DOI: https://doi.org/10.17323/j.jcfr.2073-0438.17.3.2023.129-151
JEL classification: G34, G14, G11, C35, C53

Do Inclusive Growth Strategies Affect Corporate Financing Policy? Evidence from The Metal and Mining Sector

Alexander Akhmetov ✉
Analyst, Sberbank, Moscow, Russia,
alexander.akhmetoff@gmail.com, ORCID

Maria Khamidullina
Senior Financial Controller, MTS PJSC, Moscow, Russia,
maria.khamidullinaa@gmail.com, ORCID

Abstract

The influence of inclusive growth strategy on corporate financing policies is examined within the metals and mining industry. A dataset comprises 212 of the largest publicly traded companies observed from 2016 to 2021. An econometric analysis revealed no significant effect of inclusion indicators on the financing policies of these companies. However, a positive association between the corporate resource efficiency and leverage levels was observed. Though no single inclusion indicator influences the volume of sustainable financing, the indicator of human rights compliance positively impacts the number of such financing arrangements. Furthermore, only the levels of emission reduction and the extent of improvement in living standards of local communities significantly influence the cost of capital (with a positive dependence for the former, and a negative dependence for the latter). Inclusion indicators have little impact on the capital structure, with leverage levels largely determined by metals pricing dynamics. Higher levels of inclusion correlate with increased utilization of sustainable financing. The findings can be used when implementing inclusive growth strategies in the metals and mining industry as well as when deciding on the financing of projects within this sector. We believe that analysis of other industries and a longer period of time, different results may be obtained. This is, on the one hand, a limitation of this work, and on the other hand, an area for further research.

Key words: inclusive growth, metals and mining sector, UN sustainable development goals, ESG rating, random effects model, fixed effects model, pooled panel data model, Tobit model, ordered logit model

For citation: Akhmetov A., Khamidullina M. (2023) Do Inclusive Growth Strategies Affect Corporate Financing Policy? Evidence from The Metal and Mining Sector. *Journal of Corporate Finance Research*. 17(3): 129-151. https://doi.org/10.17323/j.jcfr.2073-0438.17.3.2023.129-151

Introduction

The world has witnessed significant geopolitical and economic transformations in recent years, including trade wars, sanctions, epidemiological restrictions, an escalation of protectionist measures, the decarbonization trend, active efforts to combat climate change, and cross-border carbon regulations, to name just a few. Technological advancements and rising social tensions in certain regions have further compounded these challenges. Corporations find themselves increasingly vulnerable to these complex issues. Addressing them and sustaining effective development necessitate adjustments to strategy, business models, corporate governance practices, and interactions with stakeholders. These changes must align with inclusive growth strategies, which entail company development that not only achieves financial and operational growth and an increase in market value but also fosters an environment conducive to improving the quality of life and providing equal opportunities for all population groups, both within the countries where the company operates and globally. Adhering to these strategies enables companies to navigate turbulent economic, technological, and geopolitical landscapes with minimal losses.

Implementing such transformations requires substantial investments, and identifying the sources of financing is essential. This choice significantly influences the specifics of a company's financing policy and the extent to which different sources of funding are employed.

This paper focuses on the metals and mining sector, which presents a unique case. On the one hand, it represents one of the primary contributors to environmental pollution, accounting for approximately 8% of global greenhouse gas emissions in 2021, according to Our World in Data. On the other, products manufactured by companies in this sector, such as steel, copper, aluminum, nickel, zinc, and silicon, play a pivotal role in transitioning to a green economy and decarbonizing the transportation and power generation sectors. Consequently, these companies are indispensable to the world's efforts to achieve sustainable, eco-friendly manufacturing practices. As such, they must undertake strategic transformations and invest in green technology to remain relevant. This research focuses on the world's largest publicly traded companies in terms of market capitalization within the metals and mining sector in 2021. The sample comprises 212 companies and encompasses 1,272 observations spanning from 2016 to 2021.

This paper aims to define quantitative indicators for evaluating company adherence to inclusive growth strategies and explore the relationships between inclusive growth and company financing policies. It sheds light on previously unstudied issues, such as the impact of inclusive growth indicators on the volume and number of issues of sustainable (responsible) financing instruments and the circumstances under which they arise in the metals and mining sector.

The findings from this research can be valuable for companies in the metals and mining sector, particularly in the areas of strategy development and corporate finance, as they work toward implementing inclusive growth strategies and making decisions regarding the financing of related projects.

Literature Review

Notion and Concept of Inclusive Growth

This section delves into academic and practical literature to elucidate the meanings of "inclusion" and "inclusive" or "sustainable" growth and outlines the characteristics of companies committed to inclusive growth. Our initial search for pertinent scholarly papers was conducted using such databases as Scopus, ScienceDirect, JSTOR, and Springerlink. Additionally, we examined practical reports on the topic from esteemed global consulting firms such as BCG and McKinsey, as well as international organizations including the UN, ECE, OECD, and the Asian Development Bank.

According to specialists at the Asian Development Bank [1], inclusive growth entails not only generating new economic opportunities but also ensuring equal access to these opportunities for all segments of society, particularly for disadvantaged population groups. The OECD [2] defines inclusive growth as economic growth that fosters opportunities for all demographic groups and fairly distributes the benefits of increased prosperity, both monetarily and non-monetarily, across society. The Eurasian Economic Commission and UNCTAD [3] characterize inclusive growth as economic growth closely linked to the establishment of favorable conditions that enhance the quality of life and guarantee equal opportunities for all segments of a country's population.

Inclusive growth is intrinsically tied to the attainment of the United Nations Sustainable Development Goals (UN SDGs), a set of 17 interconnected objectives formulated in 2015 by the UN General Assembly to serve as a "blueprint to achieve a better and more sustainable future for all" [4]. These SDGs aim to enhance prosperity and protect the planet. Consequently, endeavors to accelerate economic growth must align with resolving issues in healthcare, education, social protection, environmental conservation, and the battle against climate change. The 17 UN SDGs encompass:

1) No poverty.
2) Zero hunger.
3) Good health and wellbeing.
4) Quality education.
5) Gender equality.
6) Clean water and sanitation.
7) Affordable and clean energy.
8) Decent work and economic growth.
9) Industry, innovation, and infrastructure.
10) Reduced inequalities.
11) Sustainable cities and communities.

12) Responsible consumption and production.
13) Climate action.
14) Life below water.
15) Life on land.
16) Peace, justice, and strong institutions.
17) Partnerships for the goals.

Thus, the achievement of inclusive growth is intrinsically linked with the realization of the UN SDGs. However, there is currently no universally accepted method for companies to demonstrate their alignment with the SDGs. Empirical measurement of company commitment to inclusive growth is frequently accomplished through Environmental, Social, and Governance (ESG) metrics [5].

The growing trend of ESG practices and non-financial information disclosure represents a novel approach where companies voluntarily pursue non-financial and sustainable development goals that create value for corporate investors and other stakeholders [6]. ESG ratings quantify the efficiency with which a company progresses toward sustainable development objectives. Consequently, a comparison of ESG and SDG parameters provides information for investors and other stakeholders on the efficacy with which a company is advancing toward the SDGs. Drawing from scientific research [7] and our own analysis, we have compared SDG components and ESG categories (Figure 1). A significant number of the SDGs align with the Environmental and Social categories, with some SDGs intersecting both. The Governance category relates to a smaller number of SDGs, which simultaneously intersect with the Environmental and Social categories.

Figure 1. Correspondence of SDGs to ESG components

Source: compiled by the authors based on [7].

In alignment with SDG strategies pursued by major public companies in the metals and mining sector, such as BHP Group, Vale S.A., Anglo American Plc, and Polymetal International Plc, we have selected the most relevant SDGs for this sector and examined their correspondence to ESG metrics (Figure 2).

Figure 2. SDG in the metals and mining sector

ЦУР в секторе «Металлы и добыча»

Соответствие ЦУР компонентам ESG

Source: compiled by the authors.

Inclusive Growth Strategies and Characteristics of Companies with Inclusive Growth Strategies

Research conducted by BCG [8] has identified nine distinct strategies for achieving inclusive growth:

1. Reimagining Core Activities: Companies should rethink their core areas of operation to contribute to societal prosperity, aiming for stable and long-term Total Shareholder Return (TSR). This involves integrating social responsibility into core business operations.

2. Digital Solutions: Beyond physical products or services, companies should offer in-demand digital solutions and modes of interaction to meet evolving consumer needs.

3. Localized Growth: Focusing on profitable growth in specific markets by adopting methods tailored to meet local requirements.

4. Value Source Nets: Companies should expand traditional value chains by creating dynamic "value source nets" that generate and implement solutions and modes of interaction aligned with consumer demand.

5. Technological Investment: Investing in cutting-edge technology, establishing multiple local facilities, and optimizing delivery centers to enable quick customization of offerings and cost reduction.

6. Global Data Architecture: Developing a global data architecture and analytical skills as a foundational element for the other strategies.

7. Flexible Organizational Structure: Replacing the classical matrix organizational model with flexible and adaptive teams oriented toward consumers, supported by platform capabilities.

8. Talent Attraction and Development: Attracting, retaining, incentivizing, and nurturing technologically proficient and motivated employees.

9. Continuous Change Culture: Fostering a culture of ongoing change rather than relying on isolated change initiatives.

In our assessment, strategies 1, 3, 5, 6, 8 and 9 are particularly relevant to companies in the metals and mining sector due to the specific nature of their operations.

Furthermore, companies that pursue inclusive growth strategies should exhibit the following characteristics, according to BCG [8]:

- Maximizing Total Societal Impact (TSI): Prioritizing the maximization of TSI to drive TSR growth.
- Customized Digital Solutions: Offering personalized digital solutions and services.
- Selective Growth Strategy: Implementing a selective approach to growth and market presence.
- Ecosystem Creation: Developing ecosystems to enhance value creation.
- Flexible Logistics: Establishing a flexible logistics system.
- Comprehensive Data Management: Creating a robust data handling system.
- Agile Management: Adopting an agile approach to management.
- Continuous Transformation: Embracing continuous adaptation in response to changing circumstances.

In addition, companies committed to inclusive growth tend to have diverse boards of directors, as shown by [9]. This aligns with agency theory and the stakeholder approach, both of which emphasize the importance of the board of directors in increasing a company's inclusivity. According to agency theory, separating the roles of chairman of the board of directors and CEO is more common among companies following inclusive growth strategies, as it enhances monitoring and control of executive actions. When the CEO also serves as the chairman of the board of directors, the effectiveness of monitoring is compromised.

Relationship between Inclusive Growth and Special Features of Company Financing

In order to examine the relationship between inclusive growth and the specific features of companies' financing policies, we have categorized relevant scientific papers into three subgroups based on the focus of their study:

1) Capital Structure and Inclusive Growth. An analysis of academic literature on the relationship between inclusive growth and the company's capital structure reveals mixed findings. Overall, authors in [10] emphasize that companies with strong indicators of Corporate Social Responsibility (CSR) face fewer limitations in raising capital. This is attributed to two factors: First, high CSR correlates with closer stakeholder engagement, reducing the likelihood of opportunistic behavior and promoting more efficient interactions. In other words, the interaction with stakeholders on the basis of mutual trust and cooperation decreases potential agency costs and pushes managers towards profit-making long-term decisions instead of short-term ones. Second, companies with higher CSR indicators tend to disclose information on their CSR activities publicly, enhancing transparency and accountability. Higher transparency levels reduce information asymmetry between the company and investors, thereby mitigating risk.

M. Benlemlih [11] concludes that U.S. companies with high CSR levels tend to use more equity and short-term debt for financing their operations. These companies expedite debt maturity to demonstrate their high quality and address concerns of CSR overinvestment. CSR initiatives related to diversity and community engagement have the most significant impact on reducing debt maturity.

Subsequently, Dimitropoulos and K. Koronios [12] reached similar conclusions after studying a sample of European companies, finding that companies with high corporate environmental responsibility rely more on equity and short-term debt rather than long-term debt. R. Khaled et al. [7] highlight that profitable, large companies with lower leverage are more likely to have higher inclusive growth indicators.

O. Villaron-Peramato et al. [13], drawing from agency theory, suggest that a need for higher debt may arise from the external control mechanism of CSR investments, which managers use to obtain personal benefits, maximize their utility functions, mitigate shareholder and stakeholder criticism, and mask their discretion in decision-making.

H.Al Amosh et al. [14] observe that an increase in the use of medium-term and long-term debt is associated with high ESG performance. Management aims to reduce agency costs through lower information asymmetry, which is achieved by investing in ESG projects.

On the other hand, L. Lindkvist and O. Saric [15] contend that sustainable development initiatives do not significantly impact a company's capital structure. However, they note a significant relationship between the corporate governance component and leverage ratios, with companies exhibiting high corporate governance levels finding it easier to secure loans. These results suggest that inclusion and sustainability considerations have not yet become decisive factors in financial decision-making. Nevertheless, companies should engage in inclusive growth projects because they yield benefits for shareholders and stakeholders.

2) Cost of Capital and Inclusive Growth. S. El Ghoul et al. [16] conducted an analysis of companies from various countries and found that high levels of corporate environmental responsibility lead to a decrease in stock capital value. Successful environmental performance may reduce a company's risk and enhance its attractiveness to investors, resulting in a lower stock capital value.

D. Schoenmaker et al. [17] reached similar conclusions, asserting that high environmental and social ratings are associated with a lower cost of capital. Sustainable development indicators positively influence company value by reducing costs through a lower cost of capital. They also argue that external factors such as the economic and institutional environment, as well as cultural characteristics, significantly influence the relationship between the cost of capital and corporate inclusion indicators.

T.C. Goncalves et al. [18] found that companies with high ESG performance tend to have lower stock capital values because shareholders are willing to accept lower returns in exchange for the company's commitment to inclusivity. Conversely, a high cost of debt is linked to high performance in corporate governance and the social sphere. Creditors may perceive investments in inclusive projects as less efficient and attractive, leading to a demand for additional returns.

3) Credit Rating and Inclusive Growth. G. Dorfleitner and J. Grebler [19] discovered that high environmental and social ratings among companies in North America, Europe, and Asia correlate with higher credit ratings. C.E. Bannier et al.'s research [20] generally supports this finding, indicating that high environmental ratings for U.S. companies lead to decreased credit risk. European companies exhibit similar results. Another significant factor in credit risk mitigation is a high social rating. H. Li et al. [21] substantiate these results for Chinese companies, concluding that high ESG ratings reduce default risk, especially over longer default risk timeframes (1 to 12 months). They also show that the influence of ESG ratings on default risk is less pronounced for production companies compared to non-production companies.

In summary, the analysis of scientific papers on this topic reveals several gaps in research:

1. There is no comprehensive approach to evaluating company adherence to inclusive growth strategies.

2. The influence of inclusive growth indicators on the volume and number of issues of sustainable (responsible) financing instruments has not been thoroughly explored.

3. The impact of inclusive growth indicators on a company's capital structure remains ambiguous.

Research Methodology

Indicators for Evaluating Companies Adhering to Inclusive Growth Strategies

One of the research objectives is to define quantitative indicators for evaluating company adherence to inclusive

growth strategies. We have based our approach on the study by R. Khaled et al. [7], which posits that pursuing inclusive growth strategies is closely linked to achieving Sustainable Development Goals (SDGs), which, in turn, are assessed using Environmental, Social, and Governance (ESG) metrics/ratings.

Many international organizations, such as S&P, MSCI, Refinitiv, and Sustainalytics, compile comprehensive ESG ratings for public companies. These ratings are based on various indicators, each with different weights in the final rating, depending on industry affiliation. While an ESG rating by itself does not directly evaluate SDG achievement or adherence to inclusive growth strategies, some of its components can be used for this purpose.

We believe that the concept of "inclusion" extends beyond ESG rating indicators. Assessing a company's commitment to inclusive growth encompasses not only its environmental (E), social (S), and corporate governance (G) activities but also its business strategy and the unique characteristics of its external environment, including the macroeconomic situation, institutional environment, and state policies in the countries of operation.

To measure a company's commitment to inclusive growth, we have defined five areas that capture various aspects of inclusion:

1. Environment: This area includes indicators from the 100-point Refinitiv ESG Score, such as the Emissions Score (reflecting a company's efforts to reduce emissions during its operations) and the Resource Use Score (indicating the company's reductions in materials, energy, or water usage and its search for environmentally efficient solutions through supply chain management improvements).

2. Social Sphere: This area encompasses additional components of the Refinitiv ESG Score, including the Workforce Score (evaluating improvements in job safety, employee qualifications, education, and job satisfaction), the Human Rights Score (measuring advancements in human rights), the Community Score (assessing contributions to enhancing the quality of life in local communities), and the Product Responsibility Score (evaluating the creation of high-quality and safe products or services).

3. Corporate Governance: This area focuses on the Governance Score, a component of the Refinitiv ESG Score that reflects the level and quality of corporate governance within the company.

To ensure a comprehensive and unbiased evaluation, all the above indicators are adjusted for the value of the Refinitiv ESG Controversies Score. This score accounts for ESG controversies arising from discrepancies between data reported in corporate public reports and information available in the public domain. Adjustments are made by averaging the values when the underlying indicator's value exceeds the Controversies Score.

4. Inclusion of Countries of Operation: This area considers the Country SDG Index Score, provided by the UN Sustainable Development Solutions Network. This score characterizes a company's achievement of SDGs in the countries where it operates, on a scale from 0 to 100, with higher values indicating greater SDG achievement.

5. Business Strategy: This area is evaluated by the McKinsey Corporate Horizon Index (CHI), a complex indicator consisting of five components: investment level, profitability growth, increase in earnings per share (EPS), and revenue management [20]. CHI helps classify companies based on their strategic orientation. If the index value exceeds 50 (on a scale from 0 to 100), the company is considered "long-sighted," while a value less than 50 suggests a "shortsighted" approach. Longsighted companies prioritize long-term value creation, invest consistently and with higher quality, avoid pursuing accounting-based ("paper") earnings, and aim to exceed the ESG consensus forecasts of analysts, in contrast to shortsighted companies.

Research Hypotheses

We propose five hypotheses based on the classification presented in the literature review. The first three hypotheses (H1, H2.1, H2.2) pertain to the examination of the relationship between inclusive growth and capital structure.

H1: It is characteristic of companies in the metals and mining sector that follow inclusive growth strategies to use borrowed funds more widely (resulting in high leverage). In other words, there is a positive relationship between the inclusive growth indicators and the leverage level (D/E ratio).

We contend that a high level of inclusion empowers companies to mitigate financial, operational, and reputation risks, enhancing their long-term business continuity, market positioning, and attractiveness to investors. Consequently, these companies are more inclined to secure larger loans for financing their activities, including projects related to inclusion.

The scientific literature does not provide a definitive consensus on the influence of inclusive growth indicators on capital structure. Similar hypotheses were examined in studies by O. Villaron-Peramato et al. [13] and H. Al Amosh et al. [14], both of which confirmed the existence of a positive relationship between inclusive growth indicators and leverage levels. Conversely, research by L. Lindkvist and O. Saric [15] found no correlation between sustainable development initiatives and capital structure. Other studies [11; 12] even suggest a negative relationship, indicating that highly inclusive companies tend to rely more on stock capital.

H2.1: It is characteristic of companies in the metals and mining sector that follow inclusive growth strategies to employ sustainable (responsible) financing tools more widely. In other words, there is a positive relationship between the inclusive growth indicators and the volume of issues of sustainable (responsible) financing tools.

H2.2: It is inherent to companies in the metals and mining sector that follow inclusive growth strategies to use sustainable (responsible) financing tools more widely. In other words, there is a positive relationship between the inclusive growth indicators and the number of issues of sustainable (responsible) financing tools.

Sustainable (responsible) financing tools encompass green, social, sustainable, adaptable bonds, as well as bonds and credits linked to SDGs and climate transfers. Although these hypotheses have not been previously explored, we believe that companies following inclusive growth strategies may diversify their sources of financing by incorporating such tools. This expansion would enable them to take full advantage of investment projects aligned with inclusive growth principles.

Hypothesis H3 aims to evaluate the impact of inclusive growth on the weighted average capital cost (WACC).

H3: A low weighted average capital cost (WACC) is characteristic of companies in the metals and mining sector that follow inclusive growth strategies. In other words, there is a negative relationship between the inclusive growth indicators and WACC.

Our assumptions from H1 can be extended by asserting that high inclusion levels empower companies to reduce their capital costs due to lower associated risks. Existing research by S. El Ghoul et al. [16], D. Schoenmaker et al. [17], and T.C. Goncalves et al. [18] generally supports the existence of a negative relationship between inclusive growth indicators and the cost of capital.

Hypothesis H4 investigates the relationship between inclusive growth and credit ratings.

H4: Companies in the metals and mining sector that follow inclusive growth strategies tend to have higher credit ratings. In other words, there is a positive relationship between the inclusive growth indicators and the credit rating level.

This assumption aligns with the aforementioned points: high inclusion companies typically exhibit lower financial and operational risks, which translates into higher credit ratings. Research conducted by G. Dorfleitner and J. Grebler [19], C.E. Bannier et al. [20], and H. Li et al. [21] supports the notion that high inclusive growth indicators correlate with elevated credit ratings and reduced default risks.

Description of Variables

To test H1, we utilized the Book D/E ratio, which represents the ratio of total debt to stock capital based on accounting values from financial reports. This served as our dependent variable to gauge the level of leverage.

For hypotheses H2.1 and H2.2, we employed independent variables related to the volume (Volume of Sustainable Financing) and the number (Number of Sustainable Financing) of sustainable (responsible) financing tools used. To gather this data, we retrieved all information regarding green, social, sustainable and adaptable bonds and credits, as well as those linked to Sustainable Development Goals (SDGs) and climatic transfer, from the Refinitiv database.

In the evaluation of hypothesis H3, the dependent variable used was the Weighted Average Capital Cost (WACC) measured in US dollars, sourced from the Refinitiv database.

To investigate H4, we employed the implied credit rating of companies as the dependent variable. This rating was calculated based on a comparison of a company's interest coverage ratio with the level of credit spread, referencing A. Damodaran's table.

In line with our earlier analysis, we considered several independent variables indicative of a company's adherence to inclusive growth strategies. These included components from the Refinitiv ESG Score (adjusted for the Refinitiv ESG Controversies Score), the Country SDG Index Score and the McKinsey Corporate Horizon Index.

Additionally, we introduced a dummy variable for the type of economy in the country of operation (Economy Type), with a value of 1 denoting a developed country and 0 representing an emerging country. This variable allowed us to examine the potential influence of the country's economic status on our hypotheses.

A second dummy variable (SubIndustry) was used to account for a company's affiliation with a subindustry.

Furthermore, we considered several control variables:

1. Size: Calculated as the natural logarithm of total assets. Larger companies typically exhibit more stable cash flows, greater resilience, higher levels of information disclosure, and the ability to provide substantial collateral, leading to lower bankruptcy risk, higher credit ratings, greater loan attractiveness, and a lower cost of capital.

2. Profitability: Represented by the EBIT margin. According to the pecking order theory, highly profitable companies often have sufficient cash flow from operations to finance their activities and therefore require less borrowed capital. These companies typically possess high credit ratings and a low cost of capital.

3. Growth: Measured by the Tobin's Q ratio. According to the same theory, companies with high expected growth rates may rely more on borrowed capital since they often lack internal resources to fund their operations. Consequently, their cost of capital tends to be higher due to cash flow instability and increased risks associated with growth initiatives. These companies are also more likely to have lower credit ratings.

4. Capital Expenditure Intensity (CapEx Intensity): Calculated as the ratio of capital expenditure to total assets. In periods of increased capital expenditure, companies may take on more debt to finance investment projects. The impact on credit ratings and the cost of capital depends on market conditions, financial performance, and various other factors, making it difficult to determine a straightforward relationship.

Additionally, for hypothesis H3, invested capital was included as a control variable, as a low cost of capital is typically associated with larger companies due to their greater stability and lower risks. In hypothesis H4, we also included the Book D/E ratio as an additional control variable, as changes in a company's leverage often have an inverse effect on its credit rating.

Empiric Study: Econometrics

Research Sample

This paper focuses on public companies in the metals and mining sector, specifically those with the largest capitalization in 2021. Data, both financial and non-financial, was sourced from the information and analytical system Refinitiv and other platforms such as Investing, Reuters, Damodaran, and the UN Sustainable Development Solutions Network. All financial figures are denominated in US dollars.

The study encompasses the time span from 2016 to 2021. This timeframe was chosen because countries committed to working toward the achievement of Sustainable Development Goals (SDGs) in 2016, and it was also around this time that the ESG agenda, including ESG ratings, gained global prominence. The upper limit of this interval is dictated by the fact that, at the time of the research, most of the analyzed companies had not yet published their financial results for 2022.

The sample consists exclusively of companies with complete data available for the period from 2016 to 2021. After excluding companies with missing data, we retained 212 suitable companies. In total, this resulted in 1,272 data points over the six-year period.

The resulting sample is sufficiently diverse in terms of the countries in which the companies operate and the subindustries they belong to. A majority of the companies are registered in developed countries, comprising approximately 60% of the total. The most prevalent subindustries within the sample include the ferrous metal industry and a diversified basket of metals, accounting for approximately 60% of the entire sample.

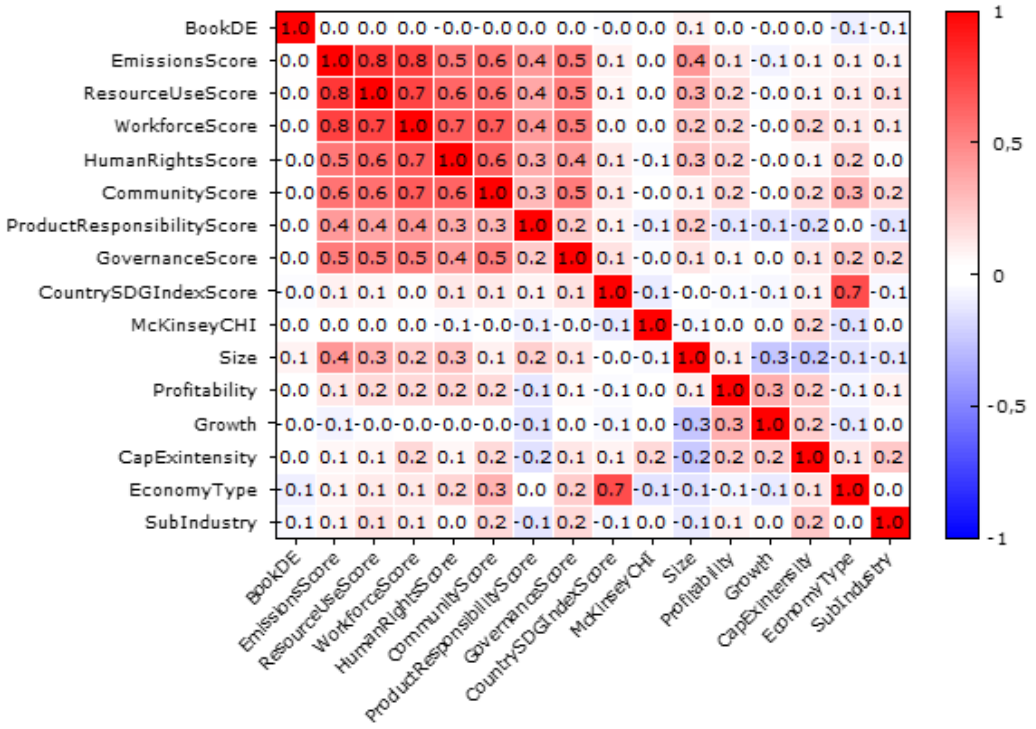
The data for each company is considered over a six-year period, resulting in a structured panel data format. Appendix 1 provides descriptive statistics. The panel structure offers both advantages and disadvantages. On the one hand, it allows for specific valuation methods that are only possible with this structure, which helps mitigate potential estimation biases arising from individual company characteristics. On the other, the panel structure does not account for time-invariant variables (e.g., subindustry or the economic type of the country where the company operates). To address this issue, dummy variables were introduced for subindustries and country economic types.

This research employs various models optimized for testing the proposed hypotheses, including random effects, fixed effects, pooled panel data, Tobit, and ordered logit models. These models are used to determine the relationship, if any, between inclusion indicators and specific aspects of the companies' financial policies.

Research Results

For the analysis of the relationship between inclusive growth indicators and leverage level (H1), we used the *random effects model*, which is particularly well-suited for this task. We constructed a regression between the leverage level (Book D/E) and the inclusion indicators and other financial metrics of companies. To ensure the validity of the analysis, we first examined the correlation matrix to detect potential multicollinearity among variables (Figure 3).

Figure 3. Correlation matrix (for hypothesis H1)



Source: calculated by the authors using Gretl.

Table 1. Panel specification (for hypothesis H1)

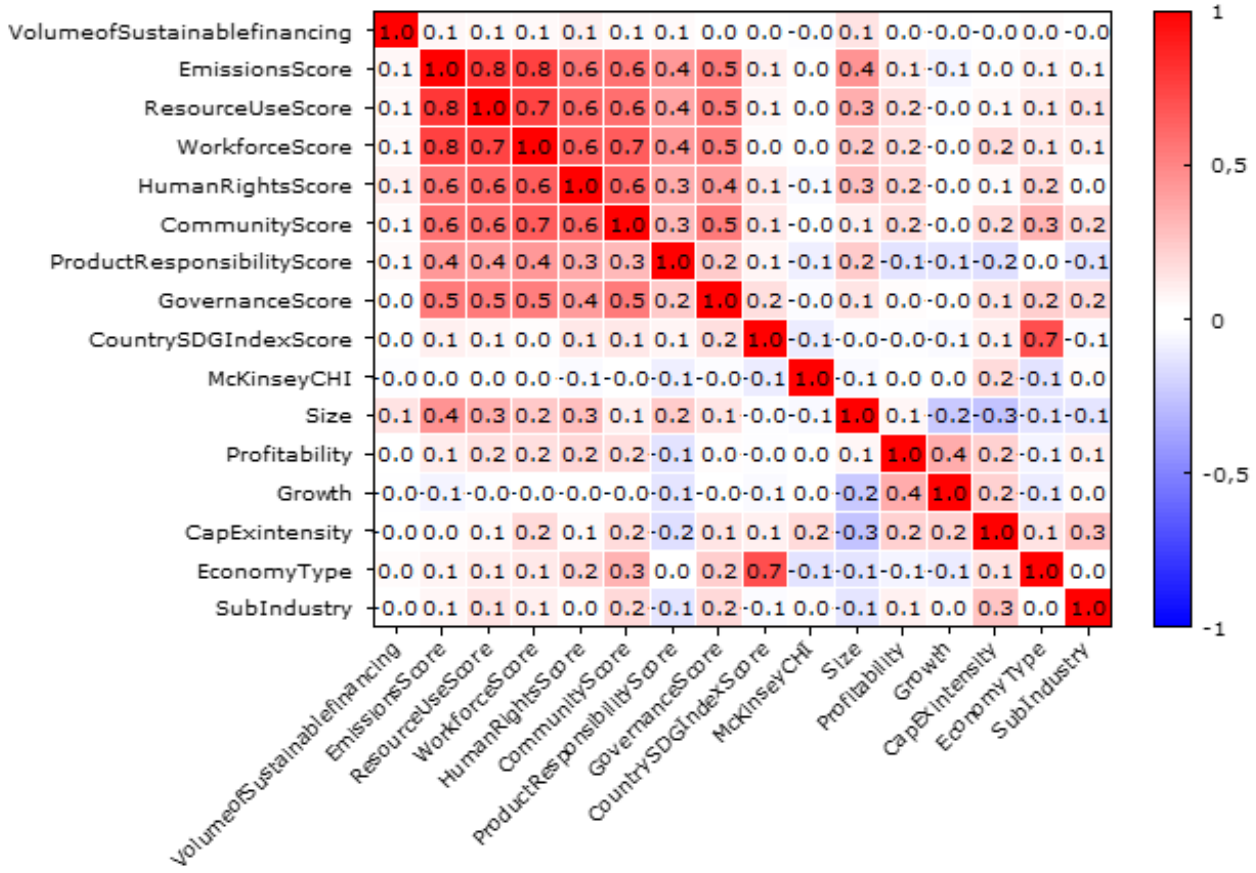
Test	P-value	Zero hypothesis	Required model
Joint significance of differences in group mean values	0.01	Adequacy of the pooled panel data model	Fixed effects model
Breusch – Pagan statistics	0.03	Adequacy of the pooled panel data model	Random effects model
Hausman's test	0.75	No correlation between individual effects and regressors	Random effects model

Source: calculated by the authors using Gretl.

The inflation factors method shows no significant multicollinearity in the data. We selected the optimal model for analysis through the panel specification test (Table 1).Based on this analysis, it is reasonable to proceed with the random effects model. This model includes dummy time variables, yet the Wald test did not support the presence of time effects (p-value of 0.47). Consequently, we decided to exclude them from the model due to their insignificance. Among the inclusion indicators, only the Resource Use Score is significant at the 10% level. Among the other variables, company size and economy type are significant at the 1% level, and the subindustry of diversified metals is significant at the 5% level.

For the analysis of the relationship between inclusive growth indicators and the volume of issues of sustainable (responsible) financing tools (H2.1), we examined various panel models to identify the most suitable one. The initial step involved constructing a correlation matrix to assess potential multicollinearity among variables (Figure 4).

Figure 4. Correlation matrix (for hypothesis H2.1)



Source: calculated by the authors using Gretl.

Using the inflation factors method, we determined that there is no significant multicollinearity in the data. To choose the most appropriate model for analysis, we conducted a panel specification test (Table 2).

Table 2. Panel specification (for hypothesis H2.1)

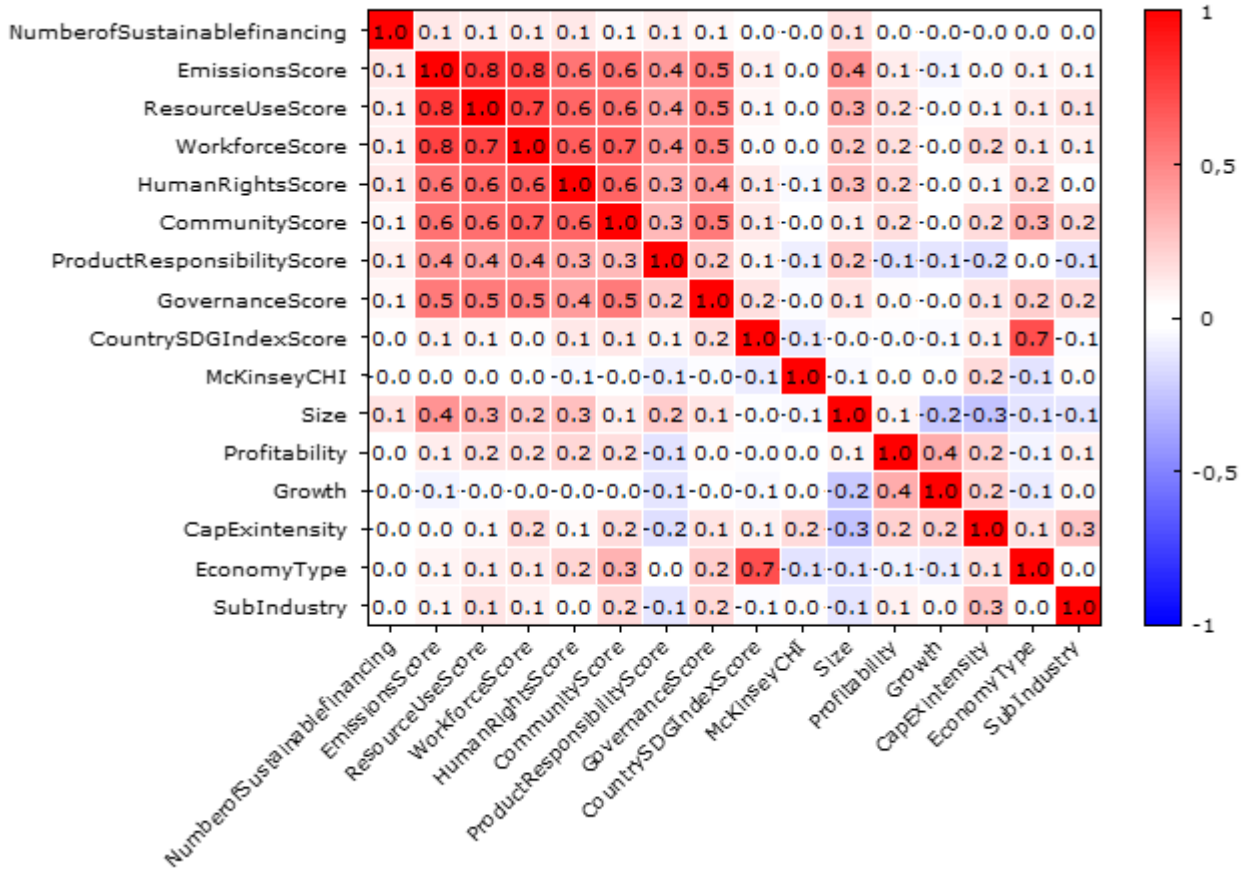
Test	P-value	Zero hypothesis	Required model
Joint significance of differences in group mean values	0.47	Adequacy of the pooled panel data model	Pooled panel data model
Breusch – Pagan statistics	0.56	Adequacy of the pooled panel data model	Pooled panel data model

Source: calculated by the authors using Gretl.

In the *pooled panel data model*, time effects were found to be significant, so we retained them as regressors. This decision was supported by the Wald test for the joint significance of time period dummy variables (p-value of 0.02). The results indicate that the dummy variable for 2019 is significant at the 5% level, and the dummy variable for 2021 is significant at the 1% level. There is no relationship between the inclusion indicators and the volume of attracted sustainable (responsible) financing. On the other hand, variables such as company size and the country's economy type are significant at the 1% and 5% levels, respectively.

For the analysis of the relationship between inclusive growth indicators and the number of issues of sustainable (responsible) financing tools (H2.2), the dependent variable is the number of issues, which is a whole number ranging from 0 to 4. Companies decide to issue sustainable (responsible) financing tools when they achieve a certain level of success in inclusion. However, other companies may be at different inclusion levels and may not see any current advantages in such issues. Therefore, the sample is censored, and the Tobit model is chosen as the most suitable one.
To ensure that multicollinearity is not present in the data, a correlation matrix was constructed (Figure 5).

Figure 5. Correlation matrix (for hypothesis H2.2)

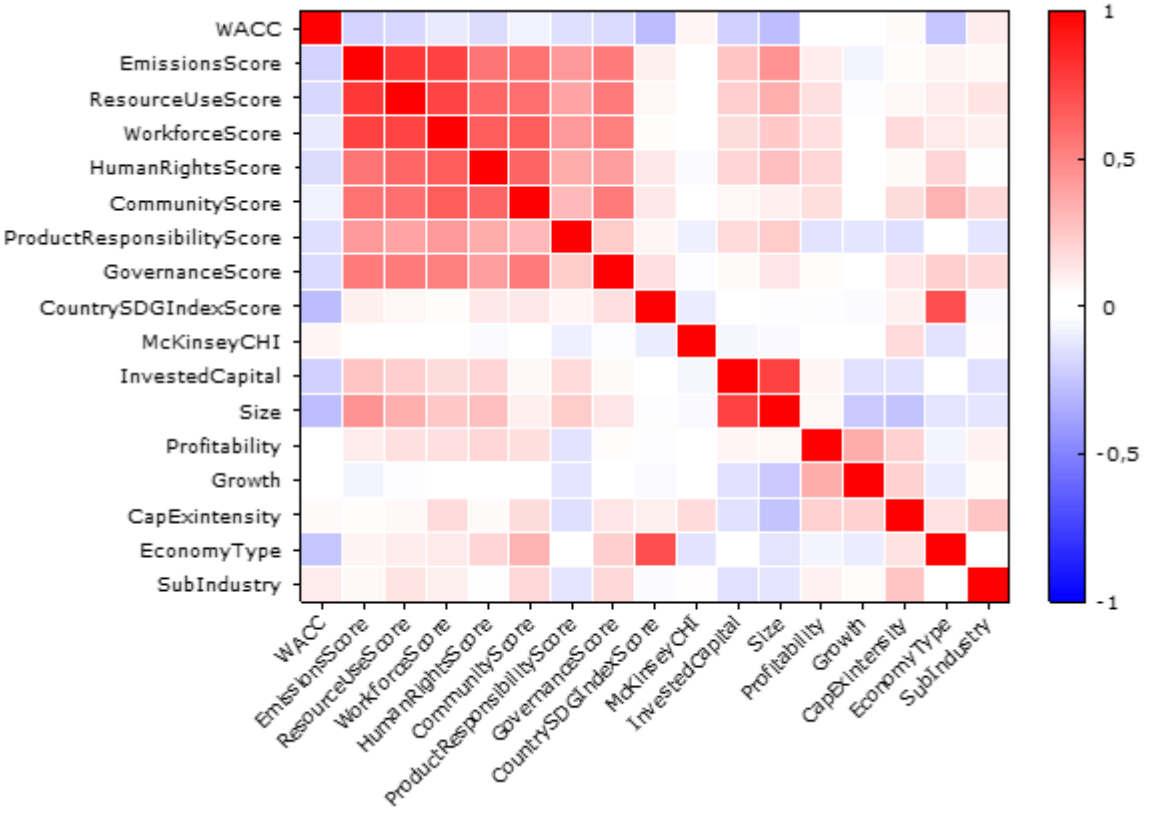


Source: calculated by the authors using Gretl.

The inflation factors method also indicated the absence of significant multicollinearity in the data. When testing this hypothesis, time effects were found to be insignificant. Consequently, we excluded them from the model, a decision supported by the Wald test for the joint significance of time period dummy variables. The Human Rights Score is significant at the 1% level, and the variables of company size and the subindustry of other precious metals are significant at the 1% level, while the subindustry of diversified metals is significant at the 5% level.

To test hypothesis H3, we utilized the *fixed effects model*, which provides a comprehensive view of the relationship between the inclusive growth indicators and the weighted average capital cost (WACC). Initially, we constructed a correlation matrix to assess potential multicollinearity among variables (Figure 6).

Figure 6. Correlation matrix (for hypothesis H3)



Source: calculated by the authors using Gretl.

The inflation factors method was also employed to check for significant multicollinearity in the data, and it confirmed the absence of such issues.

To determine the appropriate model for testing the relationship between inclusion indicators and WACC, we conducted a panel specification test, the results of which are presented in Table 3.

Table 3. Panel specification (for hypothesis H3)

Test	P-value	Zero hypothesis	Required model
Joint significance of differences in group mean values	2*10–123	Adequacy of the pooled panel data model	Fixed effects model
Breusch – Pagan statistics	2*10–177	Adequacy of the pooled panel data model	Random effects model
Hausman's test	5*10–006	No correlation between individual effects and regressors	Fixed effects model

Source: calculated by the authors using Gretl.

Based on the panel specification test results, the fixed effects model was selected as the appropriate choice for analyzing the relationship between inclusion indicators and WACC. It is worth noting that time effects remained significant during the testing, so they were retained as regressors in the model.

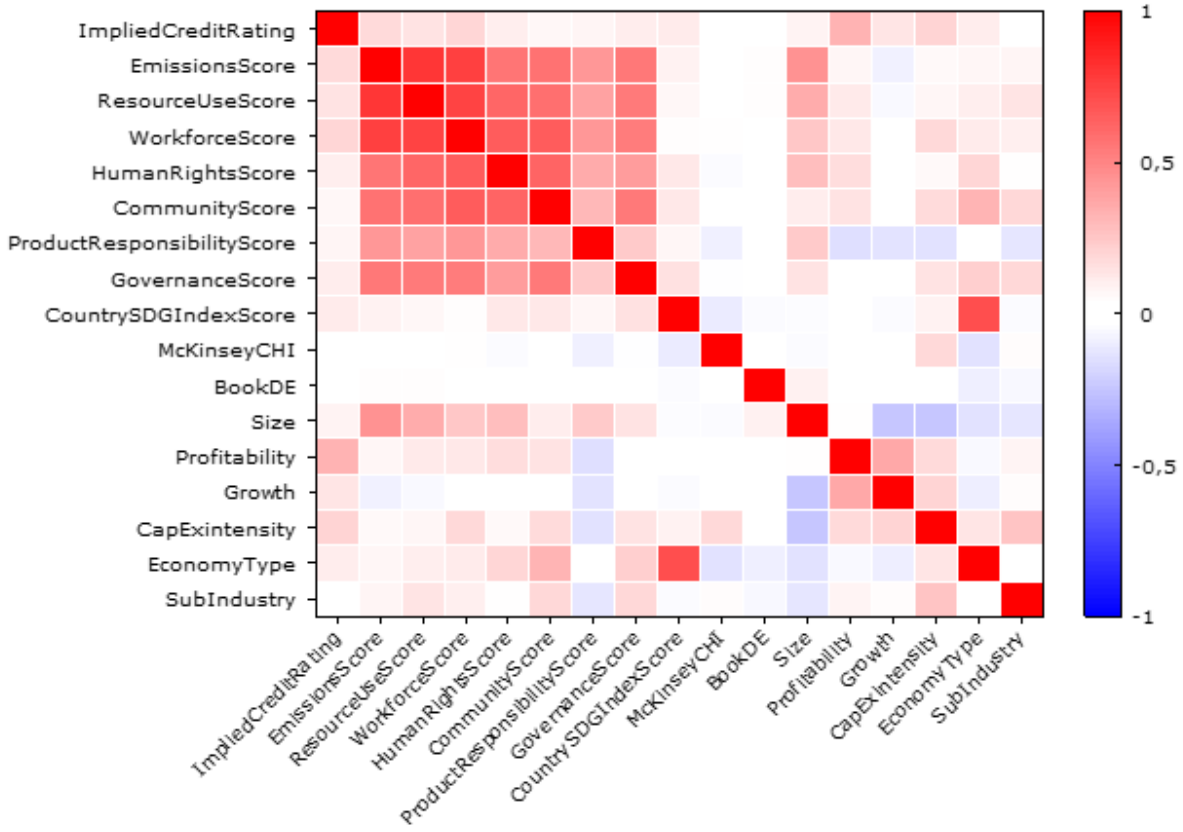
The results of the fixed effects model clearly indicate the significance of the independent inclusion variables. Specifically, the Emissions Score is significant at the 5% level, and the Community Score is significant at the 10% level. Additionally, variables such as company size, growth indicator, and dummy time variables for the years 2017, 2018, 2020, and 2021 are significant at the 1% level.

To analyze the relationship between the inclusive growth indicators and the credit rating level (H4), we took the corporate credit rating (Implied Credit Rating) as the dependent variable. This variable is discrete and ranges from 1 to 15, with 1 representing the worst rating and 15 the best.

To appropriately model the relationship with a discrete dependent variable like credit rating, the *ordered logit model* is the most suitable choice, considering that the dependent variable has a finite and ordered set of values.

The initial step in the regression analysis was to construct a correlation matrix (Figure 7) to assess potential multicollinearity among variables.

Figure 7. Correlation matrix (for hypothesis H4)



Source: calculated by the authors using Gretl.

The inflation factors method confirmed the absence of significant multicollinearity in the data.

In the logit model, time effects were found to be insignificant, leading us to exclude them as regressors. The results of the model indicate that several independent inclusion variables have significance. Specifically, the Workforce Score, Community Score, and Product Responsibility Score are significant at the 1% level. The Human Rights Score and McKinsey CHI variables are significant at the 5% level, and the Emissions Score is significant at the 10% level.

Interpretation of Results

The results of the econometric study show that the majority of inclusion indicators do not significantly impact the financing policy of companies in the metals and mining sector. These findings highlight the complexity of real-world business operations, which often do not align with advanced theoretical models. Several factors, including the subindustry in which a company operates, country-specific characteristics, cultural factors, institutional environments, and internal company-specific factors, can influence financing decisions.

The results are summarized in Table 4, which shows the influence of independent, control and dummy variables on the dependent variable.

Table 4. Results of the econometric study: final table with the signs of coefficients

Indicator designation	Hypothesis				
	H1	H2.1	H2.2	H3	H4
			Model		
	RE	Pooled	Tobit	FE	Ordered logit
			Dependent variable		
	Book D/E	Sustainable financing		WACC	Implied Credit Rating
		Volume	Number		
Independent variables					
Emissions Score	–	–	+	+**	+*
Resource Use Score	+*	–	–	–	–
Workforce Score	–	+	+	+	+***
Human Rights Score	–	+	+***	–	–**
Community Score	+	+	–	–*	–***
Product Responsibility Score	+	–	+	+	+***
Governance Score	+	–	+	+	+
Country SDG Index Score	+	–	+	–	+
McKinsey CHI	+	–	+	+	–**
Invested Capital (H3)				+	
Book D/E (H4)					–
Control variables					
Size	+***	+***	+***	–***	+
Profitability	–	–	+	–	+***
Growth	–	–	+	–***	+
CapEx Intensity	+	+	+	–	+***
Dummy variable					
Economy Type	–***	+**	–		+***
DSubIndustry_1: diversified basket of metals	+**	–	–**		+
DSubIndustry_2: ferrous metallurgy	+	–	–		+
DSubIndustry_3: copper	+	–	–		+
DSubIndustry_4: gold	+	–	–		–

Indicator designation	Hypothesis				
	H1	H2.1	H2.2	H3	H4
			Model		
	RE	Pooled	Tobit	FE	Ordered logit
			Dependent variable		
	Book D/E	Sustainable financing		WACC	Implied Credit Rating
DSubIndustry_5: Other precious metals (except for gold and silver)	–	–	–***		+
DSubIndustry_6: aluminum	–	+	–		+
Dummy variable for 2017		–		+***	
Dummy variable for 2018		+		+***	
Dummy variable for 2019		+**		+	
Dummy variable for 2020		+		–***	
Dummy variable for 2021		+***		–***	

Note: ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$; *RE* – random effects, *FE* – fixed effects, *Pooled* – pooled panel data model, *Tobit* – Tobit model, *Ordered logit* – ordered logit model.

Source: calculated by the authors using Gretl.

Here is a summary of the key findings for each hypothesis:

H1: Relationship between Inclusion Indicators and Leverage Level (D/E Ratio)

Eight out of nine inclusion indicators had no significant impact on the leverage level (D/E ratio) of companies. (This generally confirms the conclusions made by L. Lindkvist and O. Saric [15], who did not find any relationship between sustainable development initiatives and capital structure.) Only the Resource Use Score was found to have a positive relationship with the D/E ratio (at the 10% significance level), indicating that companies with higher resource efficiency can better mitigate financial, operational and reputational risks, improve long-term business resilience, and attract more loans to finance inclusion-related projects.

H2.1: Relationship between Inclusion Indicators and Volume of Sustainable (Responsible) Financing

None of the inclusion indicators had a significant impact on the volume of sustainable (responsible) financing. This hypothesis was rejected.

H2.2: Relationship between Inclusion Indicators and Number of Issues of Sustainable (Responsible) Financing Tools

Only the Human Rights Score was found to have a positive relationship with the number of sustainable (responsible) financing tools issued (at the 1% significance level). This suggests that companies with higher scores in improving human rights are more likely to procure sustainable financing tools. The reason why the majority of inclusion indicators have no impact on the volume and number of issues of sustainable (responsible) financing may lie in the fact that the ESG agenda has seriously intensified only in recent years (since 2019). Given that the procurement of sustainable financing is a time-consuming process, companies may have simply failed to attract sufficient financing over the analyzed time interval. A longer-term study will most likely give different results.

H3: Relationship between Inclusion Indicators and Weighted Average Capital Cost (WACC)

Of the nine inclusion indicators, only the Emissions Score and Community Score were found to impact WACC, which partially supports the thesis by D. Schoenmaker et al. [17] that other external factors influence the cost of capital: the economic and market environment in which the company operates, the institutional environment, and cultural characteristics. The risk-free rate level influenced the dynamics of WACC, as evidenced by the significance of dummy variables in certain years.

The positive relationship between the Emissions Score and WACC (at the 5% significance level) may imply that com-

panies with a high Emissions Score have already invested enough in emission reduction projects and therefore do not need to borrow additional funds to implement environmental measures. Shareholders and creditors perceive investments by such companies in additional emission reduction projects as not being very efficient or attractive and so may require higher returns to invest in them.

In contrast, the Community Score had a negative relationship on WACC (at the 10% significance level). This indicator may be important for investors for the reason that many large companies possess major assets in remote and underdeveloped territories, where the quality of life of local communities needs improvement. Companies that are successful in this endeavor may convince investors and creditors to accept lower returns.

H4: Relationship between Inclusion Indicators and the Corporate Credit Rating

Six out of nine inclusion indicators were found to influence corporate credit ratings. Positive relationships were observed for the Workforce Score (at the 1% significance level), Product Responsibility Score (at the 1% significance level), and Emissions Score (at the 10% significance level), partially confirming the conclusions of G. Dorfleitner and J. Grebler [19], C.E. Bannier et al. [20], and H. Li et al. [21], who stated that high inclusive growth indicators of companies are related to high credit ratings and low default risks. The likely explanation is that rating agencies consider inclusion indicators, such as a company's success in improving job safety, creating safe and high-quality products, and reducing pollutant emissions, as being important for reducing risk.

In contrast, negative relationships were found for the Community Score (at the 1% significance level), Human Rights Score (at the 5% significance level), and McKinsey CHI (at the 5% significance level). The likely explanation is that investments by companies in projects for improving indicators in the first two fields are perceived as not being very efficient or attractive. Therefore, such companies bear more financial and other risks, which leads to a lower credit rating. A negative relation between McKinsey CHI and the credit rating level is due to the fact that the credit rating is based on short-term indicators and the current company situation, while a company with high McKinsey CHI focuses on success over the long term.

Overall, our results suggest that the impact of inclusion indicators on financing policies varies across different indicators. It is worth noting that the metals and mining sector may still be in the early stages of adopting inclusive growth strategies, and the effects may become more pronounced over time.

Empirical Case Study

Selection of companies for analysis

For further analysis, we selected the 20 largest public companies in the world in terms of market capitalization within the metals and mining sector for the year 2021. We obtained indicators reflecting each company's adherence to inclusive growth strategies in 2021. These indicators encompassed the Emissions Score, Resource Use Score, Workforce Score, Human Rights Score, Community Score, Product Responsibility Score, Governance Score, Country SDG Index Score, and McKinsey CHI.

Applying an averaging process to their values, we computed a consolidated inclusivity index (Inclusivity Index), which we used for ranking these companies (see Appendix 2 for details).

For the purpose of our analysis, we chose to focus on three specific companies: Anglo American Plc (Great Britain) – one of the inclusion leaders with an Inclusivity Index of 61.77; Vale S. A. (Brazil) – a company with a below-average index value of 50.30; and PJSC Mining and Metallurgical Company Norilsk Nickel (Russia) – another company whose Inclusivity Index is below average (48.02). These companies were selected for the following reasons:

1. The chosen companies possess a diversified range of extracted metals, rendering them comparable in terms of their business profiles and potential ESG risks.

2. They exhibit a strong commitment to high levels of information disclosure, a prerequisite for conducting a high-quality analysis.

3. These companies operate not only in developed nations but also in emerging markets, enabling a comparative analysis.

Our evaluation of these companies' adherence to inclusive growth strategies encompassed the components of the Refinitiv ESG Score, duly adjusted for the Refinitiv ESG Controversies Score. Additionally, we incorporated the Country SDG Index Score and the McKinsey CHI into our analysis. Furthermore, we reviewed the companies' annual reports and investor presentations.

Analysis of Anglo American Plc

Anglo American Plc is a British mining conglomerate founded in South Africa. The company holds an 85% stake in De Beers, an international corporation engaged in mining, processing, and selling natural diamonds, as well as manufacturing manmade diamonds for industrial purposes. Additionally, Anglo American is the largest supplier of platinum group metals, specifically platinum and palladium. The company's key revenue segments include platinum group metals (29%), iron ore (23%), diamonds (18%), and copper (13%).

Inclusive Growth

Anglo American Plc's strategic vision revolves around achieving sustainable development goals, with a core focus on reevaluating extraction practices to enhance the quality of life. In its strategic framework, the company identifies priority areas aligned with SDGs, including:

- Healthy Environment (SDGs 6, 9, 13, and 15):
  - Reducing greenhouse gas emissions by 30% by 2030.
  - Improving energy efficiency by 30% by 2030.

- Achieving carbon-neutral operations by 2040.
- Reducing freshwater intake by 50% by 2030.
- Exerting a purely positive influence on biodiversity.

- Communities' Well-being (SDGs 1, 3, 4, and 8):
  - Creating five jobs outside the company for each job within the company.
  - Achieving SDG 3 regarding the health of local communities.
  - Ensuring that schools in local communities rank among the top 20% in the country.
- Positioning as a Reliable Corporate Leader (SDGs 5, 12, 16, and 17):
  - Establishing local and national forums for accountability.
  - Playing a leading role in public education and fostering relations with stakeholders.
  - Certifying third-party mines by 2025.

Before delving into the inclusive growth indicators of Anglo American Plc, it is essential to consider the dynamics of our Inclusivity Index, alongside the Refinitiv ESG Score, ESG Controversies Score, and ESG Combined Score. Notably, the ESG Controversies Score experienced a significant decline due to an increased number of incidents at the company's industrial facilities and a minor drop in environmental performance in 2020–2021. This decline, in turn, contributed to a reduction in the ESG Combined Score. Concurrently, the Inclusivity Index also decreased during this period.

Our methodology for assessing inclusivity based on Refinitiv data, adjusted for the ESG Controversies Score, led to an overall decline in the company's indicators in 2020–2021. It is worth noting that Anglo American Plc, as one of the world's largest companies in the metals and mining sector, faces heightened public scrutiny, which may sometimes result in a lower ESG Controversies Score, despite the incidents potentially being less severe than they appear. Nevertheless, we believe that factoring in this indicator provides a slightly more impartial assessment of inclusivity.

To assess the company's environmental efforts, we considered the Emissions Score and Resource Use Score. Between 2016 and 2019, Anglo American Plc consistently maintained high scores in emissions and resource utilization. However, in 2020–2021, these indicators experienced a slight decline due to minor setbacks in decarbonization and resource efficiency efforts.

In the realm of social responsibility, the company has excelled in areas such as job safety, employee skills enhancement and education, and the promotion of employee rights. Furthermore, its relationships with local communities are commendable. However, the occurrence of several fatal incidents at the company's manufacturing facilities led to a decline in these indicators in 2020–2021, whereas previous years witnessed fewer incidents. Currently, Anglo American Plc has learned from these incidents and taken steps to enhance safety and improve employee welfare.

Corporate governance quality also stands as an important determinant of inclusion. According to information disclosed in Anglo American Plc's annual reports, the company consistently adheres to best corporate governance practices. This is exemplified by the presence of external directors, accounting for at least 67% of the board of directors from 2018 to 2021, as well as a minimum of 69% of non-management directors. Additionally, there is a recurring annual trend of increasing female representation on the board of directors, with an increase from 20% in 2016 to 39% in 2021.

Refinitiv data further supports the notion that the company maintains a high level of corporate governance. However, as previously mentioned, these indicators experienced a decline in 2020–2021 due to various accidents, which were, in part, attributable to management errors and misjudgments.

An important aspect of corporate governance quality is the diversity of skills and experience among board members. In 2021, the board of directors at Anglo American Plc possessed a diverse array of competencies, including executive director experience (62%), prior experience on other boards of directors (77%), expertise in climate change and clean energy (31%), proficiency in digital technology (46%), experience in safety, health, and environmental matters (85%), marketing or trading in primary commodities (69%), financial acumen (69%), experience in construction within the extractive sector (54%), proficiency in large-scale project management (92%), engineering expertise (62%), and experience in extraction (54%). This high degree of diversification in board member skills and experience signifies effective corporate management.

In summary, our assessment indicates that the company consistently enhances its corporate governance practices on an annual basis, maintaining a high level of governance quality. Anglo American Plc operates on a global scale, with its primary activities concentrated in Australia, South Africa, Canada, and Latin America. In recent years, these regions have demonstrated a high level of achievement in relation to Sustainable Development Goals, positively impacting the company.

An analysis of the McKinsey Corporate Horizon Index reveals that Anglo American Plc exhibits a long-term perspective, focusing on value creation in the extended term. After registering a value slightly below 50 in the years 2017–2020, this figure reached 60 in 2021. This positive shift can be primarily attributed to significant and high-quality investments, improved operational performance, and a commitment to refraining from practices centered solely on creating accounting ("paper") earnings.

Relationship between Inclusive Growth Indicators and Financing Policy

The company predominantly finances its operations through equity. Over recent years, the Debt-to-Equity (D/E) ratio has remained relatively stable, ranging from 0.3 to 0.4. An analysis of the dynamics of the capital structure and the combined inclusivity index of Anglo American Plc

from 2016 to 2021 revealed no discernible relationship. As a result, hypothesis H1, positing a positive correlation between inclusive growth indicators and leverage levels (D/E ratio), is rejected.

Given the cyclical nature of the metals and mining sector, the prevailing market conditions influence companies' financial performance and financing policies. This observation is substantiated by an analysis of the dynamics of the company's D/E ratio in relation to the price index for commercial metals. A negative relationship was identified: when product prices were higher, the leverage was lower, whereas lower prices corresponded to a higher D/E ratio. This trend can be attributed to the fact that in favorable market conditions, companies generate sufficient cash flows, allowing them to finance their operations primarily through internal resources while resorting to loans to a minimal extent. Therefore, it can be asserted that Anglo American Plc adheres to the "financing order" concept (pecking order theory).

Operating in a capital-intensive industry where projects may span several years, the company makes use of borrowed capital consisting largely of long-term debt, which had a stable share of approximately 90% within the analyzed time period. Additionally, from 2017 to 2022, the Net Debt-to-EBITDA ratio remained consistently at or below 1. This signifies that the company's debt burden is relatively low, and it possesses the capability to quickly repay borrowed funds.

Starting in 2022, Anglo American Plc initiated green financing efforts. On June 9, 2022, the company entered into a $100 million loan agreement with the International Finance Corporation (IFC), extending over a 10-year term. This loan is directly linked to SDGs (Sustainability Linked Loan) and is part of the company's sustainable development financing concept. It represents the first loan of its kind by the IFC in the mining sector and is considered the world's first loan in the mining sector specifically focused on social development indicators. The loan's objectives include supporting the development of communities in rural areas near the company's mining operations in the Republic of South Africa, including the creation of jobs and the enhancement of education for 73 thousand students. The company has committed to allocate additional funds for agreed social goals should it fall short of its targets related to education and poverty alleviation, as per the terms of this loan.

On September 14, 2022, the company issued its first tranche of Sustainability Linked Bonds (SLBs) totaling €745 million, maturing over a 10-year period, following the publication of the company's sustainable development financing concept. These bonds feature a base coupon rate of 4.75%. Bondholders have the opportunity to receive an elevated final coupon payment if the company fails to achieve specific goals:

1. Reduce absolute greenhouse gas emissions (Scope 1 and 2) by 30% by 2030 compared to 2016.

2. Decrease freshwater intake in regions with water deficits by 50% by 2030 compared to 2015.

3. Provide five jobs outside the company for each job within the company by 2030 (the ratio was 1.9:1 in 2021).

The bond terms stipulate a 40 basis points increase in the coupon rate starting from September 2031 for each unmet Key Performance Indicator (KPI) or if proof of goal achievement is not published.

In summary, sustainable financing for Anglo American Plc as of late 2022 constituted a relatively small portion, approximately 2% of the total invested capital and about 6% of the total debt. However, within its industry, the company is a leader in these indicators. Thus, hypotheses H2.1 and H2.2, which propose that companies with high inclusivity indicators utilize sustainable (responsible) financing tools, were confirmed.

Throughout the analyzed time interval, no relationship was identified for Anglo American Plc between the cost of capital (WACC) and the inclusivity index. Consequently, hypothesis H3, suggesting a negative relationship between inclusive growth indicators and WACC, is rejected. Moreover, the level of the risk-free interest rate had a more significant impact on WACC dynamics. Notably, the interest rate for the aforementioned bond issue linked to SDGs is lower than the current WACC.

The company's credit rating, calculated based on the Interest Coverage Ratio relative to the credit spread level from A. Damodaran's table, remained consistently high above the A level during the considered period, except for a decline in financial indicators in 2016. However, no discernible relationship was found between the inclusivity index and the credit rating level. Consequently, hypothesis H4, positing a positive correlation between inclusive growth indicators and the credit rating level, is also rejected.

Analysis of Vale S.A.

Vale S.A. stands as one of the world's largest mining companies, with its roots in Brazil. It holds a prominent global position in the extraction of iron ore and nickel. The majority of its revenue is derived from the iron ore segment (81%).

Inclusive Growth

However, over the past decade, Vale S.A. has faced two of the most significant ecological disasters in Brazilian history, which have had profound environmental and human consequences. These events have tarnished the company's record substantially.

1. Mariana Dam Disaster (2015): On November 5, 2015, the Bento Rodrigues dams in Minas Gerais, Brazil, breached, releasing millions of tons of accumulated sludge from iron ore mining. Toxic tailings inundated downstream villages and contaminated the river, eventually reaching the Atlantic Ocean. The disaster resulted in 20 fatalities, 20 missing persons, 50 injuries, and extensive harm to the environment. The environmental impact is projected to last for 30 years.

In 2016 BHP together with Vale S.A. and Samarco agreed to pay the Brazilian government a fine of 20 billion reals ($4.8 billion). The fine did not comprise compensations to

people who suffered from the disaster or the cost of restoration of territories.

2. Brumadinho Dam Disaster (2019): On January 25, 2019, the Brumadinho dam collapsed due to catastrophic damage to the tailing dump at an iron ore mine in Minas Gerais, Brazil. This catastrophe obliterated everything in the Casa Branca river valley. 259 people died, and over 300 people were reported missing. Toxic waste severely damaged the ecosystem of the Paraopeba river. The company's failure to address problems with automatic equipment near the dams that had been reported before the accident contributed to this tragedy.

These disasters imposed significant financial burdens on the company and necessitated substantial changes in strategy and policy. Vale S.A. articulated several key objectives, including risk mitigation, enhanced liquidity management, and value creation to facilitate growth opportunities. It also adopted new values focused on safety benchmarks, leadership in low-carbon practices, and adherence to Environmental, Social, and Governance (ESG) practices.

The inclusion of these accidents within the ESG Controversies Score in 2016 and 2019–2021 resulted in a significant decline in the ESG Combined Score and the inclusivity index for Vale S.A. The example underscores the importance of adjusting indicators for the ESG Controversies Score to ensure a more unbiased assessment of a company's inclusive growth. In this case, the common ESG Score exhibited no reaction to the disasters or even increased.

The environmental impact of these incidents also led to a decrease in the company's Emissions Score and Resource Use Score. Furthermore, since these accidents adversely affected human lives, including the company's employees, various social indicators saw corresponding declines.

Given that these catastrophes were human errors, including those of top management, the indicator of corporate governance quality also witnessed a reduction.

In the aftermath of the 2019 catastrophe, Vale S.A. made a significant organizational decision by terminating the Vale S.A. Shareholders' Agreement and transitioning to a corporate structure with dispersed capital. This structural shift involved changes to the company's charter, including independent board majorities, approval of the chief external director, and the election of the chairman and deputy chairman of the board by shareholders.

Starting in 2019, Vale S.A. began to modify its top management's motivation system, with a significant portion of the president's and vice-president's remuneration being tied to long-term results and long-term motivation, aligning with best corporate governance practices.

Geographically, Vale S.A. operates primarily in Brazil, where the level of SDG achievement was not notably high during the analyzed period, although there was a trend of improvement.

An analysis of the McKinsey Corporate Horizon Index did not provide a definitive classification for the company as either "longsighted" or "shortsighted." While Vale S.A. tended more toward the former, a decline in this indicator has been observed in recent years. The company stands out for its substantial and attractive investment projects, does not engage in creating accounting-based earnings, and endeavors to exceed the ESG consensus forecasts of analysts.

Relationship Between Inclusive Growth Indicators and Financing Policy

Vale S.A. primarily relies on equity capital to finance its operations. Over the period from 2017 to 2021, its Debt-to-Equity (D/E) ratio remained stable, ranging between 0.35 and 0.50. Analysis of the capital structure dynamics and the consolidated inclusivity index of Vale S.A. for the years 2016 to 2021 yielded no apparent correlation between these indicators. Consequently, hypothesis H1, positing a positive relationship between inclusive growth indicators and leverage levels (D/E ratio), is not supported.

Similar to Anglo American Plc, Vale S.A. displayed a negative correlation between the index of commercial metal prices and the D/E ratio. This finding reinforces the argument that the current market environment plays a more substantial role in shaping the financing policies of companies in the metals and mining sector. It suggests that Vale S.A. also adheres to the "financing order" concept (pecking order theory).

In absolute terms, Vale S.A.'s debt decreased after 2016. Moreover, the borrowed capital primarily consists of long-term debt, amounting to over 90% for most of the analyzed time frame. This underscores the sector's characteristics and the dominance of long-term debt in its financing structure.

Since 2017, the Net Debt-to-EBITDA ratio has remained consistently below 1, indicating a low debt burden for the company.

Vale S.A. does not possess particularly high inclusive growth indicators and does not utilize sustainable (responsible) financing tools. This finding lends support to hypotheses H2.1 and H2.2, which propose a positive relationship between inclusive growth indicators and the volume (H2.1) and number (H2.2) of sustainable (responsible) financing tools.

Throughout the period from 2016 to 2021, no relationship was discerned between Vale S.A.'s Weighted Average Cost of Capital (WACC) and the inclusivity index. Thus, hypothesis H3, suggesting a negative relationship between inclusive growth indicators and WACC, is rejected. It is worth noting that, similar to Anglo American Plc, Vale S.A.'s WACC was more influenced by the level of the risk-free interest rate.

During the analyzed period, the company maintained a consistently high credit rating, calculated on the basis of a comparison of the Interest Coverage Ratio to the level of credit spread from A. Damodaran's table. However, no significant relationship between the inclusivity index and the credit rating level was identified. As a result, hypothesis H4, proposing a positive correlation between inclusive growth indicators and the credit rating level, is also rejected.

Analysis of PJSC Mining and Metallurgical Company Norilsk Nickel

PJSC Mining and Metallurgical Company Norilsk Nickel (Nornickel) is the leader of Russia's mining and metallurgical industry. It is the largest producer of palladium and class 1 nickel globally and is also a significant player in the manufacture of platinum, copper, silver, gold, rhodium, cobalt, ruthenium, and more. The company's main revenue streams are derived from palladium (32%), nickel (27%), and copper (22%).

Inclusive Growth

However, the company experienced an emergency at one of its mines in 2019, followed by a major accident in 2020 when a diesel fuel storage tank at Heat-and-Power Central Station 3 (TETs-3) suffered damage due to the collapse of its foundation supports, resulting in the leakage of approximately 21 thousand tons of fuel. An investigation by the Federal Environmental, Industrial, and Nuclear Supervision Service (Rostechnadzor) attributed the fuel spillage to design and construction defects, as well as poor facility usage control. In 2021, extraction operations at one of Nornickel's mines were suspended due to groundwater flooding.

These accidents had a detrimental impact on Nornickel's ESG indicators and inclusivity index. The company had not previously been a leader in ESG, particularly in the environmental domain, and its ESG Combined Score and Inclusivity Index declined even further from 2019 to 2021. Remarkably, the common ESG Score did not respond to the accidents at all. Subsequently, Nornickel renewed its inclusive growth strategies to prevent such incidents in the future.

Nornickel is committed to fully supporting the United Nations Sustainable Development Goals (SDGs) until 2030:

- Environment: The company aims to minimize its environmental impact, efficiently manage waste, and responsibly operate tailing dumps.
- Social Aspect: Nornickel's policies focus on supporting social and cultural diversity, combating discrimination, and strengthening long-term relationships with local communities in the regions where the company operates.
- Corporate Governance: Nornickel corporate culture emphasizes the efficient implementation of the company's development strategy, including sustainable development principles, and bolstering the company's reputation.

Nevertheless, due to the accidents, the company's Emissions Score and Resource Use Score decreased because of the significant environmental damage. However, the Resource Use Score remained at an average level throughout the analyzed period, indicating that the company's resource efficiency is not among the highest.

The social indicators were negatively affected as well, considering the impact of the accidents on people's lives and health. Nornickel performed the best in dealing with local communities and producing safe and high-quality products.

Overall, Nornickel's corporate governance quality suffered due to frequent disagreements with principal shareholders and public disputes between shareholders and management. The indicator of corporate governance quality declined as a result of the accidents. During the analyzed period, the percentage of external directors on the company's board of directors increased, the percentage of non-management directors remained largely unchanged, and the percentage of women on the board remained at a low 8%.

Nornickel's primary operational assets are located in Russia, a country with an above-average level of achievement in terms of the SDGs during the analyzed period. Additionally, there is a trend of improvement in this indicator.

According to the McKinsey Corporate Horizon Index, Nornickel can be described as a "longsighted" company focused on creating value over the long term. It stands out for its substantial, high-quality investments and consistently high operating performance. While a slight decrease in this indicator was observed in 2021, it remains just below the threshold of 50.

Relationship Between Inclusive Growth Indicators and Financing Policy

Nornickel predominantly finances its operations through loans, and over the analyzed period, its Debt-to-Equity (D/E) ratio hovered around 2.0x or slightly higher. An analysis of the dynamics of the leverage level and the consolidated inclusivity index of Nornickel for the years 2016 to 2021 did not reveal an evident relationship between these indicators. As a result, hypothesis H1, proposing a positive correlation between inclusive growth indicators and the D/E ratio, is rejected.

Similarly to other companies in the metals and mining sector, Nornickel displayed a negative relationship between the index of commercial metal prices and the leverage level. This underscores the notion that the current market conditions exert a more significant influence on the financing policies of companies in this sector. It suggests that Nornickel also adheres to the "financing order" concept or pecking order theory.

It is characteristic of Nornickel, as well as other companies in the sector, to primarily rely on long-term debt within their debt structure. In general, the share of long-term debt ranged between 85% and 90%, although there were periods when it was significantly lower (in 2012 and 2022). The Net Debt-to-EBITDA ratio has remained around 1 over the past few years and was even lower previously (0.5–0.6), indicating a low debt burden for the company.

Despite its relatively low level of inclusion, Nornickel did not engage in sustainable (responsible) financing. This aligns with hypotheses H2.1 and H2.2, which suggest a positive correlation between inclusive growth indicators and the volume (H2.1) as well as the number (H2.2) of sustainable (responsible) financing tools.

Throughout the analyzed period, no discernible relationship was identified between Nornickel's Weighted Average Cost of Capital (WACC) and the inclusivity index. Thus, hypothesis H3, positing a negative relationship between inclusive growth indicators and WACC, is rejected. Notably, similar to other companies, Nornickel's WACC was more influenced by the level of the risk-free interest rate.

Throughout the analyzed period, Nornickel maintained a consistently high credit rating (calculated through a comparison of the Interest Coverage Ratio to the level of credit spread from A. Damodaran's table), never falling below the AA level. The inclusivity index did not appear to have any influence on the credit rating level. Consequently, hypothesis H4, proposing a positive correlation between inclusive growth indicators and the credit rating level, is also rejected.

Conclusion

In the modern scientific literature, inclusive growth is understood as economic growth accompanied by the creation of favorable conditions to improve the quality of life and ensure equal opportunities for all segments of a country's population and the global community. This implies that companies should not solely focus on improving financial and operational indicators but also emphasize the environmental and social aspects of corporate development. Inclusive growth is achieved through the implementation of the 17 UN Sustainable Development Goals (SDGs) established in 2015 by the UN General Assembly.

Specifically, companies adhering to inclusive growth strategies pursue the following goals: prioritizing Total Shareholder Impact (TSI) for resulting Total Shareholder Return (TSR) growth, offering customized digital solutions and services, implementing selective strategies for growth and market presence, creating ecosystems and flexible logistics systems, establishing comprehensive data handling systems, adopting agile management approaches, and continuously adapting to changing circumstances.

Our empirical study, conducted through the construction of econometric models, revealed that the majority of inclusive growth indicators had no significant influence on the financing policies of the world's largest public companies in the metals and mining sector during the period of 2016–2021. This lack of influence may be attributed to the fact that the ESG agenda has significantly intensified only in recent years (since 2019), and companies are just beginning to adopt inclusive growth strategies, which requires time for transition.

However, our research has identified specific relationships between certain inclusion components and indicators characterizing distinctive features of financing policies:

Companies with high achievements in resource efficiency tend to use more borrowed capital.

Companies with strong records in improving human rights are inclined to utilize more sustainable (responsible) financing tools.

Companies with notable success in reducing pollutant emissions tend to have higher capital costs.

High achievement in improving the quality of life for local communities is associated with a lower cost of capital.

Companies with higher indicators in job safety, the creation of safe and high-quality products, and pollutant emissions reduction tend to receive higher credit ratings.

Companies excelling in improving human rights, enhancing the quality of life for local communities, and exhibiting less long-term planning are more likely to have lower credit ratings.

A case study was incorporated into our econometric study, examining three large companies engaged in the production of a diversified range of metals, each varying in their degree of inclusivity (Anglo American Plc, Vale S.A., PJSC Mining and Metallurgical Company Norilsk Nickel).

The research findings confirmed the absence of a direct relationship between inclusive growth indicators and the D/E ratio. Moreover, it was revealed that the pricing environment in commodity markets influenced the capital structure of companies in the metals and mining sector. A negative relationship between the price index for commercial metals and the D/E ratio was observed. In general, deleveraging was a common trend among all three analyzed companies following the commodity market crises in 2014–2016. This led us to conclude that these companies adhere to the "financing order" concept or pecking order theory.

Among the three companies analyzed, Anglo American Plc, a leader in implementing inclusive growth strategies, utilizes sustainable (responsible) financing methods, including credit and bond loans linked to the SDGs, amounting to 2% of its total invested capital and 6% of its total debt. Conversely, Vale S.A. and Nornickel, which have lower inclusion indicators, do not employ such financing sources. Thus, we see that more inclusive companies have the capacity to diversify their financing sources and adopt sustainable (responsible) financing tools, confirming the argument that higher inclusion levels correlate with a greater utilization of sustainable financing.

The results of our case study aligns with the conclusions drawn from the econometric model: inclusive growth indicators do not significantly impact a company's Weighted Average Cost of Capital (WACC). Instead, WACC is primarily influenced by factors such as the risk-free interest rate, current market conditions, and premiums associated with country-related and other specific risks.

Contrary to the econometric study, which identified a relationship between the credit rating and six inclusive growth indicators out of nine, the analysis of the dynamics of inclusion and credit rating levels of the three considered companies showed discrepancies. The credit ratings of these companies remained consistently high throughout the analyzed period, irrespective of their inclusion levels. This can be attributed to their relatively low debt burdens during this period.

Despite the somewhat mixed results from the empirical analysis, it remains our belief that all companies in the metals and mining sector, including those in Russia, should

focus on inclusive growth strategies. Doing so can help companies mitigate financial, operational, and reputational risks, enhance long-term business resilience, bolster their market positions, and increase their attractiveness to investors. Consequently, these companies may achieve reduced capital costs and greater diversification of financing sources.

Best practices from leading companies in this field worldwide can serve as a guide for transformation. This transformation is closely tied to the necessity of implementing large-scale investment projects and determining their financing sources. In such cases, sustainable (responsible) financing tools with potentially favorable rates may be employed.

We expect that further research conducted over a longer time frame will yield more representative results, offering opportunities for future study.

References

1. Ali H., Son H.H. Measuring Inclusive Growth. *Asian Development Review*. 2007;24(1):11-31. https://doi.org/10.1142/S0116110507000024
2. OECD. *All on Board: Making Inclusive Growth Happen*. Paris: OECD Publishing; 2015. 200 p. https://doi.org/10.1787/9789264218512-en
3. Eurasian Economic Commission, United Nations Conference on Trade and Development. *Inclusive growth of the Eurasian Economic Union Member States: assessments and opportunities*. 2019. https://doi.org/10.13140/RG.2.2.30267.36649
4. *Transforming our world: the 2030 Agenda for Sustainable Development*. 2015. URL: https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf (accessed on 11.05.2023)
5. Tamimi B., Sebastianelli R. Transparency among S&P 500 companies: an analysis of ESG disclosure scores. *Management Decision*. 2017;55(8):1660-1680. https://doi.org/10.1108/MD-01-2017-0018
6. Arayssi M., Jizi M., Tabaja H.H. The impact of board composition on the level of ESG disclosures in GCC countries. *Sustainability Accounting, Management and Policy Journal*. 2020;11(1);137-161. https://doi.org/10.1108/SAMPJ-05-2018-0136
7. Khaled R., Ali H., Mohamed E.K.A. The Sustainable Development Goals and corporate sustainability performance: Mapping, extent and determinants. *Journal of Cleaner Production*. 2021;311:127599. https://doi.org/10.1016/j.jclepro.2021.127599
8. Bhattacharya A., Lang N., Hemerling J. *Beyond Great: Nine Strategies for Thriving in an Era of Social Tension, Economic Nationalism, and Technological Revolution*. PublicAffairs; 2020. 288 p.
9. Naciti V. Corporate governance and board of directors: The effect of a board composition on firm sustainability performance. *Journal of Cleaner Production*. 2019;237:117727. https://doi.org/10.1016/j.jclepro.2019.117727
10. Cheng B., Ioannou I., Serafeim G. Corporate social responsibility and access to finance. *Strategic Management Journal*. 2014;35(1):1–23. https://doi.org/10.1002/smj.2131
11. Benlemlih M. Corporate Social Responsibility and Firm Debt Maturity. *Journal of Business Ethics*. 2017;144:491–517. https://doi.org/10.1007/s10551-015-2856-1
12. Dimitropoulos P., Koronios K. Corporate Environmental Responsibility and Capital Structure. In: *Corporate Environmental Responsibility, Accounting and Corporate Finance in the EU*. Springer Nature; 2021. 265 p. https://doi.org/10.1007/978-3-030-72773-4_7
13. Villaron-Peramato O., Garcia-Sanchez I.M., Martinez-Ferrero J. Capital structure as a control mechanism of a CSR entrenchment strategy. *European Business Review*. 2018;30(3):340–371. https://doi.org/10.1108/EBR-03-2017-0056
14. Al Amosh H., Khatib S.F.A., Alkurdi A., et al. Capital structure decisions and environmental, social and governance performance: insights from Jordan. *Journal of Financial Reporting and Accounting*. 2022; Ahead-of-print. https://doi.org/10.1108/JFRA-12-2021-0453
15. Lindkvist L., Saric O. *Sustainability Performance and Capital Structure: An analysis of the relationship between ESG rating and debt ratio.* 2020. URL: https://www.diva-portal.org/smash/get/diva2:1447928/FULLTEXT01.pdf (accessed on 11.05.2023)
16. El Ghoul S., Guedhami O., Kim H., et al. Corporate Environmental Responsibility and the Cost of Capital: International Evidence. *Journal of Business Ethics*. 2018;149:335–361. https://doi.org/10.1007/s10551-015-3005-6
17. Gianfrate G., Schoenmaker D., Wasama S. *Cost of Capital and Sustainability: A Literature Review*. 2018. URL: https://www.rsm.nl/fileadmin/Faculty-Research/Centres/EPSVC/11_04_Cost_of_Capital.pdf (accessed on 11.05.2023)
18. Goncalves T.C., Dias J., Barros V. Sustainability Performance and the Cost of Capital. *International Journal of Financial Studies*. 2022;10(3):63. https://doi.org/10.3390/ijfs10030063
19. Dorfleitner G., Grebler J. The social and environmental drivers of corporate credit ratings: international evidence. *Business Research*. 2020;13(3):1343–1415. https://doi.org/10.1007/s40685-020-00127-9
20. Bannier C.E., Bofinger Y., Rock B. Corporate social responsibility and credit risk. *Finance Research Letters*. 2022;44:102052. https://doi.org/10.1016/j.frl.2021.102052
21. Li H., Zhang X., Zhao Y. ESG and Firm's Default Risk. *Finance Research Letters*. 2022;47(B):102713. https://doi.org/10.1016/j.frl.2022.102713

Appendices

Appendix 1. Descriptive statistics

Variable	Mean	Median	St. deviation	Min.	Max.
Book D/E	0.553	0.446	3.41	−105	15.8
Volume of sustainable financing	29.865	0.00000	291.02	0.0	5400.0
Number of sustainable financing	0.05110	0.0000	0.3017	0.0000	4.000
WACC	0.08445	0.08383	0.02231	0.03561	0.2945
Implied credit rating	10.2	12.0	5.11	1.00	15.0
Emissions score	51.1	55.4	29.0	0.000	99.9
Resource use score	48.9	52.0	30.0	0.000	99.9
Workforce score	51.0	53.7	29.5	0.000	99.9
Human Rights score	34.8	32.5	31.8	0.000	97.4
Community score	48.6	53.3	30.9	0.000	99.9
Product responsibility score	41.9	45.4	32.4	0.000	99.8
Governance score	51.8	54.9	25.3	0.000	98.7
Country SDG index score	74.3	74.5	5.24	57.2	86.5
McKinsey CHI	50.0	50.0	11.6	8.90	94.5
Invested capital	7,863	3,701	12,283	96.83	89,222
Size	8.47	8.54	1.33	4.80	11.8
Profitability	0.156	0.113	0.151	−0.719	0.769
Growth	1.57	1.32	0.949	0.275	8.78
CapEx intensity	0.0610	0.0499	0.0445	0.000	0.389

Source: calculated by the authors on the basis of Gretl.

Appendix 2. TOP-20 companies in terms of market capitalization from the metals and mining sector in the world in 2021 and their inclusion indicators

№	Компания	Специализация	Страна	Emissions Score	Resource Use Score	Workforce Score	Human Rights Score	Community Score	Product Responsibility Score	Governance Score	Country SDG Index Score	McKinsey CHI	Inclusivity Index
1	Newmont Corporation	Золото		80.73	83.46	80.04	69.87	81.49	45.69	83.53	74.50	32.58	70.21
2	Grupo Mexico SAB de CV	Диверсифицированный		79.04	97.76	48.99	72.15	85.99	65.46	35.25	70.16	47.76	66.95
3	ArcelorMittal SA	Черная металлургия		68.08	58.02	66.00	67.27	70.04	53.61	58.21	75.65	42.36	62.14
4	Anglo American Plc	Диверсифицированный		60.98	66.54	66.20	65.90	62.61	31.40	61.36	80.53	60.38	61.77
5	Southern Copper Corp	Медь		65.50	76.30	40.17	72.02	94.90	64.62	24.59	70.16	43.34	61.29
6	Franco-Nevada Corp	Золото		83.20	43.67	38.68	92.79	63.34	23.79	68.94	77.68	47.56	59.96
7	Baoshan Iron & Steel Co Ltd	Черная металлургия		93.62	59.23	90.47	22.15	15.13	91.53	41.67	72.36	53.18	59.93
8	Freeport-McMoRan Inc	Медь		62.56	55.80	48.86	50.91	63.32	54.62	61.86	74.50	62.56	59.44
9	Ganfeng Lithium Group Co Ltd	Диверсифицированный		90.28	59.13	75.76	9.82	46.61	44.71	66.60	72.36	64.74	58.89
10	Saudi Arabian Mining Company SJSC	Диверсифицированный		55.34	67.41	33.97	34.06	83.97	65.46	70.36	66.36	50.42	58.59
11	Nucor Corp	Черная металлургия		42.32	57.65	32.40	83.39	49.78	65.46	50.16	74.50	42.16	55.31
12	Glencore Plc	Диверсифицированный		50.70	50.81	51.13	48.59	48.67	49.24	48.57	80.67	34.88	51.47
13	Vale SA	Диверсифицированный		51.09	54.47	52.15	51.06	49.01	32.29	48.14	72.76	41.70	50.30
14	Fortescue Metals Group Ltd	Черная металлургия		55.59	48.01	59.23	56.07	54.02	21.59	32.86	75.58	44.42	49.71
15	BHP Group Ltd	Диверсифицированный		48.95	45.92	53.40	45.27	53.29	15.47	52.51	75.58	56.20	49.62
16	Rio Tinto Plc	Диверсифицированный		42.50	41.84	51.24	48.59	48.89	34.93	34.05	80.53	50.60	48.13
17	GMK Noril'skiy Nikel' PAO	Диверсифицированный		46.18	50.68	39.74	41.57	49.95	51.66	29.60	74.06	48.70	48.02
18	Barrick Gold Corp	Золото		48.85	51.42	39.60	50.51	51.93	16.02	38.51	77.68	50.60	47.24
19	Zijin Mining Group Co Ltd	Золото		55.93	53.24	45.31	22.25	21.99	58.62	28.15	72.36	48.40	45.14
20	China Northern Rare Earth Group High-Tech Co	Диверсифицированный		28.26	16.62	39.35	69.87	8.41	51.61	49.85	72.36	49.56	35.11

Note: All indicators are measured on a scale from 0 to 100 (the higher the value, the better the company performs in the corresponding area).
Source: compiled by the authors.

Contribution of the authors: the authors contributed equally to this article.
The authors declare no conflicts of interests.
The article **was submitted** 06.07.2023; **approved after reviewing** 08.08.2023; **accepted for publication** 14.09.2023.