

## Factors of ESG ratings assigned to commercial banks – the cultural and credit risk dimensions

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The purpose of the study was to examine the impact of cultural differences and credit ratings on the ESG (Environmental, Social, and Governance) scores assigned to commercial banks. The analysis was performed using ordered logistic regression. The Akaike information criterion (AIC) and the statistical significance of the explanatory variables were used as the method of comparing the models. Count  $R^2$  and adjusted count  $R^2$  were chosen as the measure of goodness of fit, but a non-diagonal element analysis of the contingency table was also performed. Based on the data of 330 banks from 50 countries the study proved that among all the clusters considered, the region with the highest ESG risk attributable to banks was the Arab countries, whereas regions with the lowest ESG risk were Western European and Nordic countries. Cultural variables found to influence ESG ratings were MAS (masculinity vs. femininity), PDI (power distance index), LTO (long-term orientation vs. short-term orientation), and UAI (uncertainty avoidance). In addition, a relationship between banks' ESG and credit ratings was observed, i.e. an increase in the average credit rating reduces the chance of classifying a bank as high or medium ESG risk vs. ESG low risk. This is the first study focused on binding the cultural characteristics of a given country with the results of ESG risk assessments of banks registered in this jurisdiction as well as assessing the relation between ESG and credit risks. This kind of clustering with the use of an econometric model allows for capturing the interrelationships of many factors simultaneously with full interpretability of the results. An added advantage was the excellent accuracy of the model, even though the maximisation of the predictive power was not the key aspect of the research.

**Keywords:** commercial bank, ESG, rating, cross-cultural analysis

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## 1. Introduction

Contemporary investment in financial markets requires the use of synthetic measures of risk, which can then be applied to select assets for a diversified investment portfolio. In the case of banks, they may be capital adequacy, liquidity, profitability or efficiency ratios, credit ratings, and measures of the credit portfolio's resistance to crisis (Bernardelli *et al.*, 2021; Korzeb and Niedziółka, 2020; Korzeb *et al.*, 2021) or ESG (Environmental, Social and Governance) ratings. The latter, due to dynamically changing climate policies and consideration of exposure and quality of ESG risk management by different stakeholders are becoming increasingly important, as demonstrated, among others, by the fact that in June 2020 the International Capital Market Association (ICMA) issued the Sustainability-Linked Bond Principles (ICMA, 2020). According to these rules, sustainability-linked bonds incentivise issuers to achieve externally verified objectives through e.g. SPT (Sustainability Performance Targets), the role of which can be played by ESG ratings (Singh and Vanzellotti, 2021).

The foundations of cross-cultural management, which takes into account cultural differences among countries, were laid by Hall (1959, 1976). Hall's work served as an inspiration for Hofstede (1980), who examined the relationship between cultural aspects and international business development. Hofstede identified four factors that differentiate national cultures and thus individual societies: (i) power distance, (ii) level of individualism/collectivism, (iii) uncertainty avoidance, (iv) masculinity (preference for success, assertiveness and material rewards)/femininity (cooperation, modesty, quality of life). Later studies (Hofstede and Bond, 1988; Hofstede *et al.*, 2010) added two further criteria in the form of orientation horizon (long-term versus short-term) and permissiveness versus restraint. On the basis of data from more than 50 countries Hofstede (1984) discussed how cultural differences affect the validity of management solutions connected with planning. Referring to the study from 2010 (Hofstede *et al.*, 2010) in the paper from 2011 (Hofstede, 2011) Hofstede presented conceptual and research efforts that preceded using its model of six dimensions which became the worldwide paradigm for comparing cultures. In the abovementioned paper (Hofstede, 2011), Hofstede stated that the defined dimensions depend on the level of aggregation.

The aim of this paper is to examine the association of cultural differences and external credit ratings with the level of ESG ratings assigned to commercial banks. The authors examined the impact on ESG ratings of such variables as adherence of a certain bank to the proposed cluster determined by cultural dimensions and the obtained credit ratings by individual banks. The sample consisted of data on ESG assessments given by Sustainalytics (330 banks from around 50 countries).

Based on the review of the studies dedicated to ESG issues, the hypothesis of a negative relationship between the average external credit rating of a bank and its ESG rating (i.e. the higher the credit risk, the higher the ESG risk due to assumptions

that the lower the credit risk, the higher the credit rating and the higher ESG rating, the higher ESG risk), as well as the significant impact of cultural dimensions on bank's ESG rating has been defined. The testing of the hypothesis formulated above fills an important research gap related to the question of how much only the individual characteristics of banks (reflected by their credit rating), and also how much the factors related to the specific culture of the jurisdiction in which these institutions operate, influence ESG ratings. This is important because cultural dimensions are largely beyond the influence of bank managers. This means, therefore, that under conditions characterised by the potential importance of cultural factors, the need arises for managers to undertake oversized ESG initiatives in regions with a high ESG risk in order for the final ESG rating to be satisfactory to different stakeholder groups.

The research used ordered logistic regression to model the relationship between the ESG rating category and the national cultures and individual characteristics such as credit rating, as well as the characteristics of the bank's geolocation. By using the fully interpretable econometric approach, it was possible to identify and explain the sociological and cultural determinants of ESG ratings. In addition, econometric modelling allowed for capturing the interrelationships of many factors at the same time. This kind of clustering with the use of an econometric model allows for capturing the interrelationships of many factors at the same time with full interpretability of the results. An added advantage is the excellent accuracy of the model, even though the maximisation of the predictive power was not the key aspect of the research.

To the best of the authors' knowledge, this study is the first attempt to combine the characteristics of a given country (cultural dimensions) with the ESG ratings of entities registered in this jurisdiction. This is also the first study on individual commercial banks globally, focusing not on the approximation of their ESG risk but the actual ESG ratings. Another aspect of the originality results from the concentration on the association of a bank's credit risk, as reflected in an averaged external rating with the ESG rating, as well as from basing the analysis on a sample of commercial banks located around the world. It uses individual ESG ratings derived from the standardised Sustainalytics methodology, which guarantees the comparability of assessments. This methodology also has an advantage over the ESG risk approximation (used for some previous studies), since for each bank it is based on the same set of published and unpublished data. The authors found it important to verify the impact of credit risk on the ESG rating as both the credit rating and the ESG rating are important decision parameters for individual and institutional capital market investors. A possible high correlation between the ESG risk and the credit risk will exacerbate the polarisation between demand for instruments with a high and low risk. The absence of a link between ESG risk and credit risk, or a negative correlation between the two, would in turn be a serious problem for decision-making algorithms. Investors would have to choose between meeting sustainability objectives

and keeping an acceptable level of credit risk. Yet, examining the impact of cultural factors on ESG ratings *de facto* raises the question of how much of a bank's ESG rating is the result of actions taken by the institution's managers and how much is due to exogenous causes beyond the managers' control.

The remainder of this article is structured as follows. Section 1 reviews the most significant literature. Section 2 describes the data and methodology employed in the empirical research. Section 3 presents the results that are discussed in Section 4. The final section of the article summarises and presents the main conclusions.

## 2. Literature review

Currently, one of the crucial problems is the comparability of ESG ratings. This is due to the different definitions of components constituting E, S, and G factors, as well as the relatively frequent modifications of various methodologies used by the ESG rating providers (Escrig-Olmedo *et al.*, 2019; Bilio *et al.*, 2020; Berg *et al.*, 2020; Krukowska, 2021). Hughes *et al.* (2021) compared MSCI ESG ratings resulting from the application of the traditional procedure with an Alternative AI-based set of ESG ratings. They prove that discrepancies between respective ratings are driven by differences in: ESG theorisation, data sources analysed, weighting structures, and controversy analysis. There are currently ten major ESG rating agencies, only five of which rate more than 5,000 companies. Their synthetic characteristics are shown in Table 1.

The data presented in Table 1 show that the assessments are based on various scales, information sources, indicators, determinant spectra, intervals and updates. The final ESG rating is also interpreted differently for each agency.

ESG risks are reflected in both ESG and credit ratings, albeit according to Kiesel and Lücke (2019), ESG factors are relatively occasional triggers of credit rating actions. Bearing in mind that within two years up to 2018, approximately 93% of the ESG related ratings actions on financial institutions made by S&P Global Ratings were negative, banks were actually forced to circumvent ESG risks or at least address them (Laidlaw, 2018).

ESG ratings are more and more popular due to the vast scope of their applications as well as the demand from various groups of stakeholders. Among others, one can distinguish the following potential ways of their utilisation in investment policies: industry tilts, the weighted average cost of capital (WACC) adjustments, smart beta ESG, best-in-class (BIC) strategies, screening techniques, thematic investing, and corporate engagement (Morrow and Burress, 2019). The ESG factor is a kind of cut-off criterion, *i.e.* assets with an unsatisfactory level of the ESG risk are eliminated from the investment process already at the outset, or this elimination takes place after adjusting the financial parameters for the ESG factor. In the latter case, however, there is no guarantee that the ESG criterion will be determinative. For this reason, it is necessary to examine the correlation between ESG assessment and financial

Table 1  
Leading ESG rating agencies

ESG rating agency	Rating scale and its interpretation	ESG rating interpretation	Number of rated entities	Frequency of the database update	Source of data
Sustainalytics	Scale from 0 up to 60 points (divided into 5 risk groups: negligible risk (<10); low risk (10-20); medium risk (20-30); high risk (30-40); severe risk (>40)).	Measurement of a company's exposure to industry-specific material ESG risks and how well a company is managing those risks	11,000	Daily	Public information and obtained directly from the rated entity
MSCI	Scale from 0 up to 10,000 points. Scores categorised in 7 ratings: from CCC (the highest risk) up to AAA (the lowest risk) divided into 3 risk groups (Laggard: CCC and B; Average: B.B., BBB and A; Leader: A.A. and AAA)	Measurement of a company's resilience to financially material environmental, societal and governance risks	13,500	Daily	Data from evaluated entities, databases (government, science, NGOs) and publicly available information in the media
Bloomberg ESG Disclosure Score	From 0 up to 100 points (0 is the highest risk; 100 is the lowest risk)	Measurement not of an ESG performance, but ESG transparency	11,500	Daily	Data from rated banks and ESG third-party providers
Thomson Reuter's ESG Scores	E, S and G indicators. The company groups the data into 10 categories: Commodity Consumption, Emissions, Innovation, Management, Stakeholders, CSR Strategy, Employees, Human Rights, Community, Product Responsibility	Measurement of a company's relative ESG performance across ten themes based on company reported data	6,000	Every 2 weeks	Solely public data
S&P Global Ratings ESG Evaluation	Scale from 0 up to 100 points (100 points confirms perfect ESG performance) Environmental, social and governance criteria scores for up to 30 focus areas across sub-industries; question-level scores covering 130 sustainability topics; and up to an additional 1,000 underlying data points per company	Measurement of financially material factors as those that may have a present or future impact on a company's value drivers, earnings capacity, competitive positioning, or long-term value for its shareholders and if those factors have a significant impact on society or the environment.	7,300	Annually	Data of the evaluated entity (sectoral questionnaire)

Source: own elaboration based on data available on the websites of ESG rating providers and Deloitte (2021).

standing. Only a positive correlation between these quantities gives grounds to conclude that high ESG risks will not be compensated by good financial standing. If such compensation were possible, the ESG factor might *de facto* cease to be an important decision criterion. Most studies find a correlation between ESG risk and financial risk. For example, Shakil *et al.* (2019), who analysed emerging market banks, indicated a positive association of emerging market banks' environmental and social performance with their financial standing, but the governance factor has not impacted on the financial performance. According to Tarmuji, Maelah and Tarmuji (2016), the reduction of S and G risks positively affects the company's performance (associated with client loyalty, employee satisfaction, financial measures and shareholder loyalty). The study by KPMG (2020) indicated that banks that do not prioritise ESG objectives run the risk of rating downgrades, increased cost of capital, and exclusion from global investor portfolios. Banks with high ESG ratings (reflecting low risk) have also been shown to be relatively more resilient to the effects of the COVID-19 crisis (Broadstock *et al.*, 2021). Jang *et al.* (2020) focused on the Korean bond market between 2010 and 2015 and found that ESG ratings reflect valuable information on the credit risk of issuers. Out of the ESG criteria, only environmental scores have an important impact on bond returns in the case of small companies. The higher the E scoring (lower ESG risk), the lower the cost of funding.

The ESG risk level is also negatively correlated with the company's value (Tampakoudis *et al.*, 2021). Miralles-Quirós *et al.* (2019) tested the impact of the bank's CSR (corporate social responsibility) activity on its SVC (shareholder value creation). The study focused on a sample of 166 banks from 31 countries, with the data sourced from the period 2010-2015. The results revealed a lack of homogeneity in the value relevance of ESG practices adopted by the analysed banks. In particular, the authors found a positive and significant relationship of banks' environmental and corporate governance performance with SVC, as well as a negative and significant correlation of banks' social scores and SVC. In the opinion of Miralles-Quirós *et al.*, financial stakeholders exert great pressure to incorporate environmental issues into the bank's management systems. Verga Matos *et al.* (2020) provided evidence that companies characterised by relatively high ESG performance (analysed holistically or each pillar separately) exhibit a more stable dividend payment. Bearing in mind that stable dividend policy contributes to the firm's value (*e.g.* Farrukh *et al.*, 2017), these conclusions are consistent with the results of a study conducted by Miralles-Quirós *et al.* It should also be mentioned that not all studies prove that a low ESG risk leads to increased company value. For example, Przychodzen *et al.* (2016) demonstrated that ESG performance indicators are used by mutual fund managers to mitigate the portfolio risk and motivated by herding, and do not play an important role in value creation. The stronger the intensity of taking into consideration ESG factors, the shorter the average forecasting horizon, and the higher the reliance on the business risk. These researchers also came to the conclusion that the propensity to include the ESG risk in the decision-making process is positively correlated with risk aversion.

However, there exist some results of studies devoted to the association between ESG and credit ratings that do not confirm statistically significant relations. For instance, Korzeb and Niedziółka (2021) reviewed ESG ratings assigned to Polish companies, and on the basis of the centile differential analysis proved a lack of convergence between credit ratings and ESG ratings, as well as between ESG ratings granted by Sustainalytics and MSCI.

A relatively rarely addressed topic is the ESG rating assigned to individual countries, and the reasons for the variation in these measures. This issue is a kind of bridge between the analysis of ESG risks and the areas and causes of differences between various groups of countries. The results of this type of study are particularly relevant in the context of the research problem defined in this article. Among the few studies within this field, the conclusions formulated by Pan (2021) come to the fore. The author compared the ESG performance of the ASEAN-6 countries using Sustainalytics' ESG ratings granted to entities registered in the above mentioned jurisdictions, finding that Thailand leads the ASEAN-6 countries in terms of average ESG performance, due to moderate ESG risk exposure and relatively good management. Vietnam and Indonesia are characterised by a higher unmanaged ESG risk due to lower risk management quality and relatively high exposure to ESG risk intensive industries. Pan also proved that ASEAN-6 entities on average report a higher ESG risk than their peers from Europe and North America.

In the field of studies on cultural differences between countries (groups of countries) and their impact on the guidance of international economic activity, apart from the results of Hall's research (mentioned in the introduction), the scientific achievements of Hofstede come to the fore.

Hofstede and Minkov (2014) analysed answers to 16 questions from 2005-2008 about personal values and values for children in 121 religious groups from 56 nations. Their study proved the predominance of national influence over the impact of global religions, which in turn allowed them to distinguish nationally homogeneous clusters of nominally different religious groups existing in the same country. Practical opportunities of using knowledge concerning cultural dimensions defined by Hofstede were presented by Subocz (2020). The distinctiveness of national cultures is formed over a long period under the influence of political, demographic, historical, geographical, and genetic factors. According to the above mentioned authors, each culture differs from others in the way it solves specific problems (linked to relations with people, the passage of time, and the relation to the environment). Taking into account the aforementioned criterion, seven dimensions constituting each culture can be distinguished: universalism–particularism, individualism–communitarianism, neutrality–emotionality, specificity–diffusivity, achievement–ascription; sequential time–synchronous time, and internal control–external control. House *et al.* (2004), on the basis of a sample of 17,300 managers from 61 countries, defined nine criteria for describing cultural differences between societies: (i) power distance, (ii) uncertainty avoidance, (iii) humanitarian orientation, (iv) institutional collectivism, (v) intra-

group collectivism, (vi) assertiveness, (vii) gender egalitarianism, (viii) future orientation, and (ix) performance orientation. The importance of values in defining cultural traits was addressed by Schwartz (1992, 1994, 1999, and 2006) and Schwartz *et al.* (2012). The key issue here was the content and structure of values. This means that different societies have specific types (sets) of values, which in turn leads to the ability to aggregate and compare groups of societies representing certain types of values. Mensah and Chen (2012), in reference to the original Globe cluster designed by House *et al.* (2004), implemented a multivariate discriminant analysis to examine observable attributes of the countries based on the following determinants: (i) racial/ethnic structure, (ii) religion distribution, (iii) geographic proximity of the analysed countries, (iv) language distribution; and (v) colonial heritage. Applying the above methodology, Mensah and Chen classified the studied countries into ten cultural clusters. Based on the concept of cultural clusters, the issue of the impact of cultural differences on the success of investment projects in the Polish banking sector was addressed by Korzeb (2021).

The ESG studies described above are primarily focused on the application of ESG ratings and their impact on different types of characteristics of the rated entities. In this context, the key question remains as to the determinants of these ESG ratings.

As far as the financial and governance factors are concerned, the results of the research conducted so far indicate that ESG ratings are affected by the following variables: the company's size and its resources for providing ESG data (Drempetic *et al.*, 2020) and internationalisation (Khalid *et al.*, 2021). Based on the sample of 727 financial companies from 22 countries within the period 2006-2017, Crespi and Migliavacca (2020) analysed determinants of ESG ratings of financial institutions. They proved that ESG ratings are subject to improvement on a linear trend over time, and this tendency is enhanced by the size and profitability of the analysed entities. Additionally, the level of economic and social development of the country in which a financial institution conducts its operation is the determinant of ESG assessment. According to the aforementioned authors, environmental, social and governance components follow independent patterns. The positive impact of the financial performance of the company on its ESG risk was confirmed by Buallay (2019). Limiting their investigation to banks, Chih (2014) and Ciciretti *et al.* (2014) arrived at the conclusion that the better the financial standing of the financial institution, the higher the ESG rating (lower ESG risk). One should also add that US banks managing environmental risks effectively were relatively less affected during the subprime crisis (Cornett *et al.*, 2016). According to Koo and Ki (2020), effective internal control (IC) has a positive effect on the ESG rating; however, not only the way the internal control system is designed impacts ESG risk management quality. The crucial role belongs to the IC personnel, their length of service and accounting experience. Del Giudice and Rigamonti (2020) asked whether companies with ESG reporting audited by an independent body show a higher quality of ESG risks management, and found that even after the disclosure of irregularities or scandals in



the audited company, ESG ratings remain stable, but only if the ESG reports were previously independently audited. In turn, Romano *et al.* (2020) investigated how the gender composition of Boards of Directors (reflected by Blau's index) affects the sustainability risk management approximated by the Bloomberg ESG index. The empirical study based on a sample of 128 observations from Mercato Telematico Azionario indicated that greater gender diversity has a positive influence on ESG scoring. Birindelli *et al.* (2018) applied the fixed effects of panel regression models to analyse a sample of 108 listed European and U.S. banks and data for the period 2011-2016. The study found that the composition of an entity's board of directors (*e.g.* percentage of female directors, size) and the model of management (frequency of meetings, independence, existence of the CSR committee) can influence its ESG performance. The empirical study concluded that the relation between female directors and ESG scoring takes the form of an inverted U-shape. ESG ratings in banks increase in line with a board's size and are higher in institutions having CSR committees.

To date, relatively little research has been conducted on the impact of cultural factors and cultural differences on CSR and ESG. Prominent among them are the conclusions formulated by Halkos and Skouloudis (2016), who analysed the influence of national culture on CSR. For this purpose they estimated national CSR penetration and provided evidence on the impact of cultural specificity (approximated by Hofstede's model) on the implementation of CSR standards in national business industries. The authors found that the following dimensions: long-term versus short-term orientation, indulgence versus restraint, affect positively the CSR index, while the impact of uncertainty avoidance has a negative nature. Moreover, the impact of cultural dimensions on the Dow Jones Sustainability Index for the companies making up the S&P Global 1200 was examined by Peng *et al.* (2012), who proved a causal relationship between national culture specificity and CSR. In particular, they uncovered evidence of a negative relation between CSR and PDI (power distance), MAS (masculinity vs. femininity) as well as UAI (uncertainty avoidance) dimensions, while indicating the positive impact of IDV (individualism vs. collectivism) on doing business in a socially responsible manner. Yet, Ho *et al.* (2012) reached the opposite conclusions (only IDV's positive impact on CSR). In addition, the quality of integrated reporting is related to cultural aspects. On the basis of six Globe cultural dimensions, Raimo *et al.* (2019) found that assertiveness, institutional collectivism, uncertainty, avoidance and humane orientation are positively associated to the integrated reporting quality (*i.e.* reporting presenting the holistic picture of the organisation) while performance orientation and future orientation are characterised by negative relation. The impact of culture on corporate social reporting is also investigated by Haniffa and Cooke (2005). Mukherjee and Roy (2022) investigated the influence of country-level informal institutions on corporate ESG disclosures, and found significant relations between different Hofstede measures of national culture and corporate ESG disclosures. The impact of cultural measures on environ-

mental disclosures was analysed by Pucheta-Martínez and Gallego-Álvarez (2020), who suggested that companies from countries with individualist, masculine and indulgent cultures are less likely to disclose environmental information, while cultures with a long-term orientation discourage the reporting of environmental information.

Given the vast number of studies, some of which are highlighted in this article (e.g. Buallay, 2019; Chih, 2014; Ciciretti *et al.*, 2014; Halkos and Skouloudis, 2016 and Roy and Mukherjee, 2022), the study formed the hypothesis of a negative relationship between the average external credit rating of a bank and its ESG rating as well as a significant impact of cultural dimensions on bank's ESG rating.

While ESG is a broad assessment of a bank's commitment to sustainability and other values, CSR is rather an internal commitment. Nevertheless, valuable CSR initiatives should result in good ESG performance. Given the above, the particular inspiration of this study derived from the research conducted by Halkos and Skouloudis (2016), who analysed CSR at the macro level, and found that national CSR penetration is a dynamic and multilevel process involving companies, sectors and the national environment. The national CSR index is composed, among others, of non-financial accounting and reporting standards (Global Reporting Initiative, Carbon Disclosure Project, Greenhouse Gas Protocol), overarching principles and business-led conditions (Global Compact, World Business Council for Sustainable Development) as well as management system standards (ISO 14001, OHSAS 18001 and SA 8000). The demonstration by these authors of the impact of cultural dimensions on the national CSR index and semantic proximity of the concepts of CSR and ESG gave rise to the part of the hypothesis stating that cultural differences (approximated by Hofstede's cultural dimensions and analysed on the region's level) have an influence on the ESG ratings of commercial banks. Additionally, due to the limitation of the considerations given to the commercial bank sector, the adoption of an individual ESG rating instead of the national CSR index as an explanatory variable, as well as the dissimilarity of the results obtained by Peng *et al.* (2012) and Ho *et al.* (2012), this part of the hypothesis does not specify which cultural dimensions may prove to be relevant, nor does it indicate the potential direction of their impact.

### 3. Data and methodology

The authors compared the ESG performance of banks leveraging Sustainalytics' ESG Risk Ratings as of 30 June 2021 (Sustainalytics, 2021). These ratings were categorised across three levels: low risk (< 20 points), medium risk (20 – 30) points), and high risk ( $\geq$  30 points). The Sustainalytics decomposition includes two additional categories: negligible risks (< 10 points) and severe risks (> 40 points). Due to only 12 observations in the negligible risk group, the groups designated by Sustainalytics as 'negligible' and 'low risk' were combined into a group called 'low risk'. As there were no banks in the sample with ESG ratings higher than 40 points, the groups

designated by Sustainalytics as ‘high’ and ‘severe risk’ were combined and designated in the article as ‘high risk’. In view of these differences between the ESG ratings of individual ESG rating agencies and the fact that a company usually has a single ESG rating (the databases of ESG rating agencies do not overlap), the decision to issue a single ESG rating was taken in this study. Sustainalytics was chosen due to the availability of a broad and complete database, its daily updating frequency, as well as Sustainalytics using both publicly available data and information obtained directly from the rated bank.

The study was based on 351 scores out of 1,057 ESG ratings assigned by Sustainalytics. The sample covered all assessments published by the ESG rating agency. The ESG risk rating is a result of taking into consideration two aspects of the ESG risk, *i.e.* ESG risk exposure and ESG risk management quality. The management component is affected by the assessed entity’s commitments and actions to show how the financial institution approaches and manages the ESG risk to which it is exposed (Pan, 2021). In order to determine the impact of cultural differences on the application of the best ESG practices by banks, they were categorised according to the geographic and cultural criteria (Table 2).

Table 2

Selected banks categorised according to the geographical and cultural criterion

Group	Country	Number of banks
1	2	3
A – English-speaking countries	Australia	7
	Canada total	11
	Ireland	3
	South Africa <sup>1)</sup>	5
	Great Britain	12
	United States	50
B – Western European countries	Austria	7
	Belgium Flemish (Dutch speaking) <sup>2)</sup>	1
	Belgium Walloon (French speaking)	2
	France	12
	Germany	20
	Luxembourg	1
	Netherlands	10
	Switzerland	2
C – Mediterranean countries	Greece	3
	Israel	4
	Italy	8
	Portugal	1
	Spain	10
	Turkey	6

Table 2, cont.

1	2	3
D – Nordic countries	Denmark	4
	Finland	4
	Iceland	2
	Norway	8
	Sweden	6
E – CEE countries	Czech Republic	2
	Hungary	1
	Poland	5
	Russia	2
F – America C/S /Latin America/	Brazil	4
	Chile	3
	Colombia	1
	Mexico	2
	Peru	1
	Puerto Rico	1
	G – Confucian Asia countries	China
	Hong Kong	3
	Japan	21
	Singapore	3
	South Korea	8
	Taiwan	12
H – Southern Asia countries	India	10
	Indonesia	5
	Malaysia	8
	Philippines	4
	Thailand	5
I – Arab countries	Egypt	1
	Kuwait	4
	Qatar	5
	Saudi Arabia	10
	United Arab Emirates	5
Total		351

<sup>1)</sup> In the case of South Africa, the scores for the white population were assumed for the calculations. The majority of the population is Black African, and their scores may be very different from those presented above.

<sup>2)</sup> In the case of Belgium the criterion for the distinction between Belgium Flemish (Dutch-speaking) and Belgium Walloon (French speaking) was the location of the bank's head office.

Source: own elaboration.

The proposed classification of individual countries into the above mentioned groups differs slightly from the Hofstede and GLOBE studies. Firstly, France was classified in cluster B – Western European countries. In the authors' opinion, the

culture of French banking corporations is more similar to Western European countries than to the Mediterranean ones. Secondly, Greece, Israel and Turkey were classified in cluster C – Mediterranean countries due to the fact that the contemporary specifics of their organisational culture are more similar to this group than to others (*e.g.* in the GLOBE project, Greece was assigned to the Eastern European cluster, Israel to the European Latin countries and Turkey to the Middle East, respectively). This type of approach, including France in the group of Western countries, is quite often used in the scientific literature (Schwartz, 2004).

Table 3  
Selected diagnostic variables

Selected diagnostic variables	Description
Credit rating	
The average credit rating assigned by the Big Three (Standard & Poor's, Moody's and Fitch Ratings) – A_RAT	Analogous ratings in the scales used by Standard & Poor's, Moody's and Fitch Ratings were assigned weights from 1 to 21 (1 is the highest, and 21 is the lowest risk). Then, weights were determined for all ratings assigned to individual banks. An arithmetic mean was taken from the sum of the weights. Long-term international issuer ratings were taken into account. In their absence, long-term national (local currency) issuer ratings, possibly adjusted to sovereign rating (country ceiling rule) or long-term international ratings of parent companies of the analysed banks.
Cultural variables <sup>1)</sup>	
Individualism vs. collectivism – IDV	The degree of individualism as opposed to the integration into strong and cohesive groups
Uncertainty avoidance – UAI	The extent to which the members of a culture feel threatened by ambiguous or unknown situations
Masculinity vs. femininity – MAS	The degree of preference for achievement, heroism, assertiveness, and material rewards
Power distance – PDI	The degree of acceptance of the unequal distribution of power
Long-term vs. short-term orientation – LTO	The choice of focus of people's efforts
Indulgence vs. restraint – IND	Gratification vs. control of basic human desires regarding the enjoyment of life
Geographical and cultural criterion	
A – English-speaking countries	Dummy variables including a breakdown of analysed banks according to geographical and cultural criteria (a detailed breakdown of individual countries is presented in Table 2). The value one means belonging to a given region, and zero otherwise.
B – Western European countries	
C – Mediterranean countries	
D – Nordic countries	
E – CEE countries	
F – America C/S /Latin America	
G – Confucian Asia countries	
H – Southern Asia countries	
I – Arab countries	

<sup>1)</sup> All the Hofstede variables range between 0 and 112.

The quantified ESG risk category (in fact defined by the dispersion of ESG ratings) was taken as the explained variable. The used explanatory variables are the average credit ratings granted by the Big Three (Standard & Poor's, Moody's and Fitch Ratings) and the Hofstede rankings: IDV, UAI, MAS, PDI, LTO (long-term orientation vs. short-term orientation), and IND (indulgence vs. restraint), as well as the dummy variables denoting membership in the respective region (A-I) (Table 3).

In the case of 21 banks, the required data on credit ratings (LT foreign credit rating assigned by at least one of the agencies constituting the Big Three) was not available. These banks were excluded from the sample. The remaining 330 banks were classified according to the ESG risk into three categories (Figure 1).

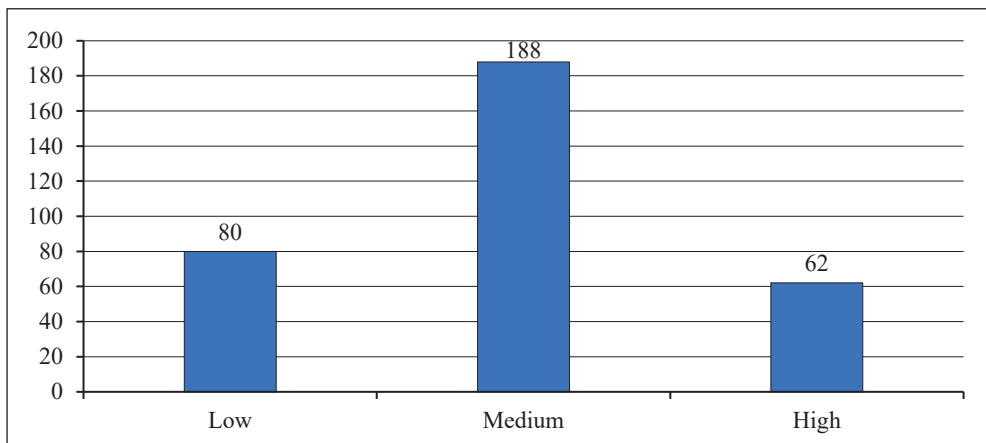


Fig. 1. Analysed banks according to ESG risk categories

Source: own elaboration.

In the authors' opinion, the level of endogeneity between the average credit rating and the ESG rating (or G component of ESG rating) is not significant, also due to the fact that Sustainalytics and the Big Three agencies belong to different corporate groups (precluding the possibility of using exactly the same ESG risk estimation methodology for ESG ratings and credit ratings), the different context in which ESG is addressed (Sustainalytics ratings take into account direct exposure and quality of management, credit ratings assess the impact of ESG risks faced by a bank's customers on the quality of the bank's loan and investment portfolio), the likely (judging by the stage at which ESG risks are factored into the credit rating algorithm) limited impact of ESG factor adjustments to the initial credit rating and the relatively late (second half of 2021), and the not rigidly framed consideration of ESG risks in credit rating methodologies. The lack of significant endogeneity is also evidenced by the lack of correlation between averaged credit ratings and specific ESG rating values (a relationship was only identified at a higher level of data aggregation).

The basic descriptive statistics for the explanatory variables are presented in Table 4. The highest average credit ranking undeniably belongs to the banks from the Nordic countries; the average for all banks from the region is 17.48. In contrast, for the Mediterranean countries the average is only 11.51. Data about IDV are quite polarised: the lowest values ( $\leq 48$ ) can be observed for Southern Asia and Confucian Asia countries and the highest for English-speaking countries ( $\geq 65$ ). The range for UAI values is wide: from 8 to 112, but half of the considered banks have their score not higher than 53, with only 25% over 75. MAS for the Nordic region ranges between 5 and 26 (the best score), and for Confucian Asia countries between 39 and 95 (the lowest core). The highest values of PDI are observable for banks in Asian countries (54-104). These are the values above the median for all banks. To compare, for banks from the Western European countries the indices scores are in the range of 11-68, but for 73% of them they are not higher than 40. LTO is very diverse from the regional point of view: English-speaking countries are at the bottom of the ranking (indices from 21 to 51), whereas Confucian Asia countries are in the upper part (scores 61-100). In terms of IND, the lowest indices are for banks from Confucian Asia countries (17-49). A quarter of banks have an index of not more than 40. On the other end of the scale are banks from Latin America (indices 46-97), and for banks in English-speaking countries the ratings are between 63 and 71.

Table 4  
The basic descriptive statistics for selected diagnostic variables

Specification	Min.	Q1	Median	Mean	Q3	Max.
A_RAT	5	13.00	15	14.76026	16.50	21
IDV	13	37.00	63	56.95455	80.00	91
UAI	8	46.00	53	58.72121	75.00	112
MAS	5	45.00	62	55.44848	66.00	95
PDI	11	38.25	54	54.10909	68.00	104
LTO	13	35.00	51	54.39394	83.00	100
IND	24	40.00	52	51.38182	68.00	97

Source: own elaboration.

In the empirical analysis, the ESG risk category was chosen as an explained variable. There are three ESG risk categories, therefore from the wide range of models for categorical variables ordered logistic regression was chosen, which is a generalisation of logistic regression to more than two possible discrete outcomes. Note that the word 'ordered' refers to the situation where the values of the dependent variable are ordered.

For three possible outcomes, the model can be formulated in the following form:

$$P(Y = Low) = \frac{1}{1 + \exp(Z_i - \kappa_1)}, \quad (1)$$

$$P(Y = Medium) = \frac{1}{1 + \exp(Z_i - \kappa_2)} - \frac{1}{1 + \exp(Z_i - \kappa_1)}, \quad (2)$$

$$P(Y = High) = \frac{1}{1 + \exp(Z_i - \kappa_2)}, \quad (3)$$

where  $\kappa_1$  and  $\kappa_2$  are the cut-off terms and

$$Z_i = \sum_{k=1}^K \beta_k X_k \quad (4)$$

is the linear combination of the  $K$  explanatory variables. In this paper, the explained variable  $Y$  is the ESG risk category. The key advantage of the ordered logistic regression as a solution method is the possibility of taking into account the influence of many factors at the same time. The popular one-way ANOVA allows for considerations for one predictor variable only. The second superiority over the other econometric models is that the information contained in the ordering of the ESG risk categories is not lost. The third advantage of using the ordered logistic regression is its full interpretability, in contrast to machine learning black-box models such as artificial neural networks.

Many explanatory variable combinations are possible. To best address the purpose of the study, the stepwise elimination of variables with the Akaike Information Criterion (AIC) as the optimisation criterion was used. The second criterion in the model selection took into account the statistical significance of the variables. As a measure of the goodness of fit, count  $R^2$  and adjusted count  $R^2$  were chosen, but the analysis of the off-diagonal elements of the contingency table was also carried out.

The proportional odds assumption (or the parallel regression assumption) underlies the foundation of the applicability of the ordered logistic regression. It provides information about the constant relationship between each pair of outcome categories. There are some statistical tests evaluating the proportional odds assumption, although they are often criticised for being too inclined to reject the null hypothesis (Harrell, 2001). Fortunately, this is not the case with the model under consideration. At the significance level of 0.05, the overall Brant test suggests (p-value = 0.08) that parallel regression assumptions are met.

The study applied Hofstede's dimensions, despite the existing criticism of his methodology. For example, McSweeney (2002) noted the obsolescence of the survey results, questioned the survey as a research technique, the results determined from



the responses of respondents employed by a single company, and the generalisability of the conclusions to entire countries, and doubted whether entire nations are the appropriate categories for studying cultural differences. It should be noted, however, that most of these doubts were not confirmed in later replications of his study (Eringa *et al.*, 2015). Despite these objections, Hofstede's model is by far the most widely used in the international academic research literature, and its dimensions have become a standard tool for measuring and comparing cultural differences (Breuer *et al.*, 2018). It is also important to note that research in the field of the banking sector relies heavily on Hofstede's continuously refined cultural model (Ahunov and van Hove, 2020; Zhang and Weng, 2018; Ashraf *et al.*, 2016). To test the relations between the ESG risk in the analysed banks and data from the Hofstede set, a comparison was made with selected counterparts from the GLOBE set.

#### 4. Results

The values of the estimated coefficients of the final model, together with the standard errors, t-values, p-values, and odds ratios, are given in Table 5. All the explanatory variables used in this model turned out to be statistically significant (at the significance level of 0.05). In the case of the dummy variables denoting belonging

Table 5  
Estimations results

Variable	Value	Std. Error	t-value	p-value	Odds ratio
A_RAT	-0.2913	0.0539	-5.4037	6.5270e-08 ***	0.7473
UAI	-0.0268	0.0082	-3.2531	1.1416e-03 ***	0.9735
MAS	0.0253	0.0091	2.7653	5.6874e-03 ***	1.0256
PDI	-0.0280	0.0121	2.3086	2.0968e-02 ***	0.9724
LTO	-0.0483	0.0101	-4.7903	1.6657e-06 ***	0.9528
is_A	-4.3210	0.8275	-5.2218	1.7720e-07 ***	0.0133
is_B	-2.7445	0.5580	-4.9184	8.7241e-07 ***	0.0643
is_C	-3.5903	0.6993	-5.1340	2.8366e-07 ***	0.0276
is_D	-2.7956	1.0541	-2.6521	7.9986e-03 ***	0.0611
is_E	-3.0268	0.9007	-3.3607	7.7757e-04 ***	0.0485
is_F	-3.4239	0.9508	-3.6010	3.1705e-04 ***	0.0326
is_H	-4.3774	0.6526	-6.7076	1.9778e-11 ***	0.0126
Low Medium Intercept	-10.0817	1.9252			
Medium High Intercept	-6.0035	1.8664			

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Source: own elaboration.

to the appropriate region, the Arab Countries region was considered the reference category. Banks from all the regions in the model were considered less risky than those from the Arab countries region. An increase in MAS by a unit translates, on average, *ceteris paribus*, into the growth of the odds of being assigned to the high risk ESG group by 1.03 relative to the probability of being qualified to the low or medium risk ESG group. A rise in UAI or PDI, respectively, by a unit, *ceteris paribus*, results in less than a 3% decrease in the chance of a bank being considered moderately or very risky according to the ESG classification, relative to the chance of being classified in the least ESG risk group. In contrast, the ‘chance drop’ for LTO is about 5%. The important variable is the average credit rating A\_RAT. An increase in the average credit rating by one unit, *ceteris paribus*, reduces the chance of classifying a bank as high or medium risk vs. low risk by about 25%.

The results of the ordered logistic regression model are given as the set of probabilities of belonging to the given ESG risk category. The category with the maximum probability is treated as the proper one. The goodness of fit of the model can be assessed based on the comparison of the actual values and the values predicted by the model called the contingency table (Table 6). The percentage of correctly predicted values, known as count  $R^2$ , turns out to be as high as 83.74, while the adjusted count  $R^2$  was equal to 53.47. What is more, the off-diagonal elements corresponding to the Low-High and High-Low relations, were equal only to 1 and 0, respectively. This means that the model predicts in almost every case at most one, not two, category lower or higher. Therefore, the predictive ability of the model, given its used type, should be considered very satisfactory.

Table 6  
The contingency table

Specification		Anticipated		
		Low	Medium	High
Actual	Low	41	38	1
	Medium	15	163	10
	High	0	24	38

Source: own elaboration.

In the case of the zero-one variables denoting membership in the relevant region, the Arab countries were taken as the reference category, which was primarily driven by the previous research on this area. Although the concept of ESG is deeply rooted in Islamic economics and investment ethics, Islamic banks focus mainly on the social dimension in their operations (Malin *et al.*, 2014). Paltrinieri *et al.* (2020) came to similar conclusions. They claim that this finding may be due to the sensitivity of

Islamic finance institutions to the social dimension of their activity, especially towards employment quality, health, safety, training, diversity and human rights indicators in the social pillar. At the same time, they do not see such a link between the dimensions of the governance pillar and the environmental pillar. Banks from all regions included in the model are considered less risky than those from the Arab states, according to the reference category (Figure 2).

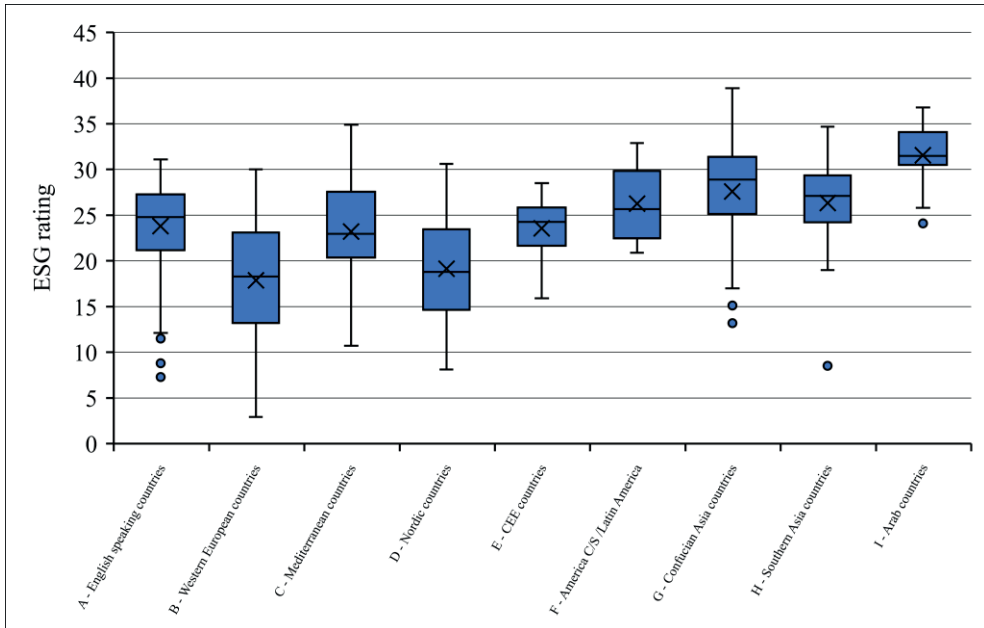


Fig. 2. ESG rating in banks analysed by region

Source: own elaboration.

However, the regions with the lowest ESG risk in banks turned out to be clusters B (Western European countries) and D (Nordic countries).

Moreover, the chance of a bank belonging to a high ESG risk group was lower, *ceteris paribus*, by about 94-99% depending on the region, than the chance of being assigned to a low or medium ESG risk group. An increase in the average credit rating by a notch, *ceteris paribus*, reduces the chance of a bank being classified as very risky or with medium risk vs. low risk by about 25%.

In order to examine the relationship between the ESG risk of the analysed banks and cultural dimensions based on Hofstede's findings, Spearman's rank correlation coefficients between the ESG rating and variables from the GLOBE set were additionally determined (Table 7).

Table 7

Spearman's rank correlation coefficients between the ESG rating and variables from the GLOBE set

Hofstede	The equivalent in the GLOBE set	Spearman's correlation coefficient $\rho$	p-value
LTO	Future Orientation Societal Practices	-0.18	0.00147
UAI	Uncertainty Avoidance Societal Practices	-0.12	0.03958
PDI	Power Distance Societal Practices	-0.01	0.81630
MAS	Assertiveness Societal Values	0.49	< 2.2e-16

Source: own elaboration.

While the correlation for peers of LTO and UAI should be considered weak and for PDI the relationship was even statistically insignificant, the directions of the relationship were confirmed by the results of modelling using the Hofstede set. The strength of Spearman's correlation between the ESG rating and Assertiveness Societal Values can be considered average ( $\rho = 0.49$ ).

## 5. Discussion

The study results indicate that an increase in MAS is positively correlated with being assigned to the high risk ESG group vs. low or medium risk ESG group. In contrast, there is a negative correlation in the case of PDI, UAI and LTO. The MAS variable indicates that the augmentation of masculinity in a culture characterised by high competition, success-oriented activities, assertiveness, and materialism increases the ESG risk. The situation is different in feminist cultures (*e.g.* Scandinavian countries, the Netherlands) reflected by low values in this cultural dimension. The emphasis on the quality of life, cooperation, concern for other members of society, respect for interpersonal relationships and attitudes aimed at solving problems through negotiation and compromise are undoubtedly attributes conducive to developing ESG issues and creating awareness of ESG risk among bank customers. Hofstede *et al.* (2010) note that "the masculinity-femininity dimension affects priorities in the area of protection of the environment versus economic growth".

The presented results are consistent with previously conducted studies (Trivedi *et al.*, 2019; Elwell and Williams, 2016; Rico, 1998). For example, the OECD (2020) report highlighted that "attitudes about the environment vary by gender. (...) Women's responses suggest they are more environmentally motivated (*e.g.* willing to make compromises that benefit the environment) than men, in the all countries surveyed. Women are also less skeptical about the importance of environmental issues." Chwialkowska *et al.* (2020) added that "the egalitarian human-nature relationship, which is associated with femininity, emphasises the need for collaboration with nature and the preservation of the environment." An inverse relationship exists for

PDI which shows the extent to which individuals accept and perceive social inequality. High values of the achieved indicator signifying authoritarian rule and hierarchical society have a negative impact on the ESG risk. Countries that show a low power distance index (Austria, Denmark, Ireland, and Scandinavian countries) are more democratic and inclined to public consultation. Thus, the relationship between decision makers and subordinates is more pragmatic in nature. The fact that the inhabitants of countries with a small power distance are not only responsible for, and often take action for the sake of their habitat, but also show a socially active attitude, is quite symptomatic. These results coincide with those of Park *et al.* (2007), who also found that power distance is significantly and negatively related to the Environmental Sustainability Index (ESI). Other studies (Lahuerta-Otero & González-Bravo, 2018; Cox *et al.*, 2011) also highlight the relationship reached between PDI and ESG. Negative relations occur also in the case of LTO and UAI, in both of which an increase in the value of the indicators lowers the ESG risk. The essence of the LTO indicator is the same as the objectives of sustainable development, namely a focus on forward-looking goals, resource efficiency, prevention, etc. Not surprisingly, in societies characterised by the highest rates of long-term orientation (China, Hong Kong, Taiwan, Japan, Korea South, and India) people are patient in waiting for results that may only appear in the distant future. Hofstede *et al.* (2010) concluded that “responsible thinking about the long term cannot avoid the conclusion that in a finite world, any growth has its limits (...).”

The most obvious area where this applies is the environment. Climate change through global warming, water shortages, and radioactive waste deposits provide examples of the environmental costs of unbridled growth, with which good government should take issue.” Previous studies (Dangelico *et al.*, 2020; Durach and Wiengarten, 2017; Petruzzella *et al.*, 2017; Milfont *et al.*, 2012) also indicated the positive impact of the long-term orientation index on ESG components. The relation between the ESG risk in the banks analysed and UAI is only seemingly surprising, because uncertainty avoidance is a manifestation of the threat felt by members of a culture when faced with new, unknown or uncertain situations. This feeling is expressed, among other things, by stress and the need for predictability, which can be satisfied by stable law, regulations and customs. High values of this indicator are recorded in Mediterranean countries (Greece, Portugal) and the countries of Central and Eastern Europe (Poland, Russia). It should be noted, however, that this dimension, which determines the extent to which citizens are willing to accept uncertainty, is reflected in the need for predictability, which can be satisfied by regulations and law. The strong emotional need to frame everything, the need to formalise and clarify all actions is the result of perceiving change as a threat, and a sense of security is an important factor of individual motivation to act. Thus, for example, citizens in societies characterised by high uncertainty avoidance rates pay attention to environmental protection, healthy food, etc. Dangelico *et al.* (2020) explained such

a relationship by the fact that the deterioration of the natural environment can lead to unknown situations, linked for instance to climate change, extreme weather events, and a high level of pollution. Thus, societies characterised by higher uncertainty avoidance tend to protect the natural environment to have stable environmental health conditions, hence they wish to avoid the unknown effects of environmental degradation. Currently conducted studies are inconclusive in assessing the impact of UAI on ESG performance. On the one hand, Kumar *et al.* (2019) indicated that high uncertainty avoidance shows positive behaviour toward environmental performance, whereas according to Onel and Mukherjee (2014), when the level of uncertainty avoidance of a country was high, the environmental health of that country was also high. In contrast, others (Pink, 2018; Tsoy and Yongqiang, 2016) indicated a different situation, consistent with the results of the presented study, while others (Nagy and Konyha, 2019) showed no significant effect of this feature on ESG.

Roughly 90% of studies find a nonnegative relation between ESG and financial performance. The majority of studies obtained positive findings (Friede *et al.* 2015). This study shows a positive correlation between credit risk and ESG risk, which is reflected by the impact of the improvement of credit rating on the reduction of the chance of classifying a bank as high or medium risk vs. low risk. Many researchers suggest that a reduction in ESG risk brings a decrease in credit risk. For instance, Aslan *et al.* (2021), verifying the relationship between environmental, social and governance (ESG) performance and the probability of corporate credit default, found the probability of corporate credit default to be significantly lower for firms with high ESG performance. Devalle *et al.* (2017) suggested that the ESG risk, especially concerning social and governance metrics, meaningfully affects credit ratings. In turn, Korzeb and Niedziółka (2021) saw no association between credit and ESG ratings, whilst according to El Khoury *et al.* (2021), the banks' level of ESG ratings (the higher rating, the lower ESG risk) are negatively affected by performance and positively by their size.

The positive association between credit rating and ESG performance can be explained by the fact that the impact of ESG risk on credit risk is taken into account in the credit assessment processes, which ultimately affects the quality of credit portfolios (including their resilience to the materialisation of ESG risks and its impact on customer standing). In turn, the quality of the loan portfolios has a direct impact on the bank's credit rating. For banks, ESG risk management is of a dual nature. On the one hand, it concerns the bank's day-to-day business, i.e. the direct impact on the implementation of the Sustainable Development Goals (SDGs), and on the other the indirect impact of the SDGs through the integration of ESG criteria into lending and investment policy. The latter is far more important for the ESG rating criteria for a bank.

## Conclusion

This study demonstrated that among all the clusters considered, the region with the highest ESG risk attributable to banks is the Arab countries, and at the other end there are banks from Western European and Nordic countries. It seems that the results achieved in terms of the prevalence of European banks were primarily due to the actions of the European Union itself. On the basis of the European Green Deal, the EU has made a number of ambitious commitments, in particular to become the first climate-neutral continent by 2050. The increasing number of regulations in this area, the gradual reorientation of financial support towards sustainable investments and a low-carbon, climate-resilient economy, as well as societal pressures, contribute to the systematic increase in the importance of sustainability for banks' activities. Recent years have also clearly confirmed the emergence of a new trend, whereby investors, lenders and asset managers in Europe expect banks to actually act appropriately to environmental, social and corporate governance aspects. In contrast, the weakest performance in the survey was achieved by banks belonging to Arab countries. The main reason for this seems to be the subordination of their philosophy to mainly social objectives. El-Zein *et al.* (2014) also stressed that "the Arab world faces large-scale threats to its sustainable development and, most of all, to the viability and existence of the ecological systems for its human settlements. The dynamics of population change, ecological degradation, and resource scarcity, and development policies and practices, all occurring in complex and highly unstable geopolitical and economic environments, are fostering the poor prospects." At the same time, the chance of a bank belonging to a high ESG risk group is lower, *ceteris paribus*, by about 94-99% depending on the region, than the chance of being assigned to a low or medium ESG risk group.

The results of the conducted analysis also prove that ESG risk is linked to the credit risk reflected in the external credit rating (the average of the Big Three long-term foreign currency ratings), as evidenced by the fact that a single notch credit rating improvement reduces the chance of a bank being classified in the high or medium ESG risk group compared to being assigned to the low ESG risk group by approximately 25%.

The study also proved the relationship between ESG ratings and cultural dimensions of the analysed countries, as defined by Hofstede. The augmentation of the MAS variable increases the chance that a bank operating in a given country will be included in a high ESG risk cluster relative to the option of moving to low and medium risk clusters. On the other hand, in the case of the PDI, UAI and LTO variables, a rise of the value of each of the above-mentioned variables separately (*ceteris paribus*) by one unit results in a decreased chance of assigning the bank to a group of medium or high ESG risk.

To the best of the authors' knowledge, this study is the first attempt to find links between the ESG risk, the credit risk of the evaluated bank and cultural variables

characterising the jurisdiction in which this bank is registered. The inclusion of the cultural factor among the determinants of the ESG risk of financial institutions, reflected in their ESG ratings, and thus the identification of exogenous (beyond the control of key stakeholder groups) causes of changes in ESG ratings is, in the authors' opinion, an important theoretical contribution. The proposed methodology for investigating the relation between the credit risk and the ESG risk, based on the search for the relations between the averaged external rating and the ESG risk category (low-medium-high), should also be considered as such. Originality also lies in the fact that the survey covered a relatively broad spectrum of institutions and countries. Furthermore, econometric modelling allows for capturing the interrelationships of many factors at the same time. This kind of clustering with the use of the econometric model is innovative in this subject. An added advantage is the excellent accuracy of the model, even though the maximisation of the predictive power was not the key aspect of the research.

Nevertheless, some limitations can be identified in relation to the results achieved. Firstly, ESG ratings from a leading, but just one agency, were taken into account. To address this issue, it is planned in the future to carry out a similar study based on data from other providers of ESG ratings and find out whether the relations proved for Sustainalytics are valid also for other ESG rating methodologies. Secondly, only disclosed ratings were included, which represent about one-third of all the ESG ratings assigned by Sustainalytics. Thirdly, some of the rated banks did not have a long-term foreign currency rating, which made it necessary to approximate the credit risk by other ratings. However, it is significant that not all banks with an ESG rating have a credit rating. This demonstrates the growing importance of ESG ratings. Finally, the authors decided to apply only Hofstede's dimensions, using just Spearman's rank correlation coefficients between the ESG rating and variables from the GLOBE set to test the relationship.

The limitations indicated above also outline the directions for further research. As mentioned above, the crucial one among these is examining the correlation between the ESG risks quantified by other agencies and cultural dimensions and then comparing the strength of these relations. In this case, however, the inability to rely on the same sample of banks may prove to be an obstacle. While banks often have two or three credit ratings, they do not usually have more than one ESG rating. For agencies other than Sustainalytics, the sample and spectrum of countries is currently much smaller. A second potential strand of consideration could be to analyse the links between sovereign ESG ratings (or indicators that determine the ESG risk) and cultural dimensions.

The results obtained can be useful for three groups of commercial bank stakeholders. The first is bank managers. From their perspective, it appears that for many banks, including their competitors, the issue of quantifying the ESG risk is at least as important as quantifying the credit risk. Moreover, the functioning of a bank in a specific cultural circle somehow enforces a certain level of attention that should



be paid to ESG risks. So far, bank managers have focused on obtaining the highest possible credit risk rating, which has contributed, among other things, to minimising the cost of capital and broadening the spectrum of financing sources. The research presented in this article shows that the ESG rating also influences the cost and availability of external financing, and having a certain level of ESG rating by a bank may be a condition for establishing cooperation with it. The results indicate that actions aimed at obtaining a high credit rating and ESG need not be contradictory, which is probably due to the inclusion of the impact of ESG risks on credit risk in the methodologies of credit rating agencies. However, the findings on the influence of cultural factors on ESG ratings indicate that there are also exogenous factors beyond the direct control of managers that affect ESG ratings. Hence, achieving a certain level of ESG rating will therefore be relatively more challenging in jurisdictions in which cultural dimensions amplify ESG risks.

The second group of the bank's stakeholders for whom the obtained results may be important, are the investors. From the point of view of their policy of rewarding a certain minimum level of credit risk and ESG risk management, it may not be possible to maintain an adequate regional (cultural) diversification of the portfolio at the same time. The convergence of the direction of changes in the ESG risk and the credit risk, confirmed by the results of this study, is an important signal as it reduces the risk of the dilemma of whether to invest in accordance with the principles of sustainable development (*i.e.* building a portfolio of assets with an acceptable level of ESG risk), or to follow only the existing criteria for portfolio diversification and risk mitigation based solely on the financial indicators and credit ratings, which provide information on the level of credit risk. Cultural differences with their known impact on the ESG risk may in turn become an additional criterion for geographical diversification.

The third group comprises the regulatory authorities. This relates primarily to the supervision and oversight of credit rating agencies and the future regulation of ESG rated entities. For rating agencies responsible for assigning credit ratings, it is important to verify the impact of ESG risks on the credit risk as reflected in credit ratings, *i.e.* whether the methodology takes into account the conversion of ESG risks into the credit risk, and then into a credit rating. Based on the averaged Big Three rating, this study showed that an improvement in the credit rating significantly reduces the risk of the ESG risk being allocated to a higher risk category. An analogous study could be carried out by the supervisory authorities for each supervised rating agency. Yet, it would be desirable to bring the providers of ESG ratings under supervision and establish guidelines for the methodology in this respect. This would allow for a gradual convergence of ESG ratings, the inclusion in methodologies of only endogenous factors influenced by bank managers, or possibly splitting the final assessment into an endogenous and an exogenous component (taking into account, among others, cultural differences).

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