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DETERMINANTS OF SUSTAINABLE PERFORMANCE ON FIRM VALUE: THE CASE OF GLOBAL 100 MOST SUSTAINABLE BUSINESS[1]

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ABSTRACT

In order to be able to talk about a sustainable business, financial information alone is not sufficient, but also qualitative and difficult-to-measure non-financial data are needed. The purpose of this study is to reveal the impact of sustainable performance determinants on the firm value of the businesses listed in the Global 100 list, where the most sustainable businesses are ranked globally. Within the scope of the research, panel data regression analysis was conducted on the data of 14 enterprises operating in the Global 100 between 2016-2021, excluding the banking sector. The results of the analysis of the final models obtained after the estimator selection and deviation from assumption tests show that there is a significant relationship between the sustainability activities of the enterprises and their firm values in general, and that the determinants of sustainable performance are most positively affected by return on assets (ROA) and return on equity (ROE), while a significant negative relationship is observed with the Tobin's Q ratio.

Keywords: Sustainability, Sustainable Development, Corporate Sustainability, Sustainable Reporting, Firm Value

FİRMA DEĞERİ ÜZERİNDE SÜRDÜRÜLEBİLİR PERFORMANS BELİRLEYİCİLERİ: GLOBAL 100 EN SÜRDÜRÜLEBİLİR FİRMALAR ÖRNEĞİ

ÖZ

Sürdürülebilir bir işletmeden söz edebilmek için finansal bilgiler tek başına yeterli olmamakta, bunun yanında niteliksel ve ölçülmesi zor olan finansal olmayan verilere de ihtiyaç duyulmaktadır. Bu araştırmanın amacı; küresel boyutta en sürdürülebilir işletmelerin sıralandığı Global 100 listesinde yer alan işletmelerin firma değeri üzerinde sürdürülebilir performans belirleyicilerinin etkisini ortaya koymaktır. Araştırma kapsamında Global 100'de bankacılık sektörü dışında, 2016-2021 yılları arasında faaliyet gösteren 14 işletmeye ait veriler üzerinde panel veri regresyon analizi yapılmıştır. Yapılan tahminci seçim ve varsayımdan sapma testleri sonrası elde edilen nihai modellerin analiz sonuçlarına bakıldığında genel olarak işletmelerin sürdürülebilirlik faaliyetleri ile firma değerleri arasında anlamlı bir ilişki olduğu ve sürdürülebilir performans belirleyicilerinin en çok aktif karlılığı (ROA) ve özkaynak karlılığını (ROE) pozitif etkilendiği bununla birlikte Tobin Q oranı ile de negatif yönde anlamlı bir ilişki gözlemlenmiştir.

Anahtar Kelimeler: Sürdürülebilirlik, Sürdürülebilir Kalkınma, Kurumsal Sürdürülebilirlik, Sürdürülebilir Raporlama, Firma Değeri

[1] This study is derived from the doctoral dissertation titled "Determinants of Sustainable Performance on Firm Value: A Comparative Analysis of Borsa Istanbul (XUSRD) and Global 100 Most Sustainability Index".

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1. INTRODUCTION

The new world order and the increasing competitive environment show that businesses can no longer sustain their activities by simply producing goods and services and achieving financial success. Problems such as global warming, resource depletion and pollution, loss of biodiversity, poverty, hunger, discrimination, corruption, human rights violations, and global pandemics lead businesses to new searches. Therefore, businesses need to adopt a corporate mission that is sensitive to the environment and people. This is possible with a good corporate governance understanding and corporate governance principles. Sustainability is the most important reflection of these developments all over the world and businesses need to take action in this regard.

Sustainable societies are prudent societies that continue to exist for generations (Meadows et al. 1992: 209). Sustainability is an economic condition that realizes the environmental demands of people and commerce without reducing the capacity of the environment to meet the needs of future generations (Hawken, 1993: 139).

Although sustainability is a whole consisting of economic, environmental and social dimensions, it first came to the agenda with environmental protection (Wakefield, 1982: 7, Drexhage and Murhy, 2020: 10). The increase in environmental damage in the 1960s and its internationalization in the 1970s increased sensitivity to the issue. In 1972, environmental problems were discussed during the United Nations (UN) Stockholm Conference held in Stockholm, Sweden. This led to the establishment of the World Commission on Environment and Development by the UN in 1983. Many organizations have initiated a wide range of sustainability programs and practices to reduce their consumption of natural resources and impacts on the natural environment (Delmas et al, 2013: 255). In international platforms, intensive efforts were made to find solutions to environmental problems and a report called the "Brundtland Report" was prepared in 1987 to understand the relationship between environment and development. This report led to the emergence of the concept of sustainable development and the development of more effective methods to find solutions to environmental problems worldwide. In the Brutland Report, known as "Our Common Future", sustainable development is defined as "Meeting the needs of present generations without jeopardizing the ability of future generations to meet their own needs" (Özmehmet, 2008; 5). This definition shows that sustainable development is an approach that aims to meet the needs of the present without depleting natural resources in order to leave a better world for future generations.

Businesses are important actors that contribute not only to economic but also to social and environmental well-being. For this reason, the role of businesses in sustainable development was emphasized at the Rio Summit in 1992 and the Johannesburg Summit in 2002. At the Johannesburg summit, while drawing attention to the lack of success in the implementation of sustainability principles worldwide, it was also recognized that environmental issues should be placed at the forefront of international political debate and that businesses should play an important role in sustainable development (Isaksson and Steimle, 2009; 170, Idowu and Louche, 2007; 139). This role has led businesses towards corporate sustainability practices.

Corporate sustainability is defined as taking into account economic, environmental and social factors in corporate governance principles, corporate activities and decision-making mechanisms and effectively managing the risks associated with these factors in order to create long-term value in companies and is called Triple Bottom Line (TBL) (Dyllick and Hockerts, 2002: 131-132, Elkington, 1998: 51).

Corporate sustainability is an approach that tries to balance the negative environmental and social impacts of businesses with positive economic and social impacts (Pothong and Ussahawanitchakit, 2011:1, Kayahan, 2014: 59), and that requires businesses to achieve goals such as profitability and corporate growth, justice and equality, environmental protection and economic development, and social responsibility. (Wilson, 2003:1)

The importance of the concept of sustainability is increasing day by day and in order to be able to talk about the sustainability of a business, it is necessary to prepare sustainability reports that present non-financial information as well as financial statements. Sustainability reports are a tool that allows businesses to demonstrate their sustainability performance by sharing their financial and non-financial information with the public. In some countries, these reports are legally mandatory, while in others they are voluntary. While these reports provide governments with an important resource to assess the

contribution and impact of businesses on the economy, they are considered a critical factor in building a sustainable global economy. This makes it inevitable to determine the relationship between sustainability activities of businesses and firm values.

It is only possible for businesses to create added value for their internal and external stakeholders, which are called "all people" and "the environment" that affect and are affected by their activities, by using scarce resources effectively (Ertuna, 2019: 30). The multidimensional nature of reports prepared for sustainability activities improves the dialog between businesses and stakeholders (Nikolaou & Evangelinos, 2010 ; Sotorrío & Sánchez, 2010). In fact, sustainability reports help to increase the degree of business accountability to stakeholders (Kolk, 2008 ; Perego & Kolk, 2012). Especially during the Covid-19 period, which emerged in Wuhan, China on December 1, 2019 and was declared a global pandemic by the World Health Organization on March 11, 2020; the fact that many companies around the world had to use their resources (energy, carbon, water, materials and waste) effectively in products and processes to combat the spread of Covid-19 has further increased the expectations of stakeholders worldwide from businesses regarding sustainable reporting.

With this research, it is aimed to determine the existence of the effect of sustainability activities on the firm value of the enterprises in the Global 100, where the world's most sustainable enterprises that prepare sustainability reports are listed, and the direction of this effect, if any. According to the level of disclosure of sustainability activities in the reports within the scope of GRI (Global Reporting Initiative) standards, it is important to investigate the impact of sustainability activities on firm performance by creating economic (ECO), environmental (CEV) and social (SOS) performance scores of enterprises. Within the scope of the research, panel data regression analysis was conducted on the data of 14 enterprises listed in the Global 100 every year between 2016-2021, excluding the banking sector. Return on Assets (ROA), Return on Equity (ROE), Return on Capital Employed (ROCE), Return on Capital Employed (ROCE), PD/DD Ratio (PDDD), Tobin's Q (Q), Asset Turnover Ratio (ACS) and Price/Earnings Ratio (P/E), which are the most frequently used firm value determinants in the literature, are included, while economic (EKO), environmental (CEV) and social (SOS) performance scores obtained from firms' sustainability reports are used as sustainable performance determinants. Firm size and leverage ratio are also included in the models as control variables to test the hypotheses determined in line with the purpose of the study.

In the following sections of the study, the relevant literature review and the application section are included. In the application section, the purpose and importance of the research are discussed, followed by the data set, model and estimator selection, analysis findings, and the conclusion section concludes the research.

2. REVIEW OF LITERATURE

As a result of the literature review on sustainability and especially sustainability reporting, many national and international studies have been found.

Schadewitz and Niskala (2010) analyzed the relationship between market capitalization and responsibility reporting of listed Finnish firms using a traditional valuation model. As a result, they argue that firms' sustainability reporting is a communication tool between managers and investors and reduces information asymmetry. They also found that publishing sustainability reporting in accordance with the GRI standard framework positively affects the firm's market value.

Yanık and Türker (2012) discussed Gray's responsibility accounting methods (sustainable cost, natural capital stock accounting, input output analysis) from a theoretical perspective, mentioned the GRI content, and proposed a sample integrated report as a result.

Bachoo et al. (2013) analyzed the relationship between firm value and sustainability reporting of firms listed on the Australian stock exchange using regression analysis and argued that there is a significant relationship between the quality of sustainability disclosures and cost of equity and a significant positive relationship between sustainability reporting quality and expected future performance.

Akarçay (2014) contributed to the literature by providing information about the Sustainability Accounting Standards Board, which prepares sector-specific sustainability accounting standards.

Tüm (2014), A literature review was conducted on questions such as what sustainability accounting means, which need it emerged in response to, its differences from traditional and environmental accounting, and what are the effects of corporate sustainability in the accounting field.

Başar (2014), in his study, determined the reporting level of the enterprises in the BIST Chemicals, Petroleum, Plastics Index between 2010-2012 according to the social responsibility criteria determined by GRI (Global Reporting Initiative) and analyzed the relationship between the results obtained and financial performance criteria. As a result, an inverse relationship was found between financial performance and social responsibility activities of enterprises.

Tschopp and Huefner (2014) evaluated four globally recognized corporate sustainable reporting standards and compared financial reporting standards with corporate sustainable reporting standards.

Yu and Zhao (2015) found a positive relationship between sustainability performance and firm value in their study on firms in the Dow Jones Sustainability Index between 1999 and 2011. They also argue that the positive effect of sustainability commitment on firm value is found for firms in countries with investor protection and high disclosure levels.

Tarakcıoğlu and Altınay (2016), Şakar and Sarıdoğan (2016) addressed the issues of integrated reporting, financial accounting and sustainability accounting in their studies and examined their reflections on accounting theoretically.

Nobanee and Ellili (2016) examined the scope of corporate sustainability disclosures in the annual reports of banks listed in the UAE financial markets between 2003 and 2013 and its impact on bank performance. As a result of the data collected from sustainability reports by content analysis method, they concluded that the overall level of sustainability disclosure is low, but sustainability disclosure has a significant and positive impact on the banking performance of traditional banks.

In their study, Yükçü and Kaplanoğlu (2016) stated the non-financial principles and indicators of prominent sustainability reports around the world and explained their importance for sustainable development.

Laskar (2017), covering the years 2009-2014 and analyzing four different Asian countries, namely Japan, South Korea, India and South Korea, found that firms' sustainability reporting has a positive impact on firm value and that the scope of reporting is wider in developed countries than in developing countries.

Coşkun Arslan and Kısacık (2017) examined the concept of triple bottom line (TBL), which is a requirement for reports that include environmental, social and economic dimensions, from a theoretical perspective and recommended the calculation of TBL based on the sustainability index.

Saban et al. (2017), in his study, mentioned the concept of corporate sustainability and sustainable reporting frameworks and provided information about the GRI Global Reporting Initiative G4 global reporting guidelines.

Swarnapali and Le (2018), in their study on 4-year data of 220 companies listed on the Colombo Stock Exchange (CSE) in Sri Lanka, concluded that there is a positive relationship between sustainability reporting (SR) and firm market capitalization.

Kuzey and Uyar (2018) emphasized in their study that businesses should announce that they care about sustainability issues by publishing reports and that this will increase the reputation of the firm by attracting individual and institutional investors. Thus, sustainability reporting will contribute to the efficient functioning of stock markets.

Önder (2018) conducted a multiple linear regression analysis using the data of 33 enterprises in Borsa Istanbul (BIST) that have sustainability reports according to the Global Reporting Initiative (GRI) in 2015 and examined the impact of corporate sustainability on corporate profitability. The sustainability sub-heading that affects the profitability of enterprises is found to be environmental factors. In addition, it was determined that employee sustainability, government and society variables used to measure sustainability do not have a statistically significant effect on the profitability of businesses in Turkey.

Karadeniz and Uzpak (2018), with this research, tried to reveal the level of meeting the economic, social and environmental dimensions of the GRI criteria of the hotel chains with the highest brand value in the world in 2017. As a result, it was determined that the hotels included the elements in the economic and

social opportunities categories in their reports, but they lacked in including the elements in the environmental category in their reports.

Şahin and Çankaya (2018) analyzed the reports of the enterprises that prepared sustainability reports until 2017 in Turkey in detail, including 121 indicators of strategy and profile, management approach and performance indicator disclosures in the GRI Guidelines, and determined the most and least disclosed disclosures in the reports.

Sampong et al. (2018), in their study on South African listed companies, concluded that sustainability reporting has a limited impact on firm value.

Altun (2018) contributed to the related literature by explaining the concept of corporate reporting, its scope, development process and the framework of global sustainability reporting principles.

Pizzi (2018) evaluated the impact of corporate social responsibility on financial economic performance of 118 companies between 2013 and 2015 and concluded that failure to control the environmental impacts of the activities carried out will have negative effects on economic-financial performance.

Düzer and Önce (2018) examined the impact of sustainability disclosure level on financial performance of 30 BIST-traded companies that prepare reports according to GRI reporting principles between 2008 and 2014 and found that the level of disclosed information on environmental performance has a positive effect on return on assets and return on equity, and the level of disclosed information on social performance has a positive effect on return on assets.

Önder (2019), with this study, the relationship between social performance and financial performance of enterprises in 2016 was examined bidirectionally and it was concluded that corporate social responsibility and business performance do not affect each other.

Supriyadi et al. (2019), in their study on firms listed in Indonesian stock exchanges, revealed that sustainability reports do not affect profitability, while firm size positively affects profitability.

Atabay (2019), In the study, it was investigated to what extent companies in Turkey and in the GRI reporting index subject their corporate sustainability reports to assurance audit. It is concluded that very few sustainability reports are subjected to assurance audit.

Kaya and Akbulut (2019) examined the impact of sustainability reports on firm value in the automotive sector and found that there is a positive and significant relationship between firm size and sustainability reports, while there is a negative and significant relationship between financial leverage and sustainability reporting.

In their study, Demircioğlu and Ever (2019) explained the purpose, principles, data collection, recording, measurement, analysis, reporting process and qualitative characteristics of sustainability accounting. Then, the regulations on sustainability reporting in Turkey are theoretically presented.

Boiral and Heras-Saizarbitoria (2020) conducted a historical analysis of sustainability reporting and assurance by companies and analyzed the organizations in the Fortune Global 500 2010. They found that although all organizations provide some form of information on social or environmental performances, the presence of sustainability assurance remains significantly limited.

Sak and Dalgar (2020) conducted a panel regression analysis to examine whether corporate sustainability has an impact on the financial performance of businesses. The dependent variable was selected as return on assets and it was concluded that return on assets has a positive effect on the financial performance of the company.

Aksoylu and Taşdemir (2020) evaluated the corporate sustainability performance of enterprises operating in different sectors in the BIST Sustainability Index within the scope of sustainability reports, covering economic, social and environmental dimensions, and identified the enterprises with the highest performance score.

Pambudi and Meini (2023) analyzed 48 firms listed on the Indonesia Stock Exchange between 2017 and 2021. WarpPLS 8.0 was used for information processing. The result of this study shows that profitability and liquidity have a significant effect on firm value, while firm size has no effect on firm value.

When the literature on the subject is examined, it is seen that sustainability is addressed from various perspectives. When the studies are examined, it is seen that enterprises in different sectors are included

in the studies and regional examinations are made without making country comparisons. As a result of the analyzes conducted using different methods, it was concluded that there is a positive relationship between sustainability performance of enterprises and firm value in general. When we look at the studies that address sustainability from a theoretical perspective, it is seen that issues such as sustainability reporting standards board, sustainability reporting, sustainability accounting, corporate sustainable reporting principles, triple bottom line approach (TBL) are mostly addressed.

3. METHODOLOGY

The fact that stakeholders want to access not only financial information but also non-financial information about businesses makes sustainability reports a necessity. The preparation of these reports and the implementation of the measures in the content of the reports create serious costs for businesses in a global competitive environment. There is no standard reporting framework in the world for the preparation of sustainability reports. However, GRI standards are one of the most preferred reporting frameworks in the world in terms of which methods businesses will use and which issues they will explain while preparing reports (IFAC, 2023: 10).

The purpose of this research is to investigate the impact of sustainable performance determinants on firm value and the direction of this impact, if any. Within the scope of the research, the data of 14 enterprises in the Global 100, which prepare their sustainability reports according to GRI standards, for the years 2016-2021 were used. In particular, the importance of the research is shown by scoring the economic (ECO), environmental (CEV) and social (SOS) dimensions of sustainable performance indicators of the enterprises and testing their effects on firm value with seven hypotheses.

3.1. Sample and Constraints of the Research

Araştırma kapsamına Global 100 listesinde yer alan 14 firmaya ait 84 finansal tablo ve 84 sürdürülebilirlik raporu dahil edilmiştir. Global 100 listesindeki firmaların seçilme nedeni tüm dünya ülkelerinin dahil olduğu ve dünyanın en sürdürülebilir firmalarının yer aldığı bir liste olmasıdır. The study included 84 financial statements and 84 sustainability reports of 14 companies in the Global 100 list. The reason for selecting the companies in the Global 100 list is that it is a list that includes all countries of the world and includes the most sustainable companies in the world. The study included 84 sustainability reports of 14 companies that prepared reports between 2016-2021. Financial statements and sustainability reports of the companies for 6 periods between 2016-2021 were used. There are two important limitations in this research. The first one is that the study cannot include financial institutions in the Global 100 sustainable companies list. The reason for this is that these firms have different structural characteristics and the presentation of financial statements differs from other enterprises. The second limitation of the study is the selection of firms that have been eligible to be included in the index for 6 years in the 2016-2020 period. In line with the constraints of the research, 14 enterprises in Table 2 were included in the study.

Table 2: Businesses Included in the Study

	Business Name	**Sector**	**Country**
1	Adidas	Textile, Footwear	Almanya
2	Cisco	Software	ABD
3	City Development	Real Estate	Singapur
4	Dassault Systemes	Software	Fransa
5	Kering	Textile, Cosmetics	Fransa
6	Kesko	Retail	Finlandiya
7	Loreal	Cosmetics	Fransa
8	Natura Cosmetic	Cosmetics	Brezilya
9	Neste Oil	Oil and Gas	Finlandiya
10	Outotec	Metal and Mineral	Finlandiya
11	Pearson	Publishing and Education	Birleşik Krallık
12	Schneider	Electricity	Fransa
13	Simens	Industry, Energy, Health	Almanya
14	Takeda	Pharmaceutical Industry	Japonya

3.2. Variables of the Research

The dependent variables of this study, which investigates the effect of the level of information disclosed on corporate sustainable performance indicators on firm value, are Return on Assets (ROA), Return on Equity (ROE), Return on Capital Employed (ROCE), PD/DD Ratio (PDDD), Tobin's Q (Q), Asset Turnover Ratio (ACS) and Price/Earnings Ratio (P/E), which are most frequently used in determining firm value. The data on these ratios to be used in determining firm value are obtained from the data for the period following the year to which the sustainability report belongs. These data were obtained from the financial reports published on the corporate websites of the firms and the Public Disclosure Platform (KAP). The independent variables of the study are the sustainability scores calculated by taking into account the level of information disclosed by firms in their sustainability reports. The sustainability scores of the firms will be expressed as economic score (ECO), environmental score (CEV) and social score (SOS). In addition, it is also aimed to examine whether the effect of the level of information disclosed by companies on sustainable performance indicators on the market value of the company differs after taking into account the control variables determined. Accordingly, the control variables of the study are firm size (Lnp and Lns) and leverage ratio (BO). The variables in the model are shown in Table 3.

Table 3: Variables in the Model

Bağımlı Değişkenler	
Return on Assets (ROA)	Net Profit / Total Assets
Return on Equity (ROE)	Net Profit / Equity
Return on Capital Employed (ROCE)	EBIT/(Total Assets – Short Term Liabilities)
Market Value / Book Value Ratio (MVBV)	Stock Market Price / Book Value of the Stock
Tobin Q Ratio (Q)	Total DD / Total Asset Value
Asset Turnover Ratio (ATR)	Net Sales / Total Assets
Price/Earnings Ratio(PE)	Stock Market Value Of Shares/ Earnings Per Share
Control Variables	
Firm Size 1 (Lns)	log(Total Assets)
Firm Size 2 (Lnp)	log(Total Sales)
Leverage Ratio (LR)	Total Debt / Total Assets
Independent Variables	
Economic Score (ECO)	
Environmental Score (ENV)	
Social Score (SOC)	

In order to calculate the ECO, ENV and SOC scores, which constitute the independent variables of the study, a checklist was created by utilizing GRI reporting standards, expert opinions and research in the literature. Data on the economic, environmental and social performance indicators of each enterprise were collected from the sustainability reports shared by the enterprises through content analysis method. The sustainability reports published by the enterprises were accessed from their corporate websites and kurumsalsurdurulebilirlik.com website. In order to determine the sustainability scores of the enterprises, a checklist was used and the qualitative data obtained from the sustainability reports were converted into quantitative data and quantified. For this purpose, the scoring model developed by Morhardt et al. (2002) was taken as an example. According to this model, a score of 0 is given if there is no explanation of the information included in the list of performance indicators, 1 if it is briefly mentioned, 2 if a little more detail is given (only qualitative information), and 3 if qualitative and quantitative criteria are included to allow comparison with other companies (Morhardt et al., 2002; 221).

In order to group the correlated variables into a category and to reduce the number of variables by obtaining fewer factors, the obtained ECO, ENV and SOC scores were subjected to factor analysis separately and dimension reduction was performed. The factors obtained as a result of the dimension reduction process are given in Appendix 1.

As a result of the Barlett test for factor analysis (p=0.00<0.05), it was accepted that there was a relationship between the variables. As a result of testing the suitability of the sample size for factor analysis, it was concluded that the sample size was suitable for factor analysis since KMO>0.60. In the factor analysis application, the varimax method was selected to ensure that the structure of the variables remained the same. As a result of the factor analysis for the ECO scores, 4 factors were found and these factors accounted for 65.99% of the variance. As a result of the factor analysis conducted for ENV scores, 9 factors were found and these factors accounted for 71.80% of the variance. As a result of the factor analysis for SOC scores, 11 factors were found and these factors summed up 72.64% of the variance. The results of the factor analysis are shown in Table 4.

Tablo 4: EKO, ÇEV, SOS Performans Faktör Ölçeği

	Dimension	KMO	Ki^2	Variance	Cumulative	Cronbach's Alfa	Mean	Standard Deviaion
ECO	4	0,71	1518,91	63,69	65,99	0,75	19,38	7,98***
ENV	9	0,69	5896,11	176,75	71,80	0,88	45,24	13,30***
SOC	11	0,63	3588,53	116,58	72,64	0,78	45,12	10,80***

%10* , %5** ve %1*** anlamlılık düzeyini göstermektedir.

3.3. Hypotheses of the Research

The hypotheses of the study, which analyzes the effect of the level of information disclosed by firms on sustainable performance indicators on firm values, are as follows:

H1: There is a relationship between return on assets and corporate sustainable performance variables.

H2: There is a relationship between return on equity and corporate sustainable performance variables

H3: There is a relationship between return on capital employed and corporate sustainable performance variables.

H4: There is a relationship between PD/DD ratio and corporate sustainable performance variables

H5: There is a relationship between Tobin's Q ratio and corporate sustainable performance variables.

H6: There is a relationship between asset turnover rate and corporate sustainable performance variables.

H7: There is a relationship between F/L ratio and corporate sustainable performance variables

The function form of the panel regression model for the dependent variables is equation (1), (2), (3), (4), (5), (6) and (7):

$$\boldsymbol{ROA_{it} = \beta_0 + \beta_1 ECO_{it} + \beta_2 ENV_{it} + \beta_3 SOC_{it} + \beta_4 Lns_{it} + \beta_5 Lnp_{it} + \beta_6 LR_{it} + u_{it}} \quad (1)$$

$$\boldsymbol{ROE_{it} = \beta_0 + \beta_1 ECO_{it} + \beta_2 ENV_{it} + \beta_3 SOC_{it} + \beta_4 Lns_{it} + \beta_5 Lnp_{it} + \beta_6 LR_{it} + u_{it}} \quad (2)$$

$$\boldsymbol{ROCE_{it} = \beta_0 + \beta_1 ECO_{it} + \beta_2 ENV_{it} + \beta_3 SOC_{it} + \beta_4 Lns_{it} + \beta_5 Lnp_{it} + \beta_6 LR_{it} + u_{it}} \quad (3)$$

$$\boldsymbol{MVBV_{it} = \beta_0 + \beta_1 ECO_{it} + \beta_2 ENV_{it} + \beta_3 SOC_{it} + \beta_4 Lns_{it} + \beta_5 Lnp_{it} + \beta_6 LR_{it} + u_{it}} \quad (4)$$

$$\boldsymbol{Q_{it} = \beta_0 + \beta_1 ECO_{it} + \beta_2 ENV_{it} + \beta_3 SOC_{it} + \beta_4 Lns_{it} + \beta_5 Lnp_{it} + \beta_6 LR_{it} + u_{it}} \quad (5)$$

$$\boldsymbol{ATR_{it} = \beta_0 + \beta_1 ECO_{it} + \beta_2 ENV_{it} + \beta_3 SOC_{it} + \beta_4 Lns_{it} + \beta_5 Lnp_{it} + \beta_6 LR_{it} + u_{it}} \quad (6)$$

$$\boldsymbol{PE_{it} = \beta_0 + \beta_1 ECO_{it} + \beta_2 ENV_{it} + \beta_3 SOC_{it} + \beta_4 Lns_{it} + \beta_5 Lnp_{it} + \beta_6 LR_{it} + u_{it}} \quad (7)$$

Since the number of economic, environmental and social factors is high, stepwise regression analysis was first performed in order to use the significant ones in the model and model selection criteria were utilized.

3.3.Methodology of the Research

The relationship between the level of information disclosed by firms regarding corporate sustainable performance indicators and firm value is tested with panel data regression analysis. Panel data regression analysis differs from other time factor analyses in that it allows the analysis of cross-sectional data and time series data together, better controlling the effects of heterogeneity between groups, understanding

complex structures and models, and allowing the examination of many variables at the same time (Şenol & Karaca, 2017: 9, Ata & Ağ, 2010: 53).In general, the panel data model (Yerdelen Tatoğlu, 2021: 177);

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \ldots + \beta_k X_{kit} + u_{it} \qquad i = 1, \ldots, N; t = 1, \ldots, T$$

is expressed as follows. In the model, t denotes time, i denotes units (such as individuals, firms, countries), u denotes the error term, X denotes independent variables and Y denotes the dependent variable.

3.4. Findings of the Research

The relationship between the level of information disclosed by firms regarding corporate sustainable performance indicators and firm value is tested with panel data regression analysis. The empirical results of the study were obtained using the Stata 17 package program.

For the regression model established in panel data analysis, it is necessary to determine which panel data model will be applied. F test and Likelihood Ratio (LR) test were conducted to test the validity of the classical model and fixed effects model. In both tests, the H0 hypothesis, which was established as "The classical model is appropriate", was tested and it was decided that the H0 hypothesis could not be rejected in all models, that is, the classical model is appropriate. It is concluded that there are no unit and time effects for ROA, ROE, ROCE, PDDD, Q, ACS and FC models and the test results are shown in Table 5.

Table 5: F and LR Test Results

		ROA	ROE	ROCE	MVBV	Tobin Q	ATR	PE
μ, λ	F	0.22	0.16	0.30	0,24	0.31	0.62	0.11
	LR	0.00	0.00	1.33	1.02	1.87	0.00	0.00

Indicates 10%*, 5%** and 1%*** significance level.

After determining the panel data model, it is necessary to test whether the model satisfies some assumptions before performing regression analysis. These assumptions are that the error term;

- Equal variance within and across units, i.e. homoskedastic,
- That it is periodically uncorrelated, i.e. autocorrelation-free,
- No spatial correlation, i.e. no correlation between units
- There is no relationship (multicollinearity) between independent variables (Yerdelen Tatoğlu, 2021: 228, Öztürk, 2020: 86).

It should be checked whether these assumptions are met and any possible deviations should be corrected. The results of deviation from the assumption are shown in Table 6.

Table 6: Deviations from Table Assumption

	ROA	ROE	ROCE	MVBV	Tobin Q	ATR	PE
VIF	3,91	3,91	1,94	4,38	4,33	3,65	3,29
Breusch Godfrey	8.70 5.55	3.67** 1.56	6.27*** 1.93	17.05*** 8.10***	9.74*** 1.81	12.70*** 5.98***	18.35*** 13.43***
White	84.00	84.00	74.61	84.00	84.00	84.00	84.00

Indicates 10%*, 5%** and 1%*** significance level.

Multicollinearity (MCL) is the presence of a relationship between independent variables in regression models. One of the methods used to detect multicollinearity is the calculation of the variance inflation factor (VIF). VIF is a criterion used to measure possible multicollinearity between independent variables and the general rule is that VIF should not exceed 10 (Robinson and Schumacker, 2009: 7, Topal et al., 2010: 54). Autocorrelation is when the error terms are correlated with the error terms of other periods. Whether the model is autocorrelated or not is tested with Breusch Godfrey in the classical model. Heteroskedasticity is a deviation from the assumption that the error term has constant variance for all observations, i.e. homoskedasticity (Sumer, 2006:18). In the classical model, it was tested with the White test.

According to the findings obtained from the tests, it was concluded that the models of the independent variables ROA, ROE, ROCE, MVBV, Q, ATR and PE are classical models. Autocorrelation was found in ROA, MVBV, ATR and PE models, while heteroskedasticity was found only in the ROCE model. No multicollinearity was detected in any model. In the presence of heteroskedasticity and autocorrelation, the variance covariance matrix (Ω) of the error term is not equal to the unit matrix and the validity of the variances, and hence the standard errors, R^2 , F statistics and confidence intervals are affected. Therefore, if at least one of heteroskedasticity and autocorrelation is present in the model, either robust standard errors are used or estimations are made using appropriate methods (Yerdelen Tatoğlu, 2021:228).

In the models where ROA, ROCE, PDDD, ATR and PE variables are dependent variables, the models are estimated using robust standard errors. Ordinary standard errors were used in other models. The estimation results are summarized in Table 7.

Table 7: Estimation Results for Final Models

	ROA	ROE	ROCE	MVBV	Tobin Q	ATR	PE
Lns	0.0100**	0.0697**	0.0140***	1.3107	0.3539	0.0487***	6.9871**
Lnp	0.0218	0,0258	0.0257**	1.0535	0.7806	0.0673***	6.0814***
FC	0.2508**	-1.1349***	0.1748	9.1640***	2.8643	0.1356***	47.7370***
E1	-	-	-	-	-	0.0388**	-
E2	0.0107***	-0.0729***	0.0136*	-	-	-	5.1780***
E3	0.0201**	0.1317***	0.0186	-	-	-	-
E4	-	-	-	-	-1.2263***	-	-
C1	0.0363**	0.2206***	0.0361	-	1.4297*	-	-
C2	0.0214*	0.1019***	0.0249	-	-	-	4.9341***
C3	-	-	-	1.0917***	6.1813***	0.0166***	4.9208***
C4	0.0151***	0.1926***	0.0268*	-	-	0.0364***	8.3999***
C5	0.0111***	-0.0813***	0.0110	0.6676***	1.6246***	0.0313**	2.8188***
C6	0.0089***	0.1379***	0.0311	0.9649***	-2.1629***	-	9.9001***
C7	-	-	-	0.6740***	-2.4937***	-	
C8	0.0165***	-0.1742***	0.0273	1.8052***	1.9832***	-	10.3965***
C9	0.0055***	0.0986***	0.0174**	-	-0.6706*	-	-
S1	0.0084***	-0.0733***	0.0170	-	-	0.0247***	-
S2	0.0253	0.0785**	0.0220	-	-	0.0222***	-
S3	-	-	-	1.0011***	2.6983***	0.0438	6.6455***
S4	-	-	-	1.2619***	1.7332**	0.0688***	-
S5	0.0257**	0.1558***	0.0224	0.9373***	-2.9711***	-	9.8275***
S6	-	-	-	0.7924***	-	-	-
S7	-	-	-	-	-	0.0205***	3.3651***
S8	-	-	-	1.0964***	-1.9663***	0.0177***	-
S9	0.0136***	0.1009***	0.0210*	0.6779***	-	-	-
S10	-	-	-	0.8660***	2.9945***	0.0307	3.5658***
S11	0.0103***	0.0787***	0.0111	1.0667***	-3.4539***	-	6.4890***
Constant Parameter	0.3632	-1.5109**	0.4748	17.6570**	-19.9415**	0.6707***	108.851***
F	0.00***	10.18***	7.23***	0.00***	40.03***	0.00***	0.00***
R^2	0.7114	0.7239	0.4684	0.8793	0.8888	0.1515	0.6982

Indicates 10%*, 5%** and 1%*** significance level.

The F test shows that all models are statistically significant. R^2 values ranged between 15% and 89%. The model with the highest R^2 value is the model in which Q is the dependent variable with 89%. For this model, the independent variables and control variables in the model together explain 89% of the variability in the dependent variable Q.

The parameter of the firm size in terms of total assets (Lns) variable is significant and has a positive sign in all models except for the models with MVBV and Q as the dependent variable. For example, for the PE variable, when the effect of other variables is fixed, each 1% increase in the size of the enterprise in terms of total assets leads to a 0.6 unit increase in the Price/earnings (PE) variable. The parameter of enterprise size in terms of total sales (Lnp) is significant in the models with the dependent variables

ROCE, ATR and PE and its effect on the dependent variable is positive. For example, when the effect of other variables is fixed, each 1% increase in the enterprise size in terms of total sales increases return on capital employed (ROCE) by 0.0003 units, asset turnover rate (ATR) by 0.0007 units and price/earnings (PE) by 0.0060 units. The effect of leverage ratio (FC) is significant except for the models with ROCE and Q dependent variables, while it is negatively significant in the model with ROE variable. A 1-unit increase in leverage ratio decreases return on equity (ROE) by 1.13 units, while price/earnings (PE) increases by 47.73 units.

Economic (ECO) factors are generally positive and significant for all models. However, the E2 factor, which includes explanations about contribution to the national and global economy, is negatively significant in the model with ROE dependent variable, albeit at a very low rate. When the effect of other variables is constant, each 1 unit increase in E2 decreases the Return on Equity (ROE) by 0.07 units. Environmental (ENV) factors are generally significant except for the ROCE model. ROA and ROE are the most positively affected by environmental factors, while Q is the most negatively affected model. For example, a one-unit increase in C6, which represents disclosures about recycled products and materials, increases ROE by 0.13 units and decreases tobin q (Q) by 2.16 units, holding the effects of other variables constant. A 1-unit increase in factor C8, which represents material and water use and waste disposal, increases the price/earnings (PE) variable by 10.40 units. Social (SOC) factors are generally significant except for the ROCE model. MVBV has the highest positive effect on social factors, while Q has the highest negative effect. For example, a 1-unit increase in S4, which represents the disclosure of products and customer service, increases the market capitalization/book value variable by 1.26 units, while a 1-unit increase in S11, which represents the disclosure of human resources policy and formal employee grievance mechanism, decreases the tobin q variable by 3.45 units, holding the effects of other variables constant.

4. COCNLUSION

In order to talk about a sustainable business, it is necessary to report and present non-financial information as well as financial information. In order to continue their activities, businesses should act in accordance with the concept of "continuity", which is one of the basic assumptions of accounting. For this reason, businesses need to make sustainability reporting that includes economic, environmental and social information. Sustainability reporting contributes to the long-term sustainability of the business by reflecting the non-financial aspects of its activities.

The purpose of this study is to reveal the determinants of sustainable performance on firm value. In line with this purpose, 14 non-banking firms that prepare sustainability reports and are included in the global list of the most sustainable firms (Global 100) were included in the study and panel data regression analysis was conducted. At the same time, it was aimed to develop a scale in order to determine the issues that companies should emphasize while preparing a sustainability report. A total of 91 scales (14 economic, 42 environmental, 35 social) were factor analyzed and the number of scales was reduced to 24. Of these, 4 are economic, 9 environmental and 11 social factors.

Seven models were created with the dependent variables ROA, ROE, ROCE, PDDD, Q, ACS and FC, which constitute the determinants of sustainability performance. The significant economic, environmental and social factors that constitute the dependent variables were selected by stepwise regression and model selection criteria and placed in the models together with the control variables (business size and leverage ratio).

The results of the analysis of the final models obtained after the estimator selection and deviation from assumption tests show that there is a significant relationship between firms' sustainability activities and firm values. As a result of the research conducted to reveal the effect of the level of information disclosed by firms on sustainable performance indicators on firm values, sustainability activities have the most positive effect on return on assets (ROA) and return on equity (ROE). A significant negative relationship is also observed between sustainability activities and tobin q (Q).

The factor that contributes most positively to return on assets (ROA), return on equity (ROE) and return on capital employed (ROCE) is C1, which represents disclosures on energy and water consumption, waste generation and greenhouse gas emissions, while the factor that contributes most to market

capitalization/book value (MVBV) and price/earnings (PE) is C8, which represents disclosures on environmental complaints and environmental fines.

It is concluded that the information disclosed by the enterprises regarding their ECO, ENV and SOC performances will increase the efficiency of the enterprises in general, but the information disclosed regarding ENV performance will decrease ROE, which shows the return on equity, and Q, which shows the extent to which scarce resources are used effectively. The reason for this can be explained as the measures taken to increase ENV performance impose an additional cost on the enterprises.

When the results of the analysis are compared with other studies in the literature, it is seen that there are studies in which sustainability reporting has a positive effect on firm value, as well as studies in which a negative relationship is found. The main reason for this situation may be the country and regional differences in the studies, as well as the use of different variables in the measurement of financial performance, the difference in sample periods or the different analysis methods used.

Since the importance of sustainability is increasing day by day, it would be beneficial to conduct analyses by changing the methods and variables used and increasing the number of periods and firms in future studies in order to consolidate the results.

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ANNEX TABLE 1: New Factors Formed as a Result of Factor Analysis

Economic factors
E1: Disclosure on payments to stakeholders and protected economic value
Explanation on Payments to Capital Providers
Explanation on Operating Expenses
Explanation on Payments to the Government
Explanation on Employee Wages and Social Rights
Explanation on Economic Value Protected (Retained)
E2: Explanation about contribution to national and global economy
Statement on Contribution to the Global Economy
Statement on Contribution to the National Economy
E3: Financial assistance from the government and investments and expenditures in R&D, pensions, infrastructure
Explanation on the Company's Defined Benefit Plan Liabilities
Explanation on Financial Assistance Received from the Government
Explanation on R&D Expenditures
Statement on Infrastructure Investments
E4: Financial consequences of climate change and payments to suppliers

Statement on Financial Consequences of Climate Change
Explanation on Payments to Suppliers
Environmental Factors
C1: Descriptions of energy and water consumption, waste generation and greenhouse gas emissions
Statement on Greenhouse Gas (GHG) Emissions
Explanation on the Amount of Energy Consumed
Explanation on the Amount of Water Discharged
Explanation on Other Indirect Greenhouse Gas Emissions
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Statement on Initiatives to Reduce Greenhouse Gas Emissions
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C2: Explanation on recycling of packaging and waste, environmental impacts of products, services and logistics activities
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C3: Environmental auditing and evaluation of suppliers and compliance with regulations
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C4: Explanation of the need for environmental protection, energy policies and efficiency
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C5: Explanations on carbon transparency project, greenhouse gas emission certificate and environmental awards
Statement on the Carbon Disclosure Project
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C6: Disclosures on recycled products and materials
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C7: Disclosures on investments in biodiversity and environmental protection
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C8: Explanations on environmental complaints and environmental fines

Statement on Complaints Regarding Environmental Activities
Statement on Environmental Fines
C9: Explanation on environmental and energy management certificates
Environmental Management System ISO 14001
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Social Factors
S1 Explanations on corporate social responsibility, risk management and membership to global agreements on sustainability
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Explanation on Employee Discrimination
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S4: Product and customer service descriptions
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S6: Employee engagement and turnover rate and maternity leave explanations
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S7: Explanation about work-related hazard identification, risk assessment and safety practices
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Description of Work-Related Hazard Identification and Risk Assessment
S8: Statement on compliance with the UN sustainable development goals and social responsibility awards

Statement on CSR Awards
Statement on Compliance with the UN Sustainable Development Goals
S9: Explanation on sustainability trainings provided to employees and evaluation of suppliers in terms of labor practices
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S10: Explanation on employee ethics and morality and other quality certificates related to the sector
Explanation on Other Quality Certificates Related to the Sector
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S11: Explanation of human resources policy and formal employee grievance mechanism
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