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RESPONSIBLE AND PROFITABLE: HOW DOES ESG AGENDA INCREASES COMPANY'S EVALUATION

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This study evaluates the differences in environmental, social, and governance factors (ESG) affecting firm value by examining the rating for aggregate ESG and for each factor separately in developed and developing countries. Innovative industry companies as well as heavy industry companies are taken as examples. The paper demonstrates that the effect of ESG rating on the Tobin coefficient, taken as a proxy variable for firm value, differs across industries in developed and developing countries. Based on the observations of 4 207 firms from 35 countries over the period of 2016–2021, the findings demonstrate that the ESG ratings have a positive effect on firm value in developed countries and in innovative industries; the above-mentioned effects are persistent. It also shows that G score is important for the same groups of companies, however, for the firms registered in developing countries, an E score is sufficient in the short term. The paper concludes that lagged variables have a bigger impact on the results in heavy industries that demonstrate their concentration on internal operations, not on investors' attention directed at the ESG factors. The findings are significant for scholars, managers and policymakers.

Keywords: ESG score, ESG investment, firm value, impact evaluation, longitudinal study.

INTRODUCTION

The impact of the global trend towards environmental protection, social human rights and support for good corporate governance provide businesses with new opportunities. In the last decade, the governance practices, firms' social and environmental performance have become increasingly important both for policy makers and for qualified investors. The concepts of social responsibility of business grew out of fundamental and economic, sociological and managerial theories. In the early 1990s, the stakeholder

theory of E. Freeman and M. Clarkson who proved the possibility of long-term maximization of profits and market value of the company if the needs and interests of all stakeholders are taken into account when building strategic priorities [Freeman, 1984] and developed the principles of stakeholder management [Clarkson, 1995] dominated. The model of social responsibility included the following: institutional principle (legality); organizational principle (social responsibility); individual principle (management judgment); corporate social responsibility (CSR) processes (environmental assessment, stakeholder management, issue management); corporate behaviour results (social impact, social programs, social policy). M. Schwartz and A. Carroll's three-pillar approach to CSR has reduced the previously outlined positions of corporate social responsibility to three: economic, legal and ethical [Schwartz, Carroll, 2003]. The principles of corporate responsibility have now been replaced by the ESG (environmental, social and governance) agenda. ESG is not a separate area of the company's activity but is incorporated into business processes at all levels.

Major world stock exchanges list ESG requirements for IPO's and such huge databases as Thomson Reuters and Bloomberg have unique sustainability data portals. Thousands of companies committed to sustainability, disclosing the ESG performance and goals in the sustainability reports. For the last decades not only academics but also investors published more than two thousand empirical studies on ESG criteria, company's corporate financial performance and its market cost. The largest number of articles examine a relationship between a part of ESG, corporate social governance (CSG) and firm value. Thus, knowledge on the financial effects of the whole ESG criteria on a company's value remains fragmented [Miralles-Quirós, Miralles-Quirós, Valente Gonçalves, 2018; McKinsey, 2020; Wong et al., 2021; Irawan, Okimoto, 2022].

At the same time ESG basic principles realisation requires additional resources. These components coincide with the urge to implement new technologies and minimise the risk of business failure during times of recession. Large economic agents have started to monitor ESG factors and actively disclose their implementation. The significance of ESG performance and disclosure has intensified a lot in the 21st century. According to the Morgan Stanley report¹, the world experienced a six times growth in corporate sustainability reporting in the period from 2005 to 2015. Moreover, the number of organisations which monitor environmental, social, and governance data enlarged dramatically.

The enhanced demand for firms with outstanding ESG performance gave an impulse for changes in the financial industry. Nowadays financial surveys around the globe pay huge attention to ESG financing. For instance, promoting socially responsible companies by investing in them has become a key topic and trend in the mutual fund industry since mid 2010's. The most developed branch of responsible finance is green finance. For example, green bonds are a widespread financing source of vari-

¹ Morgan Stanley investment brochure, 2017. ESG and the Sustainability of Competitive Advantage Morgan Stanley & CO. URL: <https://www.morganstanley.com/im/publication/insights/investment-insights/> (accessed: 09.01.2022).

ous investment projects for environmental protection, low-carbon economy, climate change and so on².

The ESG agenda has recently become actively supported by investors. This fact is supported by the increasing number of research projects initiated by major auditing firms. The relevance of the topic under investigation is particularly vividly confirmed by the consultancy company DeVere Group, which has called the ESG agenda the “megatrend of the decade”, which will involve trillions of dollars of investment³.

Other studies have quantified this, such as: 91% of investors consider ESG a key factor in investment decisions; 98% of investors in 2020 said they would more rigorously evaluate this metric when making investment decisions [Ernst & Young, 2020]. The KPMG research also confirms the relevance of the study. According to the 2021 report: more than 30% of CEOs globally would be willing to invest more than 10% of their revenue in developing their organisations’ agenda⁴.

Surveys confirm investors’ willingness to participate in positive environmental and public interest impacts: 83% of private investors believe that their investment decisions can lead to economic growth that will have a positive impact on people’s living standards [Frank, 2021]. Companies that want to increase their value in the eyes of potential investors seek to exploit the potential of factors. At the same time, this initiative could be resource-intensive as, for example, the introduction of the E-initiative may involve the purchase of expensive technology. Organisations need to make sure that their strategy will appeal to investors and counterparties and that the costs of implementation will be reimbursed through the increase in company value. The controversial nature of ESG implementation has encouraged authors to look for factors that can have a positive effect on company value.

The main idea of the research is to evaluate the impact of ESG indicators on the value of the company for developed and developing countries in two groups — innovative industry and heavy industry. The research question is: what is the degree of influence of each ESG factor on the value of the company? It is important for companies to consider the different values for different countries together with the diversity of ESG requirements for industries when formulating their strategies.

The article consists of three parts: the first one shows the evolution of the ESG concept and the relationship between ratings and financial performance of companies. The second includes the theoretical framework of the study and main hypotheses. In the third part the results of the study are discussed in quantitative terms based on regression analysis. The conclusion of the paper is devoted to theoretical and practical implication of the results of the study.

² Ministry of Finance of Russian Federation, 2016. Comparative analysis of financing mechanisms for green and dirty investment projects. URL: https://www.minfin.ru/common/upload/library/2018/06/main/2016_part_1.pdf (accessed: 15.01.2022).

³ DeVere Group. 2020. Tech and ESG are the “investment megatrends of the decade”. URL: <https://www.information-age.com/tech-and-esg-investment-megatrends-decade-123489565/> (accessed: 19.01.2022).

⁴ KPMG reports progress on ESG commitments 2022. URL: <https://home.kpmg/xx/en/home/media/press-releases/2022/03/kpmg-reports-progress-on-esg-commitments.html> (accessed: 01.07.2022).

ESG FACTORS IN A COMPANY'S NON-FINANCIAL REPORTING AND THEIR IMPACT ON THE FINANCIAL RESULT

The introduction of an ESG agenda into a company has become a sign of a firm's sustainable development. ESG represents a company's environmental, social and governance performance used in capital markets. These assessments are used to determine future financial performance of companies and finally the ability to pay dividends to investors [Jensen, 2002]. Disclosure of the ESG agenda takes place through non-financial information for investors in the form of integrated reports, corporate and social responsibility reports and environmental reports. The set of directions the company will adopt in practice depends on the company's strategy, its priorities, industry affiliation and other important factors, which are represented in Table 1.

Table 1. Examples of directions for each of the ESG factors

Environmental factor	Social factor	Governance factor
<ul style="list-style-type: none"> – Efficient use of resources – Biodiversity – Avoidance of toxic emissions and waste – Clean technology – Air pollution prevention technologies 	<ul style="list-style-type: none"> – Respect for human rights within the company – Human resources management – Health and safety – Human diversity – Human capital development – Coordination with the local community – Responsibility for product quality 	<ul style="list-style-type: none"> – Corporate governance – Compliance with regulatory requirements – Anti-corruption – Board diversity – Property rights – Executive compensation – Tax transparency – Risk management

Based on: [Nakajima et al., 2021].

In 2019, the audit firm PwC conducted a survey among investors on which of the ESG factors is important for them when making investment decisions. According to a survey 89% of potential investors voted for the importance of business ethics, 87% for corruption and theft, 83% for health and safety, and environmental factors are only at fourth place. Waste management is important for 76% of respondents. Volunteer work is claimed as an important factor by 13%, responsible marketing by 29% and biodiversity by 36% of investors [PwC, 2019]. Today, the requirements for companies to publish ESG compliance reports have been tightened by governments and investors, leading to a 57% increase in the number of companies that publish a special report since 2011.

The most used ESG reporting standard has been the GRI (Global Reporting Initiative) introduced in 1997. The standard covers environmental issues related to the business. On the government side, one example of the use of ESG reporting is the Securities

and Exchange Commission, which has issued a number of disclosure requirements and obligations. The diversity and complexity of ESG assessment has led to the development of ESG ratings.

Ratings can be used by investors in the process of making investment decisions, as well as in the course of responsible selection of an investment portfolio. In addition, they are used by the assessed organisations and the general public to determine the risks and opportunities of an ESG organisation. Each rating is assessed based on a company's exposure to specific environmental, social and governance risks and opportunities in a particular country, industry, or activity (Table 2).

Table 2. The main ESG ratings

Rating	Companies included
Bloomberg ESG Data Service	Large companies with capitalisation of 2 billion US dollars or more
Corporate Knights Global	Large companies with capitalisation of 2 billion US dollars or more
Dow-Jones Sustainability Index	Top 20% of the biggest companies
Institutional Shareholder Services	For a wide range of businesses
Rep-Risk	For a wide range of businesses
Thomson Reuters ESG Research Data	For a wide range of businesses

One of the most popular ratings is MSCI (Morgan Stanley Capital International)⁵, it evaluates more than 8 500 companies around the world. Its scoring methodology is similar to many other ratings that countries are introducing for their companies as the trend spreads. First of all, companies are divided by industry, each industry has its own set of questions. The rating evaluates more than 80 impact indicators for each of the factors and 270 management indicators. Further, a score is given from 0 to 10 according to the answers to the key questions of the questionnaire. The rating evaluates how well a company copes with reducing a particular risk. MSCI translates a numerical score into an ESG rating. ESG ratings range from CCC at the bottom to AAA at the top. Ratings are also grouped into three segments: lagging behind, average and leader.

The MSCI ranking was cited as an example as it has a very clear methodology with transparent results presented in tabular form. Other popular rating systems include:

- 1) Bloomberg ESG Data Service (works with fairly large companies with a capitalization of 2 billion US dollars; used all over the world);

⁵ Morgan Stanley investment brochure. 2017. ESG and the Sustainability of Competitive Advantage Morgan Stanley & CO. URL: <https://www.morganstanley.com/im/publication/insights/investment-insights/> (accessed: 09.01.2022).

- 2) Corporate Knights Global 100 (publishes a list of the 100 most sustainable corporations with a capitalization of 2 billion US dollars; considers companies around the world);
- 3) Dow-Jones Sustainability Index (DJSI) (the first global index; considers the top 20% of the largest companies; there is feedback on risk reduction; works worldwide);
- 4) Institutional Shareholder Services (ISS) (in-depth study of corporate governance; more complex methodology that changes every year; expanding metrics by merging with CDP to provide assessment of climate solutions; operates worldwide; has a very high reputation);
- 5) Rep-Risk (founded in 1998, one of the first ESG ratings; very wide coverage of companies; Partner of the Principles for Responsible Investment; publication of reports for companies in the field of ESG);
- 6) Thomson Reuters ESG Research Data (wide coverage of companies without reference to the amount of capital; consideration of more than 400 ESG indicators in the methodology; works worldwide).

In the work presented, when considering two industries for developed and developing countries, authors will use the Thomson Reuters rating. The rating uses a rather interesting methodology, including a large number of indicators in its questionnaires. The second advantage is that the rating works without reference to the level of capitalization of companies, if the first ratings were made only for the largest and most stable companies, here you can analyse smaller companies to identify dependencies.

Currently, Russia is actively pursuing a policy in the field of sustainable finance and financial development. ESG ratings are developed by major rating agencies: Analytical Credit Rating Agency (ACRA), Expert RA Credit Rating Agency. In 2019, a sustainable development risk assessment group was formed at ACRA. It specialises in assessing the level of compliance of green bonds with the Green Bond Principles of the International Capital Markets Association (ICMA). In addition, in 2021, ACRA's list of methods, in addition to the methodology for assessing "green" debt obligations, also included methodologies for assessing social debt obligations and debt obligations in the field of sustainable development, as well as the ESG assessment methodology.

The Expert RA agency calculates the following ratings that evaluate various aspects of sustainable finance: 1) ESG — environmental and social responsibility rating; 2) Green — verification of compliance with the principles of "green" bonds ICMA; 3) Social — verification of compliance with the principles of ICMA social bonds; 4) CGQ — management quality rating. Along with these two leading Russian rating agencies, other similar entities in Russia are starting to work in the narrower area of green bond ratings.

Since 2000, not only voluntary but also mandatory initiatives have started to appear in global practice, especially in European countries. This means that when developing this agenda, companies that are already gaining experience in the application of relevant technologies will have an advantage.

THEORETICAL FRAMEWORK AND HYPOTHESES

The ESG's impact on firms' value. There is evidence in the extant literature regarding the impact of the corporate social responsibility, and later ESG initiatives on the firm's value. In one of the most important works related to the CSR, is mentioned that social responsibility "can be much more than a cost, a constraint or a charitable deed — it can be a source of opportunity, innovation and competitive advantage" [Porter, Kramer, Randall-Raconteur, 2006, p. 2].

There is no clear distinction between the categories of CSR and ESG in the literature. CSR represents a company's internal responsibility to society, while ESG mostly are formal rules. Processes that began as business initiatives were further transformed into standards of company's responsibility to society.

The authors separate these concepts both in terms of qualitative and quantitative impact on company processes and in terms of value to the company. Many authors consider ESG as the successor to corporate social responsibility, accepting their similarities. Therefore, ESG is often considered an "umbrella term" that also includes CSR. ESG is currently perceived as a standard that companies voluntarily adopt, and investors expect.

Nowadays the business community pays high attention to a company's sustainable development strategy. The ESG strategy involves maintaining a balance of social, economic and environmental indicators in order to gain an efficient development of a firm. Although, the development of the ESG research field is still at an early stage, academics have achieved significant progress. Many researchers claim that a socially accountable way of behaving is able to have a net positive impact on a firm's performance.

To begin with, in 1990-s there was found a positive conjunction between financial performance and corporate social responsibility [Turban, Greening, 1997]. In particular, the authors of previous research found a positive correlation between factors of CSR and ROA. Later not only ROA, but also ROE metric was introduced to expand the scope of analysis [Galbreath, 2006]. There was depicted positive association relative to reputation and financial performance metrics based on the Australian firms sample. Moreover, panel data analysis conducted several years later included the sample of nearly 17 000 firm-year observations over a twelve-year period, revealed the same positive relationship [Erhemjamts, Li, Venkateswaran, 2013].

Modern studies provided theoretical arguments for the comprehensive understanding of the connection between a company's corporate social responsibility and corporate financial performance (CFP) via examining the link between them. In the mentioned article he argues that CSR is extremely important for a company in critical times majorly because it can ensure a definite social good that is used as a reputational guard or screen [Godfrey, 2005]. In other words, a company has more chances to retain its value and credence of stakeholders with "moral capital". Strategic philanthropy proposed by managers can generate insurance protection for firm's relationship-based intangible assets.

Furthermore, various studies, which aggregated several results of previous research, highlighted that the majority of empiric company-focused reports indicate a positive

correlation between ESG and a firm's financial performance. For example, a meta-analysis conducted in [Friede, Busch, Basse, 2015] combined findings of about 2 200 individual studies. According to their exhaustive academic overview of the financial effects of ESG criteria, 90% of surveys depicted a nonnegative ESG — CFP relation.

Furthermore, various studies depicted a positive correlation between Corporate social responsibility and nonfinancial performance measures. Such benefits include forcing and promoting customer loyalty, operational efficiency [Aras, Crowther, 2008], workers' motivation increase, efficacious advertisement and brand reputation [Reverte, 2009], decline of administering control needed, product differentiation and decrease in price sensitivity. Thus, non-financial measures have the possibility and capacity to reinforce financial performance metrics for a company, including firm value, if they surpass costs related to topics, that later were included to ESG.

A. Barnea and A. Rubin also found that the CSR principles reduce firm value by developing a conflict of interest among investors, which affects external financing in a negative way [Barnea, Rubin, 2006].

After several crises have shown that less responsible companies can lose control of the business and deceive their investors, the business community has turned its attention to the factors holding back the pursuit of profits in favour of long-term success [The Global Compact, 2004; Eckhaus, Sheaffer, 2018]. A 2018 study based on an analysis of 350 Chinese firms found that firms with ESG factors have a positive effect on firm value [Zhao et al., 2018]. A 2021 study based on the Malaysian market from 2005 to 2018 proved a 1.2% decrease in the firm's cost of capital, while the Tobin factor increases by 31.9%, which is positively assessed by the market [Wong et al., 2021].

A new development of the topic in the academic literature has been the examination of the influence of the three factors on the financial performance of a company for different countries. A 2015 study focused on the impact of the three factors on profitability in France, Spain and Japan. It was found that in Japan, for example, the environmental factor is considered more important, while in France and Spain companies emphasise the social and corporate factor [Ortas, Alvarez, Garayar, 2015]. For all three countries, ESG factors were found to have a positive effect on the financial position of the firm, namely on Tobin's ratio and ROA. In 2018, a sample of 4 000 firms from 58 countries for the years 2002–2011 was generated to examine the differences in the impact of ESG on large firms across countries [Aouadi, Marsat, 2018]. The regression models found that the positive relationship between ESG and firm value is present only for large successful firms in countries where the press enjoys high openness and accessibility.

In a further study, the authors touched on several factors at once: differences in the gender composition of firms, countries and industries. Data were collected on 812 firms from 22 European countries. This is the first study with a focus on the gender composition of the board of directors. In firms with women on the board, ESG disclosure is much more extensive than in firms with a traditional composition. In addition, environmental and social disclosure is more important for creating value for investors than governance disclosure. For firms in environmentally sensitive industries, the relationship

between sustainability disclosure (ESG) and share prices is more significant compared to non-sensitive industries [Muhammad, Qureshi, Kirkerud, 2020]. Other recent studies note the isolated impact of each of the ESG factors on firm value [Landi, Sciarelli, 2019].

Hypothesis H1. Firms participating in the ESG achieve higher company value.

A. Muhammad, S. Qureshi, K. Kirkerud in their paper show that the relationship between ESG and share price is greater in environmentally sensitive industries compared to non-sensitive industries [Muhammad, Qureshi, Kirkerud, 2020]. Based on the analysis of the two industries, it can be concluded that heavy industry has a greater impact on the environment, which makes the environmental factor more significant for it and investors.

Hypothesis H2. Company value is more strongly influenced by environmental factors in developing countries than in developed countries.

The literature has previously tested the assumption that ESG factors have different effects on firm value depending on the country. The positive effect of ESG on the value of Chinese firms has been found in [Zhao et al., 2018]. ROA growth after the introduction of ESG in US companies noted in [Brogi, Lagasio, 2019]. G. Badía and colleagues note that the effect of ESG factors varies for countries in Europe, Japan, North America, which has been demonstrated in the research [Badía, Cortez, Ferruz, 2020]. These papers support the idea that in developing countries such as Colombia, Brazil, Chile and Mexico, the green sustainable policy initiative is by far the most developed, while other factors are addressed to a lesser extent.

Hypothesis H3. Social and managerial factors have the same effect on firm value in heavy industry and innovative industries.

Therefore, the literature on the given topic is represented by a large number of studies that analysed different markets, industries and ratings. One group of authors declares that ESG performance has a positive impact on the cost of equity capital in the global technology sector [Nazir, Akbar, Akbar, 2022]. Other authors believe that industry differences are important. While in one industry ESGs improve a firm's position relative to its value, in another they lead to too high costs [Buallay, 2019]. The main finding is that there has been a steady shift in the view of the ESG agenda from the belief that investing in sustainability only leads to higher company costs to the understanding that, in the long run, this leads to an increase in company value. However, the debate continues, so the authors felt it necessary to contribute to defining the impact of ESG factors on company value.

Hypothesis H4. The effects of the ESG on firm value are persistent in the long term.

Additionally, the increase in ESG investments will show extensive growth potential of the firm, which is considered positively by the investors. Disclosure of ESG issues should also help companies to be more competitive in the local market. Several contemporary studies provide evidence for this fact. Thus, R. Zeidan, H. Spitzack investigated that sustainability factors can significantly change the value of a firm in the long run. His research is based on a specific method of identifying the impact of factors on firm value:

sustainability delta. A big advantage of this methodology is that it has the ability to manage the development of the firm to increase future cash flows [Zeidan, Spitzeck, 2015]. In addition, A. Behl, R. Kumari, H. Makhija found that in the long term ESG factors have a positive effect on the value of the company, even if in the short term this relationship is of a different type [Behl, Kumari, Makhija, 2021].

Data, variables and descriptive statistics. This study assessed the impact of ESG scores on company value for developed and developing countries. Two groups of industries were selected for a more exact specification: innovation industries and heavy industry. The data were derived from the following sources: a) Thomson Reuters Eikon database; b) ESG regulation databases. The outcome will be a comparative analysis of the impact of ESG by country and industry. The originality and significance of the study lies in the narrower focus on the impact of ESG factors on firm value for individual industries and countries, which will provide more accurate results. The data used in this study covers firms located in developed countries (17 countries) and developing countries (18 countries) for the two industries mentioned earlier. Since the data have different dimensions, the variables have been partially logarithmically transformed (except binary ones) to make them comparable. This allows the array to be normalised and ready to use panel analysis techniques. After cleaning the data and performing consistency checks, the total dataset comprised 4 257 firms of which 2 225 are from innovative industries and 1982 from heavy industries. The sample is unbalanced panel data, which includes observations from 2014 to 2021 on companies that were assigned a score for each ESG factor in at least one observed year.

Tables 3, 4 show the sample characteristics of the firms included in the current research.

Table 3. Sample characteristics: Distribution by country development status

Status	Number of countries	List of countries	Number of firms	Percentage of firms, %
Developed	17	Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, Norway, Sweden, Switzerland, UK	2 728	64.9
Developing	18	Argentina, Brazil, Chile, China, Colombia, Egypt, India, Indonesia, Malaysia, Mexico, Peru, Russia, Saudi Arabia, Singapore, South Africa, Thailand, Turkey, UAE	1 479	35.1

Based on: Reuters Refinitiv Eikon. URL: <https://eikon.refinitiv.com> (accessed: 23.04.2022).

Table 4. Sample characteristics: Distribution by industry status

Status	Number of industries	List of industries	Number of firms	Percentage of firms, %
Innovative	17	Biotechnology; communications equipment; diversified telecommunication services; electronic equipment, instruments and components; entertainment; health care equipment & supplies; health care providers & services; health care technology; interactive media and services; IT services; life sciences tools and services; media; pharmaceuticals; semiconductors and semiconductor equipment; software; technology hardware, storage & peripherals; wireless telecommunication services	2 225	52.9
Heavy	5	Chemicals; construction and engineering; machinery; metals and mining; oil, gas, consumable fuels	1 982	47.1

Based on: Reuters Refinitiv Eikon. URL: <https://eikon.refinitiv.com> (accessed: 23.04.2022).

The distribution of firms across country development status shows that the most part of firms with ESG agenda are traditionally operating in developed countries. The quantitative divergence between innovative and heavy industry sectors is linked to the fact that there are significantly more companies with an ESG rating among heavy industry companies.

The Tobin's Q coefficient was taken as the basis of the study, as this indicator is a proxy variable that reflects the value of the company. ESG rating data as well as its individual factors were chosen as variables.

The set of variables also includes controls related to the size of the company and the efficiency of its operations. The choice of control variables for calculating the impact of ESG on firm value is based on prior research. Traditionally are used leverage and firm size [Fatemi, Glaumb, Kaiser, 2018], profitability and CAPEX [Fuente, Ortiz, Velasco, 2021]. Capital growth vs. debt growth are used as a proxy variable reflected investor disbelief in firm performance [Nazir, Akbar, Akbar, 2022]. Consequently, taking only one of these indicators into account may provide an incomplete picture of effects related to ESG influence on firm value.

The dummy variables are responsible for country group membership and industry group membership. The variables measured on interval scale are taken in logarithmic form. Table 5 shows the description of key variables.

Table 5. Variables used in the research

Variable name	Description or formula	Presentation in the model
<i>Dependent variable</i>		
Tobin's Q	$\frac{\text{MarketCapitalization}}{\text{TotalAssets}}$	<i>ln_TQ</i>
<i>Independent variables</i>		
ESG rating	ESG score	<i>ESG.Score</i>
E rating	Environmental pillar score	<i>E.Score</i>
S rating	Social pillar score	<i>S.Score</i>
G rating	Governmental pillar score	<i>G.Score</i>
Assets	Total assets	<i>ln_TA</i>
Dummy variable for the developing countries	1 if the country belongs to developing countries	<i>Developing</i>
Dummy variable for the innovative industries	1 if the company belongs to innovative industries	<i>Innovative</i>
<i>Control variables</i>		
Total company's debt	Total debt	<i>ln_Debt</i>
Total revenue	Total revenue	<i>ln_Rev</i>
Company's leverage	$\frac{\text{TotalAssets} - \text{NetAssets} - \text{CurrentLiabilities}}{\text{NetAssets}}$	<i>Leverage</i>
Return on assets	Return on assets	<i>ROA</i>
Capital expenditures	Capital expenditures	<i>ln_CapEx</i>

Traditional approach to the variable selection dictated to use ones related to the size of the company and its assets use. Modern approach proposes to use variables related to a specific financial risk. Disseminating information about the importance of ESG factors and their disclosure allows companies to become more profitable and enhances their reputation in the market.

EVALUATION USING REGRESSION ANALYSIS

In constructing regression models by country and industry group, the effect on the value of ESG as a whole and each factor separately is examined. This separation makes sense, as the combination of these factors varies from company to company and from industry to industry. It can also be said that there is some interaction effect between, for example, the management factor and the social factor. Therefore, the impact of the whole is not the sum of the influences of the factors.

In order to justify the form of the model in a multivariate equation, a preliminary estimation of the data, correlation coefficients between the variables, was made. The variables were partially transformed so that they could be used in a linear model. Residuals analysis performed after modeling shows that there are no unaccounted for factors or unincluded effects having a significant impact on the model coefficients. The analysis of the literature also gives a background to the use of the linear form of the model [Fatemi, Glaumb, Kaiser, 2018].

The following regression model is constructed to examine the impact of ESG factors on firm value (Model 1):

$$\ln_TQ = \beta_0 + \beta_1 \text{ESG.Score} + \beta_2 \ln_TA + \beta_3 \text{Innovative} + \beta_{4-7} \text{Control variables}$$

and

$$\ln_TQ = \beta_0 + \beta_1 \text{ESG.Score} + \beta_2 \ln_TA + \beta_3 \text{Developing} + \beta_{4-7} \text{Control variables}.$$

To examine the impact of individual ESG factors on company value, the authors build the following regression (Model 2):

$$\ln_TQ = \beta_0 + \beta_1 \text{E.Score} + \beta_2 \text{S.Score} + \beta_3 \text{G.Score} + \beta_4 \ln_TA + \beta_5 \text{Innovative} + \beta_6 \text{Developing}$$

and

$$\ln_TQ = \beta_0 + \beta_1 \text{E.Score} + \beta_2 \text{S.Score} + \beta_3 \text{G.Score} + \beta_4 \ln_TA + \beta_5 \text{Developing} + \beta_{6-9} \text{Control variables}.$$

The best set of control variables for each model was determined by a two-way step-wise method based on the AIC (Akaike Information Criterion). After identifying the set of indicators that influence the outcome variable, the models are tested for the presence of fixed and random effects.

The Pregibon test was used to assess the specification quality of the models. The essence of this test is to determine whether the residuals do not contain variables not included in the model that significantly affect the results [Pregibon, 1980]. The chi-squared statistic for developed and developing country models is 0.21 (p -value = 0.6483), corresponding to the null hypothesis of complete model specification. For innovation and heavy industry models, the chi-square test value is 0.23 (p -value = 0.6326).

Developed vs developing countries. When comparing the model with fixed-effects and random-effects using relevant indicators (the Breusch-Pagan, F -test, and Hausman tests), the random effects model was preferred. Table 6 shows the random effect regression estimates using Model 1. This model was created for developed and developing countries. The first column indicates the independent regressors that are included in the

model. The regression coefficient (the slope) shows the effect of the particular regressor on a firm's value. The dependent variable in both groups is logarithm of Tobin's Q.

Table 6. ESG effect estimated by random effect panel regression, models for developed and developing countries

Variable	Developing countries			Developed countries		
	Coefficient	RMSE	Pr (> t)	Coefficient	RMSE	Pr (> t)
ESG.Score	0.0002	0.0013	0.821	0.0029***	0.0011	0.006
ln_TA	-0.3968***	0.0409	0.000	-0.2472***	0.0347	0.000
Innovative	0.5892***	0.0721	0.000	0.5845***	0.0546	0.000
ln_Debt	-0.0469**	0.0187	0.012	-0.0444**	0.0182	0.015
Leverage	-0.2614***	0.0284	0.000	-0.2174***	0.0340	0.000
ROA	2.6182***	0.3566	0.000	1.1726***	0.2419	0.000
ln_CapEx	0.0749***	0.0231	0.001	0.0289*	0.0173	0.095
N	1 553			2 940		
Wald chi ²	949.58*** (p = 0.0000)			586.52*** (p = 0.0001)		

Notes: 1) level of significance: *** — coefficient significant at 1%; ** — coefficient significant at 5%; * — coefficient significant at 10%; 2) p-values are given in brackets.

The Model 1 (for developing countries) demonstrates the negative impact of the ESG on Tobin's Q. However, it should be noted that this variable is not significant in the model; accordingly, the effect of the rating on the value of a company is not confirmed for this group of countries. Speaking about developed countries the authors may notice that ESG rating has a significant positive effect on company value. With 1-point increase in ESG rating a company's modified Tobin's Q in developed countries increases by 0.36%, that supports hypothesis *H1*. To sum up the results of the regression model for ESG score effects on company value the authors may confirm that in the two groups of countries it differs significantly. Therefore, hypothesis *H1* is confirmed only for developed countries.

Next, the authors delve into the effects of the ESG by examining its components' role in a company's value creation. All variables except the environmental and management factors were significant at the 0.001 level (Table 7).

Table 7. E, S and G effects estimated by random effect panel regression, models for developed and developing countries

Variable	Developing countries			Developed countries		
	Coefficient	RMSE	Pr (> t)	Coefficient	RMSE	Pr (> t)
<i>E.Score</i>	0.0025*	0.0013	0.055	-0.00027	0.0010	0.791
<i>S.Score</i>	-0.0017	0.0012	0.151	0.0012	0.0010	0.232
<i>G.Score</i>	-0.0007	0.0010	0.506	0.0020***	0.0007	0.004
<i>ln_TA</i>	-0.4062***	0.0407	0.000	-0.2410***	0.0349	0.000
<i>Innovative</i>	0.6089***	0.0729	0.000	0.5747***	0.0550	0.000
<i>ln_Debt</i>	-0.0403**	0.0184	0.029	-0.0455**	0.0181	0.012
<i>Leverage</i>	-0.2533***	0.0284	0.000	-0.2197***	0.0338	0.000
<i>ROA</i>	2.6227***	0.3549	0.000	1.1851***	0.2418	0.000
<i>ln_CapEx</i>	0.0738***	0.0230	0.001	0.0295*	0.0173	0.089
<i>N</i>	1 553			2 940		
<i>Wald chi²</i>	983.59*** (<i>p</i> = 0.0000)			609.52*** (<i>p</i> = 0.0000)		

Notes: 1) level of significance: *** — coefficient significant at 1%; ** — coefficient significant at 5%; * — coefficient significant at 10%; 2) *p*-values are given in brackets.

The management factor was not significant, and the environmental factor was significant at the 0.1 level having a negative impact on the company's value. This may be explained with its important role for investors in developed countries. At the same time the management component may differ greatly among companies. This fact may lead investors to different conclusions regarding the investment potential of the company. The implementation of the environmental factor may be expensive in many industries that explains its negative impact on the value of the firm in the short term.

The S factor is important for increasing company value in developed countries, where the social agenda has more application cases when assessing company value, and investors actively consider the social rating when making decisions.

In summary, these model coefficients are supporting the second research hypothesis *H2*. This finding is consistent with the works [Zhao et al., 2018; Brogi, Lagasio, 2019; Badía, Cortez, Ferruz, 2020], which present the different effects of E, S and G components on firm value for different types of countries.

Innovative vs heavy industries. Analysing the models presented below (Table 8) the authors can say that innovative industries benefit from improving ESG positions.

Table 8. ESG effect estimated by random effect panel regression, models for innovative and heavy industries

Variable	Innovative			Heavy		
	Coefficient	RMSE	Pr (> t)	Coefficient	RMSE	Pr (> t)
ESG.Score	0.0045***	0.0012	0.000	-0.0001	0.0011	0.929
ln_TA	-0.3360***	0.0315	0.000	-0.2383***	0.0449	0.000
Developing	0.2330***	0.0614	0.000	0.1383**	0.0665	0.038
ln_Debt	-0.0121	0,0156	0.438	-0.0750***	0.0216	0.001
Leverage	-0.2610***	0.0267	0.000	-0.2239***	0.0364	0.000
ROA	3.0948***	0.3258	0.000	0.9668***	0.2498	0.000
ln_CapEx	0.0272	0.0195	0.163	0.0551***	0.0200	0.006
N	2 097			2 396		
Wald chi ²	729.08*** (p = 0.0000)			269.42*** (p = 0.0030)		

Notes: 1) level of significance: *** — coefficient significant at 1%; ** — coefficient significant at 5%; * — coefficient significant at 10%; 2) p-values are given in brackets.

Company size, debt, and leverage for companies in innovative industries negatively affect the rate at which ESG converts to business value. For innovative companies from developed and developing countries, ROA, company profitability and capital expenditures have a positive effect on the adoption of ESG. This fact can be explained as the more efficient an innovative company is, the greater effect it will get from the implementation of ESG.

Table 9 shows coefficients of the second model (for individual effects of E, S and G components) for innovative and heavy industries.

The group of innovative industries demonstrates the only significant factor from the set of variables of interest. This is the environmental factor significant at 10% only. For heavy industries none of the ESG factors is significant. Recall that the overall ESG rating for this group of industries is also insignificant. All control variables are significant. The size of the company, its debt and leverage for companies in heavy industries negatively affect the rate of conversion of ESG into value.

In summary, the different results for innovative industries and heavy industry are consistent with the work of M. Dahiya and S. Singh [Dahiya, Singh, 2020], who wrote about the importance of industry in reflecting ESG factors on firm value.

The authors consider hypothesis H3 conditionally confirmed as the social and managerial factors are not significant for companies in both industries.

Table 9. E, S and G effects estimated by random effect panel regression, models for innovative and heavy industries

Variable	Innovative			Heavy		
	Coefficient	RMSE	Pr (> t)	Coefficient	RMSE	Pr (> t)
<i>E.Score</i>	0.0020*	0.0012	0.095	-0.00038	0.0011	0.717
<i>S.Score</i>	0.0010	0.0011	0.360	-0.00050	0.0010	0.626
<i>G.Score</i>	0.0015*	0.0009	0.082	0.00098	0.0008	0.195
<i>ln_TA</i>	-0.3389***	0.0318	0.000	-0.2360***	0.0453	0.000
<i>ln_Debt</i>	-0.0119	0.0155	0.443	-0.0768***	0.0215	0.000
<i>Leverage</i>	-0.2583***	0.0268	0.000	-0.2232***	0.0365	0.000
<i>ROA</i>	3.1057***	0.3254	0.000	0.9721***	0.2500	0.000
<i>ln_CapEx</i>	0.0270	0.0195	0.167	0.0565***	0.0199	0.005
<i>Developing</i>	0.2308***	0.0631	0.000	0.1292*	0.0672	0.054
<i>N</i>	2 097			2 396		
<i>Wald chi²</i>	733,65*** (<i>p</i> = 0.0000)			278,12*** (<i>p</i> = 0.0030)		

Notes: 1) level of significance: *** — coefficient significant at 1%; ** — coefficient significant at 5%; * — coefficient significant at 10%; 2) *p*-values are given in brackets.

The effects of the ESG on firm value in the long term. Hence the presence of unit root or deterministic trends may provide spurious results, it is necessary to perform the test and decide about the model type. Testing the parameters of the panel data model by Wald test for joint (simultaneous) hypotheses, the authors may conclude that the null hypothesis should be rejected and there should be one or more unit roots in the dataset, as the value of the test show the significant violation from stationarity as chi-squared test value is 263.68 has a *p*-value equal to 0.000 that means less than 1% significance.

Finally, Models 1 and 2 are modified to the Arellano–Bond dynamic panel-data estimation that is used to absorb trends and extract the true relations between the dependent variable and ESG ratings (Model 3):

$$Y_{i,t} = gY_{i,t-1} + bX_{i,t} + a_i + n_{i,t},$$

where $t = 1, \dots, T(\text{time})$ and $I = 1, \dots, I(\text{company ID})$.

In this model $X_{i,t}$ are the regressors that will be strictly exogenous, a_i is fixed individual company effect and $n_{i,t}$ has zero mean, constant variance, and is uncorrelated across time and individuals. Since the presented dynamic model is very close to the random effects model, the authors present only the coefficients associated with the variable of interest and lag variables.

For innovative industries in case of dynamic panel model (Tables 10, 11), the aggregate rating and separately the ecological factor affect the firm value, while the social and managerial factors are not significant. These results are consistent with the random effect model and partially support the hypothesis $H4$ in case of aggregate ESG rating and its ecological component.

The lagged model for the ESG factors of heavy industry companies shows the significant influence of lags, while the ESG factors did not play a significant role in influencing firm value (Table 10).

Table 10. ESG effect estimated by dynamic panel models

Variable	Developing countries	Developed countries	Innovative industries	Heavy industries
<i>ESG.Score</i>	0.0023 ($p = 0.242$)	0.0055*** ($p = 0.004$)	0.0061*** ($p = 0.007$)	-0.0006 ($p = 0.766$)
<i>Lagged ln_TQ</i> (lag = 1)	-0.0721 ($p = 0.493$)	-0.0626 ($p = 0.497$)	-0.2406 ($p = 0.134$)	-0.5116** ($p = 0.019$)
<i>Lagged ln_TQ</i> (lag = 2)	-0.1052* ($p = 0.067$)	-0.0383 ($p = 0.240$)	-0.1137* ($p = 0.087$)	-0.2429*** ($p = 0.000$)

Notes: 1) level of significance: *** — coefficient significant at 1%; ** — coefficient significant at 5%; * — coefficient significant at 10%; 2) p -values are given in brackets.

Heavy industry companies should concentrate their efforts on developing the social and managerial factor together, but they will not have a quick effect on value. Although heavy industry is one of the dirtiest industries, public acceptance of a company's ESG efforts can take a considerable amount of time and cost.

For companies from developed countries who want to increase their value, you must first pay attention to the governance factor, which will help raise the value of the company (Table 11).

In this regard, it can be assumed that for heavy industries the effect of the rating on firm value comes not immediately, but with a delay. At the same time for heavy industries, lags of 1 or 2 periods are important, that means the influence of the past data related to the particular firm is more significant that influence of ratings.

Table 11. ESG effect estimated by dynamic panel models

Variable	Developing countries	Developed countries	Innovative industries	Heavy industries
<i>E Score</i>	0.00196 (<i>p</i> = 0.275)	0.0021 (<i>p</i> = 0.144)	0.0047** (<i>p</i> = 0.023)	-0.00084 (<i>p</i> = 0.615)
<i>S Score</i>	0.00106 (<i>p</i> = 0.547)	0.0004 (<i>p</i> = 0.790)	0.0015 (<i>p</i> = 0.595)	-0.00121 (<i>p</i> = 0.484)
<i>G Score</i>	-0.0006 (<i>p</i> = 0.658)	0.0030*** (<i>p</i> = 0.002)	0.00132 (<i>p</i> = 0.315)	0.00121 (<i>p</i> = 0.256)
<i>Lagged ln_TQ</i> (lag = 1)	-0.0771 (<i>p</i> = 0.473)	-0.0586 (<i>p</i> = 0.527)	-0.2529 (<i>p</i> = 0.123)	-0.4967** (<i>p</i> = 0.027)
<i>Lagged ln_TQ</i> (lag = 2)	-0.1077 (<i>p</i> = 0.071)	-0.0334 (<i>p</i> = 0.310)	-0.1168 (<i>p</i> = 0.110)	-0.2394*** (<i>p</i> = 0.000)

Notes: 1) level of significance: *** — coefficient significant at 1%; ** — coefficient significant at 5%; * — coefficient significant at 10%; 2) *p*-values are given in brackets.

ESG score is still significant for this group of countries. Lagged variables are not demonstrating reliable results, only in the case of developing countries lag 1 is significant at 10% level. In general, these results are consistent with the panel regression data, except that the environmental factor for developing countries has lowered its significance.

CONCLUSIONS

Theoretical impact of the study. The authors of this paper considered their goal to assess the impact of a comprehensive ESG rating on the value of companies from different countries and industries, as well as assessing the individual impact on it of each component. Research results based on financial and non-financial indicators for 4 207 firms from 35 countries over six years have shown that the impact of the ESG agenda on company value varies depending on the level of development of the country and belonging to a particular industry. The control variables are also significant, suggesting that firm size and debt burden are also important in revealing differences in firm value correlated with ESG. Part of the results obtained in the study are consistent with the results of earlier studies.

M. Nazir, M. Akbar, A. Akbar [Nazir, Akbar, Akbar, 2022] wrote that the implementation of ESG factors has a positive effect on the value of tech firms, which was confirmed by the data for innovation industries. The different results for innovative industries and heavy industry are consistent with the work of M. Dahiya and S. Singh [Dahiya, Singh, 2020], who wrote about the importance of industry in reflecting ESG factors on firm value. A. Behl and colleagues argue that ESG factors have cumulative effects [Behl, Kumari, Makhija, 2021], and attempt to look at the effect of ESG factors on firm value through lagged models for each component and aggregate ESG. In other cases, the results are significantly different. For example, S. Drempetic, C. Klein, D. Zw-

ergel [Drempetic, Klein, Zwergel, 2020] find a significant positive correlation between the stated variables, which makes it necessary to continue the discussion of the effect of ranking on firm value using the additional assumptions.

Managerial implications. Companies interpret the benefits of ESG ratings in their own way, depending on their business model, the environment in which the business operates, and the level of risk. At the same time, it is quite clear that spending on ESG-related actions cannot be paid back immediately but is the focus for the long term. In this regard, investments in ESG can be considered as investments aimed at increasing the company's value in the future [Jensen, 2002].

The high significance of the coefficient with a positive effect from ROA and negative from Leverage may indicate that the ESG rating combined with competent management of the company's assets can give a significant increase in the value of the company in the long term. These variables are significant for different country groups as well as for different industry groups. This conclusion is supporting research by G. Fuente, M. Ortiz, P. Velasco. They emphasise that managers often consider ESG factors and company growth as different processes, unrelated to each other, which, in his opinion, is incorrect [Fuente, Ortiz, Velasco, 202]. In [Zumente, Bistрова, 2021] it is also confirmed that over the past decades, successful companies have refocused on long-term sustainability goals in their mission statements and shifted the focus of shareholder attention away from profits to the ESG agenda.

This study shows that ESG has a positive impact on the value of innovative companies. Among other things, this may be because investing in ESG helps to attract and retain employees, which is especially important for innovative companies. It is important for a professional who applies his talents that the results of his work do not conflict with nature and society, to act proactively [Edmans, 2012].

Limitation and further research. The findings from this research contribute to previous calls for methodologically robust analyses. However, this study has some limitations, which help to identify areas for further research. First of all, separate models for two groups of countries and two groups of industries required separate models as they are not representing the entire population and cannot be used to develop one common model with a set of binary regressors for the groups. Second, there is an opportunity to examine the relationship between survival rate of companies and ESG agenda. To support this point, it is possible to give an example of studies discussing that firm value growth continues only up to a certain "risk" point. Each factor contributes a different degree of growth and risk to firm value [Fuente, Ortiz, Velasco, 2021].

The firm's resilience to external and internal shocks is also important in today's environment. Several new studies examine the relationship between ESG and corporate default risk [Li, Zhang, Zhao, 2022]. Their study examined Chinese firms from 2015 to 2020. It was found that firms with higher ESG ratings have a lower probability of default. Another study, also focusing on the Chinese market, reveals a link between ESG and a firm's investment portfolio [Wang, Kezhi, Zhang, 2021]. The results are that ESG screening undermines portfolio value in the Chinese stock market, leading to lower out-of-sample returns, Sharpe ratio and aggregate wealth.

Thus, further research on the impact of the ESG agenda on the value of the company leads researchers to the area of determining the influence of ESG factors on the acceptable level of risk, which provides the highest value of the company at a particular time. Undoubtedly, this promising direction should be disclosed in a special study. It is assumed that firms participating in the ESG ratings should have a lower rate of failure than firms that do not participate.

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ОТВЕТСТВЕННОСТЬ И ПРИБЫЛЬ: КАК КРИТЕРИИ ESG ПОВЫШАЮТ ОЦЕНКУ КОМПАНИИ

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В исследовании оценивается влияние рейтинга ESG (environmental, social, governance — окружающая среда, общество, корпоративное управление) на стоимость компании. Проводится оценка как рейтинга в целом, так и каждого его фактора в отдельности. Изучается воздействие рейтинга ESG на стоимость компаний развитых и развивающихся стран в зависимости от сферы деятельности, к которым они относятся, — инновационным или традиционным отраслям. Установлено, что влияние рейтинга ESG на коэффициент Тоби-на определяется видом отрасли и уровнем развития страны. На основе анализа данных 4 207 компаний из 35 стран за 2016–2021 гг. показано, что рейтинги ESG положительно отражаются на стоимости фирмы в развитых странах и инновационных отраслях, при этом указанные эффекты являются устойчивыми. Кроме того, выявлено, что для тех же групп компаний важна оценка G (фактор корпоративного управления), но для фирм, зарегистрированных в развивающихся странах, в краткосрочной перспективе достаточно оценки E (экологический фактор). В статье содержится вывод о том, что лаговые переменные оказывают наиболее сильное влияние на результаты традиционных отраслей, т. е. особый акцент делается на производственной деятельности, а не на повышении рейтинга ESG. Полученные выводы имеют значимость для ученых, менеджеров и политиков.

Ключевые слова: рейтинг ESG, инвестиции в ESG, стоимость компании, оценка влияния, панельные исследования.

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