141	4.22e-05**	-0,00101	-0,000111
	(0.000152)	(2.11e-05)	(0.00199)	(0.000228)
l2_SR	0,0102	-0,000498	-0,162	-0,0173
	(0.00837)	(0.00149)	(0.109)	(0.0125)
Constant	0.116***	0.0132***	1.024***	1.001***
	(0.00700)	(0.00148)	(0.0914)	(0.0105)
Observations	28	28	28	28
Number of company	7	7	7	7

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

CDP score and SR, the relationship between CDP score and the dependent variables was different. The two-year lagged value of CDP score was positively correlated with ROE, but negatively correlated with MVBV (Table 12). Again, no relationship between SR and the dependent variables was significant.

Table 12. Econometric results of consumer discretionary companies with two-year lagged values.

	(1)	(2)	(3)	(4)
Variables	RoE	RoA	MVBV	Tobin's Q
l2_CDPScore	0.00532**	0,000507	-0.0656***	-0,00503
	(0.00203)	(0.000356)	(0.0217)	(0.00345)
l2_SR	-0,00987	-0,0132	0,0476	-0,251
	(0.0885)	(0.0155)	(0.949)	(0.174)
Constant	-0,035	0.0344***	5.061***	1.934***
	(0.0642)	(0.0113)	(0.688)	(0.246)
Observations	56	56	56	56
Number of company	14	14	14	14

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Summary of the Results of Quantitative Analyses

In all analyses of two major and two subsectors, the effect of SR on the financial performance of BIST100 companies was not significant, both for the current year of reporting and after two years of reporting. CDP score, on the other hand, was found to significantly and positively affect only the consumer discretionary subsector for the same year. CDP score affected MV/BV negatively in the financial sector ($p < 0.1$) and Tobin's Q ratios in manufacturing sector and banks subsector ($p < 0.05$) (Table 13). Additionally, CDP score positively influenced RoE in the manufacturing sector and accordingly, in its subsector; consumer discretionary in the two-year time lag analyses ($p < 0.05$). A positive significant effect of CDP score on RoA was also seen in the banking sector in the two-year time lag analysis with 5% significance level. Interestingly, a negative significant effect of CDP score was also seen in the MV/BV variable in manufacturing sector in the two-year time lag analysis with 10% significance level (Table 14).

Table 13. Significant results for CDP score and same year financial performance variables.

	RoE	RoA	MV/BV	Tobin's Q
Manufacturing				- (5%)
Financial			- (10%)	
Banks				- (5%)
Consumer Discretionary			+ (5%)	

Table 14. Significant results for CDP score and two-year lagged financial performance variables.

	RoE	RoA	MV/BV	Tobin's Q
Manufacturing	+ (5%)		- (10%)	
Financial				
Banks		+ (5%)		
Consumer Discretionary	+ (5%)			

Women Ratios in Boards and CDP Correlation Analysis

The analysis examining the correlation between the ratio of women in the board of directors and the CDP reporting level found a very low and negative (-0.1) correlation coefficient. Therefore, the hypothesis that the ratio of women in the board of directors is positively correlated with reporting environmental data to the CDP” was rejected.

Results of Qualitative Analyses

Investor relations managers reported that they take sustainability performance, e.g. carbon emission targets, seriously and use it as a tool while communicating with analysts and potential investors. The interviews indicated they presume that potential investors started to count on environmental data of companies. They consider being in BIST’s Sustainability Index is prestigious. They generally work hand in hand with sustainability departments for disclosing environmental data quarterly. However, environmental data are not used for risk management, but only for marketing purposes. Therefore, they are also not aware of the financial benefits environmental transparency will bring in the long term.

Sustainability managers interviewed for this study tend to internalize carbon emission reduction targets; however, they reported that it is generally not taken seriously by other departments and by top management. They desire to make environmental performance as one of the components of a company’s strategy; however, it is seen as a marketing tool by other departments. The financial benefits of carbon reduction are generally calculated for using in internal documentation.

Chapter IV

Discussion

The premise of this research was that understanding the financial impact of environmental transparency could lead to more informed decisions about disclosing corporate environmental data in Turkey. This research was intended to advance the value given to sustainability by Turkish companies and could be a model for other developing countries, where corporations mostly lack the sensitivity for sustainability issues. If its link to financial performance were well understood, more research and courses in the corporate sustainability field could emerge, in addition to motivating more companies to publish sustainability reports and disclose their GHG emissions in Turkey.

However, the results of the several quantitative analyses, based on a six year panel data for BIST 100 companies, surprisingly revealed that the effects of environmental transparency indicators on the financial performance of companies are very limited, and in a negative direction in some cases. It is hard to determine the underlying reasons why this effect is limited or negative with just this study.

According to the panel data analyses, the existence of sustainability reporting did not affect BIST100 companies' financial performance in any sector in the same year or two years later. The consciousness of sustainability reporting only started recently in Turkey, as indicated by the limited number of published reports. Only 20% (13 of the 60 company sample) of companies had published a SR in 2012, whereas in 2016, half of them (30 companies) published such reports. By looking closely to the average financial indicators between 2012 and 2017, it can be easily seen that all of the indicators, except

average ROA of financial sector companies, showed a decrease in 2017 compared to 2012 values (Tables 2 & 3). This coincided with a general downturn in the economy, which made BIST100 companies less profitable in 2017 compared to 2012. With SR publication rates increasing and profitability decreasing in the overall economy, it is no surprise that the regression analyses showed a limited negative or no correlation between SR and financial performance indicators.

Similar to SR, the consciousness and widespread adoption of environmental transparency, i.e. disclosing carbon emissions data through CDP, also started recently in Turkey. CDP Turkey launched its first report in 2011. Since 2012, the number of BIST100 reporters among the sample of this study increased to 23 from 17 (Tables 2 & 3). Increasing the number of CDP reporters is one of the main objectives of CDP Turkey. This constant increase in reporters also coincided with the economic downturn in Turkey. Still, the slight difference among companies in their financial performance, according to their CDP disclosure scores, could be captured in the manufacturing sector and in banks after two years. This may mean that it takes at least two years for investment returns to become evident after they start to invest in environmental transparency in a developing country like Turkey. This result is parallel to the study done in Czech Republic noted earlier, where financial returns were negative after one year and became positive after two years (Horvathova, 2012).

However, the details uncovered interesting discussion points. For instance, in the manufacturing sector, while RoE increases with the increase in CDP scores, MV/BV decreases. RoE was calculated by dividing the total net profit by the total equity, and MV/BV was calculated by dividing the total market value by the total equity. This means

that successful CDP reporting companies in this sector had better profits in two years but worse market values. Higher CDP disclosure scores were therefore reflected in net profit, a financial performance indicator. Higher net profits result in high revenues and/or low expenses situations. Scoring higher in CDP also indicates calculating, setting targets, and trying to decrease one's GHG emissions, which are also sources of expense, such as electricity and heating bills. Therefore, this result is meaningful in terms of cutting expenses while time scoring better in CDP.

However, this situation is not the same for market value, where individual shareholders in the stock market assign a price to the company's shares. This means that good CDP scores are not valued by the shareholders in the stock market, i.e., by the public. Even if the company uses it for its financial benefit, the public did not value it. There is a need for increasing the awareness of environmental transparency among the public. This may also be the reason why many companies do not value environmental disclosures. It is like a virtuous cycle: the public does not value it, so the company does not care about it.

The Task Force on Climate-related Financial Disclosures (TCFD) aims to increase awareness among companies as well as develop recommendations for more effective climate related disclosures. The Chair of this task force, Michael R. Bloomberg, believes that "Increasing transparency makes markets more efficient, and economies more stable and resilient" (TCFD, 2018). In their "Recommendations document", the task force recommends companies not only establish metrics and targets, but also manage climate risks and integrate company governance and strategy around climate related disclosures. The Task Force recommends that organizations provide climate related

financial disclosures in their public annual financial results meetings. TCFD expects that environmental transparency will evolve over time as companies and investors contribute to the quality and consistency of the disclosed information. In the near future, starting with the developed countries, companies may be forced to disclose more information about climate risk to investors and the general public. This will lead to more measurement and disclosure, which will then lead to better performance.

Turkey signed the Kyoto Protocol in 2009, but without any obligation to decrease its carbon emissions. That is why companies, even in the energy and cement sectors, conduct only voluntary carbon calculations and reductions. Carbon calculation and reduction are seen as burdens rather than opportunities for most firms. They even collectively lobby to not be included in the ETS. This indicates that environmental transparency is seen as a source of cost and unnecessary burden rather than a source of savings and opportunities.

Companies in Turkey need more information, basic instruments, and government incentives to exercise environmental transparency. The limited interest from investors and consumers is not enough for them to continuously manage sustainability in their companies. Accordingly, many of the largest 100 public firms in Turkey don't have a sustainability department. Even the ones that do have still rely on consulting firms for calculating carbon emissions and following up other sustainability indicators in their companies. The cost of carbon calculations by consultancy firms also discourages companies with limited or negative profits. In times of financial downturns, sustainability management is one of the first areas to be cut off. Similar to other indicators of

development, environmental transparency will be internalized by developing country companies several years later than in the developed world.

Conclusions

The main hypothesis of this study, that financial performance of BIST 100 companies is predicted by a company's willingness to publish sustainability reports, and disclose environmental data through its CDP and CDP score, was rejected by the results of the same year panel data analyses, except for the MV/BV of consumer discretionary sector. However, when the financial performance of CDP and SR was taken into account two years later, in the manufacturing sector together with its subsector, consumer discretionary, RoE was found to be positively predicted by the CDP score after two years of reporting to CDP at the 5% significance level. Similarly, RoA was found to be – positively predicted by the CDP score after two years of reporting to CDP, with a relatively small significance level (5%) in the banking sector.

Contrary to the general assumptions and expectations, MV/BV of financial sector companies and Tobin's Q ratios of manufacturing and consumer discretionary sector companies were found to be–negatively predicted by their CDP scores of the same year. Two-year lagged MV/BV of manufacturing sector companies were also found to be–negatively predicted by their CDP scores.

Therefore, we can conclude the following revised hypotheses were supported in this sample of companies for this time period of analyzed data:

- MV/BV ratios of consumer discretionary sector companies in BIST 100 index were positively influenced by companies disclosing their environmental data through CDP and their CDP scores.
- Two-year lagged RoE ratios of manufacturing and consumer discretionary sector companies in BIST 100 index were positively affected if companies disclose their environmental data through CDP and their CDP scores.
- Two-year lagged RoA ratios of banking sector companies in BIST 100 index were positively predicted if companies disclose their environmental data through CDP and their CDP scores.
- MV/BV ratios of financial sector companies in BIST 100 index were negatively influenced if companies disclose their environmental data through CDP and their CDP scores.
- Tobin's Q ratios of manufacturing and consumer discretionary sector companies in BIST 100 index were negatively affected if companies disclose their environmental data through CDP and their CDP scores.
- Two-year lagged MV/BV ratios of manufacturing sector companies in BIST 100 index were negatively affected if companies disclose their environmental data through CDP and their CDP scores.

As clearly seen from the results, different sectors, different financial performance indicators, and different timelines showed varying results regarding the impact of environmental transparency on financial performance of publicly traded companies in Turkey. Turkey, as a rising economy, focused more on growth rather than green growth in the recent decade. Since environmental reporting is relatively new in Turkey, the

number of reporting companies will predictably increase as it also continues to increase internationally. The Sustainability Index of BIST is also crucial here; it should not remain only as a list, but the index should start being traded among investors as soon as possible. Investors are using CDP scores for creation of financial products in some countries. For example, Nedbank in South Africa developed the Nedbank Green Index. CDP Disclosure scores are used for selecting stocks and performance scores for assigning weight (CDP, 2014). With a similar trade in Turkey, companies would realize the financial effects of their environmental responsibility from another perspective.

Turkish companies should follow their counterparts in developed countries as benchmarks. It is not hard to increase the ratio of GHG reporting companies from 10% to at least the current global average of 43% with correct incentives and motivations. Once they realize how much saving could be generated with decreasing GHG emissions, Turkish companies will be more motivated to measure and further decrease emissions in the following years. Awareness in the public and among the investors is also expected to rise. This will lead to better financial returns for companies due to their environmental responsibility and transparency.

A further or follow up research is recommended to analyze the impacts in a wider timeline. Even two-year lagged values made a difference in this study; perhaps there will be more surprising results when three or five-year lagged values are measured with increased public awareness and the internalization of environmental responsibility within companies.

Appendix 1

List of Manufacturing Sector Companies

Company Name	SubSector	12/2017 Market Value (USD)
Anadolu Efes	Consumer Staples	3.646.042.494
Afyon Çimento	Materials	197.964.377
Ak Enerji	Utilities	168.839.440
Aksa Akrilik	Consumer Discretionary	604.898.219
Aksa Enerji	Utilities	644.373.537
Arçelik	Consumer Discretionary	3.700.170.738
Aselsan	Industrials	8.091.603.053
Aygaz	Utilities	1.226.717.557
Bagfaş	Materials	120.229.008
Bim Mağazacılık	Consumer Discretionary	6.033.374.046
Bizim Mağazacılık	Consumer Discretionary	117.557.252
Brisa	Consumer Discretionary	564.427.226
Coca Cola İçecek	Consumer Discretionary	2.214.902.799
Doğuş Otomotiv	Consumer Discretionary	461.272.265
Eczacıbaşı İlaç	Health Care	768.955.725
Enka İnşaat	Industrials	7.058.015.267
Ereğli Demir Çelik	Materials	8.923.664.122
Ford Otosan	Consumer Discretionary	5.379.726.972
Göлтаş Çimento	Materials	119.633.588
Good Year	Consumer Discretionary	291.984.733
Gübre Fabrikaları	Materials	359.496.183
Karsan Otomotiv	Consumer Discretionary	238.167.939
Kartonsan	Materials	204.510.433
Konya Çimento	Materials	316.215.522
Kardemir	Materials	637.283.715
Migros Ticaret	Consumer Discretionary	1.248.475.064
Netaş Telekom	Information Technology	261.439.695
Otokar	Industrials	756.030.534
Petkim	Materials	2.965.648.855
Park Elektrik Madencilik	Materials	157.958.270
Şişe Cam	Industrials	2.690.839.695
Turkcell	Telecommunication Services	8.665.648.855
Türk Hava Yolları	Industrials	5.509.465.649
Tofaş Oto	Consumer Discretionary	4.201.017.812

Trakya Cam	Industrials	1.328.396.947
Türk Telekom	Telecommunication Services	5.735.368.957
Türk Traktör	Industrials	1.032.072.265
Tüpraş	Energy	7.741.967.684
Ülker Bisküvi	Consumer Discretionary	1.711.740.458
Vestel	Consumer Discretionary	646.158.779
Zorlu Enerji	Utilities	804.071.247

Appendix 2

List of Financial Sector Companies

Company Name	SubSector	12/ 2017 Market Value (USD)
Akbank	Banks	10.025.445.293
Alarko Holding	Industrials	412.816.901
Doğan Holding	Industrials	579.322.216
Emlak Konut GMYO	Financials	2.717.048.346
Garanti Bankası	Banks	11.456.488.550
Gözde Girişim	Financials	554.478.372
GSD Holding	Financials	82.442.748
T. Halk Bankası	Banks	3.428.753.181
İhlas Holding	Industrials	106.593.384
İş Bankası	Banks	7.980.862.824
İş GMYO	Financials	316.208.651
Koç Holding	Industrials	11.924.528.235
Metro Holding	Consumer Staples	75.572.519
Sabancı Holding	Financials	5.773.356.670
Tav Havalimanları	Industrials	2.076.156.966
Tekfen Holding	Industrials	1.600.508.906
T.S.K.B.	Banks	879.389.313
Vakıflar Bankası	Banks	4.306.615.776
Yapı ve Kredi Bankası	Banks	4.800.560.451

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