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ESG-SCORE EFFECT IN RISK ASSESSMENT OF DIRECT AND PORTFOLIO INVESTMENT: EVIDENCE FROM CEE MARKETS

Andriy Kaminskyi
Dr. Habil., Professor,
Professor of Economic Cybernetic Department
Kyiv National Taras Shevchenko University
60, Volodymdrska str., Kyiv, 01033, Ukraine
e-mail: kaminskyi.andrey@gmail.com

Maryna Nehrey
PhD, Associate Professor
Professorship for Agricultural Economics and Policy
Swiss Federal Institute of Technology Zurich,
Sonneggstrasse 33, 8092, Zürich, Switzerland
Associate Professor of Economic Cybernetics
National University of Life and Environmental Sciences of Ukraine
16a Heroyiv Oborony St., Kyiv, 03041, Ukraine
ORCID: https://orcid.org/0000-0001-9243-1534
e-mail: marina.nehrey@gmail.com

Anastasiia Fedchun
Master student
Economic Cybernetic Department
Kyiv National Taras Shevchenko University
60, Volodymdrska str., Kyiv, 01033, Ukraine
e-mail: fedchun.ana@gmail.com

The inclusion of ESG factors (Environmental, Social, Governance) in the assessment of investment attractiveness is a dynamic trend in the current period. The integrated indicator of these factors is the ESG score. In the paper, the authors examined the interdependencies between the three indicators: ESG scores, expected returns, and risks. The survey was conducted for 21 companies from Central and Eastern Europe. The inverse relationship between ESG score and risk is shown, as well as the practical absence of a relationship with expected returns. ESG score effect in risk assessment of direct and portfolio investment was identified and analyzed.

Key words: ESG, ESG-score, direct investments, portfolio investments, risk assessment, CEE markets
JEL Classification: G 23, L14, L26, L86

Introduction

Over the last decade, there has been a growing interest of investors in the investment segment named ESG-investing. Thus, nearly 25% of all global assets under management (AUM) are now being invested with a comprehensive analysis of environmental, social, and governance factors (ESG). It's estimated that ESG AUM globally are over $23 trillion in 2020 [1] and the growth rate will increase. Sustainable investments with ESG criteria are becoming popular in almost all segments of the investment market: the stock market, the bond market, the market of mutual funds, and ETFs. Moreover, ESG criteria also apply to alternative investments analysis [2].

Segment ESG-investing involves looking at investments from the angle of three groups of factors that investors pay attention to when considering investments in a company, project, or investment portfolio: Environmental, Social, and Governance.

The "Environmental" refers to the factors that characterize a company in terms of its engagement with the environment. These include such factors as

carbon footprints, greenhouse gas emissions, energy efficiencies, biodiversity, climate change mitigation, waste management, and others.

The "Social" component of factors is considered the company's relationships with employees, customers, and, more generally, the community in which it operates. One of the pillars of this is the conception of "Diversity, Equity, and Inclusion" (DE&I). Diversity is the presence of differences that may include race, gender, religion, sexual orientation, ethnicity, nationality, socioeconomic status, (dis)ability, age, religious commitment, or political perspective. Equity is promoting justice, impartiality, and fairness within the procedures, processes, and distribution of resources by institutions or systems. Inclusion is the degree to which diverse individuals can participate fully in the decision-making processes and development opportunities within an organization or group.

The "Governance" component corresponds to the quality of rules and procedures of corporate governing – corporate board formation and its structure, strategic sustainability plan (which among other things, involves enhancement "E" and "S" components), and executive compensation. An inalienable part of "G" is clearly defined company's strategy on the issues of political contributions, lobbying, bribery, and corruption.

The development and implementation of such assessments raise a topical question about their impact on investment characteristics, primarily risk and expected return. Today, there are a lot of both theoretical and practical studies in this area. At the same time, a well-established pattern in this direction, in our opinion, is still in the process of forming. Our research was carried out in this direction based on the analysis of large companies in Central and Eastern Europe (CEE). We investigated the relationships between ESG levels, expected returns, and risks. The ESG scoring developed by S&P Global was used to assess the ESG levels of analyzed companies. The results of our research revealed one effect in the market under study, which is presented in this paper. The effect is that companies with higher ESG scores are less risky when investing directly in the company. But in portfolio investment, the risk is due to more diversification effect than ESG scoring of the companies included in the portfolio.

Literature Review

Over the past 10 years, considerable attention has been given to ESG investing. This strong development derives an increasing number of publications. This trend is very well illustrated by the data analysis given in the article [3]. This paper involves bibliometric systematization and visualization research in ESG analysis (more precisely this study searched Scopus for "ESG"). Authors demonstrated interesting dynamics of "Annual Scientific Production" from 1990 to 2020. It shows exponential growth in scientific publications in this sphere. This, together with a large volume of practical publications and reviews, indicates great interest in this topic.

Of course, the initial analysis in ESG investing should be an understanding on the insight the nature of ESG factors, their appearance, and interpretation. This approach is presented deeply in the paper [4]. It presents an introduction to ESG factors consideration and identifies a couple of critical issues for companies in such frameworks.

A wide range of conceptual and practical aspects of ESG investing is provided in [5]. This paper, from our point of view, very deep overview of qualitative and quantitative analysis of ESG factors in the framework of classical investment theory. The authors illustrate the ESG financial ecosystem in terms of various market participants, and the logic of assessment of ESG level through the scoring methodology. Taking into account that we have used portfolio analysis in our research, we focus on this paper because it also presents the application of Markowitz's modern portfolio theory and, additionally, Fama-French factor models. Comparing the results obtained in this article for indices with the results obtained in our research for CEE companies allows a deeper understanding of the research problems. Challenges concerning the current state of ESG investing also are analyzed.

In the context of the ESG scoring tools, we used the information resource [6], which gives an exclusively complete picture of the ESG scoring of this species. This resource presents several important explanations about the interpretation and use of the ESG score.

One of the objectives of our research was to analyze stock returns on ESG scores. Similar issues were discussed in the paper [7].

From a more general point of view, the analysis of the relationship between ESG scoring and profitability and risk is presented in [8]. In this paper, the analysis of profitability is considered as a whole from the index ESG, and its components E, S, and G separately. This approach allows a deeper understanding of which factors determine profitability more than others.

A study of the impact of the financial shock as a result of the COVID-19 pandemic was conducted in papers [9], [10]. The results of the studies showed relatively rapid recovery of all the companies in question. The analysis of risks caused by COVID-19 and their evaluation showed several effects with research potential.

The results of our research it is interesting to consider through cross-analysis with [11] where authors considered similar issues but in another market.

Generally, the number of publications devoted to ESG investing is exponentially increasing. This leads to the need for an active permanent analysis of the obtained results.

Data and methodology

In this study, we aimed to investigate the relationships between sustainability, risk, and return for large

companies in Central Eastern European countries. By large companies, we meant the companies represented in index baskets of leading indexes from these countries. The focus of data collection was grounded on this.

CEE countries are EU member states which were part of the former socialistic bloc. There are Bulgaria, the Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia, and Slovakia. The peculiarity of these countries is that on the one hand they, being the the members of EU, should apply different regulatory approaches to the EU. The formal regulatory frameworks in the EU have certainly speeded up the focus on ESG. It has formalized the rout both investment managers and shareholders. The Sustainable Finance Disclosure Regulation (the "SFDR") entered into force in December 2019 and started to apply across the EU from March 2021. More detailed information about milestones of ESG implementation in the EU is in [12]. Thus, these countries have the regulatory impulse to implement ESG, which is complemented by aspects of investment attractiveness.

On the other hand, markets of these countries are emerging and, as we have seen in the research process, are still significantly behind the practice of ESG for developed countries from the EU. The data which was used in our research involves three components. The first component was the evaluation of ESG (general score and score on an individual basis – «E», «S», «G»). The second component was the expected return and the third component was a risk.

The ESG valuation data for this market were limited. We have considered several such indices, focusing on S&P Global ESG Scores. It can be used in different ESG as provided by MSCI, Sustainalytics, Refinitive, and some others. We were involved in our research on S&P Global ESG Scores because it is more transparent from a methodological point of view (of course it is only from our point of view).

Initially, we analyzed the coverage of this type of scoring company that is included in the indices of countries. The largest coverage of companies by this index is for the companies included in the Polish WIG20. The Czech Republic (PX) and Hungary (BUX) indices are characterized by a smaller coverage percentage. The companies represented in the indices of other CEE countries are not yet covered by this index. This fact suggests that ESG at CEE markets index coverage is still in the process of development. For comparison, coverage of the ESG Score of companies included in the extended DAX index (40 companies) is 100%.

Thus, we have selected 21 companies for analysis, which are presented below in Table 1. For these companies, we have an ESG score. Score values are adequate for 2022.

From a methodological point of view, the ESG score indicates the company's resistance to the appearance of

Table 1

Indicators

Index	Company	ESG	E	S	G	Expected return	Risk
Bux	MOL Plc	69	68	73	67	0,12%	2,64%
PX	ČEZ Group	56	66	43	55	0,13%	1,91%
PX	Komerční banka	52	45	48	56	-0,02%	1,98%
PX	Erste Group Bank	49	38	51	50	0,13%	3,10%
Bux	OTP Bank Group	40	42	49	35	0,42%	2,86%
PX	VIG	36	33	29	41	0,10%	2,47%
Wig20	Bank Polska Kasa Opieki SA	34	21	33	38	-0,09%	3,04%
Wig20	Santander Bank Polska	34	27	34	34	0,03%	3,26%
Wig20	Powszechna Kasa Oszczednosci Bank Polski SA	32	25	38	30	0,18%	3,11%
Wig20	Orange PL	30	41	41	18	-0,01%	3,56%
Wig20	CCC SA	27	37	30	19	-0,25%	4,93%
Wig20	KGHM Polska Miedz SA	25	26	26	21	0,12%	4,32%
Wig20	Cyfrowy Polsat SA	24	26	28	20	0,13%	2,83%
Wig20	MBANK	24	19	20	28	0,18%	3,90%
Wig20	Polski Koncern Naftowy Orlen SA	23	14	26	26	-0,09%	3,38%
Wig20	LPP SA	23	37	25	14	0,36%	3,88%
Wig20	Grupa Lotos	22	23	25	20	0,63%	4,67%
Bux	Gedeon Richter	20	36	10	26	0,08%	2,92%
Wig20	PGE Polska Grupa Energetyczna SA	20	23	22	14	-0,07%	4,31%
Wig20	CD Projekt SA	18	0	28	20	1,23%	5,36%
Wig20	Asseco Poland	15	11	22	13	0,16%	3,31%

risk in the three groups of factors under consideration. High scoring indicates that the company has a system of management of these risks. At the same time, the low ESG score value is considered an indicator of the high probability of occurrence of ESG risks.

We chose a three-year time interval from 2017-2019 to return consideration. The choice of the interval was determined by the purpose of the study in a relatively stable period - before the onset of the pandemic shock. At the same time, the use of the time interval until 2017 is controversial because the time difference between the current scoring value and the data is more than 5 years.

We used the data of weekly returns (a total of 156 values). The returns were calculated on the stock prices (in the local currency). The data source was a resource [13].

Expected return and standard deviation of returns were the basic indicators

$$E(R) = \frac{1}{N}\sum_{1}^{N} R_t \quad \text{and} \quad \sigma(R) = \sqrt{\frac{1}{N-1}\sum_{1}^{N}\left(R_t - E(R)\right)^2}.$$

Thus, each stock can be characterized by six indicators:

$$Stock \rightarrow (ESG\ score; E\ score; S\ score; G\ score; E(R);\ \sigma(R))$$

Based on this presentation for 21 companies we applied research methods:

– Correlation analysis
– Cluster analysis
– Portfolio analysis.

The effect of the difference between direct and portfolio investments in terms of triple "ESG score – Expected Return – Risk".

Results and discussion

The calculations and ordering of ESG score values are given in Table 1.

As shown in Table 1, the values of the ESG score differ significantly among the companies under consideration.

Correlation analysis indicates a relatively high level of correlation between ESG scores and risks. The analysis of the correlation between ESG scores and expected returns does not show significant interdependency.

Table 2

Correlations

	ESG	*E*	*S*	*G*
Expected return	*-0,21*	*-0,34*	*-0,06*	*-0,17*
Risk	*-0,65*	*-0,59*	*-0,45*	*-0,70*

Cluster analysis provides forming three clusters (fig.1).

The main result of our research is to identify the following effect associated with the application of ESG-score. The meaning of the effects is as follows. Scoring values have an inverse relationship with the level of risk. Therefore, the higher ESG score of some companies corresponds to the lower average risk of direct investment in this company. However, the average risk of direct investment increases if the selection of companies is extended downward in Table 1. ESG scores are decreased in this situation. But it is possible to use Markowitz's approach to build a portfolio with minimal risk. And moving down the range of companies in Table

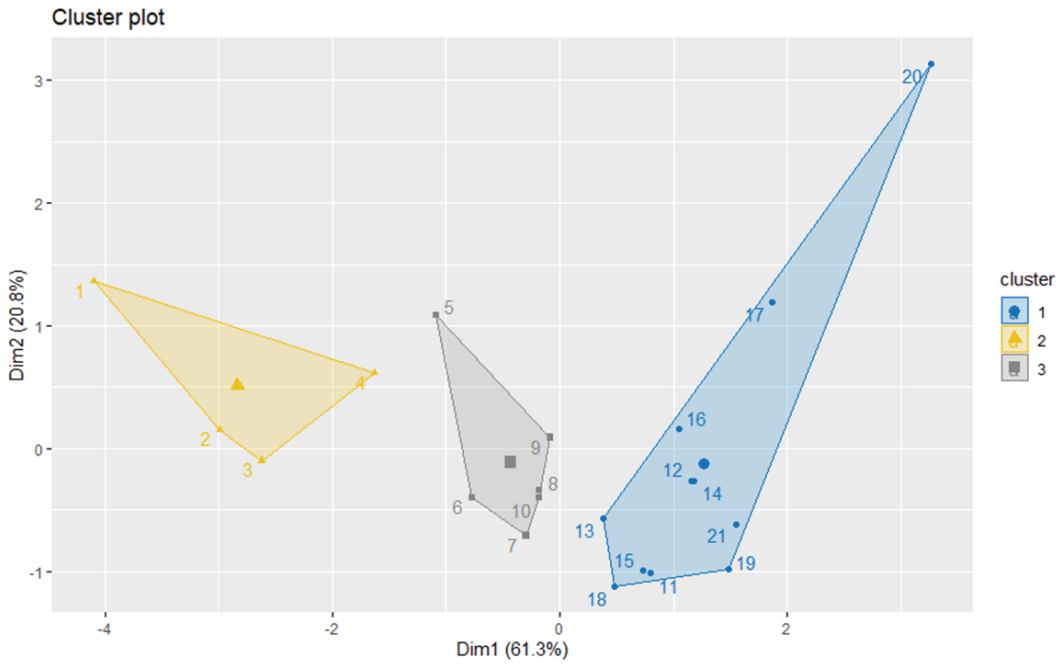

Fig. 1. Clustering

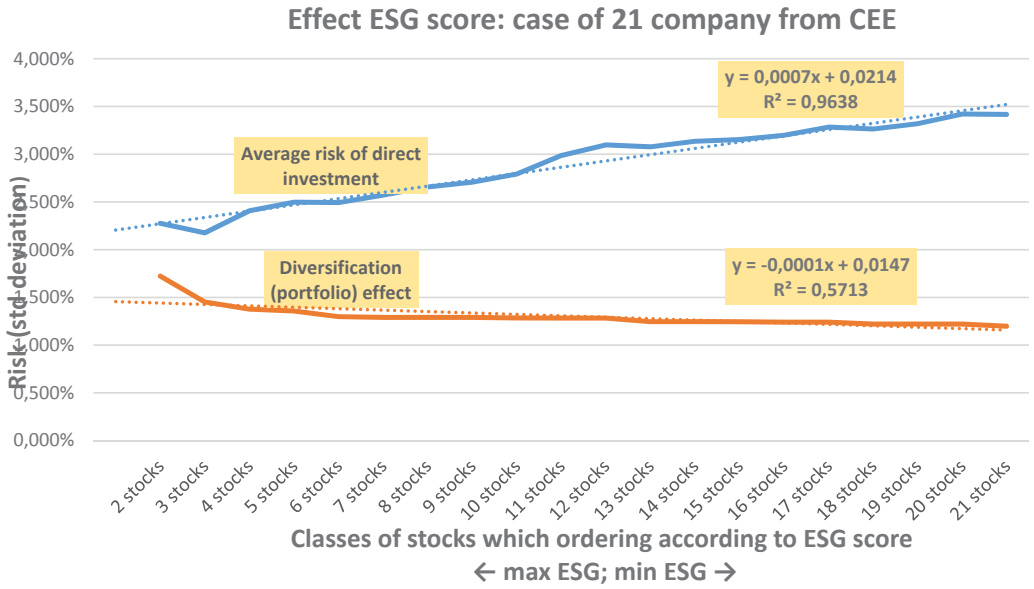

Fig. 2. Effect ESG score: the case of 21 companies from CEE

1, it is possible to take more and more advantage of the diversification effect. It reduces the risk.

Thus, the effect is that reducing the ESG score level increases the risk of direct investment, but reduces the risk of portfolio investment.

Does the main discussion question concern how to use ESG scores for investment strategies? From one side it logically concentrates focus on the sample of companies with high ESG scores. But narrowing investments to the high ESG scores companies destroys the diversification effect. One possible approach in such a situation is to construct a model of increasing/decreasing risk and find some appropriate level of the risk on this base. Another approach is raised from establishing some cut-off. In other words, to define some level of sustainability (ESG score not lower than 70, for example) and minimize risk in this segment through the H. Markowitz approach.

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Камінський Андрій Борисович, доктор економічних наук, професор, професор кафедри економічної кібернетики, Київський національний університет імені Тараса Шевченка, вул. Володимирська, 60, м. Київ, 01033, Україна, e-mail: kaminskyi.andrey@gmail.com

Негрей Марина Володимирівна, кандидат економічних наук, доцент, професор департаменту аграрної економіки і політики, Швейцарський федеральний технологічний інститут, Зоненгштрасе 33, 8092, Цюріх, Швейцарія, доцент кафедри економічної кібернетики, Національний університет біоресурсів і природокористування України, вул. Героїв Оборони, 16а, м. Київ, 03041, Україна, ORCID: https://orcid.org/0000-0001-9243-1534, e-mail: marina.nehrey@gmail.com

Федчун Анастасія, магістр кафедри економічної кібернетики, Київський національний університет імені Тараса Шевченка, вул. Володимирська, 60, м. Київ, 01033, Україна, e-mail: fedchun.ana@gmail.com

ЕФЕКТ ESG-SCORE В ОЦІНЦІ РИЗИКУ ПРЯМИХ ТА ПОРТФЕЛЬНИХ ІНВЕСТИЦІЙ: ДОКАЗИ З РИНКІВ ЦСЄ

Включення факторів ESG (Environmental, Social, Governance) в оцінку інвестиційної привабливості є динамічною тенденцією в поточний період. Сегмент ESG-інвестування передбачає розгляд інвестицій під кутом зору трьох груп факторів, на які інвестори звертають увагу, розглядаючи інвестиції в компанію, проект або інвестиційний портфель: екологічні, соціальні та управління. Розробка та впровадження таких оцінок актуалізує питання про їх вплив на характеристики інвестицій, насамперед ризик та очікувану прибутковість. У статті досліджено взаємозалежність між трьома індикаторами: оцінками ESG, очікуваною прибутковістю та ризиками. Оцінювання проводилося для 21 компанії з Центральної та Східної Європи. Оцінка ESG, розроблена S&P Global, використовувалася для оцінки рівнів ESG аналізованих компаній. Результати дослідження виявили один ефект на досліджуваному ринку, який представлений у цій статті. Результат полягає в тому, що компанії з вищими показниками ESG менш ризиковані, інвестуючи безпосередньо в компанію. Але в портфельних інвестиціях ризик зумовлений більшим ефектом диверсифікації, ніж ESG-оцінка компаній, включених до портфеля. Показано зворотний зв'язок між показником ESG та ризиком, а також практично відсутність зв'язку з очікуваною прибутковістю. Було виявлено та проаналізовано вплив оцінки ESG на оцінку ризику прямих і портфельних інвестицій. Основним результатом дослідження є виявлення ефекту, пов'язаного із застосуванням ESG-score. Результат полягає в тому, що зниження рівня оцінки ESG збільшує ризик прямих інвестицій, але зменшує ризик портфельних інвестицій. Головне питання обговорення стосується того, як використовувати оцінки ESG для інвестиційних стратегій? З одного боку, це логічно зосереджує увагу на вибірці компаній з високими показниками ESG. Але звуження інвестицій до компаній з високими показниками ESG знищує ефект диверсифікації. Одним із можливих підходів у такій ситуації є побудова моделі збільшення/зменшення ризику та знаходження відповідного рівня ризику на цій основі. Інший підхід випливає зі встановлення деякої точки відсікання.

Ключові слова: ESG, ESG-score, прямі інвестиції, портфельні інвестиції, оцінка ризиків, ринки ЦСЄ.

Коди класифікації JEL: G 23, L14, L26, L86

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