

## Research Article

# The Multifaceted Sustainable Development and Export Intensity of Emerging Market Firms under Financial Constraints: The Role of ESG and Innovative Activity

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The role of sustainable development in the export intensity of small and medium-size enterprises (SMEs) represents an open research question. We consider sustainable development through the environmental, social, and governance (ESG) dimensions as well as via firms' innovative activity indicators. Our objective is to reveal the sustainability determinants of export intensity of SMEs in emerging markets subject to financial constraints, which is one of the major obstacles for SMEs. Our sample is based on the 2018–2020 Business Environment Enterprise Performance Survey data. The Heckman model allows us to reveal the factors relevant for SMEs to gain access to foreign markets under the control of financial constraints specific for SMEs. We also analyze the determinants of the SMEs' share of direct exports in revenue. Our results demonstrate that innovative activity and corporate social responsibility facilitate entry to foreign markets, while equity concentration is a major deterrent. In particular, we reveal a significant positive effect of research and development investment on export intensity. Our findings highlight the complex nature of the interrelations between the SMEs' share of direct exports in revenue and ESG consciousness. We find that other significant factors are political links of the top management, the gender composition of production and administrative units, employee training facilities, and ownership structure.

## 1. Introduction

The early 21st century marked the development of a strong globalization trend [1–3]. Modern trade theories emphasize that trade liberalization helps a country to increase the competitiveness of its economy and identify the most effective industries and firms. Benefits of international trade have been revealed even in the 19<sup>th</sup> century: Bernhofen and Brown [4] show advantages of an open economy for Japan. Fajgelbaum et al. [5] estimate a short-term impact of an increase in US import tariffs in 2018. They find that a return to protectionism resulted in an aggregate real income loss for the US economy of about \$7.2 billion, or almost 0.05% of GDP. Yet, recently, we have been witnessing instances of a

reverse trend, i.e., isolation. Some countries have been advancing import substitution (Russia) or participating in sanctions war (Russia, Belarus, Iran, and Venezuela).

Another trend synchronous with globalization is an increasing awareness of the importance of sustainable development among researchers and practitioners. According to Brundtland and Khalid [6], sustainable development is a “development which meets the needs of current generations without compromising the ability of future generations to meet their own needs.” In this paper, we make an attempt to investigate the determinants of exports through the prism of sustainable development. Taherdangkoo et al. [7] present a literature review in the field of sustainability and marketing strategies of export companies. Many studies report that

sustainability is often considered a competitive advantage and a way to manage costs (see, e.g., [8]). Varadarajan [8] develops a conceptual framework describing interrelationships among public policy actions, quantitative and qualitative gaps in public goods, ecologically more harmful substitute products and sustainability effects. However, this conceptual framework does not take into account environmental and governance dimensions and does not comprise innovations. As noted by Zeriti et al. [9], sustainability has a positive influence on the performance of export-oriented companies. Yoon et al. [10] based on the analysis of previous papers report the following benefits of sustainable development: an increase in operating efficiency and employee productivity, improvement in corporate reputation and risk management, and capital market benefits. These benefits can create competitive advantages which facilitate entering foreign markets. However, the authors do not investigate the impact on exports. We fill this gap.

For emerging markets and in particular for small and medium enterprises (SMEs), export activity and involvement in global value chains have become a key success factor given national currency fluctuations and imported inflation [11]. A research question that remains open is as follows: what is the role of sustainable development in SMEs' export intensity? Export intensity contributes to an increase in profitability ratios and a decrease in management costs. Access to foreign end markets allows SMEs to adopt best practices, build up intellectual capital, and improve the quality of their production [11, 12]. This, in turn, results in a better competitiveness and attractiveness of SMEs for global investors. Arora and De [13] focus on Environmental Sustainability Practices in Latin America and demonstrate that the adoption of such practices helps export companies to improve credibility among external stakeholders. Falahat et al. [14] reveal that market intelligence capability and the ability to develop and produce innovative and unique products create competitive advantages for exporting SMEs, and that these competitive advantages positively impact firm performance. Ullah et al. [15] show that social and environmental attributes in production positively and significantly contribute to export performance of US manufacturing companies. SMEs play an important role in the economy of West Europe and the US. For example, in 2018, SMEs contributed 56.4% to the total value added and provided 66.6% of employment in the European Union [16]. Emerging market firms, especially SMEs, have been facing more administrative and financial constraints while receiving less government financial support than in developed countries [17].

The concept of sustainable development is multi-faceted. We consider two groups of factors contributing to sustainable development: environmental, social, and governance (hereinafter ESG) indicators and innovative activity. Recently, companies, investors, and regulators have acknowledged ESG indicators as factors essential for sustainable development. The ESG principle is "an investment philosophy that pursues long-term value growth, and it is a comprehensive, concrete, and down-to-earth governance

method" [18]. Zhan et al. [19] define ESG investment criteria as "a series of standards for the company or investor who pursues long-term sustainable benefits," and these standards are directly associated with environmental, social, and governance issues. ESG criteria are often used by investors to assess the sustainability of business activities. The review of the papers studying the role of ESG score as an indicator of corporate sustainability development is presented in Dremptec et al. [20]. The authors show that the ESG score is a popular approach to measuring sustainability. The advantage of the ESG score is that it represents a single quantitative assessment similar to a credit rating. However, they express doubts about the reliability of some metrics due to the lack of transparency, and there is a question of its comparability among different sectors. We agree with Dremptec et al. [20]; hence, we will analyze a wide range of indicators of sustainable development instead of using an integrated ESG score.

A series of academic papers reports a significant and positive ESG impact on firms' market value, financial position, cost of capital, and resilience during the periods of crisis [21–24]. Diez-Cañamero et al. [25] analyze corporate social responsibility through sustainable development indices, ratings, and rankings. They conclude that socially responsible investing has led to the emergence of corporate sustainability systems (CSSs). Ziolo et al. [26] test the hypothesis that adopting ESG standards in decision-making by financial institutions results in a greater stability of a country's financial system. The authors show that regulators in financial markets account for ESG-related risks. According to Governance and Accountability Institute (Governance & Accountability Institute (2020), G&A Institute's 2020 S&P 500 Flash Report URL: <https://www.ga-institute.com/research-reports/flash-reports/2020-sp-500-flash-report.html>), in 2011, only 20% of S&P 500 companies published reports on sustainable development or corporate responsibility. In 2020, this number rose to 90%. Also, there are many examples of successful implementation of environmental sustainability practices at companies around the world (Appendix A).

Scholars and practitioners point to firms' innovative activity as another factor essential for competitiveness and sustainable growth [27–29]. For example, Skare and Porada-Rochon [27] show that innovation has a positive influence on sustainability at both the micro and macro levels. The authors report that companies' technology-related innovations do decrease energy intensity, and that economies with a large fraction of innovative firms have high energy efficiency. Another empirical fact is that stocks of innovative firms (especially from the high-tech industry) tend to generate higher average returns compared to noninnovative companies.

So, we specify our research question as follows: do innovative activity and adherence to ESG standards facilitate SMEs' access to foreign markets and export intensity? Academic papers that study the impact of ESG and innovative activity on the export intensity of SMEs are scarce [30–32]. For example, Gupta and Chauhan [32] conduct a meta-

analysis of 74 empirical studies of impact of SMEs' capabilities on their export performance, but there is no consideration of the impact of ecological, corporate governance, and social responsibility factors. A lot of studies concentrate on large firms [33, 34].

Golovko and Valentini [35] use a panel of Spanish manufacturing firms and show that there is a positive bi-directional relationship between innovation and export. Innovation allows companies to enter new markets with better-quality goods. In turn, activity in foreign markets improves the innovation performance of companies by learning. The authors also find that more innovative export companies are more likely to perform better. Tandrayen-Ragoobur [36] studies the interplay between innovation and export behavior across companies in Africa. The analysis confirms both the self-selection hypothesis (innovation has a positive influence on export) and the learning-by-exporting hypothesis (globalization drives firms to innovate) mentioned earlier. Love and Roper [37] provide evidence that innovation activities allow SMEs to produce export-based growth. The authors discuss the internal and external factors which promote export and innovation (research and development, intellectual property management, ecosystems, etc.).

Gupta and Chauhan [32] highlight the context-dependent nature of the impact of firm's capabilities on their export intensity. They report on the significance of the business environment in the country. The relevance of our research question comes from the fact that the domestic market in developing countries is usually small, unstable, and less profitable for SMEs than foreign markets [32, 38]. Yet, entrance to foreign markets for SMEs is complicated because of the greater level of competition, cultural differences, and economic uncertainties [39]. It is, thus, important to reveal the determinants of export performance with the focus on sustainable development [39]. According to Haddoud et al. [40], most of the previous works deal with the determinants of export propensity and only few papers focus on determining factors for accessing foreign markets. Our research fills this gap.

Many relevant academic papers only consider domestic firms of one country [41–43]. The novelty of our research is that the sample formed based on the Business Environment Enterprise Performance Survey (BEEPS) data includes 37 Asian and Eastern European developing countries. Hence, we can reveal country-specific features. Many previous studies [40, 44, 45] use data from firms' financial statements, owners' personal characteristics (e.g., knowledge, experience, and age), and the quality of business environment as determining factors for export intensity. This makes it difficult to isolate the influence of a wide range of sustainable development indicators: ESG and innovative activity. The BEEPS data contain responses of top-managers to various questions on their firms' business including questions on ecological and social responsibility, corporate governance and innovative activity, and involvement in export trade.

While many previous studies only use the logit and probit models [40, 46], we employ the Heckman model [47, 48] to reveal the impact of ESG and innovative activity

on export intensity. This allows us to take into account SME-specific features and identify instances when sustainability provides favorable conditions for export trade given financial constraints. Previous studies emphasize the high policy costs of accessing foreign end markets and possible problems due to financial constraints [40, 45, 49].

Section 2 presents a literature review and lays out research hypotheses. Section 3 presents research methodology. Section 4 contains sample descriptive statistics. Section 5 presents test results of the impact of ESG and innovative activity on firms' export intensity given financial constraint and the size effect. Section 6 concludes.

## 2. Literature Review and Research Hypotheses

Gupta and Chauhan [32] conduct a meta-analysis of 74 academic papers that investigate the impact of different characteristics of SMEs on export performance. The authors emphasize that the concept of export performance is ambiguous. Traditionally, scholars have distinguished between subjective and objective metrics. Objective metrics include the share of export-based revenue in total revenue [50, 51], the annual profitability of export sales, and the annual export profit margin [32]. Subjective metrics include assessing the effectiveness of functioning in foreign markets based on survey data by such indicators as export sales, export profits, growth in export sales, and entry into new markets [52]. We consider such objective metrics of export intensity as entry to foreign markets and the share of direct export in revenue (SDER).

The concept of sustainable development is also multifaceted [53, 54]. Most widely accepted indicators of sustainable development are innovative activity and ESG. In Section 2.1, we describe in more detail different indicators of innovative activity and innovations and put forward a hypothesis regarding the influence of innovative activity on export intensity of firms. In Section 2.2, we describe ESG indicators and put forward hypotheses regarding the influence of ESG on export intensity.

*2.1. Innovative Activity and Innovations: The Concept and the Impact on Export Intensity.* Since financial indicators (for example, R&D expenditures) often are not able to fully describe company's innovative profile, various metrics of innovative activity and innovations have been proposed in the academic literature. García-Pérez-de-Lema et al. [53] identify objective and subjective metrics for assessing technological innovation based on survey data (Table 1). The authors conclude that the subjective approach is more suitable for SMEs, while the objective approach tends to underestimate the innovative activity of SMEs. Since our research is based on survey data, we will strike a balance between subjective and objective metrics.

Many papers addressed the issue of identifying the relationship between innovative activity and profitability and financial stability of firms [31, 56, 59]. Studies that examine the influence of these factors on the entry of SMEs into international markets utilize the thesis that SMEs face a

TABLE 1: Overview of indicators of innovative activity and innovations.

Indicator	Papers
<i>Objective metrics</i>	
Number of new products and services	García-Pérez-de-Lema et al. [53]
Number of technological innovations	García-Pérez-de-Lema et al. [53]
Dummy of introduction of new products or new technological processes	Friesenbichler and Peneder [55]
Participation in international research activities	Davcik and Cardinali [56]
Implementation of innovations aimed at lean manufacturing	De et al. [30]
Number of patents	Teplova and Sokolova [57]
Existence of R&D expenses for the reporting year	Teplova and Sokolova [57]
Share of R&D expenses in revenue	Teplova and Sokolova [57]; Friesenbichler and Peneder [55]
Intangible assets in total assets	Teplova and Sokolova [57]
Share of employees involved in R&D in the total number of employees	Kim and Hemmert [58]
<i>Subjective metrics</i>	
Market innovation in products and processes	García-Pérez-de-Lema et al. [53]
Responsiveness to new products or technological innovations	García-Pérez-de-Lema et al. [53]
The ability to develop your own innovations	Martinez-Roman and Romero [43]; Friesenbichler and Peneder [55]
The ability to implement the acquired technologies	Martinez-Roman and Romero [43]
«Accumulation of knowledge»: focus on the use of internal developments in technological processes, which determines technological leadership	Friesenbichler and Peneder [55]

number of obstacles. The authors note such limitations as: (1) intellectual capital (management capabilities, access to human resources, cultural mismatch, insufficient knowledge of foreign market, language, etc. [32, 60]; (2) financial constraints [32]; (3) regulatory barriers (complex export procedures and technical barriers [61]. The existence of these limitations and comparative competitive advantages is explained by three theoretical concepts: the resource-based view (RBV), the Dynamic capability theory, and Porter's theory [62]. RBV is used to describe endogenous firm factors, while the second approach describes how firms develop dynamic capabilities in response to difficulties in entering foreign markets. Within the RBV framework, in order for a resource to be useful in a rapidly changing environment, it should be valuable, rare, unique, and not subject to replacement. To ensure these resource attributes, firms rely on their dynamic capabilities which are reflected in their ability to adapt the resource base. Recent studies [63–65] identified three most significant opportunities for SMEs: innovation, marketing, and networking. In line with this, RBV argues that innovation, new technologies, and patents are a long-term competitive advantage for firms in foreign markets [66]. Some papers oppose RBV and Porter's theory: for example, a study on 1642 Spain firms found that industry conditions explain 3%, while firm resources explain 36% of performance variation [67]. Our research assumptions are in line with Asad [68]: we assume that it is equally important for companies to have rare and unique resources and take into account the external environment and industry constraints.

The results of previous studies appear to contradict each other. For example, Kim and Hemmert [58]; Rodil et al. [46]; Bierut and Dybka [69] find a positive relationship between innovative activity and export intensity, while others show a lack of such relationship [70] or bidirectional causal relationships [71]. However, the last two mentioned papers do

not focus on sustainable innovations. Our motivation is to fill this gap.

So, we put forward the following hypothesis:

*Hypothesis 1.* Sustainable innovative activity significantly and positively affects the export intensity of SMEs.

Gupta and Chauhan [32] find that, according to the results of most studies, there is a positive relationship between the implementation of innovations and the entry of SMEs into foreign markets. The authors emphasize that SMEs face limited access to finance and a lack of management experience, and innovative activity helps them to overcome these limitations. They also find that innovative activity has a moderate impact on the export performance of SMEs, and attention should be paid to the development of marketing capacity and networking. The authors show that innovative activity is more prominent for the exports of companies from developing countries, since such companies are in an unfavorable business environment and are forced to overcome institutional constraints and solve problems with undeveloped infrastructure. Innovative potential helps them to adapt flexibly to conditions in foreign markets.

Haddoud et al. [40] analyze survey data on 409 family firms and reveal that process innovation positively impacts export intensity. The authors highlight that one of possible channels of influence is that innovation creates a competitive advantage and adds to firm value. Monreal-Pérez et al. [72] perform a longitudinal analysis of export activity for a sample of 1,767 Spanish firms from 2001 to 2008. The authors find that innovation encourages firms to increase their export activity. They explain this by the following: exports increase the customer base and help firms to recover R&D costs which are fixed. Foreign markets are an area where firms can exploit innovations and increase performance. Moreover, only the most productive firms can overcome the barriers of entry to foreign markets, and innovation is a

TABLE 2: Indicators of export orientation and its determinants.

Variable in the model	Variable in the BEEPS base	Indicator	Direction of influence
<i>Dependent variables</i>			
export	export	SDER, %	
export_dummy	export_dummy	Is there a direct export: 0 - no, 1 - yes	
<i>Explanatory variables</i>			
<i>Innovative activity (to test Hypothesis 1)</i>			
r&d	bmh2	Was there any R&D spending over the past 3 years? 0 - no, 1 - yes	+
techlicence	e6	Does the company use technology obtained under a license from a foreign company? 0 - no, 1 - yes	+
extknowledge	bmh1	Over the past 3 years, were there any expenses for acquiring external knowledge? 0 - no, 1 - yes	+
ext_r&d	bmh3	Over the past 3 years, were there any expenses for acquiring R&D from outside organizations? 0 - no, 1 - yes	+
<i>Environment governance (to test Hypothesis 2)</i>			
safe_energy_prod	bmgc23b	Were climate-friendly energy production technologies adopted over the past 3 years? 0 - no, 1 - yes	+
advanced_lighting	bmgc23i	Was any improvement of lighting system adopted over the past 3 years? 0 - no, 1 - yes	+
eco_strategy	bmga1	Are ecology or climate change issues mentioned as strategic objectives? 0 - no, 1 - yes	+
eco_standards	bmga4	Do customers require certification or adherence to environmental standards? 0 - no, 1 - yes	+
energy_control	bmgc1	Did the company monitor energy consumption over the last 3 years? 0 - no, 1 - yes	+
audit_energy_consumpt	bmgc3	Was an external audit of energy consumption completed over the last 3 years? 0 - no, 1 - yes	+
water_control	bmgc4	Did the enterprise monitor water consumption over the past 3 years? 0 - no, 1 - yes	+
emitted_CO2	bmgc7	Did the enterprise emit CO <sub>2</sub> over the last 3 years? 0 - no, 1 - yes	+
emitted_pollutants	bmgc12	Did the enterprise emit pollutants (other than CO <sub>2</sub> ) over the last 3 years? 0 - no, 1 - yes	+
plan_electricity	bmgc16	Did the enterprise plan indicators for the use of electricity over the last 3 years? 0 - no, 1 - yes	+
plan_CO2	bmgc18	Did the enterprise have targets for CO <sub>2</sub> emissions over the last 3 years? 0 - no, 1 - yes	+
plan_pollutants	bmgc20	Did the enterprise have targets for emissions (other than CO <sub>2</sub> ) over the last 3 years? 0 - no, 1 - yes	+
improve_heat_cool	bmgc23a	Was there an improvement in heating and cooling over the last 3 years? 0 - no, 1 - yes	+
min_waste	bmgc23e	Were any measures taken to minimize and recycle waste over the past 3 years? 0 - no, 1 - yes	+
control_air_pollution	bmgc23f	Were any air pollution control measures taken in the past 3 years? 0 - no, 1 - yes	+
incr_energy_efficiency	bmgc25	Over the last 3 years, were any measures taken to increase energy efficiency?	+
standard_energy_efficiency	bmgd7	Was the energy efficiency standard observed in the activities of the enterprise?	+
renewable_energy	bmge5	In the last fiscal year, did a company use own renewable energy sources?	+
<i>Social governance (to test Hypothesis 3)</i>			
website	c22b	Does the company have a website? 0 - no, 1 - yes	+
share_females_workers	l5a	Share of females among full-time workers, %	+
share_females_nonprod	l5b_l3b	Share of females among nonproduction employees working full-time, %	+
empl_education	l10	Is there training for permanent employees? 0 - no, 1 - yes	+
<i>Corporate governance (to test Hypothesis 4)</i>			
CEO_female	b7a	Is the CEO female? 0 - no, 1 - yes	-
performance_control	bmr2	Are any production/service indicators monitored by the management? 0 - no, 1 - yes	+
environment_manager	bmga2	Has the company a manager responsible for environmental protection and climate preservation? 0 - no, 1 - yes	+

TABLE 2: Continued.

Variable in the model	Variable in the BEEPS base	Indicator	Direction of influence
fin_audit	k21	Were the financial statements checked and certified by an external auditor last year? 0 - no, 1 - yes	+
CEO_politic	bmb5	<i>Social capital of the CEO (to test Hypothesis 5)</i> Has the owner/CEO ever been elected or appointed to a political position? 0 - no, 1 - yes	+/-
gov_regulations	j2	What percentage of senior management's time was spent working with government regulations?	+/-
politic_gifts	bmj3a	The degree of payments, gifts, or exchange favors with parliamentarians to affect votes? 0-4*	+/-
<i>Control variables</i>			
num_empl	l1	Number of employees, people	+
num_empl_sqr	l1_sqr	Number of employees squared	+
age	b5_v	Company age, years	+
age_sqr	b5_sqr	Company age squared	+
gdp_ln	gdp_ln	Logarithm of GDP per capita	+
rate	rate	Key rate of the Central Bank, %	+
export_GDP	export_GDP	Country's export of goods and services as a percentage of GDP	+
sizecode	sizecode	Company size dummy (number of employees): 1- small (5-19), 2- medium (20-99), 3- large (100 or more)	-
dummy_Asia	a3ax	Dummy for Asian region: 0 - no, 1 - yes	+/-
dummy_public	b1	Dummy of a public company: 1 - nonpublic, 0 - public	+
trade_union	trade_union	Number of trade unions the country is a member of	+
owner_female	b4	Presence of females among the owners of the company: 0 - no, 1 - yes	+
shadow_econ	e30	How much of an obstacle are competitors in the shadow sector? 0-4*	-
num_competitors	e2b	Number of competitors for the main product/service in the main market	-
owner_share	b3	The share of the firm owned by the largest owner (s)	+
ind_ef	ind_ef	Index of Economic freedom	+
ind_ps	ind_ps	Index of political stability (World Bank)	+
fin_obstacle	k30	How serious constraint is access to finance? 0-4 *	-
iso	iso	ISO certificate: 0 - no, 1 - yes	+
<i>Additional variables-potential determinants of financial constraints</i>			
for_share	b2b	Share of a foreign owner in the equity capital of the company, %	
gov_share	b2c	Share of the state in the equity capital of the company, %	
workcap_banks	k3bc	Share of working capital borrowed from banks, %	
workcap_nonbanks	k3e	Share of working capital borrowed from nonbank financial, %	
workcap_bonds	bm3b	Share of working capital financed by issuing bonds, %	

Note. For variables with a score from 0 to 4, the following gradation is used: 0 for absent, 1 for insignificant, 2 for moderate, 3 for serious, and 4 for very serious.

driver of increasing productivity. Wu et al. [34] provide evidence that innovation has a positive effect on the exports of Chinese manufacturing companies for the period from 1998 to 2007. The authors explain this by the fact that exports assume the large costs of studying foreign markets, developing suitable products, transportation, and establishing contacts with customers. Innovations can reduce export costs and make firms more adaptive to the new business environment.

We note that the accumulation of intellectual capital and the implementation of R&D are associated with increased risks. For example, Takeda et al. [73], using a sample of Japanese banks, find that investment in IT increases the investment attractiveness of banks in the short term but decreases it in the long term. The smaller the bank, the more onerous R&D costs can be.

The proxies of innovative activity that we consider are shown in Table 4. Our sample is based on survey data

containing few financial indicators, so we primarily analyze the influence of dummy variables.

Gupta and Chauhan [32] show that, in general, the innovation and marketing potential of SMEs, as well as their network connections, positively affect their performance in foreign markets, but these relationships are context-dependent. In addition to the characteristics of firms, the quality of business environment is important; innovation potential is most significant for SMEs from developed countries. Gupta and Chauhan [32] do not consider ESG factors in their meta-analysis. In contrast, we account for the impact of ESG on export intensity.

*2.2. ESG: Different Dimensions and Impact on Export Intensity.* Zhan and Santos-Paulino [19] consider such aspects of sustainable development investment at the country level as: power (investment in generation and distribution of

electricity), water, sanitation and hygiene, food and agriculture, climate change mitigation and adaptation, ecosystems and biodiversity, health and education. Escrig-Olmedo et al. [54] analyze the assessment processes of ESG rating agencies and provide detailed lists of criteria according to which the ESG rating are assigned to firms. In academic literature and analytical reports, ESG indicators are divided by three projections: environment responsibility, social responsibility and corporate governance (Table 4).

We also consider ESG factors as determinants of entering foreign markets. A recent trend has been to incorporate ESG characteristics of companies in analysis. The influence of ESG factors on the financial performance of firms has been extensively studied. A number of papers document a positive impact [22, 74, 80, 81], although some studies reveal negative or nonlinear effects [82]. Xie et al. [83] based on the data of 209 Chinese companies find a positive impact of green technology innovation on the financial performance.

At the same time, there are not many studies in the academic literature aimed at identifying the impact of innovation and ESG factors on firms' export intensity [32, 40], and the conclusions of previous studies are ambiguous.

We put forward the following hypotheses:

*Hypothesis 2.* Adherence to ESG principles aimed at preserving the environment increases the chances of a firm entering foreign markets and the volume of exports.

There are few papers devoted to the analysis of the impact of environmental policies of companies on their export intensity. Meneto and Siedschlag [84], using a sample of Irish companies for 2012–2014, find that the implementation of environmental innovations has a significant positive effect on the entry of companies into foreign markets but does not significantly affect the volume of exports. Zhai et al. [85] investigate the impact of country-level environmental regulation on the export performance of Chinese companies. The authors conclude that stricter environmental regulation has a positive effect on the company's exports. The channels for this effect are the increased innovative activity of firms (investment in R&D) and increased production efficiency. Shi and Wu [75], based on a sample of Chinese companies from sectors with high levels of environmental pollution, conclude that increased regulation has a positive effect on the likelihood of companies entering foreign markets.

Haddoud et al. [40] reveal that the strategic commitment of family firms to environmental issues has a positive effect on their export activities. The authors explain this by the fact that environmental commitment is a competitive advantage because it facilitates compliance with international standards and stimulates green innovations. Xie et al. [86] find evidence of a positive and statistically significant effect of environmental disclosure on Chinese manufacturing firms' export value and export intensity. Xie et al. [86] highlight that environmental regulation promotes the introduction of new technologies and thus enhances a firm's competitive advantages.

We assume that different environmental policy factors at the firm level have different impacts on the firm's export intensity. In our study, unlike Zhai et al. [85]; Shi and Xu [75]; or Meneto and Siedschlag [84]; we examine the impact of a wide range of firm-level environmental policy indicators on export intensity. We rank the factors of environmental policy according to the importance of their influence.

*Hypothesis 3.* Compliance with ESG principles aimed at increasing the social responsibility of firms increases the chances of firms entering foreign markets and SDER.

Ehsan and Masoud [87], using a sample of 127 Iranian companies, find a positive relationship between social responsibility and entering foreign markets. We assume that the implementation of strategies to increase social responsibility helps companies in attracting and retaining competent employees, increases staff motivation and labor productivity, and this, in turn, contributes to the formation of a favorable company image and entry into foreign markets. Along with the factor of employee training, we consider such original indicators of social responsibility as the share of females among workers and among non-production employees. The full list of chosen indicators is given in Table 2.

Baric and Omazič [88], using a sample of Croatian export firms show that high-quality corporate governance is crucial for the company's reputation and improves the sustainability of business operations. Moreover, corporate social responsibility allows a company to differentiate itself from the competitors in the global market. Jamali and Karam [89] reveal that firms that do not pay attention to social responsibility can succeed in the short term, but make their business riskier in the long term.

*Hypothesis 4.* Companies with well-developed corporate governance are more likely to enter foreign markets and are characterized by a higher SDER.

For SMEs there is no classical agent conflict between owners and managers as the duality of these roles is more typical. So, individual characteristics of managers are of great importance for SMEs. Haddoud et al. [40] conduct a meta-analysis of academic papers devoted to identifying the determinants of companies' entry into foreign markets. The authors find that the following characteristics of owners and managers play an important role: education, age, gender, work experience (including work experience abroad), and risk appetite. Serra et al. [90] identify country differences in the determinants of entering foreign markets: for example, managerial education is a significant factor for Portuguese companies, and the manager's age for UK companies. Orser et al. [91] show that male-owned companies are more likely to enter foreign markets. Carbonero et al. [33] investigate the influence of the reform that introduced a gender-balancing quota on the boards of directors on various export-related measures for a sample of Italian firms. The authors show that women previously excluded from leadership positions can bring valuable resources to work in international markets. Following Carbonero et al. [33], we assume that high-quality corporate governance can reduce agency costs and improve

TABLE 3: Potential determinants of financial constraints.

Variables	Expected direction of influence	Paper/reason
Workcap_banks	+	Zhang et al. [100]
Workcap_nonbanks	+	Zhang et al. [100]
Workcap_bonds	±	Teplova et al. [48]
Techlicence	–	Companies that have an ISO certificate or a foreign license have already passed the quality control procedure for business processes and products; therefore, these indicators serve as a quality criterion and a signal of sustainability
Iso	–	
R&D	–	Zhang et al. [100]
Safe_energy_prod	–	Zhang et al. [100]
Advanced_lighting	–	Zhang et al. [100]
Foreign_share	–	Teplova et al. [17]
Gov_share	+	Teplova et al. [48]
Age	+	Teplova et al. [17]; Zhang et al. [100]
Age_sqr	–	
Sizecode	–	Zhang et al. [100]
Num_empl	–	Zhang et al. [100]
Dummy_Asia	+	Macro-indicators characterize the level of a country's economic development and business climate. The hypothesis about the significant influence of regional affiliation was confirmed by Teplova et al. [48]; Cai et al. [97]
Rate	+	
Gdp_ln	–	
Ind_ef	–	
Ind_ps	–	
Dummy_public	–	Public companies have passed the listing procedure, which is an external assessment of sustainability and reduces investment risks
Ownshare	+	Zhang et al. [100]
Shadow_econ	+	We assume that the presence of competitors causes certain restrictions for firms in connection with the struggle for resources, including financial ones. A similar conclusion was obtained by Eliwa et al. [101]
Num_competitors	+	
Environment_manager	–	Zhang et al. [100]
Eco_standards	–	Zhang et al. [100]
Water_control	–	Zhang et al. [100]
Politic_gifts	–	Zhang et al. [94]
CEO_experience	–	Eliwa et al. [101]
Share_females_workers	–	Eliwa et al. [101]
Empl_education	–	Eliwa et al. [101]

the company's reputation; this creates a competitive advantage and increases sustainability of business processes. We test the influence of such previously unconsidered factors as the control of managers over production efficiency, the presence of a manager responsible for environmental protection, and verification of financial statements by an external auditor (the latter factor is especially relevant for SMEs).

*Hypothesis 5.* The social capital of a SME significantly affects its export intensity.

As proxies of social capital, we use the political and other contacts of managers. On the one hand, social capital lowers barriers to access to resources, and the managers are given the opportunity to influence decisions that are beneficial for the firm, so such connections can help firms to survive [92] and increase the profits and market value of firms [93, 94]. It can be assumed that firms with a stable financial position have a better reputation in the eyes of foreign partners and investors and will be able to enter foreign markets more easily. On the other hand, Sharma et al. [95] conclude that older firms and firms with a greater political influence are more likely to operate in domestic markets, while younger

firms and firms with less power are more likely to seek access to foreign markets.

Gupta and Chauhan [32] come to the conclusion that networking capabilities positively impact SMEs' export performance. The authors highlight that SME survival in foreign markets depends on its participation in associations and trade units, and its relations with trade partners. Knight and Liesch [96] show that network capabilities are crucial to increase the export intensity of SMEs and enable them to adapt to different market conditions.

Cai et al. [97], as part of an assessment of the impact of corporate social responsibility (CSR) on a company's financial performance, conduct a study of 2,600 companies from 36 countries and conclude that a country's development characteristics play a significant role in CSR ratings: per capita income, political rights, civil liberties, and the level of cultural development. Based on this, in our study, macro indicators and the quality of the institutional environment, as well as the country's belonging to the Asian region, are used as control variables.

Table 4 shows all the indicators of ecological responsibility, social responsibility, corporate governance, and social capital to test Hypotheses 2–5.



TABLE 4: Overview of ESG indicators.

Indicator	Papers
<i>Environmental indicators</i>	
Environmental management (environmental risk manager, waste manager, and environmental policy)	Escrig-Olmedo et al. [54]
Packaging materials recycled and reused	Escrig-Olmedo et al. [54]
Protection of biodiversity	Escrig-Olmedo et al. [54]
Soil contamination and landscape impacts	Escrig-Olmedo et al. [54]; Wagner [74]
Air emissions (CO <sub>2</sub> , SO <sub>2</sub> emissions)	Shi and Xu [75]
Water and energy consumption/efficiency	Wagner [74]
Renewable energy/renewable raw materials	Escrig-Olmedo et al. [54]
Travel and transport impact	Escrig-Olmedo et al. [54]
<i>Social indicators</i>	
Human capital development and training	Escrig-Olmedo et al. [54]
Human rights	Escrig-Olmedo et al. [54]
Supply chain management and integration of standards	Wagner [74]
Working condition quality, health, and safety	Escrig-Olmedo et al. [54]
Stakeholder engagement	Wagner [74]
Customer and product responsibility, customer relation management	Escrig-Olmedo et al. [54]
Privacy and data security	Escrig-Olmedo et al. [54]
Market ethics and business behavior	Escrig-Olmedo et al. [54]
Philanthropy	Escrig-Olmedo et al. [54]
<i>Governance indicators</i>	
Founder/CEO's characteristics, including education, management, and work experience	Stucki [76]; Chong et al. [77]; Escrig-Olmedo et al. [54]; Manolopoulos et al. [78]
Prevention of corruption and bribery	Escrig-Olmedo et al. [54]
Remuneration/compensation policy	Escrig-Olmedo et al. [54]
Respect of shareholders' rights	Escrig-Olmedo et al. [54]
Audit and control systems	Escrig-Olmedo et al. [54]
Risk and crisis management	Escrig-Olmedo et al. [54]
Transparency	Escrig-Olmedo et al. [54]
Board diversity and structure, corporate governance committees	Moumen et al. [79]; Escrig-Olmedo et al. [54]

### 3. Methodology

Many studies examining the innovative activity of firms are based on survey data [41, 43, 98] which can be explained by the necessity to take into account the subjective assessment of innovation. This obviously affects the research methodology. Several studies have been carried out on the basis of a survey of a small number of enterprises in one country. For example, in a paper by Curado [41], data from an online survey of 630 SMEs in Portugal are employed; Grego-Planer and Kuš [42] use 2015 survey data for 202 SMEs in Poland; García-Pérez-de-Lema et al. [53] use a sample of 310 Spanish SMEs; Kim and Hemmet [58] consider 1733 SMEs in South Korea. De et al. [30] interview four respondents from each SME under consideration to improve the objectivity of their survey data. In other papers, data are taken from information and analytical databases: for example, Mina et al. [47] use the SME Instrument (CORDA) database for 2014–2017 and the ORBIS Bureau van Dijk as their main data sources. We base our research on the BEEPS survey data (as in Ref. [17]), which allows us to consider the impact of a wide range of innovative activity metrics.

The regression analysis of panel data is often used in studies where the dependent variable of export intensity is quantitative [31, 32]. Such an approach makes it possible to correctly consider the influence of the individual effects of

firms. There are studies that are based on qualitative characteristics and use interviews with expert assessment [56], but this method is associated with a high degree of subjectivity, due to the limited knowledge of a particular expert.

When the dependent variable is binary, the most commonly used methodology is logit models [42, 46] or probit models [98, 99]. When using logit and probit regressions for data analysis, the problem of censoring arises, which can be solved by applying the Heckman model [47]. Teplova et al. [48] identify the determinants of the financial constraints of firms based on survey data and conclude that the Heckman model is more suitable than the simple probit model. We also build a Heckman model which allows us to consider the effects of financial constraints when companies enter foreign markets.

In our study, the binary dependent variable *export\_dummy* is the presence or absence of direct exports. For this variable, we apply the Heckman model.

The outcome equation is as follows:

$$\text{export\_dummy}_i = 1 \text{ if } y_i^* > 0; \text{export\_dummy}_i = 0 \text{ otherwise,} \quad (1)$$

$$y_i^* = X_{1,i}\beta + u_i, \text{ where } u \sim N(0; 1).$$

The selection equation is as follows:

$\text{fin\_obstacle}_l = 1$  if  $y_l^{\text{select}} > 0$ ;  $\text{fin\_obstacle}_l = 0$  otherwise ,

$$y_l^{\text{select}} = (X_{2,l}\gamma + v_l > 0),$$

$$v \sim N(0, 1),$$

$$\text{corr}(u; v) = \rho,$$

(2)

where  $\text{fin\_obstacle}$  is the dummy variable of the presence or absence of financial constraints for firms,  $X_1$  are the determinants of entry in foreign markets,  $X_2$  are the determinants of financial constraints, and  $l$  is the number of the company in our sample.

Based on a review of previous studies, we identify variables that potentially have a significant impact on financial constraints (see Appendix B, Table 3). To empirically identify significant determinants of the presence or absence of financial constraints, we build two types of regression models: logit and probit. In logit regressions, the logistic distribution functions (3) and (4) are used for modeling:

$$f(Z) = \frac{1}{1 + e^{-z}}, \quad (3)$$

$$Z = \beta_1 + \sum_i \beta_i * X_{2i}, \quad (4)$$

where  $\beta_i$  are the coefficients before the explanatory variables and  $X_{2i}$  are the explanatory variables.

Probit models use the standard normal distribution functions (5) and (6):

$$f(Z) = \frac{1}{\sqrt{2\pi}} e^{-z^2/2}, \quad (5)$$

$$Z = \beta_1 + \sum_i \beta_i * X_{2i}. \quad (6)$$

The marginal effect of the  $i$ -th factor for the probit model is calculated by

$$\frac{\partial p}{\partial X_i} = \frac{\partial p}{\partial Z} * \frac{\partial Z}{\partial X_i} = f(Z) * \beta_i = \frac{e^{-z}}{(1 + e^{-z})^2} \beta_i. \quad (7)$$

The indicators are presented in Table 4.

To identify the determinants of direct exports, an ordinary least squares (OLS) regression model is used:

$$\begin{aligned} \text{export} = & \alpha + \sum_i \beta_{1,i} \text{Innovations}_i + \sum_j \beta_{2,j} \text{ESG}_j \\ & + \sum_k \beta_{3,k} \text{Control}_k + \varepsilon, \end{aligned} \quad (8)$$

where  $\text{export}$  is SDER (the quantitative variable);  $\text{Innovations}_i$  are the indicators of innovative activity (Table 4);  $\text{ESG}_j$  are the characteristics of environmental and social responsibility and corporate governance in the company

(Table 4); and  $\text{Control}_k$  are the control variables. We use dummies to control for sector affiliation and the year. Firms in most observations are not repeated for different years, so we do not consider regression models with individual effects.

## 4. Descriptive Statistics

Our study is based on BEEPS survey data for emerging market companies for 2018–2020. The BEEPS database contains data for the 2017–2019 financial years. In total, the sample contains 22,420 observations. We use macroeconomic indicators from Eikon Refinitiv and World Bank databases.

Initially, to test the hypotheses, we selected more than 70 variables characterizing innovative activity and ESG. We excluded those indicators for which less than 40% of observations were available. The final set includes 53 variables; they are presented in Table 4. During the data proceeding, we have eliminated the outliers, defined herein as observations outside of the interval from minus to plus three standard deviations from the median value of the respective indicators. Descriptive statistics for quantitative variables are presented in Table 5.

The sample includes 11,020 small enterprises and 7,656 medium-sized ones, and the total number of SMEs is 18,676 (Table 6). Table 6 shows descriptive statistics on the availability of direct exports for companies of various sizes. Among the companies that have direct exports, the share of small ones is 25%, medium 40%, and large 35%. Among the companies that do not have direct exports, the share of small ones is 54%, medium 32%, and large 14%. Publicly traded companies represent 5% of the sample. Companies from the Asian region account for 31% of the sample, of which only 13% export directly (Table 7).

## 5. Results

To test the hypotheses, a regression analysis is carried out. The results are shown in Tables 8 and 9.

*5.1. Determinants of the Likelihood of Entering Foreign Markets.* Table 8 shows the results of the analysis of the influence of factors on entry to foreign markets. The lambda indicator in the Heckman model is significant at the 1% level, which allows us to further interpret the results. The presence of financial constraints reduces the likelihood of entering foreign markets but the statistical significance of this factor is not high. If a company is spending on R&D, the likelihood of entering foreign markets increases.

The following indicators of preserving the environment have a significant positive impact on the dependent variable: control over water consumption, customer requirements for certification or compliance with any environmental standards, and implementation of energy-saving technologies. But the presence of a manager responsible for environmental

TABLE 5: Descriptive statistics for quantitative variables.

Variable	Median	Mean	Std. dev.	Min	Max	Obs
Share_export	0	10	24.23	0	100	22420
Num_competitors	5	11	23	0	350	9961
Num_empl	20	60	103	1	826	22298
Num_empl_sqr	400	14287	54811	1	682276	22298
Age	16	18	11	1	61	22217
Age_sqr	256	423	515	1	3721	22217
Gdp_ln	8.9	8.7	0.82	7	10.18	22420
Ind_ef	64.5	62.49	7.38	48	79.10	22420
Ind_ps	-0.3	-0.3522	0.81	-1.87	1.08	22420
Ownshare	100	82.32	24.39	22	100	21855
Gov_regulation	0	8.99	18.07	0	100	20216
Share_females_workers	14.29	27.49	30.84	0	100	11578
Share_females_nonprod	50	56.81	29	1.67	100	9141
Export_GDP	40.42	43.98	19.42	14.98	96.38	22417

Source: authors' calculations.

TABLE 6: Availability of direct exports for companies of various sizes.

Availability of direct exports		Company size			
		Small	Medium	Large	All
No	Number	9796	5706	2479	17981
	Share (%)	54	32	14	100
Yes	Number	1224	1950	1726	4900
	Share (%)	25	40	35	100
All	Number	11020	7656	4205	22881
	Share (%)	48	33	18	100

Source: authors' calculations.

TABLE 7: Availability of direct exports for companies in different regions.

Availability of direct exports		All countries		
		Asian region	Other regions	Total
No	Number	6219	11762	17981
	Share (%)	35	65	100
Yes	Number	936	3964	4900
	Share (%)	19	81	100
All	Number	7155	15726	22881
	Share (%)	31	69	100

Source: authors' calculations.

protection and climate preservation has a significant negative impact on entering foreign markets.

If a company invests in the training of its employees, then the likelihood of entering foreign markets increases (the factor is significant at the level of 1%). The higher the share of females among workers, the higher the likelihood of entering foreign markets. But the statistical significance of this factor is not very high.

The length of experience of a top manager in the sector significantly and positively influences (at the 5% level) the probability of entering foreign markets. The ownership concentration has a negative and significant impact (at the

10% level). If there are females among the owners, the likelihood of entering foreign markets is reduced.

The political contacts of top managers have a positive effect on the company's entry into foreign markets, but the statistical significance is not high. If there are competitors in the shadow market, companies are more likely to resort to direct exports (the factor is significant at the 1% level). The number of competitors does not have a significant impact on direct exports.

The regional affiliation of the company has a significant impact on exports. Firm size is significant at the 5% level, the direction of influence is positive. Financing working capital

TABLE 8: Regression results for the binary dependent variable of the presence of direct exports.

	Coefficient (standard error)
<i>Main equation: Influence on the export dummy</i>	
Const	-0.8624*** (0.0867)
Shadow_econ	0.1035*** (0.0115)
Num_competitors	-0.0004 (0.0006)
Iso	0.0690* (0.0317)
R&D	0.1277*** (0.0319)
Sizecode	0.0289** (0.0116)
Export_GDP	0.0003 (0.0005)
Safe_energy_prod	0.0316 (0.0392)
Fin_obstacle	-0.0039 (0.0081)
Dummy_public	0.1688*** (0.0495)
Owner_share	-0.0011* (0.0006)
Dummy_Asia	-0.1478*** (0.0337)
Owner_female	-0.0175 (0.0148)
Politic_gifts	0.0178 (0.0163)
Share_females_workers	0.0001 (0.0005)
Empl_education	0.1589*** (0.0310)
Environment_manager	-0.1032** (0.0414)
Eco_standards	0.0923** (0.0371)
Audit_energy_consumpt	-0.0075 (0.0147)
Water_control	0.2134*** (0.0300)
Trade_union	-0.0054 (0.0050)
Rate	0.0167*** (0.0026)
CEO_experience	0.0030** (0.0013)
Workcap_bonds	0.0038 (0.0023)
Lambda	0.6179***
<i>Selection equation: influence on financial constraints</i>	
Const	-1.8479*** (0.2547)
Shadow_econ	0.1887*** (0.0188)
Rate	0.0381*** (0.0048)
Num_competitors	-0.0009 (0.0009)
Iso	0.0793 (0.0518)
R&D	0.2029*** (0.0515)
Safe_energy_prod	0.0447 (0.0630)
Gdp_ln	0.0539** (0.0233)
Dummy_public	0.3066*** (0.0808)
Owner_share	-0.0013 (0.0009)
Dummy_Asia	-0.2104*** (0.0547)
Politic_gifts	0.0326 (0.0267)
Share_females_workers	0.0003 (0.0008)
Empl_education	0.2811*** (0.0498)
Environment_manager	-0.1353** (0.0651)
Eco_standards	0.1623*** (0.0598)
Water_control	0.3670*** (0.0473)
CEO_experience	0.0049** (0.0021)

through the issuance of bonds also increases the likelihood of entering foreign markets, but the statistical significance is not high. The presence of an international quality certificate has a positive and significant effect on the dependent variable at the 10% level. Of the macroeconomic indicators, the key rate of the central bank is significant at the 1% level. The higher the share of exports in GDP, the higher the likelihood of firms entering foreign markets, but the statistical significance of this factor is not high. The companies in countries that are members of trade unions are less likely to enter foreign markets. The statistical significance of this factor is not high. The sector and year dummies are insignificant.

TABLE 9: Regression results for the SDER.

	(1)	(2)	(3)
R2	0.265	0.265	0.256
Shadow_econ	-1.0497***	-1.0804***	-1.0975***
Iso	5.8976***	5.5356***	6.6923***
R&D	3.2244***	2.9862***	3.1417***
Num_empl	0.0349***		
Sizecode		6.3808***	
Num_empl_sqr			0.00004***
Gdp_ln	1.9227***		
Ind_ef		0.2106***	
Export_GDP			0.1059***
Fin_obstacle	-0.4577*	-0.4730*	-0.4222***
Dummy_Asia	-11.3693***	-11.0780***	-10.2165***
Gov_regulation	-0.0326*	-0.0334*	-0.0323*
Share_females_workers	0.1168***	0.1050***	0.1309***
Share_females_nonprod	-0.0825***	-0.0587***	-0.0998***
Eco_standards	2.3653***	2.4851***	2.5652***
Fin_audit	3.6947***	3.2656***	4.0880***
Trade_union	-3.1456***	-2.8605***	-2.6651***
Rate	-0.9609***	-0.8871***	-0.8526***
Foreign_share	0.3145***	0.3102***	0.3253***
Gov_share	-0.1353***	-0.1112**	-0.1179***
Workcap_banks	0.0474***	0.0453***	0.0577***

5.2. *Determinants of SDER.* The regression analysis of the model with a quantitative dependent variable (SDER) shows results similar to those obtained above for the binary variable (Table 9). The influence of R&D expenditures on SDER is positive and significant at the 1% level. The influence of the presence of customer requirements for compliance with environmental standards is also positive and significant at the 1% level. The impact of the number of employees is positive. Moreover, the impact of the square of this variable is also positive and significant at the 1% level. The influence of the proportion of a country's exports to GDP is also positive and significant. On the contrary, the impact of belonging to the Asian region and the country's entry into trade unions is negative and significant at the 1% level (Table 9). With an increase in the share of females among nonproduction employees (managers and administration), direct exports decrease (the factor is significant at the 1% level).

If the managers work with government regulations, then SDER reduces. If the financial statements are verified and certified by an external auditor, then SDER increases, the factor is significant at the 1% level. The presence of a foreign owner in the equity capital increases SDER (the factor is significant at the 1% level). On the contrary, the participation of the state in the equity capital has a deterrent effect. Macro indicators such as the logarithm of GDP per capita and the Index of Economic Freedom significantly positively affect SDER. The impact of the key rate of the central bank is negative and significant at the 1% level. The presence of competitors in the shadow sector of the economy negatively and significantly impacts SDER (at the 1% level). The sector and year dummies are insignificant.

TABLE 10: The correlation matrix of regressors with a strong relationship.

	Num_empl	Num_empl_sqr	Age	Age_sqr	Gdp_ln	Sizecode	Ind_ef	Ind_ps	Energy_control	Water_control
Num_empl	1									
Num_empl_sqr	0.910	1								
Age	0.138	0.098	1							
Age_sqr	0.124	0.094	0.940	1						
Gdp_ln	0.011	-0.005	0.060	0.014	1					
Sizecode	0.703	0.431	0.154	0.127	0.035	1				
Ind_ef	-0.006	-0.017	-0.045	-0.070	0.690	0.014	1			
Ind_ps	0.006	0.000	-0.033	-0.066	0.588	0.007	0.601	1		
Energy_control	0.115	0.066	0.032	0.019	0.033	0.160	-0.014	0.085	1	
Water_control	0.142	0.092	-0.005	-0.010	0.090	0.176	0.035	0.097	0.624	1

Source: authors' calculations.

TABLE 11: Logit and probit models for the dependent variable of financial constraints.

	Logit model		Probit model	
	Coefficient	(standard error)	Coefficient	(standard error)
Workcap_banks	0.01926***	(0.00098)	0.01106***	(0.00058)
Workcap_nonbanks	0.05031***	(0.00684)	0.02897***	(0.00413)
Workcap_bonds	0.03307***	(0.00599)	0.01717***	(0.00311)
Techlicence	0.01471	(0.04129)	0.00190	(0.02462)
R&d	0.27897***	(0.03904)	0.16510***	(0.02313)
Safe_energy_prod	0.07240	(0.04697)	0.03530	(0.02795)
Advanced_lighting	0.05619*	(0.02961)	0.03260*	(0.01761)
Foreign_share	-0.00374***	(0.00071)	-0.00196***	(0.00042)
Gov_share	-0.00145	(0.00216)	-0.00040	(0.00125)
Num_empl	-0.00027	(0.00020)	-0.00017	(0.00012)
Age_sqr	-0.00005*	(0.00003)	-0.00003*	(0.00002)
Gdp_ln	0.15036***	(0.02522)	0.06967***	(0.01510)
Sizecode	-0.10103***	(0.02738)	-0.06308***	(0.01632)
Ind_ef	0.00038	(0.00301)	0.00177	(0.00179)
Ind_ps	-0.84255***	(0.02934)	-0.47735***	(0.01680)
Dummy_public	0.02757**	(0.01274)	0.01339*	(0.00763)
Owner_share	0.00051	(0.00058)	0.00028	(0.00035)
Rate	-0.01801***	(0.00452)	-0.00928***	(0.00269)
Cut1	1.25441***	(0.26055)	0.64689***	(0.15645)
Cut2	2.06177***	(0.26099)	1.13991***	(0.15663)
Cut3	3.28247***	(0.26191)	1.85658***	(0.15691)
Cut4	4.70046***	(0.26342)	2.59196***	(0.15725)
Log likelihood		-24057.07		-24114.20
Schwarz criterion		48329.18		48443.43
AIC		48158.15		48272.40
Hannan-Quinn criterion		48214.46		48328.70

5.3. *Determinants of Firms' Financial Constraints.* As shown in Table 9, the financing of working capital through bank loans increases SDER. We built regression models to identify factors that significantly affect firms' financial constraints. A set of explanatory variables is formed considering the correlation coefficients to solve the problem of multicollinearity (Appendix C, Table 10). We build logit and probit regression (Appendix D, Table 11).

The results of the regression analysis show that in the short term, R&D expenditures have a significantly positive effect on the level of financial constraints. The introduction of new lighting technologies also leads to an increase in financial constraints. The presence of foreigner owners increases the availability of financing. The influence of the presence of the state equity capital is negative.

Indicators characterizing the share of working capital financed from different sources of borrowed funds (bank loans, nonbank loans, and bond issues) complicate access to financing. The size of the company increases the availability of financing. Increasing the number of employees also increases the availability of funding. The squared age of the company has a significant negative impact on the level of financial constraints (a parabola with branches down). If the company is public, then the availability of financing increases.

The logarithm of GDP per capita has a positive and significant effect on the level of financial constraints. The higher the political stability, the higher the availability of funding. The lower the level of interest rates, the less financial constraints for firms.

## 6. Discussion of the Results

*6.1. Determinants of the Likelihood of Entering Foreign Markets.* The presence of financial constraints reduces the likelihood of entering foreign markets. We explain this by the fact that export intensity is associated with high costs, which is in line with the findings by Wu et al. [34]. Innovative activity (spending on R&D) increases the likelihood of entering foreign markets, which confirms Hypothesis 1. This result is consistent with the findings of the meta-analysis by Gupta and Chauhan [32] that there is a positive relationship between the implementation of innovations and the entry of SMEs into foreign markets. This result is also in line with the findings of Haddoud et al. [40]; Monreal-Pérez et al. [72]; Wu et al. [34]. Our paper confirms the resource theory with an emphasis on the innovative activity factors.

Our Hypothesis 2, on the impact of environmental factors, is partly confirmed. The factor of customer requirements for certification or compliance with any environmental standards has a significant positive impact. The implementation of energy-saving technologies has also a positive impact (but the significance of this factor is not very high). These results are consistent with Aguilera-Caracuel and Ortiz-de-Mandojana [80]; Wagner [74]; Xie et al. [83]; Zhang et al. [100] that environmental conservation policies improve firms' competitiveness and financial sustainability, and Haddoud et al. [40]; Xie and Zhou (2022) that environmental conservation stimulates export intensity. However, we also found the paradoxical conclusion that the presence of a manager responsible for environmental protection and climate preservation has a significant negative impact on entering foreign markets. A possible explanation could be the following: the duly signaled focus on environmental issues, endorsed by the creation of the special management position within the firm, could be exaggerated, which results in too much effort channeled towards environment-linked issues rather than exports-related activity. However, a causal analysis of such cases remains outside of the scope of the present study, although such an approach would surely be insightful. Moreover, further research of this issue is highly desirable. In emerging markets, firms pay less attention to the management of ecological risks than in developed ones, and it is especially typical for SMEs. If a SME engages such a manager, it is a signal of the environmental risks of a company and the increasing costs for measures aimed at preserving the environment. These costs prevent firms from entering foreign markets.

Our Hypothesis 3, on the impact of social responsibility, is confirmed. Investing in the training of its employees increases the likelihood of entering the foreign market. This result is consistent with the findings of Kuo et al. [82] and Rodil et al. [46]. A high share of females among workers stimulates export activity. This result is in line with the findings of Gupta and Chauhan [32] that there is a positive relationship between social responsibility and export intensity.

Our Hypothesis 4, on the impact of corporate governance, is partly confirmed. The length of experience of a top manager in the sector increases the probability of entering foreign markets, which corresponds to the results of Spence

et al. [102] for a sample of Canadian startups. The ownership concentration negatively impacts the likelihood of entering foreign markets. Vega Salas and Deng [103] obtain a similar conclusion for the Peruvian market. A possible explanation is that a high concentration of equity capital reduces agency costs in emerging capital markets and limits the risks taken by managers, including access to foreign markets. If there are females among the owners, the likelihood of entering foreign markets is reduced. We attribute this to the fact that females are less inclined to take risks. This conclusion is consistent with the results of Orser et al. [91].

Our Hypothesis 5 is confirmed. The social capital of the company (measured as the political contacts of managers) has a positive effect on the company's entry into foreign markets. The direction of influence of the factor is confirmed by the results of Faccio et al. [92] and Zhang et al. [94]. If there are competitors in the shadow market, companies are stimulated to enter foreign markets, since they are forced to look for customers in foreign markets. This result is consistent with the findings of Hessels and Terjesen [104] for the Dutch market.

If the company belongs to the Asian region, then the likelihood of entering foreign markets is lower. Our sample of Asian countries mainly includes the Post-Soviet states (Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Mongolia, etc.) and does not include the export-oriented countries of South-East Asia (China, etc.). The predominantly developing Asian countries under consideration are characterized by the small size of their economies and limited domestic demand, which stimulates companies to enter foreign markets.

Firm size significantly and positively influences the company's entry into foreign markets, which is in line with the findings of Haddoud et al. [40]. We attribute this to the fact that larger companies have more resources (human, financial, and operational), are more reliable, and inspire more trust in investors. If the company is public, then the likelihood of entering foreign markets increases. Financing working capital through the issuance of bonds also increases the likelihood of entering foreign markets. We explain this by the fact that larger companies traditionally enter bond markets. The presence of an international quality certificate increases the likelihood of entering foreign markets.

We come to an original conclusion that the likelihood of entering foreign markets increases when domestic interest rates rise. We explain this by the fact that high interest rates are a signal of high inflation and depreciation of the national currency, which is beneficial for exporters. Another original result is that companies in countries that are members of trade unions are less likely to enter foreign markets. We explain this by the fact that the presence of economic agreements supposes certain restrictions on the volume of sales in foreign markets, but at the same time, sales in the domestic market are facilitated.

*6.2. Determinants of SDER.* The regression analysis of the model with a quantitative dependent variable (SDER) shows results similar to those obtained above for the binary

variable, for the following factors: the presence of R&D expenditure, the presence of customer requirements for compliance with environmental standards, the presence of financial constraints, the size of a company (one of the proxies is the number of employees), the country's export to GDP ratio, and the country's entry into trade unions. These results are in line with our assumptions. Innovations (R&D) increase export intensity, which confirms Hypothesis 1 and corresponds to the findings of Gupta and Chauhan [32]; Haddoud et al. [40]; Monreal-Pérez et al. [72]; and Wu et al. [34]. Compliance with environmental standards increases export intensity, which confirms Hypothesis 2 and corresponds to the findings of Zhai et al. [85] and Shi and Xu [75]. If the country as a whole is more export-oriented and participates in trade unions, this encourages firms (even SMEs) to enter foreign markets. The size of the company is important: the export intensity of large companies is greater which is in line with our assumptions. A greater share of females among nonproduction employees decreases direct exports. We explain this dependence by the fact that entering foreign markets carries certain risks, and female managers are less inclined to take risks. This is consistent with the findings of Orser et al. [91].

If the managers work with government regulations or the state participates in the equity capital, then the export intensity reduces. This result confirms the findings of Sharma et al. [95] that firms with more political power are more likely to operate in domestic markets. If the financial statements are verified and certified by an external auditor, then SDER increases. We explain this by the fact that the sustainability of a company is important for investors and customers. The impact of a foreign owner in the equity capital is positive, which is in line with the findings of Haddoud et al. [40]. High GDP per capita and economic freedom stimulate export intensity, which is in line with the findings of Cai et al. [97].

There are, however, a number of differences from the conclusions obtained earlier for the binary variable of entering foreign markets. An increase in the key rate of the central bank leads to the fact that financing becomes more expensive, and for exporting companies SDER decreases. An original conclusion is that the presence of competitors in the shadow sector of the economy also has a restraining effect on the SDER of exporting companies. We conclude that a developed shadow sector of the economy and high competition lead to the fact that competitors increase profit margins by reducing costs. In this regard, it is easier for competitors from the shadow sector to expand exports.

*6.3. Determinants of Firms' Financial Constraints.* In a pioneering paper, the hypothesis on self-selection was put forward [105]: entry into foreign markets is always associated with costs, so only firms characterized by greater performance can cope with these costs and take advantage of exports. Subsequently this hypothesis was confirmed in a number of studies. Manova [106] came to the conclusion

that the more efficient the firm, the greater the possibility that the firm has high revenue and net income, so it can receive more financing from banks. According to this conception, financial constraints can reduce the likelihood of becoming an exporter. We come to a similar conclusion: the attraction of financing removes financial constraints and positively affects the volume of exports.

R&D expenditures positively impact the level of financial constraints, which we explain by the fact that the sample of our study includes companies from developing countries with a banking-oriented financial system. Banks are reluctant to provide loans for intangible assets since R&D spending is associated with increased risks. This is consistent with the findings of Demeulemeester and Hottenrott [107].

The original conclusion that the introduction of new lighting technologies leads to an increase in financial constraints can be explained by the fact that the implementation of such technologies is costly and is associated with risks. The use of technologies under the license of foreign companies and technologies for safe energy production also positively influences the dependent variable. Banks in emerging economies are reluctant to provide loans to finance innovation. Even the existence of foreign patents does not lift financial constraints.

Our result that the foreign owners increase access to finance is in line with Teplova et al. [17] and Wang [108]. The result that the state share in the equity capital decreases the availability of financing is in line with conclusions of Haider et al. [109] for 81 countries. If the share of working capital is financed from borrowed funds, access to financing becomes more difficult. We explain this by the fact that a further increase in the debt burden is negatively perceived by both creditors and owners. The size of the company and the fact that the company is public increase the availability of financing. We attribute it to the fact that large firms are more reliable borrowers and look more attractive for investors. This conclusion is consistent with the results of Teplova et al. [48] for emerging markets. Increasing the number of employees also increases the availability of funding. The squared age of the company decreases financial constraints.

Macroeconomic factors also play an important role. The logarithm of GDP per capita increases financial constraints, which confirms the hypothesis about the middle-income trap. Political stability increases the availability of funding, which is consistent with the results of Teplova et al. [17]. The poor quality of the institutional environment leads to an increase in agency costs and hinders access to funding. Low interest rates reduce financial constraints for firms, which corresponds to our assumptions.

## 7. Conclusion

We reveal the impact of ESG indicators and companies' innovative activity on export intensity across a wide sample of emerging markets. The study sample is based on BEEPS

survey data for 2018–2020, and a significant part of the sample consists of SMEs. In contrast to a number of previous papers, in which only the logit and probit models are used, we use the Heckman model to identify the determinants of companies entering foreign markets. This allowed us to identify when, in the presence of financial constraints, sustainable development factors create favorable conditions for exports. We also identify the determinants of SDER.

For the binary dependent variable of entering foreign markets, we obtain the following conclusions. The presence of financial constraints reduces the likelihood of entering foreign markets. The results of the regressions confirm the presence of a significant positive effect of innovative activity (R&D).

We obtain original results regarding the impact of complying with ESG principles aimed at preserving the environment. The factor of customer requirements for certification or compliance with environmental standards has a significant positive impact. The implementation of energy-saving technologies also has a positive impact. At the same time, we come to the paradoxical conclusion that the presence of a manager responsible for environmental protection and climate preservation has a significant negative impact on entering foreign markets.

If a company invests in the training of its employees, then the likelihood of entering foreign markets increases. The higher the share of females among workers, the higher the likelihood of entering foreign markets. The concentration of ownership has a negative and significant impact on the likelihood of entering foreign markets. If there are females among the owners, this likelihood reduces. The social capital of the company (the political contacts of the managers) has a positive effect on the company's entry into foreign markets.

The regression analysis of the model with the quantitative dependent variable SDER shows results similar to those obtained above. With an increase in the share of females among nonproduction employees, SDER decreases. Managers' work with government regulations reduces SDER. The presence of a foreign owner in the equity capital increases SDER. On the contrary, the participation of the state in the equity capital has a deterrent effect.

The key limitation of our study is that the BEEPS survey data contain few quantitative variables and a lot of dummy variables. In the survey, the period under consideration is 2017–2019 and does not include the pandemic of the COVID-19. So, one of possible directions of the future work is to consider a wider spectrum of quantitative variables such as the financial indicators of firms. The second direction is analyzing the influence of the COVID-19 pandemic.

In contrast to developed markets, in emerging markets, the contribution of SMEs to GDP is smaller. To ensure the sustainable development of the economy and protect it from monopolization and the negative effects of the influence of large players, it is necessary to provide state support to SMEs. One of the drivers of the development of SMEs is entry to foreign markets. Our paper reveals the determinants of export intensity of SMEs. The policy implications are: (1)

to support innovative activity of SMEs and especially R&D projects through tax incentives or state subsidies, (2) to support social responsibility and especially firms' investing in the training of its employees, (3) to support ecological initiatives of firms, to set environmental standards, to pursue the procedure of certification or compliance with environmental standards, and to foster implementation of energy-saving technologies. [110–111].

## Appendix

### Examples of Environmental Sustainability Practices

There are a lot of examples of the successful implementation of environmental sustainability practices at companies around the world [112] (Enel (2022). Sustainability Report 2021. URL: [https://www.enel.com/content/dam/enel-com/documenti/investitori/sostenibilita/2021/sustainability-report\\_2021.pdf](https://www.enel.com/content/dam/enel-com/documenti/investitori/sostenibilita/2021/sustainability-report_2021.pdf)); Ormat Technologies INC, 2021 (Ormat Technologies INC. [114]. Sustainability report 2020. Our Environmental, Social and Governance Performance Highlights. URL: <https://www.ormat.com/en/company/engagement/view/?ContentID=140>); [113] (Polymetal International PLC. (2021). Responsible and Sustainable. Sustainability Report 2020. URL: [https://www.polymetalinternational.com/upload/iblock/b02/Polymetal\\_Sustainability\\_Report\\_2020.pdf](https://www.polymetalinternational.com/upload/iblock/b02/Polymetal_Sustainability_Report_2020.pdf)). Enel considers the following activities as environmentally sustainable ones (according to EU Taxonomy Regulation 2020/852): “sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control and protection and restoration of biodiversity and ecosystems.” Some examples of Enel's eligible environmental practices are: electricity generation from wind power and hydropower, construction and operation of transmission systems that transport the electricity on the extra high-voltage and high-voltage interconnected system, and installation and replacement of energy efficient light sources. Ormat Inc generates power “in a sustainable manner,” i.e., offers green solutions: “geothermal, solar, recovered energy generation, or storage.” Polymetal International PLC over the past decade is committed to sustainable development and innovation in order to achieve long-term benefits for all stakeholders. Its environmentally sustainable practices are: the implementation of the environmental management system certified to ISO 14001, disclosure of sustainability reports (including data on carbon emissions), the realization of a renewable energy generation project, issuing green loans under the Green Financing Framework, and certification of two mines under the Cyanide Code. The company developed a disciplined approach to social and environmental issues, which resulted in a substantial growth of the stock prices at the London Stock Exchange from 2011 to 2020.



## Data Availability

The data used to support the findings of this study are available upon request.

## Additional Points

(i) Applying the Heckman model allows us to identify when, in the presence of financial constraints, sustainable development factors create favorable conditions for export for SMEs. (ii) We reveal a significant positive effect of R&D on entry to foreign markets. (iii) If a company invests in the training of its employees, then the likelihood of entering foreign markets increases. (iv) The presence of a foreign owner increases the share of direct exports, while the participation of the state in the equity capital has a deterrent effect.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

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