BER www.berjournal.com ISSN: 2619-9491 BUSINESS AND ECONOMICS RESEARCH JOURNAL

Business and Economics Research Journal Vol. 14, No.2, 2023 pp. 199-216 doi: 10.20409/berj.2023.407

The Analysis of The Dynamic Relationship between Corporate Sustainability and Financial Performance

Ebru Aydoğan[1], **Esen Kara**[2]

Abstract: *One of the frequently mentioned issues in the literature is that studies analyzing the relationship between corporate sustainability and financial performance do not reach a consensus on the existence and direction of the relationship. This study is aimed to contribute to the literature by analyzing the relationship between corporate sustainability practices and financial performances of 58 non-bank firms included in the Borsa Istanbul (BIST) Sustainability Index between the years 2015-2021. The study employed the System Generalized Method of Moments (system GMM) estimator, which is one of the dynamic panel data models. The results of the analysis can be summarized as follows; (i) there is a positive relationship between corporate sustainability practices and both market-based and accounting-based financial performance indicators, (ii) corporate sustainability positively affects different financial performance indicators at different terms, (iii) sustainability investments affect the market value of businesses more and faster than the return on assets, and (iv) the relationship between corporate sustainability and financial performance is dynamic, and the endogeneity problem should be taken into account in the analysis of the relationship between them.*

Keywords: Corporate Sustainability, Financial Performance, Endogeneity, Panel Data, System GMM

JEL: C23, G30, G34

Received : 01 December 2022
Revised : 09 February 2023
Accepted : 28 February 2023

Type : Research

1. Introduction

Problems such as climate change, loss of biodiversity, unjust distribution of resources, and increasing environmental pollution, which are accepted as common problems of the globalizing world, have increased the importance of the concept of sustainability. In this direction, sustainability goals, which are based on a global framework with a macro approach, have also become a critical issue for businesses (Cantele & Cassia, 2020). Corporate sustainability (CS) practices have become an important strategy especially for businesses that want to survive in increasingly competitive markets, be in line with government regulations, and respond to social responsibility and transparency demands (Wagner & Blom, 2011; Lassala, Apetrei, & Sapena, 2017) from stakeholders.

While CS practices are considered as ethical conduct responsibilities (Lo & Sheu, 2007) of businesses towards society and the environment from the perspective of stakeholders, they are also investments that require long-term resource allocation from the perspective of businesses. For this reason, it is important to know the financial and non-financial benefits of sustainability investments for businesses that continue their activities for the purpose of maximizing the value of their shareholders. The number of academic studies on

Cite this article as: Aydoğan, E., & Kara, E. (2023). The analysis of the dynamic relationship between corporate sustainability and financial performance. *Business and Economics Research Journal,* 14(2), 199-216. http://dx.doi.org/10.20409/berj.2023.407

The current issue and archive of this Journal is available at: ***www.berjournal.com***

[1] PhD., Bursa Uludag University, Faculty of Economics and Administrative Sciences, Department of Business Administration, Bursa, Turkiye, ebruaydogan@uludag.edu.tr (Corresponding Author)

[2] Asst. Prof., Bursa Uludag University, Faculty of Economics and Administrative Sciences, Department of Business Administration, Bursa, Turkiye, esencimilli@uludag.edu.tr

the impact of CS practices on corporate financial performance (CFP) have increased significantly, especially in the last decade (Alshehhi, Nobanee, & Khare, 2018). However, in the related literature, it has been stated by many researchers that there is no consensus on the existence and representation (+ or -) of the relationship between CS and CFP (Marti, Rovira-Val, & Drescher, 2015; Shahzad & Sharfman, 2017; Alshehhi et al., 2018; Soytas, Denizel, & Durak Usar, 2019; Eide, Saether, & Aspelund, 2020). The literature suggests that this is caused by factors such as (i) invalid, unreliable, and different CS and CFP measurements, (ii) not including possible variables that may affect CFP in the analysis, (iii) not including the historical value of CFP in the analysis of the CS-CFP relationship, (iv) differences in sample characteristics used, (v) time lag between sustainability investments and return on investment, and (vi) methodological issues and use of different methodologies (Marti et al., 2015; Shahzad & Sharfman, 2017; Alshehhi et al., 2018). The most important problem put forward about the methodology is the endogeneity (Crane, Henriques, Husted, & Matten, 2017; Shahzad & Sharfman, 2017; Ben Lahouel, Gaies, Ben Zaied, & Jahmane, 2019; Soytas et al., 2019), which is not taken into account in the analyses. Shahzad and Sharfman (2017), Ben Lahouel et al. (2019), stated that the main reason for the uncertain results seen in previous studies is endogeneity. Again, Crane et al. (2017) stated that studies analyzing the relationship between corporate social performance and CFP, like every strategic decision, have an endogeneity problem that makes causal inference almost impossible. Moreover, Wintoki, Linck and Netter (2012) stated that corporate finance studies dealing with the causes and effects of financial decisions often have an endogeneity problem, and ignoring endogeneity may lead to biased and inconsistent results.

The primary aim of this study, which was made to contribute to the literature analyzing the relationship between CS and CFP, is to examine the effect of CS investments on CFP of firms that were included in the BIST Sustainability Index (SI) for at least one year between 2015-2021. The secondary aim of this study is to perform the analysis by considering the above-mentioned possible problems related to previous studies. In this direction; (i) two dependent variables, accounting-based ROA and market-based Tobin's Q, were used to represent CFP in order to take into account different aspects of FP, (ii) historical values of CFP indicators have been included in the analysis to take into account dynamic endogeneity, (iii) lagged values of CS are included in the analysis in order to capture the time interval between sustainability investments and investment returns, (iv) finally, the two-stage dynamic system GMM was used in the analysis in order to capture the dynamic structure in the CS-CFP relationship and to obtain unbiased and consistent results. On the other hand, Alshehhi et al. (2018) stated that the number of publications in developing countries lags far behind developed economies in terms of the relationship between CS and CFP. In line with this, the third aim of this study is to analyze the relationship between CS and CFP in the context of developing country economies.

2. Conceptual Framework

2.1. Development of The Concept of Sustainability

It is accepted that the emergence of the concept of sustainability first developed in the field of forestry in the 1700s (Ebner & Baumgartner, 2006; Scoones, 2007; Abdi, Li, & Càmara-Turull, 2020). At that time, the continuity of resource use was emphasized by considering the negative effects of ongoing practices on forests, as well as the needs of future generations (Wiersum, 1995). The concept of sustainability, which could not reach a worldwide acceptance until the last 50 years, re-emerged with the report called "The Limits to Growth" published in 1972 by an informal organization called "The Club of Rome", which was founded in 1968. The report in question modeled the interconnected systems of our planet and revealed that the world's capacity will have exceeded within a century if the growth trends in population, industrialization, resource use and environmental pollution continued unchanged (Meadows, Meadows, Randers, & Behrens, 1972; The Club of Rome, 2022). The concept of sustainable development was carried to a more formal dimension with the report, also called the "Brundtland Report", published by the World Commission on Environment and Development in 1987 under the name "Our Common Future". Furthermore, the adoption of the report by the United Nations General Assembly has given the concept of sustainability a political significance (WCED, 1987; Drexhage & Murphy, 2010). The report mentioned common problems such as the damage caused by

industrialization to nature, the distinction between developed and developing countries, and depleted resources, leading to the decision that the world should adopt sustainable development for the next century (Keeble, 1988). Then, with the United Nations Environment and Development Conference held in Rio de Janeiro in 1992 and attended by 178 government representatives as well as heads of state and non-governmental organizations, sustainability and sustainable development have become concepts that are taken into consideration around the world. The conference aimed to develop a global framework to address environmental issues such as climate change and biodiversity loss through sustainable development (Scoones, 2007; Ashrafi, Adams, Walker, & Magnan, 2018). Sustainable development is a concept that has no clear meaning and definition, with various definitions made by different people (Eden, 2000; Drexhage & Murphy, 2010). In the Bruntland Report (p.38), sustainable development is defined as *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (WCED, 1987). Additionally, it was emphasized in the report that the needs of the poor regions in the world should be met first and that economic development should be strengthened with social development and should not harm the environment (WCED, 1987). In other words, with sustainable development, the necessity of equal distribution of resources both among current generations and between current and future generations has been emphasized. Another important definition of sustainability is the theory developed by Elkington (1998), called the "Triple Bottom Line". This theory, also called the 3P, aims to establish a harmonious balance between social equality (people), environmental quality (planet) and economic welfare (profit), which are the three pillars of sustainability (Elkington, 1998; Ashrafi et al., 2018). In the two years following the publication of the Brundtland Report, the number of definitions of sustainable development and sustainability increased from approximately 140 to almost 300 in 2007 (Johnston, Everard, Santillo, & Robert, 2007). Despite the diversity, Drexhage and Murphy (2010) summarized the common points in definitions as (i) commitment to equality and justice, (ii) long-term perspective emphasizing the principle of precaution, and (iii) the integration of complex links between the environment, economy and society.

2.2. Corporate Sustainability

While sustainable development goals are based on a global framework with a macro approach, it has also become an increasingly critical issue in business processes and consumers' lives. The general belief that businesses have many negative effects on the environment and society has led businesses to focus on the concept of sustainability (Dyllick & Hockerts, 2002; Lozano, 2015; Cantele & Cassia, 2020). CS was defined by Dyllick and Hockerts (2002: 131) as *"meeting the needs of a firm's direct and indirect stakeholders (such as shareholders, employees, clients, pressure groups, communities etc.), without compromising its ability to meet the needs of future stakeholders as well"*. CS, which was generally used as a firm's ability to demonstrate stable CFP until the late 1980s, now refers to a tripartite structure that includes the financial, social, and environmental aspects of corporate performance. CS includes the efforts that should be included in the overall management model of the firm. Therefore, all business decisions and activities must balance the tripartite structure of sustainability, also called (Elkington, 1998) the "Triple Bottom Line" (Adams, Thornton, & Sepehri, 2012; Alshehhi et al., 2018; Barbosa, Castañeda-Ayarza, & Lombardo Ferreira, 2020). In this direction, firms need to develop corporate strategies that integrate sustainable practices into their activities, as well as establish a healthy communication with all their stakeholders, and commit to the management of related decisions (Abdi et al., 2020; Eide et al., 2020; Pizzi, Corbo, & Caputo, 2021). It is accepted that some internal and external factors shape the orientation of firms toward sustainability practices. Negative global developments such as scarcity of resources despite the increasing population around the world, climate change, deterioration of the ecosystem and emissions have increased the external pressure on firms to deal with the related problems (Linnenluecke, Russell, & Griffiths, 2009; Bartolacci, Caputo, & Soverchia, 2020; Hermundsdottir & Aspelund, 2021). In particular, social responsibility and transparency demands from stakeholders, government regulations and public influence have an important role in leading firms toward sustainability practices (Wagner & Blom, 2011; Lassala et al., 2017). In addition to the external pressure for firms to be more sustainable, the increase in competition in the markets due to globalization and new technologies is another reason that pushes firms to be sustainable. Borghesi and Vercelli (2003) stated that in a more competitive market, consumers will have more product alternatives and thus, their chances of

expressing their environmental demands will increase. In the face of consumer pressure accompanying increasing competition, businesses see CS practices as an advantage and focus more on green innovation and creating sustainable value (Borghesi & Vercelli, 2003; Alshehhi et al., 2018; Chu, Xu, Lai, & Collins, 2018; Hermundsdottir & Aspelund, 2021). Cantele and Zardini (2018) found that sustainability increases competitiveness through corporate reputation, customer satisfaction and corporate loyalty, and increasing competitive advantage also positively affects financial performance. They also argued that the operational and financial benefits of sustainability apply to SMEs as well as large and multinational businesses. Similarly, Cantele and Cassia (2020) stated that with sustainability activities, customer satisfaction and competitiveness of firms increase directly, and firm performance indirectly. Furthermore, stakeholders such as investors, financial analysts and portfolio managers have begun to consider the non-financial performance of firms more in their investment decisions (Lourenço, Branco, Curto, & Eugénio, 2012; Aggarwal, 2013; Abdi et al., 2020; Madaleno & Vieira, 2020; Yilmaz, Aksoy, & Tatoglu, 2020). Regarding this issue, as a result of their study that involved the firms in BIST SI, Ates (2020) concluded that investors do care whether the firm is included in the SI or not. Particularly the 2008 financial crisis led to a positive change in the attitudes of capital markets towards CS (Lopatta & Kaspereit, 2014). For this reason, in today's world where the possibilities of providing capital are getting more difficult, sustainability investments also offer important opportunities for businesses that want to reduce their capital costs by expanding their investor base (El Ghoul, Guedhami, Kwok, & Mishra, 2011). According to Lozano (2015), external factors include avoiding fines, improving external trust with suppliers, customers, etc., meeting the expectations of stakeholders, acting ethically, improving relations with regulators, facilitating access to permits, increasing customer satisfaction, and reducing the pressure of NGOs.

Internal factors, on the other hand, can be evaluated as financial and non-financial benefits that increase the efficiency of the operations of the firm, the overall business performance, and the CFP. Empirical findings showing that CS increases the resource use efficiency of firms, enhances corporate reputation, strengthens relations with stakeholders, improves employee productivity, motivation, and workplace participation, and provides access to new markets, are generally accepted as internal factors (Greening & Turban, 2000; Branco & Rodrigues, 2006; Bowen & Bowen, 2007; El Ghoul et al., 2011; Flammer, 2015; Saeidi, Sofian, Saeidi, Saeidi, & Saaeidi, 2015; Aksoy, Yilmaz, Tatoglu, & Basar, 2020). Moreover, CS practices enable firms to better control their costs (Pätäri, Jantunen, Kyläheiko, & Sandström, 2012) and use their resources (Dincel & Gungor, 2018) on the way to having a stronger CFP, while contributing to the maximization of shareholders' wealth by creating brand loyalty and corporate reputation (Adams et al., 2012). Lozano (2015) summarized the internal factors as improving internal trust, having a more cohesive workforce, improving product quality, helping to increase innovative practices, enabling the management of risks, intangibles and internal processes, and most importantly, increasing the CFP of the business.

In addition to creating intangible assets such as increased reputation, competitive advantage, customer satisfaction, and good relations with stakeholders for businesses (Saeidi et al., 2015), sustainability investments can also be considered as intangible assets that create value (El Ghoul et al., 2011; Adams et al., 2012; Yilmaz et al., 2020). For this reason, it is necessary to evaluate the long-term effects of sustainability investments, where it is difficult to achieve visible results in the short term. Dyllick and Hockerts (2002) stated that the aim of making short-term profit is contrary to the spirit of CS activities, and that a long-term and short-term perspective should be integrated (Dyllick & Hockerts, 2002; Ashrafi et al., 2018).

3. Literature Review

Table 1 contains a summary of some of the international studies conducted to analyze the CS-CFP relationship. There is no consensus in the literature on the existence and the representation of the effect of CS investments on CFP. Although a clear positive and negative relationship was found between CS and CFP in some of the studies, it was seen that some others did not reach a clear result.

Table 1. Some of the Previous International Studies Analyzing the CS – CFP Relationship

Study	Country & Data Period	Sample	Methodology	Dependent Variable	Independent Variable	CS - FP Relationship
Lo & Sheu (2007)	1999-2002 USA	349 firms in the DJSGI USA index	Variation between two groups, fixed and random effects models	Tobin's Q	Dummy variable (DJSGI USA)	Positive
Chang & Kuo (2008)	2003-2005	311 global public firms	Structural Equation Model (SEM)	ROA, ROE, ROS	Corporate sustainability assessment data from SAM Sustainable Asset Management	Positive
Wagner (2010)	1992-2003 USA		Ordinary Least Squares (OLS)	Tobin's q	Kinder Lydenberg Domini index	Positive with the advertising intensity moderation
Garcia-Castro et al. (2010)	1991-2005 USA	658 US-based firms included in KLD database	OLS, fixed effects and instrumental variable estimation	ROE, ROA, Tobin's Q, Market Value Added	Kinder Lydenberg Domini index	Negative for MVA and neutral for ROA, ROE and Tobin's Q
Detre & Gunderson (2011)		36 firms traded NYSE, NASDAQ, or AMEX	Event study	Stock returns	firm's inclusion on a Dow Jones Sustainability Index (DJSI)	Negative
Ameer & Othman (2012)	2006-2010	the top 100 sustainable global firms in 2008	content analysis and statistical analysis	sales growth, profit before tax, ROA, cash flows from operating activities	sustainability reports	Positive
Lourenço et al. (2012)	2007–2010 Canada and USA	63 firms included in the Dow Jones sustainability United States index	Several regressions based on the same model	Market value of equity	Dow Jones sustainability United States index	Positive
Pätäri et al. (2012)	2000-2009	60 energy firms that are included in the DJSI, and the biggest 150 firms from the global energy sector	t-test and the Wilcoxon two-sample test	growth in net sales, increase in personnel, operating profit margin, ROA, ROIC, year-end market capitalization,	Dow Jones sustainability index	Positive
Ziegler (2012)	1999-2003 Europe	266 firms	Fixed and random effects models	ROA, Tobin's Q	Dummy variable (DJSI World)	Mixed

Table 1. Some of the Previous International Studies Analyzing the CS – CFP Relationship (Continued)

Study	Country & Data Period	Sample	Methodology	Dependent Variable	Independent Variable	CS - FP Relationship
Aggarwal (2013)	2010-2012	45 firms continuously included in S&P CNX Nifty 50 Index	Multiple regression analysis	ROA, ROE, ROCE, profit before tax, growth in total sales	Sustainability Rating (OSR), Community Performance, Employees Performance, Environmental Performance and Governance Performance Ratings	Mixed
Eccles, Ioannou & Serafeim (2014)	1993-2009 USA	180 U.S. firms	Variation between two groups	ROA, ROE	Thomson Reuters ASSET4	Positive
Marti et al. (2015)	2007-2010 Europe	153 firms in the Stoxx Europe 600 Index	pooled OLS, random effect, fixed effect estimators, Parks' feasible generalized least squares estimators and panel corrected	ROA, ROE, Tobin's Q	Dummy variable (CSP)	Positive
Ching, Gerab & Toste (2017)	2008-2014 Brazil	51 firms	Multiple linear regression analysis	ROA, ROE, Net Margin, Opeational cash flow, P/E, Tobin's Q, Market capitalization	Corporate Sustainability Index	Neutral
Soytas et al. (2019)	2010-2013 North America	1714 firms	Instrumental variable estimation	ROA, ROE	The CSRHUB database to construct company sustainability scores	Positive
Thayaraj & Karunarathne (2021)	2006-2009 Indonesia	32 firms	Single and multiple linear regression analysis	ROA	Sustainability reporting, economic-environmental and social performance disclosures	Mixed

For clarifying the studies that have mixed results about CS-CF relationship in Table 1 some additional explanations were made. For example, Wagner (2010) stated that high CS performance and high advertising density alone did not have an effect on CFP, but the interaction of the two had a significant and positive relationship with CFP. Ziegler (2012) found that the effect of being included in the Dow Jones Sustainability World Index (DJSI) on CFP was insignificant for the UK and Ireland, but significant for continental European countries. Thayaraj and Karunarathne (2021) stated that among the economic, environmental, and social performance statements that make up the three pillars of CS, only social performance statements have a significant positive effect on CFP. Aggarwal (2013) found that CS had a positive effect on ROA, Profit Before Tax and Growth in Total Assets, but had a negative effect on ROE and ROCE. Accordingly, it was concluded

that CS had no significant effect on CFP holistically. And some of the national studies about CS-CFP relationship summarized in Table 2.

Table 2. Some of the Previous National Studies Analyzing the CS – CFP Relationship

Study	Country & Data Period	Sample	Methodology	Dependent Variable	Independent Variable	CS - FP Relationship
Önder (2017)	2016 Turkey	91 firms	Multiple linear regression analysis	Pre-tax profit	Dummy variable (BIST Sustainability Index)	Insignificant
Düzer & Önce (2018)	2008-2014 Turkey	30 firms	Fixed and random effect	ROA, ROE, MV/BV, P/E	sustainability scores according to GRI Standards	Mixed
Gürünlü (2019)	2014-2018 Turkey	55 firms	Pooled OLS, fixed and random effect	Operating ROA, Tobin's Q	Dummy variable (BIST Sustainability Index)	Mixed
Aksoy et al. (2020)	2014-2018 Turkey	63 firms listed in BIST 100 Index	Logit and probit models	Tobin's Q as control variable	Dummy variable (BIST Sustainability Index)	Negative
Doğukanlı & Borak (2020)	2015-2017 Turkey	235 firms	OLS, fixed and random effect	ROA	Dummy variable (BIST Sustainability Index)	Insignificant
Emir & Kıymık (2021)	2014-2018 Turkey	27 firms listed in BIST Metal Products, Mach	Panel data	ROA, ROE, ROCE, profit before tax, growth rate in total assets	sustainability scores according to GRI G4 Standards	Mixed
Gündüz (2021)	2014-2016 Turkey	42 firms	Random effect	Tobin's Q, MV/BV	Dummy variable (BIST Sustainability Index)	Insignificant

Düzer and Önce (2018) stated that while environmental performance has positive effect on the ROA and the ROE, social performance has only a positive effect on the ROA. As a result of their analysis of the firms in BIST SI, Gürünlü (2019) determined that the effect of being included in the index on the Operating ROA of the firms was positive but limited, and it did not have a significant effect on the Tobin's Q ratio. And lastly, Emir and Kıymık (2021) found that the level of knowledge disclosed regarding sustainability performance have a positive impact on the ROA, ROE, capital return and profit before tax. But the effect turned into negative when the performance indicator is the growth rate in total assets.

Although the number of academic studies on the impact of CS practices on CFP have increased significantly in recent years, as can be seen from the cited studies which are international and national in Table 1 and Table 2, the findings of the studies did not clear. Much as the relationship between CS practices and CFP mostly determines that the relationship is positive, there are also studies suggesting that the relationship is negative, mixed, or insignificant (Alshehhi et al., 2018). The literature suggests that this is caused by factors such as, (i) invalid, unreliable, and different CS and FP measurements, (ii) not including possible variables that may affect FP in the analysis, (iii) not including the historical value of FP in the analysis of the CS-FP relationship, (iv) differences in sample characteristics used, (v) time interval between sustainability investments and return on investment, and (vi) methodological issues and use of different methodologies (Marti et al., 2015; Shahzad & Sharfman, 2017; Alshehhi et al., 2018).

4. Data and Methodology

4.1. Data

The sample of this study consists of firms included in BIST SI. BIST SI started its operations on November 4, 2014, one year after the cooperation agreement signed between Borsa İstanbul and Ethical Investment Research Services Limited (EIRIS) (Borsa İstanbul, 2014). Since annual data are used in the analysis, the analysis period covers seven years between 2015 and 2021. Non-bank firms that were included in BIST SI at least once were selected for the sample. The sample of the study consists of 58 firms.

Dependent Variables

In this study, in which the relationship between CS-CFP was analyzed, financial performance was used as the dependent variable. In the literature (Table 1), ROA and Tobin's Q ratios are mostly used as CFP indicators. ROA, which measures the efficiency of use of assets during a given financial year, is an accounting-based measure that shows the short-term profitability of the firm. Tobin's Q, a market-based measure, represents investors' perceptions of the firm's market value. McGuire, Sundgren and Schneeweis (1998) stated that accounting and market-based measures focus on different aspects of performance and each has certain biases. Accordingly, accounting-based measures that focus only on past performance have biases arising from managerial manipulation and differences in accounting practices. However, market-based ratios focus on the firm's growth prospects, earnings sustainability and expected future performance, and are more resilient to changes in accounting practices. However, due to the fact that the firm has different stakeholders and funders, the evaluation provided by investors alone is not sufficient (McGuire et al., 1988; Inoue & Lee, 2011; Ziegler, 2012). In line with these explanations and in order to consider different aspects of CFP, accounting-based ROA and market-based Tobin's Q ratios were used as dependent variables in the study.

ROA is calculated by dividing net profit by assets. Although Tobin's Q ratio is calculated by dividing the market value of a firm by the replacement cost of its assets (Lindenberg & Ross, 1981), this formula is not used much due to the complexity encountered in obtaining the data and computation (Ziegler, 2012). The Market Value/Book Value (MV/BV) ratio was used to represent Tobin's Q ratio, following the studies of Garcia-Castro, Ariño and Canela (2010), Wintoki et al. (2012), and Marti et al. (2010). The monthly MV/BV ratios were converted into annual data by taking their arithmetic averages.

Independent Variable

A dummy variable was used as the independent variable. The dummy variable was created by giving a value of 1 for the years when the firms were included in the BIST SI and 0 for the years they were not included in the index.

Control Variables

Considering previous studies examining the relationship between CS and CFP (Lo & Sheu, 2007; Garcia-Castro et al., 2010; Ben Lahouel et al., 2019; Madaleno & Vieira, 2020), firm size, financial leverage, sales growth rate and firm age were determined as control variables. The firm size is calculated by factoring in the natural logarithm of total assets, financial leverage, the ratio of total debt to total assets, the growth rate of sales, the percentage of annual increase in sales, the age of the firm as in the natural logarithm of the years since the establishment of the firm.

The list of firms that make up BIST SI is available on Borsa Istanbul's website (www.borsaistanbul.com). ROA, firm size, financial leverage, and sales growth rate variables were calculated using the financial statement data of the firms. The financial statements of the firms were accessed from the Public Disclosure Platform (PDP) website (www.kap.org.tr). Finally, the MV/BV ratios used to represent Tobin's Q ratio were obtained from Borsa Istanbul Historical and Reference Data Platform (https://datastore.borsaistanbul.com/).

4.2. Methodology

As stated in the literature review section above, one of the reasons why the findings of the studies about CS-CFP relationship were not clear is the problems related to methodology. The most important problem put forward about the methodology is the endogeneity, which is not taken into account in the analyses (Crane et al., 2017; Shahzad & Sharfman, 2017; Ben Lahouel et al., 2019; Soytas et al., 2019). Crane et al. (2017) stated that the endogeneity between CS and CFP may be due to reverse causality, omitted variable, and measurement errors. Reverse causality is that if firms enter CS practices to reach a certain level of CFP, CFP is affected by CS practices as well as CS practices are affected by CFP. This causes the CS to be correlated with the error term (Wintoki et al., 2012; Ben Lahouel et al., 2019). The omitted variable is the factors that affect both explanatory variables and performance and cannot be observed by the researcher (Wagner, 2010). An example of this situation is that CFP can be driven by unobservable variables such as R&D investments, advertising expenditures, unavailable data that may be associated with CS. Advertising and R&D investments made by a firm within the scope of CS practices are likely to affect both CFP and environmental performance under CS (Alper & Aydoğan, 2016; Ben Lahouel et al., 2019). However, unobservable factors specific to the firm such as the attitude of the managers, organizational culture, and the skills of the employees or the management can also be evaluated within this scope (Garcia-Castro et al., 2010; Pellegrini, Rizzi, & Frey, 2018; Kutzschbach, Tanikulova, & Lueg, 2021; Siyal, Ahmad, Riaz, Xin, & Fangcheng, 2022). Measurement errors arise because the variables representing CFP and CS cannot be measured correctly. For example, there have been heavy criticism about the indexes chosen to represent CS (Crane et al., 2017).

Ben Lahouel et al. (2019) stated that any feedback from past shocks regarding the current value of the dependent variable cannot be excluded, so the entire history of current CFP should be explained with lagged CFP. They also stated that the relationship between CS and CFP is dynamic, in other words, there is a relationship between current CS values, which is called dynamic endogeneity, and past CFP values. Indeed, firms that are financially stronger will have more resources and incentives for sustainability practices. In addition, financially stronger firms with lower CSPs are subject to greater public scrutiny and stakeholder pressure (Lourenço et al., 2012; Soytas et al., 2019). Wintoki et al. (2012) stated that due to the dynamic relationship between the current values of the explanatory variable and the past values of the dependent variable, analyzes with standard Ordinary Least Squares (OLS) or static panel data methods will yield biased and inconsistent results, and the bias may be in the opposite direction of the dynamic relationship (Wintoki et al., 2012). As a matter of fact, Ben Lahouel et al. (2019) found that the CSP-CFP relationship that turned positive when they used a fixed effects estimator in the analysis, disappeared when endogeneity was also factored in.

In order to eliminate the endogeneity problem in the CS-CFP relationship, there are studies (Garcia-Castro et al., 2010; Soytas et al., 2019) that use the Instrumental Variable (IV) technique in the literature as well as studies using the dynamic panel data method (Ben Lahouel et al., 2019; Jan, Marimuthu, bin Mohd, & Isa, 2019; Madaleno & Vieira, 2020). In this study, the system GMM method, which is one of the dynamic panel data methods, was used similar to the latter studies in order to control the dynamic relations between the variables and the endogeneity. Wintoki et al. (2012) stated that the unobservable heterogeneity, simultaneity, and the dynamic relationship between the current value of the explanatory variables and the past value of the dependent variable can be controlled with the dynamic system GMM method.

Arellano and Bover (1995) and Blundell and Bond (1998) developed the system GMM method because the difference GMM method developed by Arellano and Bond (1991) caused a decrease in the number of observations and poor tools in the analysis. As a result of the Monte Carlo Simulation, Soto (2009) determined that the system GMM estimator has lower bias and higher efficiency than all other estimators including standard first-differences GMM.

With reference to Wintoki et al. (2012) and Nguyen, Locke and Reddy (2014), in the dynamic relationship between CS (X_{it}) and CFP (Y_{it}), X_{it} is a function of past performance and other firm characteristics.

$$X_{it} = f(Y_{it-1}, Y_{it-2}, \ldots . Y_{it-p}, Z_{it}, \eta_{it}, \varepsilon_{it}) \quad (1)$$

Here: i represents firms, t time, X_{it} CS variables, Z_{it} other control variables, η_{it} unobservable firm effects, ε_{it} random error term, and p the number of lags of firm performance. In this case, the estimate of the effect of CS (X_{it}) on CFP (Y_{it}) should be expressed as follows:

$$Y_{it} = f(Y_{it-1}, Y_{it-2}, \ldots . Y_{it-p}, X_{it}, Z_{it}, \eta_{it}, \varepsilon_{it}) \quad (2)$$

In the system GMM method, the lagged value of the dependent variable is added to the model as an independent variable. Empirically, it is necessary to determine the number of lags necessary so that all information from the past can be included in the analysis. For this purpose, with reference to Wintoki et al. (2012) and Nguyen et al. (2014), the number of lags required for both dependent variables was calculated with the OLS estimator. According to the OLS results, it was concluded that 2 (Y_{it-1} and Y_{it-2}) for TQ and 1 lag (Y_{it-1}) for ROA were appropriate (Table 4). The models to be estimated were created as follows.

$$ROA_{it} = \alpha_0 + \gamma ROA_{it-1} + \alpha_1 CS_{it} + \beta_1 FS_{it} + \beta_2 Lev_{it} + \beta_3 SG_{it} + \beta_4 FA_{it} + year\ dummies + \eta_{it} + \varepsilon_{it} \quad (3)$$

$$TQ_{it} = \alpha_0 + \gamma TQ_{it-1} + \gamma TQ_{it-2} + \alpha_1 CS_{it} + \beta_1 FS_{it} + \beta_2 Lev_{it} + \beta_3 SG_{it} + \beta_4 FA_{it} + year\ dummies + \eta_{it} + \varepsilon_{it} \quad (4)$$

Here, ROA_{it-1} represents returns on assets with one year lag; TQ_{it-1} and TQ_{it-2} represent Tobin's Q ratios with one year lag and a two-year lag; FS_{it} represents firm size; Lev_{it} represents leverage ratio; SG_{it} represents sales growth rate; FA_{it} represents firm age.

5. Findings

Table 3 presents descriptive statistics for the variables used in the analysis. As seen in Table 3 the average return on assets was approximately 6%. This ratio shows that the assets of the firms included in the analysis are not very effective in generating profits on average. However, the average of 3.26 Tobin's Q ratio, which is preferred to be greater than 1, reveals that firms were able to create value for their shareholders. The average leverage ratio, which shows what percentage of their assets are financed by debt, is approximately 54%. The growth rate of sales was around 10%.

Table 3. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	406	0.06	0.07	-0.26	0.33
TQ	406	3.26	10.66	0.29	201.74
FS	406	8.40	1.14	5.85	10.72
Lev	406	0.54	0.22	0.01	1.27
SG	406	9.81	80.93	-1294.98	93.61
Age	406	1.60	0.20	1.08	1.94

Table 4 shows the Pearson correlation coefficients between the variables. There is a positive correlation between the financial performance indicators and their lagged values at 5% significance level. This result confirms the validity of the dynamic panel data method used in the analysis. However, while the degree of financial leverage is only positively correlated with Tobin's Q ratio, firm size has a negative correlation with all variables. Firm age showed a positive correlation with all variables. On the other hand, there is a positive relationship between being included in the corporate governance index and the two performance indicators. Furthermore, the variable with the highest correlation of CS is the two lagged values of Tobin's Q.

Table 4. Correlation Coefficients

	ROA	TQ	L.ROA	L.TQ	L2.TQ	CS	FS	Lev	Age	CS
ROA	1.000									
TQ	0.125*	1.000								
L.ROA	0.569*	0.117*	1.000							
L.TQ	0.119*	0.877*	0.120*	1.000						
L2.TQ	0.069	0.285*	0.099	0.574*	1.000					
CS	0.029	0.029	0.048	0.036	0.071	1.000				
FS	(0.021)	(0.093)	(0.059)	(0.157)*	(0.196)*	(0.171)*	1.000			
Lev	(0.450)*	0.022	(0.410)*	(0.059)	(0.204)*	(0.049)	(0.120)*	1.000		
SG	0.124*	0.024	(0.053)	0.021	(0.010)	(0.021)	0.000	0.096	1.000	
Age	0.133*	0.073	0.1723*	0.067	0.024	(0.080)	(0.205)*	(0.113)*	0.054	1.000

*: %5 significance.

Table 5 shows the results of the OLS analysis to determine the number of lags required for the two dependent variables. Presented in Table 5, the OLS analysis was repeated three times for both ROA and Tobin's Q variable; once excluding lagged values, once including one lag, and once including both lags. When the results of analyzes 1, 2 and 3 are examined, it is seen that one lagged value of ROA has a positive effect on ROA at the 1% significance level, but the positive effect of two lagged values is insignificant. Also, when R-squared and Adj. R-Squared values were examined, it was determined that model 2 (model with one lag) showed the best performance for ROA.

Tablo 5. The Number of Lags Required for The Two Dependent Variables

***Dependent Variable:* ROA**				***Dependent Variable:* Tobin's Q**			
	(1)	(2)	(3)		(4)	(5)	(6)
L.ROA		0.501*	0.412*	L.TQ		2.474*	3.055**
		(0.051)	(0.067)			(0.071)	(0.077)
L2.ROA			0.013	L2.TQ			-1.65**
			(0.069)				(0.144)
FS	-0.004	-0.002	-0.002	FS	-0.808	0.628**	0.089
	(0.003)	(0.002)	(0.003)		(0.482)	(0.271)	(0.264)
CS	0.003	-0.002	-0.001	CS	1.152	-0.189	0.355
	(0.007)	(0.007)	(0.008)		(1.17)	(0.655)	(0.646)
Lev	-0.154*	-0.089*	-0.09*	Lev	1.028	4.899*	1.71
	(0.015)	(0.016)	(0.019)		(2.473)	(1.381)	(1.398)
Age	0.026	0.013	0.007	Age	3.262	2.391	1.235
	(0.017)	(0.016)	(0.018)		(2.736)	(1.507)	(1.444)
Constant	0.133*	0.086**	0.096**	Constant	3.453	-15.09*	-4.581
	(0.043)	(0.043)	(0.048)		(6.972)	(3.896)	(3.864)
Observation	406	348	290	**Observation**	406	348	290
R2	0.213	0.379	0.367	**R2**	0.014	0.78	0.86
R2adj	0.205	0.37	0.355	**R2adj**	0.004	0.776	0.857

*: %1 significance, **: %5 significance. Standard errors are presented below the corresponding coefficient

When the results of analyzes 4, 5 and 6 in Table 5 are examined, it was determined that both one-lag and two-lag TQ values affected the dependent variable (Tobin's Q) at 1% significance level, but in different directions (positive and negative, respectively). Looking at the R-squared and Adj. R-squared values of second group regression results, it is seen that model 6 (model with two lags) performs the best. According to the results reported in Table 5, the number of lags was determined as one for ROA and two for Tobin's Q. The analysis results of the models given in Equation (1) and (2) are presented in Table 6.

Tablo 6. Dynamic Panel System GMM Esimation Result

Dependent Variable:	**ROA_{it}**		**TQ_{it}**	
	Coef.	*p value*	*Coef.*	*p value*
ROA_{it-1}	0.44	0.000		
	(0.049)			
TQ_{it-1}			3.075	0.000
			(0.036)	
TQ_{it-2}			-1.297	0.000
			(0.128)	
CS_{it}	-0.011	0.205	0.984	0.006
	(0.009)		(0.358)	
CS_{it-1}	0.029	0.000	0.863	0.015
	(0.006)		(0.355)	
FS_{it}	0.010	0.005	0.498	0.062
	(0.003)		(0.267)	
Lev_{it}	-0.080	0.000	6.455	0.000
	(0.019)		(1.171)	
SG_{it}	0.0002	0.000	0.006	0.038
	(0.000)		(0.003)	
FA_{it}	0.042	0.000	0.040	0.001
	(0.011)		(1.206)	
		p value		*p value*
Observations	348		290	
Wald test	17632.62	0.000	42114.8	0.000
Hansen test	34.35	0.682	45.98	0.175
Fark- Hansen test	21.78	0.592	28.58	0.195
AR(2)serial correlation test	0.39	0.694	-1.43	0.153

Standard errors are presented below the corresponding coefficient.

Table 6 shows the results of the analysis of the effect of being included in BIST SI on the CFPs of the firms. The analysis used the two-stage system GMM method. The conclusions that can be made according to the results are as follows:

First, it was found that the historical values of the CFP indicators (a two-year lag for a Tobin's Q and one-year lag for ROA) had a significant effect on the current values in the direction of expectations. Accordingly, a one-unit increase in the previous year's return on assets increases the current return on assets by 0.44 units. The effect was much higher for Tobin's Q. A one-unit increase in the previous year's Tobin's Q ratio positively increases the current year's Tobin's Q ratio by 3.07 units. However, it was determined that a one-unit increase two years ago had a negative and significant effect on the current year. These results also show that the dynamic panel estimation method is valid in analyzing the CS-CFP relationship.

Secondly, FS, SG and Firm Age variables have a positive effect on ROA, while the Lev variable has a negative and significant effect. This means that a one-unit increase in debt financing reduces the return on assets by 0.08 units. On the other hand, when the results on the right side of the table are examined, it is seen that FS does not have a significant effect on TQ. However, other variables affect the TQ ratio positively and significantly. The effect of leverage ratio on TQ was quite high. From this finding, it can be said that firms with a high market value are seen as reliable by the creditors and these firms have more financing opportunities with external resources.

Thirdly, it has been found that involvement in CS has different effects on different performance indicators. The results in Table 5 show that the CS variable has a negative and insignificant effect on the current year's return on assets, but this effect turns positive and significant one year later. In other words, one unit of sustainability investment made in the current year increases the return on assets by 0.02 units in the next year. This finding shows that sustainability investments increase costs in the current year and have

no effect on asset profitability, but the next year's return on investment is positive. This finding also supports the view that CS investments have an intangible investment characteristic. On the other hand, it is seen that being included in the CS index has a positive effect on Tobin's Q both in the current year and in the next year, and much higher than ROA. This shows that sustainability investments affect the market value of businesses more and faster than asset profitability.

Finally, tests showing the consistency of the estimation results are reported below the table. The results of the Wald test, which tests the significance of the model as a whole, show that both models are significant. According to the Hansen test results, which tests the validity of the instrumental variables, the instrumental variables used are valid. Also, it is seen that there is no autocorrelation in either model.

9. Discussion and Conclusion

Although the majority of academic studies to determine the existence and the representation of the relationship between corporate sustainability and corporate financial performance suggest that there is a positive relationship between the variables (Alshehhi et al., 2018), there are also studies in the literature suggesting that the relationship is negative, mixed, or insignificant. This study, which aims to contribute to the aforementioned literature, analyzed the relationship between CFP and CS investments of 58 firms that were included in BIST SI for at least one year between 2015-2021. The analysis was made using the two-stage system GMM method, one of the dynamic panel data models. In this way, the results obtained from the analysis performed by controlling the unobservable heterogeneity, simultaneity and dynamic endogeneity can be summarized as follows:

First of all, similar to the studies of Wintoki et al. (2012), Nguyen et al. (2014), Ben Lahouel et al. (2019), it was concluded that both of the CFP indicators had a significant and positive effect on the current values of their past values. This shows the necessity of considering the dynamic endogeneity bias in studies examining the relationship between CFP and CS. In other words, it is thought that it would be appropriate to add the historical values of CFP indicators to the model as an explanatory variable.

Secondly, unlike Ching, Gerab and Toste (2017), other researchers (Santis, Albuquerque & Lizarelli, 2016; Doğukanlı & Borak, 2020; Gürünlü, 2020), concluded that CS positively affects both accounting-based and market-based performance indicators. This finding supports the analysis results of Eccles, Ioannou and Serafeim (2014), Pätäri et al. (2012), Sak and Dalgar (2020), Soytas et al. (2019). However, the positive relationship between the CS and CFP variables occurred at different levels for different performance indicators. In other words, the positive effect of CS practices on market-based Tobin's Q is greater than accounting-based ROA. Accordingly, this effect should be factored in the conclusions regarding the existence and the direction of the relationship between CS and CFP.

Thirdly, in support of the view of Dyllick and Hockerts (2002) that short-term and long-term perspectives should be integrated in sustainability investments and the view of Chang and Kuo (2008) that the impact of sustainability on performance can spread to later periods, it has been found to be possible that CS can affect different performance indicators in the same direction in both short term and long term. In other words, while CS investments affects Tobin's Q positively in the same year, the negative and insignificant effect of CS on profitability turns into a positive effect one year later, in line with the findings of López, Garcia and Rodriguez (2007). In other words, although sustainability investments seem to negatively affect profitability in the short term and put the business at a disadvantage compared to its competitors, it adds positive value to the business in the long run (López et al., 2007). This finding suggests that sustainability investments to be made with the expectation of profit in the short term will not meet the profitability expectations of the firm. In addition, this result shows that the number of lags required for performance indicators may be different.

Fourthly, the findings of the study support the view that the results will be inconsistent and biased if the CS and CFP relationship is not factored in the studies. Finally, according to the findings in Table 6, although the increase in debt financing of assets affects the ROA negatively, it affects the Tobin's Q positively. This result shows that firms with high market value have the capacity to receive more external sources and are

considered more trustworthy by them. In a similar vein, firm age and the growth of sales also have a positive effect on both financial indicators.

The study's findings suggest that, investors care about the CS practices of the firms' both in the year the firm invests in CS and in the following years and put emphasis on CS performances in their investment decisions. Furthermore, although sustainability investments seem to increase costs in the investment year the contribution margin of market exceedingly offset these costs. Moreover, one year later also the return on asset turns into positive. Based on the main findings of this study we can conclude that firms can attract more investors and obtain internal and external resources more easily while increasing their profitability and market value with CS practices. These findings encourage public companies to adhere to sustainability investment and develop corporate strategies that integrate sustainable practices into their activities.

Although it is thought that the findings of the study will contribute to the literature from different aspects, the study has some limitations. First of all, the small number of firms included in the BIST SI and the fact that the index started its activities a short time ago led to a rather low number of observations. On the other hand, since the study in question was made on the basis of only one country's index, it is thought that comparative studies are necessary in order to generalize some results.

Declarations and Disclosures

Ethical Responsibilities of Authors: The authors of this article confirm that their work complies with the principles of research and publication ethics.

Conflicts of Interest: No potential conflict of interest was reported by the authors.

Funding: The authors received no financial support for the preparation and/or publication of this article.

Author Contributions: The authors confirm contribution to the article as follows: Conceptualization and design, E. Aydoğan and E. Kara; data collection, E. Aydoğan and E. Kara; analysis of data and interpretation of results, E. Aydoğan; writing the first draft of the manuscript, E. Aydoğan and E. Kara; review and editing, E. Aydoğan and E. Kara. The manuscript/article was read and approved by all the authors, and all authors accepted responsibility for their article.

Plagiarism Checking: This article was screened for potential plagiarism using a plagiarism screening program.

References

Abdi, Y., Li, X., & Càmara-Turull, X. (2020). Impact of sustainability on firm value and financial performance in the air transport industry. *Sustainability*, 12(23), 1-23. https://doi.org/10.3390/su12239957

Adams, M., Thornton, B., & Sepehri, M. (2012). The impact of the pursuit of sustainability on the financial performance of the firm. *Journal of Sustainability and Green Business*, 1, 1-14.

Aggarwal, P. (2013). Impact of sustainability performance of study of listed Indian companies. *Global Journal of Management and Business Research Finance*, 13(11), 61-70.

Aksoy, M., Yilmaz, M. K., Tatoglu, E., & Basar, M. (2020). Antecedents of corporate sustainability performance in Turkey: The effects of ownership structure and board attributes on non-financial companies. *Journal of Cleaner Production*, 276, 1-11. https://doi.org/10.1016/j.jclepro.2020.124284

Alper, D., & Aydoğan, E. (2016). Relationships Between R&D and Corporate Performance: An Empirical Analysis in Istanbul Stock Exchange. *PARADOKS Economics, Sociology and Policy Journal*, 12(2), 96-114.

Alshehhi, A., Nobanee, H., & Khare, N. (2018). The impact of sustainability practices on corporate financial performance: Literature trends and future research potential. *Sustainability*, 10(2), 494. https://doi.org/10.3390/su10020494

Ameer, R., & Othman, R. (2012). Sustainability practices and corporate financial performance: A study based on the top global corporations. *Journal of Business Ethics*, 108(1), 61-79. https://doi.org/10.1007/s10551-011-1063-y

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58, 277-297. https://doi.org/10.2307/2297968

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29-51. https://doi.org/10.1016/0304-4076(94)01642-D

Ashrafi, M., Adams, M., Walker, T. R., & Magnan, G. (2018). How corporate social responsibility can be integrated into corporate sustainability: A theoretical review of their relationships. *International Journal of Sustainable Development & World Ecology*, 25(8), 672-682. https://doi.org/10.1080/13504509.2018.1471628

Ates, S. (2020). Membership of sustainability index in an emerging market: Implications for sustainability. *Journal of Cleaner Production*, 250, 1-11. https://doi.org/10.1016/j.jclepro.2019.119465

Barbosa, M., Castañeda-Ayarza, J. A., & Lombardo Ferreira, D. H. (2020). Sustainable strategic management (GES): Sustainability in small business. *Journal of Cleaner Production*, 258, 120880. https://doi.org/10.1016/j.jclepro.2020.120880

Bartolacci, F., Caputo, A., & Soverchia, M. (2020). Sustainability and financial performance of small and medium sized enterprises: A bibliometric and systematic literature review. *Business Strategy and the Environment*, 29(3), 1297-1309. https://doi.org/10.1002/bse.2434

Ben Lahouel, B., Gaies, B., Ben Zaied, Y., & Jahmane, A. (2019). Accounting for endogeneity and the dynamics of corporate social – Corporate financial performance relationship. *Journal of Cleaner Production*, 230, 352-364. https://doi.org/10.1016/j.jclepro.2019.04.377

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115-143. https://doi.org/10.1016/S0304-4076(98)00009-8

Borghesi, S., & Vercelli, A. (2003). Sustainable globalisation. *Ecological Economics*, 44(1), 77-89. https://doi.org/10.1016/S0921-8009(02)00222-7

Borsa İstanbul. (2014). Şirketler için Sürdürülebilirlik Rehberi. In *Borsa İstanbul*. Retrieved from https://www.borsaistanbul.com/data/kilavuzlar/surdurulebilirlik-rehberi.pdf (Access Date: 19 September 2022)

Bowen, F., & Bowen, F. (2007). Corporate social strategy : Competing views from two theories of the firm. *Journal of Business Ethics*, 75, 97-113. https://doi.org/10.1007/s10551-006-9240-0

Branco, M. C., & Rodrigues, L. L. (2006). Corporate social responsibility and resource-based perspectives. *Journal of Business Ethics*, 69, 111-132. https://doi.org/10.1007/s10551-006-9071-z

Cantele, S., & Cassia, F. (2020). Sustainability implementation in restaurants: A comprehensive model of drivers, barriers, and competitiveness-mediated effects on firm performance. *International Journal of Hospitality Management*, 87, 1-10. https://doi.org/10.1016/j.ijhm.2020.102510

Cantele, S., & Zardini, A. (2018). Is sustainability a competitive advantage for small businesses? An empirical analysis of possible mediators in the sustainability – financial performance relationship. *Journal of Cleaner Production*, 182, 166-176. https://doi.org/10.1016/j.jclepro.2018.02.016

Chang, D., & Kuo, L. R. (2008). The effects of sustainable development on firms' financial performance - an empirical approach. *Sustainable Development*, 16(6), 365-380. https://doi.org/10.1002/sd.351

Ching, H. Y., Gerab, F., & Toste, T. H. (2017). The quality of sustainability reports and corporate financial performance: Evidence from Brazilian listed companies. *SAGE Open*, 7(2), 1-9. https://doi.org/10.1177/2158244017712027

Chu, Z., Xu, J., Lai, F., & Collins, B. J. (2018). Institutional theory and environmental pressures: The moderating effect of market uncertainty on innovation and firm performance. *IEEE Transactions on Engineering Management*, 65(3), 392-403. https://doi.org/10.1109/TEM.2018.2794453

Crane, A., Henriques, I., Husted, B. W., & Matten, D. (2017). Measuring corporate social responsibility and impact: Enhancing quantitative research design and methods in business and society research. *Business & Society*, 56(6), 787-795. https://doi.org/10.1177/0007650317713267

Detre, J. D., & Gunderson, M. A. (2011). The triple bottom line: What is the impact on the returns to agribusiness? *International Food and Agribusiness Management Review*, 14(4), 166-178. https://doi.org/10.22004/ag.econ.117608

Dincel, C., & Gungor, N. (2018). Does corporate sustainability practices have an impact on financial performance: A study based on BIST manufacturing firms. *Pressacademia*, 8(1), 9-13. https://doi.org/10.17261/pressacademia.2018.971

Doğukanlı, H., & Borak, M. (2020). Sürdürülebilirliğin firma performansına etkisi: Borsa İstanbul'da bir araştırma. *Eskişehir Osmangazi Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 15(1), 81-94. https://doi.org/10.17153/oguiibf.537243

Drexhage, J., & Murphy, D. (2010). Sustainable development : From Brundtland to Rio 2012. In *United Nations Headquarters*. Retrieved from http://www.surdurulebilirkalkinma.gov.tr/wp-content/uploads/2016/06/Background_on_Sustainable_Development.pdf (Access Date: 05 October 2022)

Düzer, M., & Önce, S. (2018). Sürdürülebilirlik performans göstergelerine ilişkin açıklamaların finansal performans üzerine etkisi: BIST'te bir uygulama. *Muhasebe ve Vergi Uygulamaları Dergisi*, 11(1), 93-117. https://doi.org/10.29067/muvu.372882

Dyllick, T., & Hockerts, K. (2002). Beyond the business case for corporate sustainability. *Business Strategy and the Environment*, 11(2), 130-141. https://doi.org/10.1002/bse.323

Ebner, D., & Baumgartner, R. J. (2006). The relationship between Sustainable Development and Corporate Social Responsibility. *Corporate Responsibility Research Conference 2006*, (September), 17. Retrieved from http://www.crrconference.org/Previous_conferences/downloads/2006ebnerbaumgartner.pdf (Access Date: 10 October 2022)

Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management Science*, 60(11), 2835-2857. https://doi.org/10.1287/mnsc.2014.1984

Eden, S. (2000). Environmental issues: sustainable progress? *Progress in Human Geography*, 24(1), 111-118. https://doi.org/10.1191/030913200671287506

Eide, A. E., Saether, E. A., & Aspelund, A. (2020). An investigation of leaders' motivation, intellectual leadership, and sustainability strategy in relation to Norwegian manufacturers' performance. *Journal of Cleaner Production*, 254, 1-12. https://doi.org/10.1016/j.jclepro.2020.120053

El Ghoul, S., Guedhami, O., Kwok, C. C. Y., & Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital? *Journal of Banking & Finance*, 35(9), 2388-2406. https://doi.org/10.1016/j.jbankfin.2011.02.007

Elkington, J. (1998). Partnerships from cannibals with forks: The triple bottom line of 21st-century business. *Environmental Quality Management*, 8(1), 37-51. https://doi.org/10.1002/tqem.3310080106

Emir, S., & Kıymık, H. (2021). Sürdürülebilirlik düzeyinin finansal performans üzerindeki etkisinin değerlendirilmesi: Borsa İstanbul'da bir araştırma. *Muhasebe ve Vergi Uygulamaları Dergisi*, 14(1), 101-108.

Flammer, C. (2015). Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach. *Management Science*, 61(11), 2549-2568. https://doi.org/10.1287/mnsc.2014.2038

Garcia-Castro, R., Ariño, M. A., & Canela, M. A. (2010). Does social performance really lead to financial performance? Accounting for endogeneity. *Journal of Business Ethics*, 92(1), 107-126. https://doi.org/10.1007/s10551-009-0143-8

Greening, D. B., & Turban, D. B. (2000). Corporate social performance as a competitive advantage in attracting a quality workforce. *Business & Society*, 39(3), 254-280.

Gündüz, Ç. (2021). Sürdürülebilirlik endeksi kapsamına alınmanın hisse senedi değerine etkisi: BIST uygulaması. *Bankacılar Dergisi*, 106*,* 37-58

Gürünlü, M. (2019). Sürdürülebilirlik ve finansal performans arasındaki ilişki: BİST şirketleri üzerine bir araştırma. *Muhasebe ve Finansman Dergisi*, 625803(84), 177-190. https://doi.org/10.25095/mufad.625803

Hermundsdottir, F., & Aspelund, A. (2021). Sustainability innovations and firm competitiveness: A review. *Journal of Cleaner Production*, 280, 1-18. https://doi.org/10.1016/j.jclepro.2020.124715

Inoue, Y., & Lee, S. (2011). Effects of different dimensions of corporate social responsibility on corporate financial performance in tourism-related industries. *Tourism Management*, 32(4), 790-804. https://doi.org/10.1016/j.tourman.2010.06.019

Jan, A., Marimuthu, M., bin Mohd, M.P., & Isa, M. (2019). The nexus of sustainability practices and financial performance: From the perspective of Islamic banking. *Journal of Cleaner Production*, 228, 703-717. https://doi.org/10.1016/j.jclepro.2019.04.208

Johnston, P., Everard, M., Santillo, D., & Robert, K. H. (2007). Reclaiming the definition of sustainability. *Environmental Science and Pollution Research - International*, 14(1), 60-66. https://doi.org/10.1065/espr2007.01.375

Keeble, B. R. (1988). The Brundtland report: 'Our common future.' *Medicine and War*, 4(1), 17-25. https://doi.org/10.1080/07488008808408783

Kutzschbach, J., Tanikulova, P., & Lueg, R. (2021). The role of top managers in implementing corporate sustainability—A systematic literature review on small and medium-sized enterprises. *Administrative Sciences*, 11(2), 44. https://doi.org/10.3390/admsci11020044

Lassala, C., Apetrei, A., & Sapena, J. (2017). Sustainability matter and financial performance of companies. *Sustainability (Switzerland)*, 9(9), 1-16. https://doi.org/10.3390/su9091498

Lindenberg, E. B., & Ross, S. A. (1981). Tobin's q ratio and industrial organization. *The Journal of Business*, 54(1), 1-32. https://doi.org/10.1086/296120

Linnenluecke, M. K., Russell, S. V., & Griffiths, A. (2009). Subcultures and sustainability practices: The impact on understanding corporate sustainability. *Business Strategy and the Environment*, 18(7), 432-452. https://doi.org/10.1002/bse.609

Lo, S. F., & Sheu, H. J. (2007). Is corporate sustainability a value-increasing strategy for business? *Corporate Governance: An International Review*, 15(2), 345-358. https://doi.org/10.1111/j.1467-8683.2007.00565.x

Lopatta, K., & Kaspereit, T. (2014). The world capital markets' perception of sustainability and the impact of the financial crisis. *Journal of Business Ethics*, 122(3), 475-500. https://doi.org/10.1007/s10551-013-1760-9

López, M. V., Garcia, A., & Rodriguez, L. (2007). Sustainable development and corporate performance: A study based on the Dow Jones sustainability index. *Journal of Business Ethics*, 75(3), 285-300. https://doi.org/10.1007/s10551-006-9253-8

Lourenço, I. C., Branco, M. C., Curto, J. D., & Eugénio, T. (2012). How does the market value corporate sustainability performance? *Journal of Business Ethics*, 108(4), 417-428. https://doi.org/10.1007/s10551-011-1102-8

Lozano, R. (2015). A holistic perspective on corporate sustainability drivers. *Corporate Social Responsibility and Environmental Management*, 22(1), 32-44. https://doi.org/10.1002/csr.1325

Madaleno, M., & Vieira, E. (2020). Corporate performance and sustainability: Evidence from listed firms in Portugal and Spain. *Energy Reports*, 6, 141-147. https://doi.org/10.1016/j.egyr.2020.11.092

Marti, C. P., Rovira-Val, M. R., & Drescher, L. G. J. (2015). Are firms that contribute to sustainable development better financially? *Corporate Social Responsibility and Environmental Management*, 22(5), 305-319. https://doi.org/10.1002/csr.1347

McGuire, J. B., Sundgren, A., & Schneeweis, T. (1988). Corporate social responsibility and firm financial performance. *Academy of Management Journal*, 31(4), 854-872. https://doi.org/10.5465/256342

Meadows, H. D., Meadows, L. D., Randers, J., & Behrens, W. W. (1972). *The limits to growth*. New York: Universe Book. https://doi.org/10.1016/B978-0-444-63768-0.00630-2

Nguyen, T., Locke, S., & Reddy, K. (2014). A dynamic estimation of governance structures and financial performance for Singaporean companies. *Economic Modelling*, 40, 1-11. https://doi.org/10.1016/j.econmod.2014.03.013

Önder, Ş. (2017). İşletme kârlılığına kurumsal sürdürülebilirliğin etkisi: BİST'te bir uygulama. *Muhasebe Bilim Dünyası Dergisi*, 4(19), 937-956.

Pätäri, S., Jantunen, A., Kyläheiko, K., & Sandström, J. (2012). Does sustainable development foster value creation? Empirical evidence from the global energy industry. *Corporate Social Responsibility and Environmental Management*, 19(6), 317-326. https://doi.org/10.1002/csr.280

Pellegrini, C., Rizzi, F., & Frey, M. (2018). The role of sustainable human resource practices in influencing employee behavior for corporate sustainability. *Business Strategy and the Environment*, 27(8), 1221-1232. https://doi.org/10.1002/bse.2064

Pizzi, S., Corbo, L., & Caputo, A. (2021). Fintech and SMEs sustainable business models: Reflections and considerations for a circular economy. *Journal of Cleaner Production*, 281, 1-9. https://doi.org/10.1016/j.jclepro.2020.125217

Saeidi, S. P., Sofian, S., Saeidi, P., Saeidi, S. P., & Saaeidi, S. A. (2015). How does corporate social responsibility contribute to firm financial performance? The mediating role of competitive advantage, reputation, and customer satisfaction. *Journal of Business Research*, 68(2), 341-350. https://doi.org/10.1016/j.jbusres.2014.06.024

Sak, A. F., & Dalgar, H. (2020). Kurumsal sürdürülebilirliğin firmaların finansal performansına etkisi: BIST kurumsal sürdürülebilirlik endeksindeki firmalar üzerine bir araştırma. *Muhasebe ve Finansman Dergisi*, *673722*(85), 173-186. https://doi.org/10.25095/mufad.673722

Santis, P., Albuquerque, A., & Lizarelli, F. (2016). Do sustainable companies have a better financial performance? A study on Brazilian public companies. *Journal of Cleaner Production*, 133, 735-745. https://doi.org/10.1016/j.jclepro.2016.05.180

Scoones, I. (2007). Sustainability. *Development in Practice*, 17(4-5), 589-596. https://doi.org/10.1080/09614520701469609

Shahzad, A. M., & Sharfman, M. P. (2017). Corporate social performance and financial performance: Sample-selection issues. *Business and Society*, 56(6), 889-918. https://doi.org/10.1177/0007650315590399

Siyal, S., Ahmad, R., Riaz, S., Xin, C., & Fangcheng, T. (2022). The impact of corporate culture on corporate social responsibility: Role of reputation and corporate sustainability. *Sustainability*, 14(16), 1-21. https://doi.org/10.3390/su141610105

Soto, M. (2009). System GMM estimaton with a small sample. In *UFAE and IAE Working Papers*. Barcelona. Retrieved from https://ddd.uab.cat/pub/worpap/2009/hdl_2072_41978/78009.pdf (Access Date: 24 September 2022)

Soytas, M. A., Denizel, M., & Durak Usar, D. (2019). Addressing endogeneity in the causal relationship between sustainability and financial performance. *International Journal of Production Economics*, 210, 56-71. https://doi.org/10.1016/j.ijpe.2019.01.016

Thayaraj, M. S., & Karunarathne, W. V. A. D. (2021). The impact of sustainability reporting on firms' financial performance. *Journal of Business and Technology*, 5(2), 51. https://doi.org/10.4038/jbt.v5i2.33

The Club of Rome. (2022). The Limits to Growth+50. Retrieved from https://www.clubofrome.org/ltg50/, (Access Date: 9 September 2022)

Wagner, M. (2010). The role of corporate sustainability performance for economic performance: A firm-level analysis of moderation effects. *Ecological Economics*, 69(7), 1553-1560. https://doi.org/10.1016/j.ecolecon.2010.02.017

Wagner, M., & Blom, J. (2011). The reciprocal and non-linear relationship of sustainability and financial performance. *Business Ethics: A European Review*, 20(4), 418-432. https://doi.org/10.1111/j.1467-8608.2011.01622.x

WCED. (1987). Report of the world commission on environment and development: Our common future. In *Report of the World Commission on Environment and Development*. Oxford University Press. https://doi.org/10.9774/GLEAF.978-1-907643-44-6_12

Wiersum, K. F. (1995). 200 years of sustainability in forestry: Lessons from history. *Environmental Management*, 19(3), 321-329. https://doi.org/10.1007/BF02471975

Wintoki, M. B., Linck, J. S., & Netter, J. M. (2012). Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics*, 105(3), 581-606. https://doi.org/10.1016/j.jfineco.2012.03.005

Yilmaz, M. K., Aksoy, M., & Tatoglu, E. (2020). Does the stock market value inclusion in a sustainability index? Evidence from Borsa Istanbul. *Sustainabilit*, 12(2), 483. https://doi.org/10.3390/su12020483

Ziegler, A. (2012). Is it beneficial to be included in a sustainability stock index? A panel data study for European firms. *Environmental and Resource Economics*, 52(3), 301-325. https://doi.org/10.1007/s10640-011-9529-z