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ANALYSIS OF THE LINKS BETWEEN ESG PERFORMANCE AND LIQUIDITY RATES FOR THE COMPANIES LISTED ON THE EMERGING MARKETS IN THE EUROPEAN UNION

VASIU Diana Elena
Lucian Blaga University of Sibiu, Romania

Abstract:

Nowdays investors and other stakeholders increasingly consider ESG factors when making investment decisions. They were supported by numerous rating agencies that developed a large number of indices and reporting standards to facilitate the choice of the most sustainable companies from an ESG perspective. When the relationship between financial performance and sustainability was analyzed, the researchers did not reach an unanimously accepted conclusion: many studies show a positive relationship, while others show a negative one. In many studies, the relationship between ESG performance and financial performance, assessed through profitability rates was privileged. The aim of this study is to investigate if there is a relationship between ESG performance and the liquidity rates of the listed companies from emerging financial markets in European Union. The emerging markets in European Union were selected due to their attractiveness, as they offer high earning possibilities to investors. At the same time, aspects regarding the mandatory of non-financial sustainability reporting, starting from 2023, were taken into account. This will increase the comparability and homogeneity of ESG scores, but will also generate additional reporting costs, putting suplimentary pressure on companies.

Key words: *ESG performance, liquidity ratio**,** emerging EU markets*

1. Introduction

The term of ESG was first proposed in an United Nation report, based on the concept and goals of sustainable development. In recent years, integration of ESG criteria in decisions of capital allocation by investors is a dominant theme in the landscape of global capital markets.

The analysis of how sustainability performance and financial performance are correlated represents an intensive field of research. In many studies, researchers have focused on the financial performance of companies evaluated through profitability rates. They also investigated the relationship between ESG performance and the cost of debt, respectively the liquidity of stocks. Considering that the analysis of how ESG performance

could affect the liquidity of sustainable companies was not sufficiently addressed, this topic is the objective of this study.

Emerging markets are very attractive for investors, offering them higher earnings and being characterized by a higher growth rate, compared to developed ones. At the same time, the risk assumed by investors is higher. For these reasons, it is important for investors to be able to analyze the financial health of companies and the probability of bankruptcy they might face, in order to liquidate unsafe investments in time.

2. Theoretical framework and empirical literature review

ESG standing for Environmental, Social, and Governance is a framework for evaluating the sustainability and societal impact of a company or investment. In recent years, investors and other stakeholders increasingly consider ESG factors when making investment decisions, as they have become more interested in investing in companies that prioritize sustainability and responsible business practices.

ESG is a new investment concept and enterprise evaluation standard that focuses not only on financial performance, widely used in specialized academic literature as well as by financial professionals. Extensive research has investigated the relationship between ESG performance and companies' performance. One important strand of literature focuses on the relationship between integrated reporting and the cost of capital, on the adoption of laws and regulations and on the internal motivation of companies to publish information in the field of ESG. Although most of the studies consider developed economies, recently, the attention of researchers has turned to emerging markets.

The literature linking ESG to corporate financial performance, market value, risk and uncertainty is still controversial. While majority of prior studies find positive relationships between ESG performance and firm financial performance and value, some authors find that ESG investment can have a mixed, controversial and non-linear effect on financial performance and firm value.

Altan (Atan et al., 2019) examined the impact of ESG factors on the performance of 54 Malaysian public limited companies in terms of profitability, firm value, and cost of capital. The relations between ESG and Return of Equity (ROE), Tobin's Q and Cost of Capital (WACC) had ben investigated. Findins shows that there is no significant relationship between individual and combined factors of ESG and firm profitability. None of the factors of ESG is significant with the cost of capital (WACC), but the combined score of ESG positively and significantly influences the cost of capital (WACC) of a company.

Mohamad (Mohamad et al.,2020) investigated if ESG might influence firm's financial performance, in case of 69 firms listed on Bursa Malaysia during 2009 to 2018. Using Return on invested capital (ROIC) to mesure financial performance, their findings shows a statistically significant negative relations between the ESG score and firm's financial performance.

Bahadori (Bahadori, Kaymak, & Seraj, 2021) investigated whether firm-level financial performance is positively associated with ESG scores in emerging markets, using a multi-industry sample of over 600 firms located in 24 leading emerging markets, during

2014 and 2018. The results suggest that companies with higher ESG scores experience greater levels of profitability.

Boyu He (Boyu, 2022) studies how ESG information disclosure influences investor confidence and corporate stock liquidity on Chinese A-share listed companies. For the study, all Chinese A-share listed companies from 2016 to 2020 were selected, excepting the financial domain, delisted or suspended from listing companies and companies that have been listed for less than one year.The results show that ESG information disclosure has a positive effect on corporate stock liquidity: Environmental (E) and social responsibility (S) rating scores have a significant impact on stock liquidity, while corporate governance disclosure (G) has no significant impact on liquidity. To analyze corporate stock liquidity, Amihud's illiquidity index was used.

Suresha (Suresha et al., 2022) investigates the impact of ESG inclusion on the price, liquidity and financial performance of stocks listed in the Indian ESG indices. The stock price reaction when a stock is included in an index is critical for investors. The inclusion of a share in an index is associated with increased visibility that increases investors' preference for this type of share, thus influencing the liquidity and financial performance of companies. To measure different dimensions of liquidity, Amihud 2002 illiquidity ratio was used. The financial impact of stock inclusion is verified using key financial indicators such as EPS, Book Value Per Share market capitalization, price book ratio and stock return and stock turnover. The study documents improved EPS and hareholders' market wealth post-inclusion of stock in the ESG index. Considering liquidity, overall, the study found no permanent impact on the price and liquidity, though liquidity was highly significant.

Chen (Chen, 2022) analised the relations between ESG and Corporate Performance. Findings shows that a large number of researchers demonstrate positive relationship between ESG and corporate value, while some investigators indicate negative association and few researchers do not find significant evidence regarding this relationship. These very different results are due to different samples, research site, proxy, methodology and research period. In addition, some researchers focus on ESG disclosure while others focus on ESG score or performance, which differs, depending on the scoring methodology, being therefore inconsistent and haveing different degrees of influence on corporate performance. Considering the effect of COVID-19 on the link between ESG and corporate performance, most research has indicated that the positive influence of ESG tends to be more pronounced during the COVID-19 crisis.

In a large Literature Review Study on ESG and Firm Performance, Yating Shen (Shen, 2023) summarizes the relationship between ESG and enterprise performance. The conclusions of the analysis show that the disclosure of ESG information can be seen as a kind of value investment, which can provide a perspective of sustainable future development of companies, helping them avoid focusing only on short-term objectives such as costs and benefits. Focusing on economic, social and environmental impact will be reflected more deeply in the value creation of enterprises and improve their performance in the short and long term.

Naeem (Naeem et al., 2022) investigate whether the environmental, social, and governance (ESG) performances of corporations from environmentally sensitive industries

affect their financial performance. Sample includes ESG data from corporations in six environmentally sensitive industries: 103 corporations from the energy sector, 85 corporations from heavy machineries and equipment, 76 from utilities, 40 from chemicals, 64 from mining and construction, and 15 corporations from pulp, paper, and packing sectors. Return on Assets (ROA), Return on Equity (ROE), and Tobin's Q had been used as dependent variables and proxies for the financial performance. Findings indicate that the overall ESG performance have positive and significant relation-ships with ROE and Tobin's Q,. ESG performances of environmentally sensitive corporations are more recognized in the developed countries' markets and havea stronger impact on the financial performance of the corpo-rations from developed countries than on those from emerging countries.

Chen (Chen et al., 2023) studyed the impact of Environmental, Social, and Governance (ESG) performance on stock liquidity, using Chinese A-share listed companies from 2015 to 2020. They found that ESG performance has a significant positive impact on listed companie's stock liquidity, the positive effect of corporate ESG performance on stock liquidity being more significant among state-owned enterprises, heavily polluting enterprises, and enterprises in low-market regions

Araştırma Makalesi (Makalesi, 2023) analyzed the relationship between the cost of debt and (ESG) in the case of 66 companies in the BIST All Shares index, between the years 2015-2021. Based on panel regression analysis, a significant negative relationship was found between the cost of debt and environmental performance, social performance, and overall ESG performance, while no relationship was found between the cost of debt and governance performance. Using size, leverage ratio, and ROA as control variable, research results have indicated significant negative relationship between the cost of debt and firm size and Return On Assets, while a significant positive relationship was found between the cost of debt and the leverage ratio (Aivaz et al., 2022). These drive the conclusion that environmental and social performance and overall ESG performance reduce the cost of debt, considering that companies with higher ESG performance have access to more external financing sources and benefit from lower cost of debt.

Burak and Lamija (Burak&Lamija 2023) investigated the influence of integrated reporting on the cost of financing within the Turkish capital market and the relationship between environmental, social, and governance (ESG) scores and the cost of financing. Data analysis revealed a positive association between integrated reporting and both weighted average cost of capital and cost of debt, while the impact on cost of equity was not statistically significant. However, it can be considered as the use of integrated reporting by companies to improve communication of their nonfinancial value-creating activities can mitigate the weighted average cost of capital and cost of debt, thus indicating moderate impact on the relationship between ESG factors and the cost of financing.

Șerban (Șerban et al., 2023) analised a sample of more than 5,000 companies divided into 10 sectors of activities, to find if there is a link between financial performance and sustainability in the case of listed companies on stock markets, worldwide. The study showed that the link is a week one, and that there are differences between sectors of activity.

Halid (Halid et al., 2023) performed a a research on the need for overall ESG scores and their impact on the firm performance of listed companies, finding that there are both positive and negative relationships between ESG scores and firm performance.

Analyzing the aforementioned studies, it can be observed that usually, the financial performance of companies is assessed through Return on assets (ROA), return on equity (ROE), and Tobin's Q. Also, among the indicators most often analyzed in connection with ESG performance are the cost of capital, Return on invested capital (ROIC) and cost of capital. When corporate stock liquidity was analysed, Amihud's illiquidity index was used. On the relationship between ESG and firm performance, many studies show a positive relationship while others show a negative one. These aspects are due to the different measurement of ESG performance, the different databases used, the researched fields, the financial markets on which the companies are listed (developed or emerging) and the type of companies analyzed. Also, the way in which ESG reporting is voluntary or mandatory on the analyzed markets can have a significant impact on the financial performance of the analyzed companies, while the cost of ESG disclosure cannot be neglected.

2. ESG disclosure regulations in European Union

Non-financial performances of the firms are increasingly becoming the critical assessment criteria of overall corporate performance. Without being mandatory yet, sustainability reporting is one of the strategies increasingly adopted by corporations around the world, considering stakeholder's demanded for greater transparency on environmental, social and gouvernance issues (ESG). (Diwan and Binilkumar, 2023).

There are a growing number of ESG ratings agencies and indices including the MSCI ESG Indices, the FTSE Russell (FTSE4Good Index Series), S&P Dow Jones Indices (Dow Jones Sustainability Indices), designed to provide investors with a way to invest in companies that are considered to be more sustainable and ethical in their operations, helping them more effectively benchmark to ESG investment performance as well as manage, measure and report on ESG mandates.

As a result of the relatively high number of indices and scores measuring ESG performance, navigating the complex landscape of existing and future regulations can be daunting for investors, although global efforts are made to ensure greater consistency, accuracy and transparency of disclosure requirements.

Focusing only on the European Union, EU measures in terms of regulating non-financial aspects regarding sustainability include Non-Financial Reporting Directive (NFRD), the Corporate Sustainability Reporting Directive (CSRD), the Sustainable Finance Disclosure Regulation (SFDR) and the Taxonomy Regulation.

The NFRD (Directive 2014/95/EU) was adopted in 2014 and entered into force in 2018. It applied to large public interest entities with over 500 employees that records total assets over 20 million EUR or registred net turnover over 40 million EUR. Even if NFRD helped to increase the supply of ESG data, sherholders considered that published information were insufficient and difficult to compared between societies. Thus, in April 2021, the European Commission adopted a legislative proposal for the CSRD, to amend

the NFRD requirements. The CSRD along with the complementing sustainability reporting standards are expected to be applyed by large companies for the first time to reports published in 2024, covering financial year 2023. From January 2027, it will be mandatory for all companies listed of the EU regulated markets with more than 10 employees to report according to the new CSRD requirements

The EU Taxonomy is a classification system that creaties a clear framework to classify “green” or “sustainable” economic activities executed in the EU, establishing a list of economic activities that should be considered sustainable. The focus lays on six environmental objectives: climate change mitigation, climate change adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, protection and restoration of biodiversity and ecosystems. Starting with January 1st, 2023, is mandatory for companies to disclose each economic activity’s alignment with the Taxonomy’s six environmental objectives. Even if EU Taxonomy is not intended to be a reporting framework, it generatess certain reporting obligations for companies and financial market participants it applies to.

EU Sustainable Finance Disclosure Regulation (SFDR) is a European regulation applicable since March 2021, aiming to prevent greenwashing and increase transparency on the European capital markets. SFDR imposes comprehensive disclosure requirements covering a range of ESG metrics, both at the entity and product levels, thus providing relevant information to investors, so that they will be able to make investment choices in line with their sustainability goals.

Considering the reporting requirements in the field of ESG, which will be applicable to an increasing number of companies listed on the financial markets in the European Union, starting with the year 2023, ESG performance will become a mandatory criterion for attracting investors. If until 2023 the ESG disclosure was voluntary, or mandatory only for large companies, once it becomes mandatory, it will generate certain costs. On the other hand, these costs should be compensated by increasing the attractiveness of green companies, whose ESG performance score will position them in the top of investors' preferences. As numerous studies have find, high ESG performance score can be correlated with high financial performance, especially when the criteria for assessing these aspects are uniform and comparable, this being also the purpose of the implementation of the new ESG regulations at the level of European Union.

3. Emerging Financial Markets in Europe

Developed markets are characterized by strong economic growth, high income per capita, liquidity of capital markets, easy access of foreign investors, efficient and reliable regulations. An emerging market refers to a country's economy that is developing and becoming more connected to global markets as it develops. Emerging market economies have a single currency, a stock exchange, a banking system, and are in the process of industrialization. Over time, emerging markets adopt reforms and institutions like those of modern developed countries, which promotes economic growth. Unlike emerging markets, frontier markets are smaller than emerging markets, have lower incomes per capita, less

liquidity and less industrialization and are considered riskier for investors than emerging markets, even if they offer attractive investment opportunities.

Emerging markets, offering the prospect of high returns, based on faster economic growth as measured by gross domestic product, are extremely attractive to investors. But returns are associated with greater exposure and risk, that can include potential political instability, domestic infrastructure problems, lack of dependable information, currency fluctuations, and illiquid equity.

Emerging markets are classified differently by various institutions, each using its own criteria. Among the criteria taken into account are macroeconomic conditions, the level of income, rapidly increasing gross domestic produc, the quality of financial systems, political stability, the rate of economic growth, capital market processes. The largest emerging markets are considered to be the "BRIC" nations: Brazil, Russia, India, and China.

The World Economic Outlook Database (IMF 2023) provided by International Monetary Fund, considering data on national accounts, inflation, unemployment rates, balance of payments, fiscal indicators, trade for countries and country groups and commodity prices, includes in April 2023 15 countries on the list of Emerging-and-Developing-Europe**:** Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Hungary, Kosovo, Moldova, Montenegro, North Macedonia, Poland, Romania, Russia, Serbia, Türkiye, Ukraine. Advanced Europe countries are: Germany France Italy Spain The Netherlands Belgium Ireland Austria Portugal Greece Finland Slovak Republic Croatia Lithuania Slovenia Luxembourg Latvia Estonia Cyprus Malta United Kingdom Sweden Czech Republic Norway Denmark Iceland Andorra San Marino.

Morgan Stanley Capital International (MSCI), with over 50 years of expertise in research, data and technology, is a provider of decision support tools and services for the global investment community. The indices developed by MSCI have been designed to accurately represent and measure global equity markets as they evolve, meeting a wide range of investor's changing needs in one framework. MSCI Emerging Markets Index was launched in 1988. At inception, the index included 10 emerging markets markets. In 2023 it came to encompasses 24 markets, splited on 3 region and country allocation America: (Brazil, Mexico, Chile, Peru, Colombia), Europe, Middle East, and Africa (EMEA) (Saudi Arabia, South Africa, United Arab Emirates , Qatar, Kuwait, Poland, Turkey, Greece, Hungary, Czech Republic, Egypt) and Asia Pacific (APAC) (China, Taiwan, India, Korea, Thailand, Indonesia, Malaysia, Philippines)

FTSE Classification of Equity Markets, conducted every year, divide markets in Developed, Advanced Emerging, Secondary Emerging Frontier markets. The last the market classification, from March 2023, is as follows: Developed Markets: Australia, Austria, Belgium/Luxembourg, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, South Korea, Spain, Sweden, Switzerland, UK, USA; Advanced Emerging Markets: Brazil, Czech Republic, Greece, Hungary, Malaysia, Mexico, South Africa, Taiwan, Thailand, Turkey; Secondary Emerging Markets: Chile, China, Colombia, Egypt, Iceland, India, Indonesia, Kuwait, Pakistan, Philippines, Qatar, Romania, Saudi Arabia, United Arab Emirates; and Frontier Markets: Bahrain, Bangladesh, Botswana, Bulgaria,

Côte d'Ivoire, Croatia, Cyprus, Estonia, Ghana, Jordan, Kazakhstan, Kenya, Latvia, Lithuania, Malta, Mauritius, Morocco, Nigeria, Oman, Palestine, Peru, Republic of North, Macedonia, Serbia, Slovak Republic, Slovenia, Sri Lanka, Tanzania, Tunisia,Vietnam, Mongolia.

Considering Refinitiv Bussiness Clasification, Emerging Europe markets comprise Albania, Andorra, Azerbaijan, Belaerus, Bermuda, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Faroe Islands, Georgia, Gibraltar, Greenland, Guernsey, Hungary, Isle of Man, Jersey, Latvia, Lithuania, North macedonia, Moldova, Malta, Monaco, Montenegro, Poland, Romania, Russia, San Marino, Serbia, Slovak Republic, Slovenia, Turkey and Ukraine.

Beyond inclusion in an emerging market, companies listed on a market in the European Union must apply the regulations specific to the community space. Making a synthesis of the countries considered both emerging markets and belonging to the European Union, the list includes: Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia.

4. Data and methodology

In aforementioned studies, research has focused especially on identifying the links between ESG performance and financial performance, approached through Return on assets (ROA), return on equity (ROE), and Tobin's Q, the links between ESG performance and debt cost, or the relations between ESG performance and stock liquidity usually analysed trough Amihud's illiquidity index.

Considering the attractiveness of emerging markets for investors, due to the rapid growth and the possibility of high returns, companies that also register a high ESG performance score should be at the top of investors' preferences. This should contribute to an easier obtaining of financing, with a favorable impact on the companies' liquidity. In addition, even if the relationship between stock liquidity and ESG performance has been investigated, researchers had focused too little on investigating a link between ESG performance and companies' liquidity, and further, between ESG performance and the risk of insolvency or bankruptcy.

The aim of this study is to investigate if ithere is a relationship betweenon ESG performance and the liquidity of the listed companies from emerging financial markets in Europe.

Considering the different way of classifying emerging markets as well as the unitary reporting criteria mandatory in the European Union, the financial markets from Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia have been selected for research. Among the companies listed on these markets, were selected the companies for which ESG scores provided by Thomson Reuters Refinitiv Eikon are available. The companies were analyzed according to the industry in which they operate, as defined by Refinitive Business Clasification scheme: Energy, Basic Materials, Industrials, Consumer Cyclicals, Consumer Non-Cyclicals, Healthcare, Technology, Utilities, Real Estate. For homogeneity of financial reports, companies from the Financial field were not selected. No listed company acting in

Institutions, Associations & Organizations, Government Activity and Academic & Educational Services domains provide sustainability reports and haven't been included in the Refinitiv Eikon ESG scores, therefore they were not selected.

The analyzed period is 2016-2022, for which the latest financial and non-financial reports were published, covverin Covid crise period. Financial data and ESG scores needed for analysis were also provided by Thomson Reuters Refinitiv Eikon database.

For liquidity analysis Current Ratio and Quick Ratio were used.

Quick Ratio (QR) was computed as Total Current Assets minus Total Inventory for the fiscal year, divided by Total Current Liabilities for the same period.

Current Ratio (CR) was computed as Total Current Assets for the fiscal year divided by Total Current Liabilities for the same period.

The Altman Z-score, that measures the financial health of a company and predicts the probability of bankruptcy, can be used by investitors to determine whether they should buy or sell a stock, if they're concerned about the company's underlying financial strength. A score below 1.88 indicates that a company is likely heading for bankruptcy, while companies that score above 2.99 are less likely to experience bankruptcy. The Altman Z-score datas were also provided by Thomson Reuters Refinitiv Eikon database.

Sustainability performance was considered trough ESG scores from Refinitiv: ESG Combined Score, ESG Controversies Score, Environmental Pillar Score, Social Pillar Score, and Governance Pillar Score. The ESG controversies score is calculated based on controversy topics. If a company faces lawsuits, ongoing legislation disputes or fines it is penalised, affecting it's overall ESGC score and grading, thus being less atractive for investitors. The scores are expressed numerically, from 0 to 100, existing also a letter grade correspondence, from A to D, where A+ represents the highest score, over 96 and D- the weakest ESG performance, below 8.

In IBM-SPSS, Pearson correlation have been applied to test the link between the financial performance approached trough liquidity rates and sustainability performance (Environmental Pillar Score, Social Pillar Score, and Governance Pillar Score) of the companies analyzed. The link between ESG scors and Altman Z-score was tested. Furthermore, it was analyzed if the ESG performantce, liquidity and Altman Z-score relationship is depending on the company's field of activity. When the average values were taken into account, for their homogeneity, the outliers were eliminated.

Considering that some of the analyzed companies started to publish sustainability reports after 2016, the first year taken in considerating for this analise, their number of analised companies differs in the analyzed period, as presented in Figure no.1

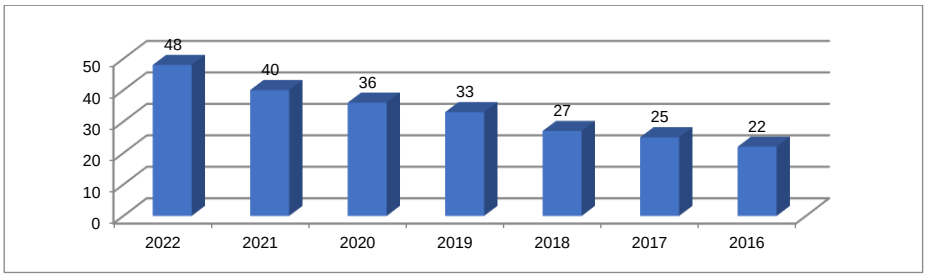


Figure 1: The evolution of the number of companies analyzed during 2016-2022

5. Results and discussions

A significant aspect that characterizes the emerging markets in Europe is the small number of companies that, until 2022, have published sustainability reports, considering the fact that disclousure was not mandatory. For each analyzed industries domain, scores were calculated for less than 5% of companies listed on emerging markets in the EU, the largest share of companies registering in the Energy field.

Industries	Number of companies		
Energy	Number of companies in Emerging UE financial markets	153	%
	Number of analised companies	6	4%
Basic Materials	Number of companies in Emerging UE financial markets	448	
	Number of analised companies	6	1%
Industrials	Number of companies in Emerging UE financial markets	1022	
	Number of analised companies	4	0,39%
Consumer Cyclicals	Number of companies in Emerging UE financial markets	789	
	Number of analised companies	6	1%
Consumer Non-Cyclicals	Number of companies in Emerging UE financial markets	508	
	Number of analised companies	6	1%
Healthcare	Number of companies in Emerging UE financial markets	150	
	Number of analised companies	3	2%
Technology	Number of companies in Emerging UE financial markets	305	
	Number of analised companies	9	3%
Utilities	Number of companies in Emerging UE financial markets	251	
	Number of analised companies	6	2%
Real Estate	Number of companies in Emerging UE financial markets	228	
	Number of analised companies	2	1%

The small number of companies for which ESG performance could be monitored, compared to the total number of companies listed on emerging financial markets in the EU is a limitation of this study.

In order to monitor the evolution of ESG performance, average ESG scores were calculated for each score, in the case of the analyzed companies, as presented in Figure no.2.

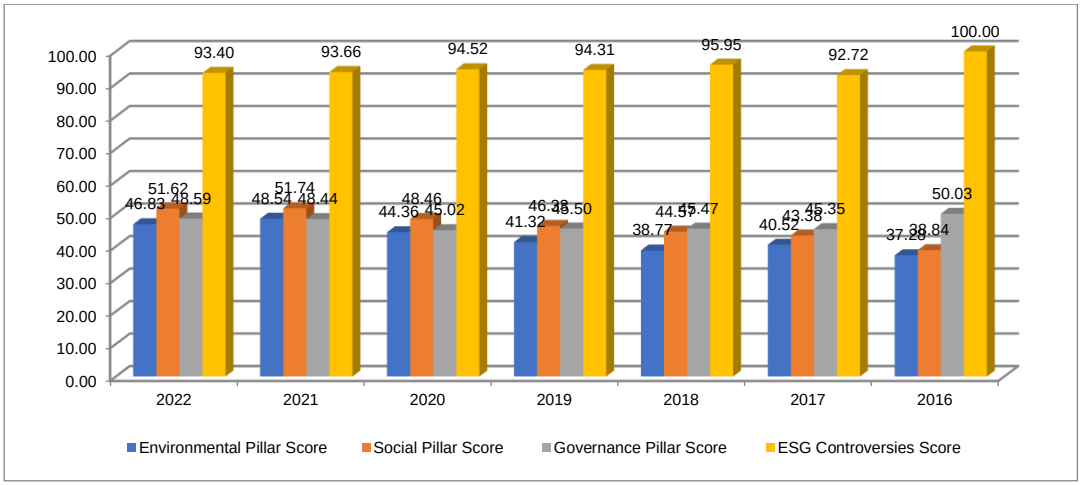


Figure 2: The evolution of average ESG Score, during 2016-2022

All average ESG scores registred values over 41, that, according to Refinitiv methodology, indicates good relative ESG performance and above average degree of transparency in reporting material ESG data publicly. It should be noted that ESG Controversies Score recorded values over 90, during entire analyzed period, indicating excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.

The evolution of Liquidity Ratios is presented in figure no 3.

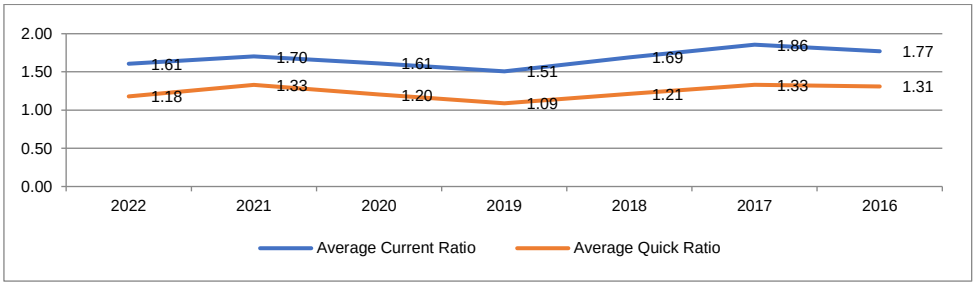


Figure 3: The evolution of average ESG Score, during 2016-2022

The average values of both liquidity rates had an oscillating evolution, registering increases and decreases. In the analyzed period, both average QR and CR recorded with an average decreased rate of 2% from one year to another. Regardless of the evolution, in no period were they at the level of the recommended values (2 in the case of CR and 1.5 in the case of QR), although significantly approaching these thresholds. Therefore, the liquidity of the analyzed companies can be considered satisfactory, but not excellent, the situation being similar to the ESG scores, where the sustainability performance being rated as good relative and aboveaverage degree.

Considering the Altman Z-score to measures the financial health of a company and predict the probability of bankruptcy, the evolution of average Altman Z-score is presented in figure no.4

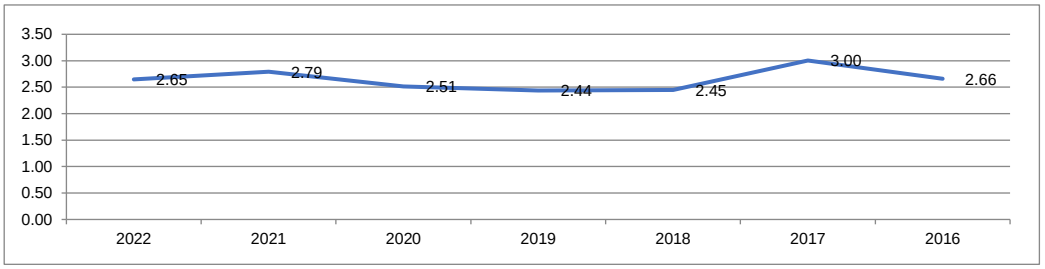


Figure 4: The evolution of average Altman Z-score, during 2016-2022

The average annual Altman Z-score registred each year values above the critical value of 1.88, approaching the safety level of 2.99, but without exceeding it. So, regard to the risk of bankruptcy, the analyzed companies do not face particular problems, investors being able to benefit from the advantages of investments on EU emerging markets, without subjecting themselves to an immediately foreseeable risk.

Considering the comparative evolutions of ESG performance and liquidity of the analyzed companies, it can be assumed that there is a link between these indicators. To test it, Pearson correlation using IBM-SPSS have been applied. Pearson's correlation coefficients value were interpretated according to Evans (Evans, 1996)

Coefficient Value	Interpretation
0.00–0.19	Very weak
0.20–0.39	Weak
0.40–0.59	Moderate
0.60–0.79	Strong
0.80–1.00	Very strong

The results are presented in table No. 1. below, leading to the conclusion that there are only very weak correlation between liquidity rates, risk of of bankruptcy and sustainability performance.

Table 1 : Pearson correlation coefficients for all analised companies

Coreations	ESG Combined Score	ESG Score	ESG Controversies Score	Environmental Pillar Score	Social Pillar Score	Governance Pillar Score
Current Ratio	-,087	-,097	,063	-,117	-,043	-,069
Quick Ratio	-,133*	-,143*	,043	-,145*	-,095	-,108
Altman Z score	,122	,122	-,050	,098	,108	,084

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Further, the existence of these links was tested depending on the industry in which the analyzed companies operate. The results are presented table No. 2, below.

Table 2 : Pearson correlation coefficients, depending on the industry field

Coreations	ESG Combined Score	ESG Score	ESG Controversies Score	Environmental Pillar Score	Social Pillar Score	Governance Pillar Score
Energy						
Current Ratio	***-,459****	***-,461****	-,048	-,283*	-,348**	***-,478****
Quick Ratio	***-,445****	***-,448****	-,060	-,273*	-,331**	***-,490****
Altman Z-score	***-,446****	***-,448****	-,083	-,248*	-,342**	***-,496****
Basic Materials						
Current Ratio	,152	,005	,047	,184	-,030	,214
Quick Ratio	,209	***,579****	***,584****	-,128	,255	,160
Altman Z-score	***,948****	-,036	-,002	,161	-,309	,093
Industrials						
Current Ratio	,375	,375	.b	,477*	,027	,389
Quick Ratio	,207	,207	.b	,304	-,122	,431*
Altman Z-score	,531*	,531*	.b	,506*	,287	,403
Consumer Cyclicals						
Current Ratio	-,077	,054	,021	-,235	,100	-,191
Quick Ratio	-,398	**,745****	***,705****	-,346	***,521****	***,514****
Altman Z-score	**,753****	-,316	-,350	-,194	-,322	-,337
Consumer Non-Cyclicals						
Current Ratio	,206	,210	,175	,228	,253	-,020
Quick Ratio	,131	,134	,177	,249	,166	-,107
Altman Z-score	,183	,183	,015	-,110	,318	,002
Healthcare						
Current Ratio	-,083	-,083	.b	,109	,009	-,199
Quick Ratio	-,181	-,181	.b	-,094	-,129	-,134
Altman Z-score	-,336	-,336	.b	-,305	-,253	-,228
Technology						
Current Ratio	***-,717****	***-,721****	-,274	***-,394****	***-,760****	***-,588****
Quick Ratio	***-,719****	***-,723****	-,270	***-,400****	***-,762****	***-,586****
Altman Z-score	***-,673****	***-,677****	-,257	-,327*	***-,714****	***-,575****
Utilities						
Current Ratio	-,031	-,018	,135	-,069	,127	-,159
Quick Ratio	,020	,030	,097	-,009	,165	-,179
Altman Z-score	-,064	-,055	,096	-,122	,129	-,149
Real Estate						
Current Ratio	***,745****	***,745****	.b	,651	,689	**,753****
Quick Ratio	,768*	,768*	.b	,599	,713*	**,928****
Altman Z-score	-,114	-,114	.b	-,005	-,126	-,300

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

b. Cannot be computed because at least one of the variables is constant

If testing the links between liquidity rates, risk of of bankruptcy and sustainability performance for all the companies listed on the emerging markets in the EU, correlation cannot be identified. Taking into account the industry field led to the identification of some strong correlation.

Current Ratio: Between Current Ratio and ESG scores, there is a strong corelation (>0.60) in Technology and Real Estate domains. For Real Estate domain, the strong corelations are registred for all ESG scors. Regarding Technology domain, Current Ratio - ESG Controversies Score is week.

Quick Ratio: Between Quick Ratio and ESG scores there is a strong corelation (>0.60) in Technology and Consumer Cyclicals domains. For Real Estate domain, the strong corelations are registred for all ESG scors. Regarding Technology domain, Current Ratio - ESG Controversies Score is week. For Consumer Cyclicals, week corelations are finded in relation with ESG Combined Score and Environmental Pillar Score.

Altman Z-score: Strong corelations between Altman Z-score and sustainability performance were founded in Basic Materials, Consumer Cyclicals and Technology domains, when ESG Combined Score was considerated.

In Utilities, Healthcare and Consumer Non-Cyclicals domains only weak correlation ware founded between liquidity rates, risk of of bankruptcy and sustainability performance. The weakest values for Pearson's correlation coefficients have been registred in Utilities domain.

In Industrials, Healthcare and Real Estate diomains Pearson's correlation coefficients cannot be computed because ESG Controversies Score is constant, recording the highest value of 100, indicating excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.

The strongest correlations between Liquidity Ratio and ESG scores have been registred in Technology domain. For this field, the same situation is also valid in the case of the relationship between Altman Z-score and sustainability performance.

Although all the companies for which the ESG scores were calculated have been analyzed, the non-compulsory character of these sustainability reports, prior to 2023, means that the number of these companies represents less than 6% of total number of companies listed on the emerging markets in the EU. Once these reports will be mandatory for an increasing number of companies, the analysis of these correlations will be much more relevant.

6. Conclusions

By performing the Pearson correlation between the liquidity ratios, Altman Z-score and the Environmental, Social, Governance, and ESG Controversies Scores, calculated for the companies traded on emergent EU markets during the period 2016-2022, in most cases a very weak link was found.

Takeing into consideration de industry domains, the situation has changed, strong correlations being recorded between liquidity ratios, Altman Z-score and sustainability performance in Technology domain, for which more detailed future research will be performed, in order to identify a regression model.

The strongest corelations was founded between Quick Ratio and Governance Pillar Score, for Real Estate domain while in Utilities domain seems that there is no relationship between analised variables.

The limitation of this study comes from the period, only 7 years, taking into consideration. The limited number of companies for which the ESG scores were calculated and the fact the sustainability performance scores were calculated by a third-party organization are another limitation factors.

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