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The Relationship Between ESG Rating and Firm Value—Evidence from Companies Listed on Polish Capital Market in the WIG-ESG Index

Abstract
The literature are abound with studies on the impact of environmental, social, and governance (ESG) factors on a company's value, or more broadly, on its financial performance. However, most analyses concern developed markets, mainly because the largest rating agencies operate in these markets, as well as because these are markets where ESG awareness and regulations have developed much faster. In developing markets, the number of studies in this area is disproportionately smaller. Therefore, the purpose of this article is to examine the relationship between the environmental, social, and governance ratings (ESGR) of Polish listed companies included in the WIG-ESG index and their value. This study covered 36 companies listed in WIG-ESG in the period of 2019–2023. We used market data, financial data from examined companies and ESG data provided by Refinitive. The empirical results were negative but a non-statistically significant influence of ESGR and a company's value. Further analysis indicated that none of the sub-ratings (environmental rating (ER), social rating (SR) and governance rating (GR)) had significant impact on value. The Polish market does not seem to recognize the potential of ESG factors in building the long-term value of companies and believes that the costs of ESG factors outweigh the benefits. Investors seem to disregard or underestimate ESG criteria when valuing companies, which may seem irrational when looking at the long-term effects of ESG factors.
This article contributes to the existing literature by being part of the research on ESG factors and company value. The article expands the field of analysing the relationship between ESGRs and corporate value by examining this relationship not only using the overall ESGR, but also its individual sub-ratings. We also attempt to answer the question of where the channels of transmission of ESGRs on the value of the company are located, and which areas affect ratings. To the best of our knowledge, this is the first study of this type for the Polish market.

Keywords
ESG rating | ESG | firm value | Tobin's Q | environment rating | social rating | governance rating

JEL Codes
G12, G15, G23

1. Introduction

Companies' environmental, social, and governance (ESG) performance is of interest to asset owners, institutional investors, regulators and individual consumers alike. Shareholders and stakeholders have begun to recognize ESG issues not only as areas of risk, but also as a tremendous opportunity for value creation. For this reason, companies guided by ESG factors in their decision-making process are likely to attract long-term investors as innovative entities and be more credible in the eyes of stakeholders. Sustainable investing is growing quickly. According to the Global Sustainable Investment Alliance (GSIA), the global market for socially responsible investments grew from USD 13.3 trillion at the beginning of 2012, to USD 35.3 trillion at the beginning of 2020 (GISIR, 2000, and mutual funds that invest according to ESG strategies experience sizable inflows (Hartzmark & Sussman, 2019). At the same time, the COVID-19 pandemic and its socio-economic effects have brought renewed attention to issues such as climate change, income inequality and diversity, further increasing interest in ESG investments. According to PwC, in the

next five years ESG funds will grow much faster than the overall market (+12.9% vs +4.3%). In this scenario, the value of ESG funds is expected to reach USD 34 trillion by 2026, and the share of ESG in total AuM will increase from 14.4% in 2021 to over one-fifth of all assets (21.5%) until 2026 (PwC, 2022, p.8).

Managers and investors use environmental, social, and governance ratings (ESGR) within their decision-making process. Moreover, a growing number of academic research relies on ESGRs for their empirical analysis (e.g., Chatterji et al., 2009; Dorfleitner et al., 2015; Gibson et all, 2021; Christnensen et al., 2021; Berg et al., 2022). Thus, ESGR providers have become influential institutions.

There is no one-size-fits-all methodology for analysing ESG data used by rating agencies. There are currently more than 600 rating agencies in the global market, and it is common for different agencies to give different ratings to the same company. This is caused by two main reasons (Berg et al., 2022)

1. ESG performance definition is not clear, thus, rating agencies offer an interpretation of what ESG performance means.
2. ESG reporting is in its infancy, thus ESGRs are based on collected and aggregated information from various sources and reporting standards.

Additionally, rating agencies faced pressure to grow and internationalize the types of companies they cover, which caused a lot of consolidation in the market.

The most important global ESGR providers are: KLD (Kinder, Lydenberg, Domini & Co.)[1], ASSET4 by Thomson Reuters, MSCI (Morgan Stanley Capital International) ESG Ratings, FTSE Russell ESG Ratings, S&P Global ESG Scores, Refinitiv ESG Scores, Sustainalytics ESG Risk Ratings, Moody's ESG (Vigeo-Eiris), Bloomberg ESG Ratings, CDP Scores (Formerly Carbon Disclosure Project) and ISS (Institutional Shareholder Services) ESG Ratings & Rankings. However, these ESGRs are incompatible. All ESGR agencies, based their analysis mainly on non-financial data. As a result, they often work with different indicators and organise them in different hierarchies, which implies different evaluation systems. Some agencies give ratings like credit rating agencies (AAA-D), while others give numerical scores. In some agencies, the highest numerical scores mean the best rating, while the same high scores in another agency may mean the worst rating.

The validity of ratings by rating agencies has been criticized by many academic researchers (Chatterji et al., 2009; Delmas et al., 2013; Bouten et al., 2017). Chatterji, Durand, Levine, and Touboul (2016), stated that lack of agreement across rating agencies comes mainly from two sources: the absence of both a common "theorization" (refers to agreement across rating agencies on a definition of CSR and its dimension, e.g., environmental, social, and corporate governance), and "commensurability" (refers to the extent that rating agencies get similar responses when they measure the same construct). Eccles and Stroehle (2018) studied the meaning of the social and contextual origin of social ratings (SRs) as the main sources of ESGR divergences. Gibson et al. (2019) analysed the level of disagreement about a firm's ESGR and its consequences for firms and investors. Berg et al. (2022) pointed out that disagreement about ESGRs provided by different providers makes it difficult to assess the ESG performance of companies, funds, and portfolios. Moreover, companies and investors receive mixed signals from rating agencies, which may introduce uncertainty into any decision taken based on ESGRs.

Recognising the existing limitations of ESGRs, they can be viewed as indicators of a company's environmental, social and governance practices. An environmental rating (ER) will indicate, for example, a company's commitment to reducing emissions, water or energy consumption, as well as measuring and managing climate risk. The SR can indicate, e.g., respect for labour rights, respect for human rights, quality of employment or taking action regarding the physical and mental health of employees. The governance rating (GR) can refer to the assessment of the ownership and management structure, risk management, codes of conduct or information security.

The literature is abound with studies on the impact of ESG factors on a company's value, or more broadly, on its financial performance. However, most of the analyses concern developed markets, mainly because the largest rating agencies operate in these markets, as well as because these are markets where ESG awareness and regulations have developed much faster. In developing markets, the number of studies in this area is disproportionately smaller (Alshehhi et al., 2018). Therefore, the purpose of this article

1 KLD was acquired by RiskMetrics in 2009, and then bought by MSCI in 2010. The data set was subsequently renamed to MSCI KLD

is to examine the relationship between ESGRs of companies listed on the Polish capital market in the WIG-ESG index and their value. The article's contribution to the literature is bi-directional. On the one hand, to the best of our knowledge, this is the first study of this type for the Polish market. On the other hand, the article expands the field of analysing the relationship between ESGRs and corporate value by examining this relationship not only using the overall ESGR, but also its individual sub-ratings—the ER, SR and GR. The novelty of this article also comes from the inclusion of the division of ER, SR and GR into further categories. The ER distinguishes emissions, resource use and innovation. The SR included community, human rights, product responsibility and the workforce. The GR covered CSR strategy, management and shareholders rights. The Tobin Q index was adopted as an approximation of the value of enterprises. The study covered 36 companies in the period of 2019–2022.

Our paper is structured as follows. First, we present a theoretical background on the relationship between ESG performance and a company's value (broader financial performance), which leads us to state our hypothesis. Second, we describe the research method, identify the variables and develop the regression models. In the third section we discuss the results of this research. The last part of the article summarises the analyses conducted, indicating the limitations of the study and possible directions for further research.

2. Literature review and hypothesis development

2.1. Results of meta-analysis in the literature

The significance of ESG factors has led many researchers to explore the relations between ESG performance and firm value, measured as price-to-book ratio, market value added or Tobin Q. There are several meta-analyses documenting the influence of ESG factors on corporate financial performance, where firms' value is one of the variables.

Friede et al. (2015) analysed more than 2200 individual studies, and in nearly 90 % of studies, found nonnegative ESG–corporate financial performance relations. They stressed that in the vast majority of studies, the impact of ESG factors on companies' financial performance was positive and stable over time.

Hou et al. (2016) used meta-analytical techniques based on 31,773 East Asian firms reported in 28 empirical studies and proved a general positive association between ESG factors and business performance. The author also found that environmental factors had a stronger impact than social factors on business performance.

Meta-analysis of 198 studies with a total sample size of 31,514 observations conducted by Lu and Taylor (2016) suggested that sustainability performance increases a firm's financial performance, especially in the long run. Plewnia and Guenther (2017) analysed 45 empirical studies and revealed that corporate philanthropy (as the one of the ESG factors) is positively related to corporate financial performance.

Alshehhi et al. (2018) in their meta-analysis examined 132 papers from the period of 2002–2017 and found that 78% of publications report a positive relationship between ESG factors and financial performance. Research conducted by the authors revealed that from 2012, market-based measures had begun to play a leading role in analysed papers, especially those based on corporate value, which incorporate future expectations to measure financial performance of companies. Similar results were obtained in meta-analysis performed by López-Arceiz et al. (2018). Based on 83 papers, they revealed a positive relationship between economic and social performance. In turn, Hang et al. (2019) used meta-analysis of 893 empirical estimates from 142 research sources, and found a positive relationship between corporate environmental performance (CEP) and corporate financial performance (CFP).

Huang et al. (2020) carried out a meta-analysis based on 437 primary studies and showed that most of these studies (about 86%) observed positive and statistically significant effects of ESG factors on CFP. Similar results were obtained by Whelan et al. (2021) who analysed more than 1000 studies published between 2015–2020, and by Hirsh et al. (2022), who applied meta-regression analysis to 7800 results of 512 empirical studies. Both of the research revealed a positive link between CSP and CFP, but they also pointed out that some of the analysis showed negative or mixed results.

The vast majority of meta -analysis studies proved that a growing consensus to incorporate ESG issues in

corporate management typically results in improved financial performance like ROE, ROA or firm value. None of the meta-analyses included research conducted on the Polish capital market. Besides, the majority of this research concerned the relationship between ESG factors and financial performance. Rarely was reference made only to a company's value, or ESGRs, much less their sub-ratings. This represents a significant research gap.

Generally, we can divide research on relationship between ESG performance and firm value into three groups: those with positive, negative or mixed results.

2.2. Positive relationship between ESG performance and firm value

Many researchers have documented a positive relationship between ESG performance and firm value. These are studies conducted in various dimensions. Some involved sectoral approaches, some focused on country analysis, while others cover international markets. There are also studies conducted for companies listed in specific indices.

Abdi et al. (2022) analysed the effect of ESG scores on firm value in the airline industry based on 38 worldwide airline companies for the period from 2009 to 2019. They found that social and environmental operations increased firm value (Tobin's Q) and were positively and significantly rewarded by a higher level of financial efficiency. According to Zhao et al. (2018), ESG performance can improve firm value in China's power generation industry (21 companies in 2016).

Many studies are country-focused. Peris (2010) provided evidence of a significant positive relationship between particular ESGR criteria and firm value for the American market (250 S&P stocks being listed in Domini 400 Social Index (DSI) over the period 1991–1996). Similar results for US market where obtained by Fatemi et al. (2017), whose empirical analysis was based on data for 1,640 firm-year observations for publicly traded U.S. firms for the period of 2006 to 2011 revealed that strength in ESG activities and reporting improves firm value.

Yoon et al. (2018) analysed 705 corporations listed on the Korea Stock Exchange, between 2010 and 2015 and revealed that the total ESGR and its three central factors positively affect the stock price of a firm. Dalal and Thaker (2019), analysed 65 Indian enterprises listed on the NSE 100 ESG Index database, covering the period from 2015 to 2017. Random effect panel data regression analysis used in this study confirmed that ESG performance enhances financial performance, as evaluated through Tobin's Q, for example. Giannopoulos et al. (2022) investigated the effects of ESG initiatives on the financial performance of 20 Norwegian listed companies from 2010 to 2019 and revealed that the variable Tobin's Q increases when ESG factors increase.

There are several worldwide studies. Results obtained by Chouaibi et al. (2022a), based on 553 companies from North American and West European stock exchanges, show a positive and significant relationship between environmental disclosure (ED) and financial performance (FP). Chouaibi et al. (2022b) analysed the relationship between green innovation and enterprise value for the UK and German markets. Their research unequivocally confirmed that ESG firms that exhibit a high level of green innovation intensity are able to enhance their CFP. A positive effect between ESG practice and firms' financial performance was also confirmed by Rossi et al. (2021). Authors applied linear regressions for 225 European companies listed between 2015–2019 with panel data using the Thomson Reuters ASSET4 database.

Xie et al. (2019) explored the relationship between ESG activities and CFP. Based on analysis of 6,631 companies from 74 countries and 11 sectors, they found that most of the ESG activities reveal a nonnegative relationship with CFP, including corporate efficiency, return on assets and market value. Similar results based on 4,887 global companies for the period of 2014 to 2018 were obtained by Bhaskaran et al. (2020). The sample consisted of 1,317 emerging market and 3,569 developed market firms, and Tobin's Q was used to measure the firm performance. According to the authors, the study documents rational justification for ESG initiatives in terms of value creation. A paper by Chairani and Siregar (2021) proved that ESG factors had a significant moderating role in increasing the effect of enterprise risk management on firm value. The study covered companies listed in the ASEAN 5 (Indonesia, Malaysia, Philippines, Singapore, and Thailand) during the years 2014–2018, with total observations of 680 firm-years. Analysis conducted by Naeem and Ullah (2022) based on 1042 companies of emerging countries for the period of 2010 to 2019 documented a positive and significant impact of ESGRs on firm value, measured by Tobin's Q.

A few indices studies support the positive relations between ESGRs and firm value as well. Li et al. (2018), using a cross-sectional dataset comprising of FTSE 350 listed firms, found a positive association between an ESG disclosure level and firm value (Tobin Q). Almost the same sample (351 firms of 10 industries from FTSE350 from 2002 to 2018) was analysed by Ahmad et al. (2021) and the results were close: ESG factors had a positive and significant impact on firm market value.

2.3. Negative relationship between ESG and firm value

Some authors proved a negative impact of ESG scoring on firm value. Bramer et al. (2006) examined the relationship between ESG indicators and stock returns for the FTSE All Share Index in the UK and found that higher social performance scores tend to achieve lower returns, while firms with the lowest possible ESG scores considerably outperformed the market. Marsat and Williams (2011) analysed the relationship between firms' ESGRs and their value (Tobin's Q) for companies from MSCI ESGRs in the period of 2005–2009, and they documented strong evidence of the negative impact of ESGRs on the corporate market value.

Velte (2017), using data for companies listed on the German Prime Standard (DAX30, TecDAX, MDAX) from 2010 to 2014 (412 company observations per year), documented the lack of impact of ESG performance on Tobin's Q. The negative impact of ESG assessments on company value was also demonstrated by Landi and Sciarelli (2019), who found no statistically significant evidence of ESG assessments on the abnormal returns of Italian Blue Chips (companies listed on the FTSE MIB, analysis of data from 2002–2015). Garcia et al. (2020), based on 2,165 companies from developed and emerging countries, covering the period between 2007 and 2014, and showed that ESG performance of companies from emerging countries did not positively affect their value (DCF).

Negative relations between ESGRs and firm value were found also by Duque-Grisales and Aguilera-Caracuel (2019). They analysed data from 104 multinational companies from Brazil, Chile, Colombia, Mexico and Peru (listed in MSCI Emerging Markets Index) between 2011 and 2015, and documented a significant negative relationship between an ESG score and company value (Tobin's Q).

2.4 Contradictory results

Some articles show contradictory results regarding the relationship between ESGRs and firm value. For example, a study by Nollet et al. (2016), based on Bloomberg's Environmental Social Governance Disclosure score covering the S&P500 firms from 2007 to 2011, examined linear and nonlinear relationships between ESG performance and corporate performance, and revealed that in a linear model there is a significant negative relationship between CSP and Return on Capital, but the nonlinear models suggested that in the long run ESG effects on firm value was positive.

Han et al. (2016), using data from companies listed on the Korea Stock Exchange (94) between 2008 and 2014, found that there was a positive relationship between ERs and firm value (Tobin's Q), a negative relationship between GR and firm value, and that there was no statistically significant relationship between SR and firm value. Any significant relationship between individual and combined ESG factors and firm value (Tobin's *Q*) was also proven for 54 Malaysian companies (2011–2013) by Atan et al. (2018).

Lopez-de-Silanes et al. (2020) also did not find any significant relationship between ESG scores and firm value (Tobin Q) in their multinational analysis. The only statistically significant relationship was found for the United States, and it was negative. (Authors analysed Sustainalytics ESG quality rankings from 2015–2018).

Saygili et al. (2021) conducted analysis for 36 Turkish companies over the period 2007–2017 and documented mixed results between ESG scores and firm value. They found a negative effect of ER on CFP (e.g., Tobin Q), and a positive effect of social and governance scores. Mixed results were also obtained by Behl et al. (2022). Authors tested the bidirectional causality and autoregression effects between ESG scores and the firm value (Tobin's Q) of Indian energy sector companies and documented that the relationship between ESGRs in all and individual and firm values is not bidirectional and is negative in first two lags and positive in the last.

Dincă et al. (2022), explored the relationship between non-financial sustainability, measured by ESG scores, (Sustainalytics's ESGRs) and firm value (capitalization) in the automotive industry. They indicated a mixed effect of the ESG scores on company value over the 2015–2020 analysed period, with some

inconclusive effects, especially from the social score. Mixed results were obtained by Aydoğmuş et al. (2022), who analysed the impact of ESGRs (Refinitive) on firm value (Tobin's Q) in the period of 2013–2021. They showed that the overall ESG score, social score and governance score were positively and significantly related to firm value, environmental score had no significant relationship with firm value.

Literature review conducted so far clearly shows that the results obtained in different studies are not consistent. Although the vast majority of research indicate a positive influence ESGR on corporate value, some scholars identified it insignificantly or even found a significant negative relationship between these variables. There is lack of research for the Polish capital market in this area, thus, in this article we examine the relationship between the ESGRs of companies listed in the WIG-ESG index and their value, measured by Tobin's Q.

Table 1. Literature on relationship between firm value and ESGR

Authors	Used ESGR	Firm value/performance measure	Period	Country	Research findings
Chouaibi et al. (2022a)	Environmental disclosure (ED) practiced by firms listed on the ESG index	Tobin's Q	2005–2019	International	Positive significant
Chouaibi et al. (2022b)	Measure developed by ASSET4 to measure the degree of green innovation	market-to-book value (MTBV), return on assets (ROA), asset turnover (ATO), return on equity (ROE) and Tobin's Q (TOBINQ)	2005–2019	UK and Germany	Positive significant
Abdi et al. (2022)	Participation in social, environmental and governance activities	Tobin's Q	2009–2019	International	Positive significant
Rossi et. al. (2021)	CSR practices	Tobin's Q (TOBINQ), return on assets (ROA), return on equity (ROE), and market-to-book value (MTBV)	2015–2019	Europe	Positive significant
Zhao et al. (2018)	ESG performance index	ROCE as financial performance indicator & Debt to Equity ratio	2016	China	Positive significant
Peris (2010)	ESGR criteria Domini 400 Social Index (DSI)	Market value	1991–1996	USA	Positive significant
Fatemi et al. (2017)	ESG disclosure	Tobin's Q	2006–2011	USA	Positive significant
Yoon et al. (2018)	CSR activities	Stock price	2005–2010	Korea	Positive significant
Dalal and Thaker (2019)	Sustainability ratings by NSE 100 and indices	ROA	2015–2017	India	Positive significant
Giannopoulos et al. (2022)	ESG initiatives	Tobin's Q	2010–2019	Norway	Positive significant
Xie et al. (2019)	Bloomberg ESG disclosure score	Corporate efficiency (Revenue earned, ROA)	2015	international	Positive significant
Bhaskaran, et al. (2020)	ESG activities	Tobin's Q	2014–2018	international	Positive significant

Continued **Table 1.** Literature on relationship between firm value and ESGR

Authors	Used ESGR	Firm value/performance measure	Period	Country	Research findings
Chairani and Siregar (2021)	ESG performance	Market value	2014–2018	Indonesia, Malaysia, Philippines, Singapore and Thailand	Positive significant
Naeem and Ullah (2022)	Thomson Reuters Asset4 ESG index	Tobin's Q	2010–2019	Emerging countries	Positive significant
Li et al. (2018)	ESG disclosure	Tobin's Q	2002–2018	UK	Positive significant
Ahmad et al. (2021)	ESG disclosure	Market value	2002–2018	UK	Positive significant
Bramer et al. (2005)	ESG indicators: environment, employment and community activities	Stock returns		UK	Negative significant
Marsat and Williams (2011)	MSCI ESGRs	Tobin's Q	2005–2009	MSCI	Negative significant
Velte (2017)	ESG performance Asset4 database of Thomson Reuters	Tobin's Q	2010–2014	Germany	Negative significant
Landi and Sciarelli (2019)	ESG assessment: Standard ethics agency on FTSE MIB's companies	Stock returns	2002–2015	Italy	Negative significant
Garcia et al. (2020)	ESG performance Thomson Reuters ASSET4	DCF	2007–2014	Emerging countries	Negative significant
Duque-Grisales and Aguilera-Caracuel (2019)	ESG score Asset4 database of Thomson Reuters	Tobin's Q	2011–2015	Brazil, Chile, Colombia, Mexico and Peru	Negative significant
Nollet et al. (2016)	Bloomberg's Environmental Social Governance (ESG)	Return on capital	2007–2011	USA	mixed
Atan et al. (2018)	ESG activities	Tobin's Q	2011–2013	Malaysia	mixed
Lopez-de-Silanes et al. (2020)	Sustainalytics ESG	Tobin's Q	2015–2018	international	mixed
Saygili et al. (2021)	ESG scores, according to Borsa Istanbul Corporate Governance Index	Tobin's Q	2007–2017	Turkey	mixed
Behl et al. (2022)	ESG disclosure	Tobin's Q	2016-2019	India	mixed
Dincă et al. (2022)	Sustainalytics's ESGRs	Tobin's Q	2015-2020	international	mixed
Aydoğmuş et al. (2022)	Refinitiv ESG	Tobin's Q	2013-2021	International	mixed

Source: Own elaborations

Based on the above discussion we state the following hypothesis:

H1: The aggregate ESGR has a significant positive impact on firm value.

H2: The ESGRs have a significant positive impact on firm value.

3. Methodology

The extant literature on the ESG-FV relationship has provided mixed results for the last four decades and left a gap in time-varying and industry-based studies, especially in emerging economies where industries and social-cultural issues are highly diversified.

This study examines the relationship between ESGRs, and the value of companies listed on the Polish capital market on WIG-ESG. To investigate this relationship, we specified two regression models as discussed below. To verify hypothesis, certain financial data were selected and analysed. We assumed a significance level of a=0.05.

3.1. Variable measurement

3.1.1. Dependent variable - estimation of firm value

Tobin's Q was used as the measure of company value, estimated as market value to book value of assets (e.g., Marsat and Williams, 2011; Kim et al., 2013; Han et al., 2016; Bhaskaran et al., 2020; Naeem and Ullah, 2022). According to Xie et al. (2018) scholars extensively use Tobin's Q, as it can predict long-term firm value better than accounting measures (Alshehhi et al., 2018). We applied the natural logarithm of the Tobin's Q to eliminate the effect of outliers (Aouadi and Marsat, 2016; Jo and Harjoto, 2011).

3.1.2. Independent variables – estimation of ESG score

We used the ESG scores as the independent variables (Marsat and Williams, 2011; Duque-Grisales and Aguilera-Caracuel, 2019; Saygili et al., 2021; Dincă et all, 2022; Aydoğmuş et al., 2022). The study used the overall ESGR, as well as specific ratings as independent variables. To measure ESG scores, we used data provided by Refinitiv (Aydoğmuş et al., 2022), which provided depth and breadth of ESG insight built upon multiple layers of ESG data. Refinitiv captures and calculates over 630 company-level ESG measures, which are grouped into 10 categories that reformulate the three pillar scores of environmental, social and governance aspects (Table 2) and the final ESG score, which reflects the company's ESG performance, commitment and effectiveness based on publicly reported information[2].

3.1.3. Control variables

In this study we used several control variables, as they are factors that can influence other variables. Following Atan et al., 2018; Bhaskaran et al., 2019; Abdi et al., 2021; Giannopoulos et al., 2022, as a control variable we used the size of the company measured by the natural logarithm of total assets. Leverage is another control variable widely present in the literature, which can be treated as a proxy for unsystematic risk (Fischer and Sawczyn, 2013; Bhaskaran et al., 2019; Abdi et al. 2021; Ullah et al., 2022). We also used the beta coefficient as a measure of a company's systematic risk (Velte, 2016; Bhaskaran et al., 2019).

3.2. Model specification

Based on the main purpose of this study and aforementioned hypothesis, we specified two regression models to investigate the relationship between firm value and ESGR. In the first model, we used the aggregate ESGR score. In the second, we used ESGRs to capture specific components of ESG factors that might have different weights for the company's value. We also proposed an extension of Model 2 to include assessments affecting ESGRs.

Model 1.

$$TQ_i = \beta_0 + \beta_1 RESG_i + \beta_2 SIZE_i + \beta_3 LEV_i + \beta_4 BETA_i + \varepsilon$$

Model 2.

$$TQ_i = \beta_0 + \beta_1 RE_i + \beta_2 RS_i + \beta_3 RG_i + \beta_4 SIZE_i + \beta_5 LEV_i + \beta_6 BETA_i + \varepsilon$$

2 https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf

Table 2. ESG themes covered in each category by ESG score Refinitive

Pillars	Categories	Themes
Environment	Emission	Emissions Waste Biodiversity Environmental management systems
	Resource use	Water Energy Sustainable packaging Environmental supply chain
	Innovations	Product innovation Green revenues, research and development (R&D) and capital expenditures (Capex)
Social	Community	Equally important to all industry groups, hence a median weight of five is assigned to all
	Human rights	Human rights
	Product responsibility	Responsible marketing Product quality Data privacy
	Workforce	Diversity and inclusion Career development and training Working conditions Health and safety
Governance	CRS strategy	CSR strategy ESG reporting and transparency
	Management	Structure (independence, diversity, committees) Compensation
	Shareholders	Shareholder rights Takeover defenses

Source: https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf

Table 3. Definition of variables

Dependent variable	Tobin's Q (TQ_i)	Market value to book value of assets (natural logarithm) for i-company;
Independent variables	$ESGR_i$	ESG provided by Refinitive for i-company;
	ER_i	ER provided by Refinitive for i-company;
	SR_i	SR provided by Refinitive for i-company;
	GR_i	GR provided by Refinitive for i-company;
Control variables	$SIZE_i$	Size of the company measured by natural logarithm of total assets for i-company;
	LEV_i	Leverage ratio measured by total debt/total assets (unsystematic risk) for i-company;
	$BETA_i$	Systematic risk of company measured according to CAPM for i-company;

Model 3. – Extension of Model 2.

$$TQ_i = \beta_0 + \beta_1 EmR_i + \beta_2 RR_i + \beta_3 IR_i + \beta_4 HRR_i + \beta_5 PRR_i + \beta_6 WR_i + \beta_7 CR_i + \beta_8 MR_i + \beta_9 ShR_i + \beta_{10} CSRR_i + \beta_{11} SIZE_i + \beta_{12} LEV_i + \beta_{13} BETA_i + \varepsilon$$

Where: EmR_i – Emission Rating for i-company; RR_i – Resource use Rating for i-company; IR_i – Innovations Rating for i-company; HRR_i – Human Rights Rating for i-company; PRR_i – Product Responsibility Rating for i-company; WR_i – Workforce Rating for i-company; CR_i – Community Rating for i-company; MR_i – Management Rating for i-company; ShR_i – Shareholders Rating for i-company; $CSRR_i$ – CSR Strategy Rating for i-company; other variables as before.

4. Results and discussion

4.1. Descriptive statistics and correlation matrix

Table 4 provides descriptive statistics for dependent variable Tobin's Q (Panel A), ESGRs (Panel B) and control variables (Panel C).

Tobin's Q value ranges from 0.15 to 16.39, with a mean (median) of 2.58 (1.19). The ESGR ranges from 17 for STSHolding to 96 for BNPP with a mean (median) score of 57.36 (54.50). The highest mean scores were obtained for SRs: 59.83 (min. value of 8.00 for STSHolding and max value of 96 for BNPP). The lowest mean ratings were noticed for ERs: 54.4 (min. score of 7.00 for STSHolding and max score of 95 for BNPP). The GRs indicated the mean value of 55.83 with a min. score of 15 for Budimex and a max. score of 94 for BNPP. The highest ESGR values for banks do not seem surprising since the financial sector was the earliest to be covered by ESG rules, and the financial sector has become a type of transmission line of sustainable transformation. This is the result of its particular placement at the centre of the market-client-regulator relationship.

Furthermore, control variables (Panel C) indicated the mean (median) value of 16.91 (16.93) for Size, 0.62(0.55) for LEV and 0.32 (0.32) for BETA.

Table 5 presents a correlation matrix between all the variables used in this study, providing the value of Pearson correlations and the results of their statistical significance. ER, SR, and GR, as the components of an ESGR, are positively and significantly linked with the total ESG score. They are also positively linked to each other, but a significant correlation occurs only between ERs and SRs.

As supposed, leverage ratio (LEV) and systematic risk of company (BETA) are negatively correlated with a company's value measured by Tobin's Q, but these correlations are not significant. Negative significant correlation is noticed between size of the company (SIZE) and Tobin's Q.

ESGR, ER and SR have significant positive correlations with SIZE and LEV. Significant positive correlations are also noticed between leverage and company size and between the beta coefficient and firm size.

The overall ESGR is statistically significantly, negatively related to Tobin's Q, and correlations between all components of the ESGR and Tobin's Q are negative, but only in the case of the SR is this correlation significant. These results suggest that there are negative significant influences between ESGR, SR and the company value and no significant influences between other components of an ESGR: ER, GR and Tobin's Q.

4.2. Regression results and discussion

Table 6 provides the results of the multivariate regression analysis and Table 7 presents partial correlations. ESGR has a negative impact on a company's value measured by Tobin's Q, but this impact is not statistically significant.

These results tend to contradict the mainstream conclusion of positive impact of ESG scores on a company's value. However, similar results were obtained by Garcia at al. (2020) which are consistent with the results of Aras et al. (2010) for Turkish companies, Kapoor and Sandhu (2010) for Indian companies and Rodrigo et al. (2016) for Latin American companies. We can speculate that the main reason for such results is that these studies focused on emerging markets, but there are also international studies that indicate similar regression results such as Landi and Sciarelli (2019) and Marsat and Williams (2011). Their findings indicate that the higher the ESG score, the lower the stock value of the firm. The above results allow us to reject H1. Additionally, we found that investors pay more attention to traditional factors, like the size of the company and degree of financial

Table 4. Descriptive statistics

Variable	Descriptive Statistics				
	Valid N	Mean	Minimum	Maximum	Std. Dev.
Panel A: company value					
TOBIN's Q (mv/bv)	36	2.578	0.150	16.390	3.366
Panel B: ESGRs					
ESGR	36	57.361	17.000	96.000	16.716
ER	36	54.444	7.000	95.000	21.720
SR	36	59.833	8.000	96.000	19.935
GR	36	55.833	15.000	94.000	21.331
Panel C: control variables					
SIZE	36	16.917	13.024	19.915	1.766
LEV	36	0.624	0.088	0.950	0.236
BETA	36	0.322	0.035	0.621	0.148

Source: Author's calculations

Table 5. Correlations matrix

Variable	TOBIN.S q (mv/bv)	ESGR	ER	SR	GR	SIZE	LEV	BETA
TOBIN.S q (mv/bv)	1	-0.3699*	-0.2696	-0.3365*	-0.1685	-0.5464*	-0.0444	-0.1846
ESGR	-0.3699*	1	0.7872*	0.8907*	0.6403*	0.4831*	0.4639*	0.2736
ER	-0.2696	0.7872*	1	0.6921*	0.2865	0.4624*	0.3834*	0.3136
SR	-0.3365*	0.8907*	0.692129*	1	0.2981	0.4358*	0.4972*	0.2321
GR	-0.1685	0.6403*	0.286499	0.2981	1	0.2696	0.1932	0.1795
SIZE	-0.5464*	0.4831*	0.462419*	0.4358*	0.2696	1	0.4967*	0.3549*
LEV	-0.0444	0.4639*	0.383427*	0.4972*	0.1932	0.4967*	1	0.2653
BETA	-0.1846	0.2736	0.313568	0.2321	0.1795	0.3549*	0.2653	1

* statistically significant at significance level of a=0.05

Source: Author's calculations

leverage. which may suggest that they consider such variables to be under the company's control and to be manageable. Marsat and Williams (2011) put forward two hypotheses for such results. First, that there is a conflict of interest between maximizing shareholder wealth and the interests of stakeholders, and investors can consider being a socially responsible firm as spending money to the detriment of the stockholder's best interests. Second, myopic investors could be unaware of the long-term benefits of a high level of ESG aspects.

R2 is 0.409, which means that 41% of the variability of the dependent variable was explained by the independent variables adopted in the model 1.

Table 7 presents the regression analysis of Model 2 SR and GR, as seen in the ESGR in Model 1, negatively impact the company's value, while the ER has a positive influence on Tobin's Q. However, both negative and positive impacts are not statistically significant.

The positive influence of the ER on a company's value results from the fact that environmental

Table 6. Regression results for TOBIN's Q (mv/bv)

	Coef. b* (Std. Err.)	Coef. b (Std. Err.)
Intercept		21.8661*** (4.6466)
ESGR	-0.247792 (0.1657)	-0.04990 (0.0334)
SIZE	-0.6134*** (0.1727)	-1.16931*** (0.3293)
LEV	0.3748** (0.1668)	5.3562** (2.3845)
BETA	0.0014 (0.1491)	0.0339 (3.3886)
N	36	36
F test	5.3830*	5.3830*
R2	0.4099	0.4099

*statistically significant at significance level of 0.1, **0.05, *** 0.01.

Source: Author's calculations

Table 7. Regression results for TOBIN's Q (mv/bv)

	Coef. b* (Std. Err)	Coef. b (Std. Err)
Intercept		22.3819*** (4.8303)
ER	0.1050 (0.2055)	0.0163 (0.0319)
SR	-0.3221 (0.2110)	-0.0544 (0.0356)
GR	-0.0024 (0.1510)	-0.0004 (0.0238)
SIZE	-0.6469*** (0.1785)	-1.2332*** (0.3403)
LEV	0.4024** (0.1754)	5.7507** (2.5069)
BETA	-0.0195 (0.1548)	-0.4420 (3.5163)
N	36	36
F test	3.4954*	3.4954*
R2	0.4197	0.4197

*statistically significant at significance level of 0.1, **0.05, *** 0.01.

Source: Author's calculations

factors at a given moment force the fastest changes and transformation in enterprises (e.g., it is of key importance for all companies from the energy sector in Poland). It is also most strongly embedded in social and investor awareness, which means that companies are already required to demonstrate their impact on the natural environment, including the climate, for example, by disclosing the greenhouse gas emissions they generate.

R2 is 0.419, which means that 42% of the variability of the dependent variable was explained by the independent variables adopted in the Model 2.

These results allow us to reject H2.

Further extension of Model 2 by considering the breakdown of ER, SR and GR into individual categories (as presented in Table 2), allowed for deeper insight into the environmental, social and management factors that positively or negatively affect the company's value as measured by Tobin's Q.

Although none of the ESG categories significantly impact a company's value, these influences are different (Table 8). Considering the ERs, only the innovation rating positively affects the value of the company measured by Tobin's Q. Although this impact is not significant, it seems to indicate that investors are willing to value companies that introduce product innovations and invest in research and development.

Within the group of SRs, we notice a positive impact on the value of the company for the Human Right Rating and Workforce Rating. Therefore, a kind of bonus is awarded in the market to companies that care about human rights, working conditions, health, and safety of employees, as well as providing conditions for personal development, diversity, and inclusion.

Among the GRs, a slight positive impact on the company's value was noticed for the CSR Rating, which includes an assessment of both the CSR strategy as well as the quality of ESG reporting and transparency of the company.

R2 is 0.572, which means that 57% of the variability of the dependent variable was explained by the independent variables adopted in the Model 3.

The above results allow us to reject H2.

Table 8. Regression results for TOBIN's Q (mv/bv)

	Coef. b* (Std. Err.)	Coef. b (Std. Err.)
Intercept		23.7390*** (6.0057)
EmR	-0.2303 (0.3100)	-0.0371 (0.04992)
RR	-0.1886 (0.4306)	-0.0288 (0.0659)
IR	0.2981 (0.1940)	0.0304 (0.0198)
HRR	0.1056 (0.2115)	0.0119 (0.0239)
PRR	-0.2998 (0.2204)	-0.0379 (0.0278)
WR	0.1161 (0.2649)	0.0169 (0.0386)
CR	-0.0945 (0.2188)	-0.0116 (0.0269)
MR	-0.1015 (0.1802)	-0.0117 (0.0209)
ShR	-0.0140 (0.1897)	-0.0016 (0.0211)
CSRR	0.0567 (0.2153)	0.0068 (0.0258)
SIZE	-0.5665*** (0.2195)	-1.0799*** (0.4184)
LEV	0.2456 (0.2460)	3.5099 (3.5157)
BETA	-0.0724 (0.1549)	-1.6445 (3.5183)
N	36	36
F test	2.2594*	2.2594*
R2	0.5717	0.5717

*statistically significant at significance level of 0.1, **0.05, *** 0.01.

Source: Author's calculations.

5. Conclusions and limitations

Our article concentrates on the impact of ESGRs (both overall ESGR and partial ratings) on companies' value listed in the Polish capital market in WIG-ESG. The analysis comprises 36 firm-year observations covering the years of 2019–2023.

Our empirical research showed a negative but non statistically significant influence of ESGR and a company's value. Such results were noticed in several studies from emerging countries. Further analysis indicated that none of partial ratings (ER, SR and GR) had significant impact on value. Moreover, only in the case of ERs was this influence positive. It is interesting to speculate why no significant relationship was found, but it is difficult to determine a reason. One possible explanation of this results could be the greater environmental awareness of society compared to social and governance awareness. Among ERs, we noticed a positive impact of Innovation Rating on a company's value. Also, a Human Rights Rating, Workforce Rating and CSR Rating showed weak positive influence on the value of the analysed companies.

It seems that the Polish market does not see the potential of ESG factors in building long-term value of companies and believes that the cost of ESG factors outweigh the benefits. Investors do not seem to consider environmental, social and governance criteria while valuing companies, or they underestimate these factors, which may seem irrational when we look at the long-term effects of ESG factors.

Research conducted by Deloitte (2019) showed that in the case of individual investors, the level of environmental, social and governance awareness in Poland is not comparable to other EU countries. At the same time, the level of interest of investors in "green" investment products is also lower, which may be due to the lower availability of such products in Poland, as well as low social awareness. On the other hand, a small offer of investment products referring to the issues of sustainable development may also mean that such investments are perceived by individual investors as an insignificant segment of the market.

Thus, the results of our research are the most relevant for researchers, regulators, and as practice to strengthen ESG education to use the full potential of the capital market and generate demand for green investment products. ESG education is an urgent need as it seems that the financial market is unable to keep up with the rapidly changing EU ESG regulations. This article is also relevant to the ongoing discussion on the credibility and utility of ESGRs for investors. The results obtained may also be an argument for the introduction of an ESGR certification (European Commission, 2023).

One of the most important challenges is the low level of correlation of ratings between different providers. The discrepancy between ESGR providers

is due to several factors: they differently identify the relevance of ESG issues, use different methods to aggregate data, including the public disclosure of companies, surveys, unstructured company data, or data from third parties used different scoring methods, or weighting systems for the identified indicators, and aggregation methods for the final assessment and updated the methodologies for compiling ESGRs over different time periods. This results in a number of negative consequences. Investors find it difficult to find companies with high sustainability scores; consequently, stock prices do not reflect companies' actual sustainability performance. Benchmark administrators develop indices based on ESGRs, about which they do not have full clarity on how they are calculated. The discrepancies make it difficult for companies to improve their performance, as they receive mixed signals from rating agencies about which measures they should improve and which will be evaluated by the market. Thus, companies may not take into account all potential risks and opportunities arising from their operations and target investments correctly.

We are aware of the limitations of our study. First, our analysis covered the years of 2019–2023, which was due to data availability. Our analysis is short-term, additionally it concerns the period of large changes in the value of assets on financial markets (pandemic, war in Ukraine, the specter of recession), hence, capturing statistically significant relationships can be extremely difficult. In addition, the study is limited to the analysis of the ESGRs of Refinitive, which is not free of subjective influences.

Our suggestion for future research is to extend analysis with long term data, when they will be available, and replicate the present study with other ESGRs.

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