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ESG as a Tool for Advancing SDGs from High-Income to Low-Income Countries: Evidence from Matched Data of Japanese Central Headquarters and Overseas Subsidiaries[1]

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Abstract

This study investigates the impacts of the "Environmental," "Social," and "Governance" (ESG) stances of multinational corporations (MNCs) in high-income countries on the performance of their overseas subsidiaries situated in low-income countries. This inquiry is particularly relevant in the context of the global push to achieve the Sustainable Development Goals by 2030. To address this question, we construct unique matched data by combining the ESG scores of Japanese-listed companies with financial data from their central headquarters (CHQs) in Japan and overseas subsidiaries in low-income economies. The estimation results reveal that improvements in the ESG scores of CHQs do not positively impact the employment and wages of their overseas subsidiaries. However, they have a significantly positive effect on labor productivity. Specifically, improving the "Community" score, which is associated with the level of social capital, demonstrates an economically significant positive impact.

JEL Classification: D22, F23, O35.
Keywords: ESG, Multinational corporations, Social capital, Labor productivity, Low-income countries

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I. Introduction

Amidst the global pursuit of achieving the Sustainable Development Goals (SDGs) by 2030, an increasing number of large firms in high-income economies are incorporating "Environmental," "Social," and "Governance" (ESG)-related practices into their corporate identity, contributing to the SDGs.[2] This strategic consideration has become imperative, as publicly listed firms find it challenging to attract funds from globally influential investors who are increasingly focusing on ESG investing.

Despite the growing emphasis on ESG practices, investors face limitations in monitoring the global supply chains of multinational corporations (MNCs).[3] Consequently, MNCs may be incentivized to covertly shift the costs[4] of their ESG practices to foreign subsidiaries, particularly those located in low-income economies. Should this scenario unfold, foreign direct investment by MNCs into low-income countries could roll out as a "curse" rather than a "blessing," hindering sustainable growth opportunities for these nations. In the worst-case scenario, heightened ESG practices by MNCs in high-income countries might exacerbate disparities in environmental and working standards (including human rights) between low- and high-income economies, posing a significant challenge to the global achievement of the SDGs.

Given these potential consequences, it is essential to investigate the effectiveness of ESG practices adopted by MNCs in high-income countries as a tool for advancing SDGs in low-income countries. To address this critical issue, we conduct an in-depth examination by constructing a unique and confidential dataset combining the ESG ratings of large Japanese corporations and the business performance of their foreign subsidiaries.

Various steps have been undertaken to promote ESG in Japan. On February 26, 2014, the Financial Services Agency in Japan published the "Principles for Responsible Institutional Investors (Japan's Stewardship Code)" to promote sustainable growth of companies through investment and dialogue with corporations. Subsequently, on September 16, 2015, the Government Pension Investment Fund in Japan underscored its commitment to ESG issues by signing the United Nations Principles for Responsible Investment.

This pivotal move further urged external domestic and international equity managers to

[2] Pérez et al. (2022) mentioned that firms of various sizes across different industries and locations are dedicating increased resources to enhance their ESG practices. They also described that more than 90% of S&P 500 companies and approximately 70% of Russell 1000 companies publish ESG reports in various formats.
[3] The Economist (September 21, 2017) reported that even MNCs willing to participate in ESG surveys often overlook the supply chain and provide incomplete responses; according to O'Connor and Labowitz (2017), many existing approaches do not consider the entire supply chain, especially critical manufacturing endpoints.
[4] "Environmental" practices involve carbon emission reductions, resource conservation, pollution reduction, and climate change mitigation. "Social" activities encompass diversity, labor practices, employee relations, human rights, and community engagement. "Governance" practices include board composition, executive compensation, shareholder rights, transparency, and ethical business practices. Pursuing these requires substantial effort and commitment from companies.

intensify their efforts to steer the sustainable growth of invested firms. Against this backdrop, MNCs in Japan have proactively embraced ESG practices and initiated the publication of sustainability reports. These shifts in the ESG stances of Japanese MNCs are evident in the ESG scores compiled by LSEG Data & Analytics, a financial markets data and infrastructure division of the London Stock Exchange Group plc[5] (LSEG [Refinitiv]). As Figure 1 shows, Japanese firms' ESG scores began to increase rapidly in 2015. By leveraging the variations in changes in ESG scores within Japanese firms, we identify the association between their ESG practices and the performance of their foreign subsidiaries in low-income countries, such as growth rates of labor productivity, wages, and job creation (i.e. employment).

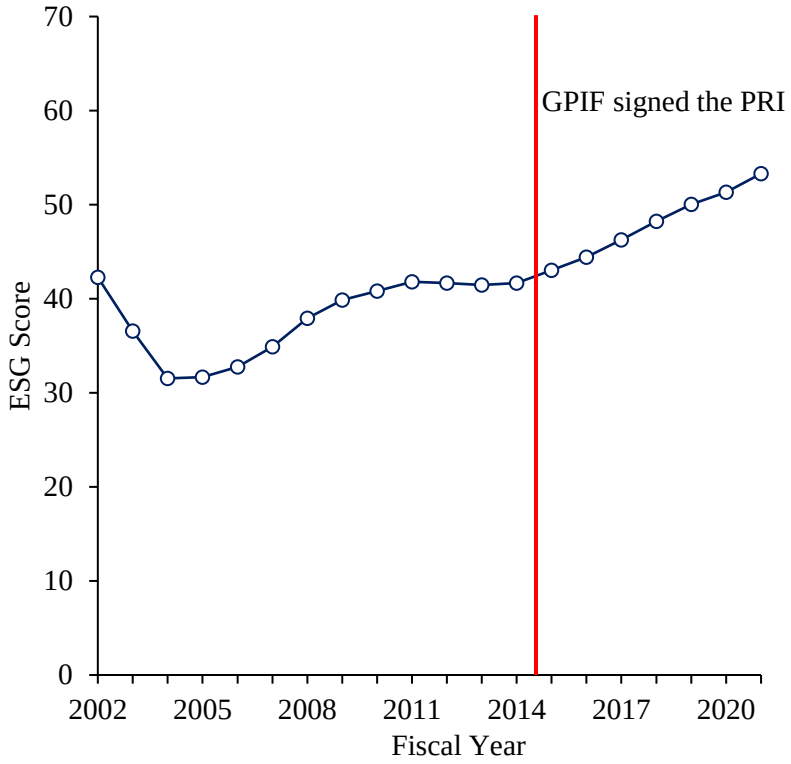

Figure 1 Development of ESG score of Japanese listed firms

Source: LSEG ESG score.
Note: Average of ESG score of Japanese listed firms.

Our empirical approach is inspired by Bloom et al. (2012b), who explored the impact of distinct managerial or organizational technologies implemented at central headquarters (CHQs)

[5] The London Stock Exchange Group plc. is a United Kingdom-based stock exchange and financial information company headquartered in London, England. LSEG Data & Analytics was previously called Refinitiv, an investment data and analytics firm, which was purchased by LSEG in January 2021. Refinitiv was established as a spin-off of Thomson Reuters' financial information division in October 2018.

on their foreign affiliates. They discovered that these CHQs transferred such technologies to overseas affiliates, leading to an overall improvement in productivity. To investigate the correlation between the ESG practices of Japanese CHQs and the performance of their foreign offices in low-income economies, we employ an empirical framework similar to that of Bloom et al. (2012b). Specifically, we construct firm-level data to establish connections between CHQs in Japan and their overseas offices in low-income economies. Our objective is to explore the relationship between changes in ESG practices in CHQs and the performance of their foreign affiliates. This approach enables us to analyze how the adoption of ESG practices at the central level influences the operational outcomes of affiliated offices in economically challenged regions.

The panel data at the firm level in our study consists of three primary components: (i) ESG scores for a listed Japanese company; (ii) financial data encompassing profits, costs, and employment data for a CHQ;[6] and (iii) corresponding data for its overseas subsidiaries located in low-income economies over the fiscal years 2016–2020. The ESG scores are sourced from LSEG (Refinitiv), while financial data for (ii) and (iii) are derived from uniquely detailed confidential firm-level statistics provided by the Japanese government. To bolster the robustness of our estimation, we leverage the panel data structure by incorporating various fixed effects. This approach enables us to control for potential unobserved confounding factors, including global and country-level macroeconomic shocks as well as the country-by-industry and specific characteristics of each overseas affiliate. Furthermore, to disentangle the impact stemming from the managerial or organizational technology and financial profitability of CHQs, we introduce their Total Factor Productivity (TFP) growth rates and Return on Equity (ROE) into our estimations. This dual-pronged approach enhances our ability to discern the nuanced effects of these factors on the observed outcomes.

Our estimation reveals that an improvement in Japanese CHQ ESG scores is uncorrelated with the growth rates of wages and jobs in Japanese foreign subsidiaries in low-income economies. However, a positive correlation is observed with the growth rate of labor productivity. For example, a one standard deviation increase in standardized ESG scores correlates with a 9.1% increase in productivity growth. Decomposing the effect of the three pillars of ESG—“Environmental,” “Social,” and “Governance”—indicates that only the “Social” pillar has a positive correlation with labor productivity. Furthermore, simultaneous estimation of the effects of the ten detailed components of ESG scores reveals that an improvement in the “Community” score within the “Social” pillar is linked to a 13.7% increase in labor productivity growth. The “Community” score measures firms’ positions on fair competition, absence of bribery and corruption, and contributions to the local community.

Therefore, in low-income countries, where corruption is generally prevalent, Japanese

[6] We assume that a CHQ is a major Japanese parent firm for its foreign offices.

subsidiaries with strong anti-bribery and anti-corruption stances can allocate their resources more effectively to production rather than engaging in rent-seeking activities compared to other Japanese subsidiaries with weaker stances on "Community." These findings remain robust even when adopting a dynamic Generalized Method of Moments (Arellano-Bond estimator), controlling for macroeconomic shocks across different developing countries, considering the direct influence of productivity and profitability of parent companies in Japan (as a proxy for know-how), and incorporating the fixed effects of local subsidiaries.

Our study is situated within three key strands of the literature. The first pertains to the diffusion of social capital through the cross-border arms of MNCs from high- to low-income countries. Numerous studies have examined the impacts of management know-how on labor productivity through international trade and foreign direct investment (FDI) (Bloom and Reenen, 2007; Burstein and Monge-Naranjo, 2009; Bloom et al., 2012a; Alviarez et al., 2023). However, the literature specifically focusing on the cross-border diffusion of social capital rather than management know-how through MNCs remains relatively sparse, with a few exceptions, such as the work of Bloom et al. (2012b). Their findings indicate that social capital, as proxied by social trust, promotes decentralized decision-making within firms. This decentralization, in turn, may enhance productivity by supporting larger firm.

Specifically, our research reveals that firms' commitment to the principle of "Community" positively influences the labor productivity of their foreign offices in emerging and developing countries. While these principles share similarities with the concept of social trust that MNCs often engage with in high-income countries, our study is the first to underscore the distinct significance of this principle within globally promoted ESG practices mandated by governments.

The second strand of the literature concerns the concept of "dirty work export" through FDI. Existing literature presents two opposing hypotheses. One is the "pollution haven" hypothesis,[7] which advocates that nations with lax environmental regulations are more attractive to FDIs. However, Javorcik and Wei (2003) found no support for the "pollution haven" hypothesis in their study on Eastern Europe and the former Soviet Union. Conversely, Cust et al. (2023) presented a case in which major MNCs with robust corporate governance practices and/or a commitment to high environmental standards drilled oil wells in developing countries, without necessarily leading to lower forest losses after drilling.[8] The other hypothesis is the "pollution halo," which asserts that international firms can introduce globally accepted environmental norms—along with ecologically sustainable technologies and managerial approaches—to the

[7] Refer to Wagner and Timmins (2009), Olney (2013), and Cust et al. (2023) for the definition of "pollution haven" hypothesis.
[8] Even in the U.S., the most developed country in the world, a state with a strong commitment to clean energy can reduce CO2 emissions. However, another physically distant state that supplies the former state with electricity increases CO2 emissions by generating more coal combustion (Holland et al., 2016). This "pollution export" phenomenon could result in overall increased air contamination for the entire country.

countries in which they operate (Birdsall and Wheeler, 1993). We address the question of whether MNCs with strong ESG stances in advanced countries transfer the associated costs to their foreign subsidiaries in low-income economies.

The third strand of the literature relates to ESG scores and firm performance. Many prior studies have reported that firms with higher ESG scores achieved through carbon emission reduction, promotion of gender and racial diversity, and active engagement with local communities have experienced enhanced firm value (Yu et al. 2018; Irawan and Okimoto 2021), improved credit ratings (Devalle et al. 2017; Okimoto and Takaoka 2024), increased productivity (Albrizio et al. 2017), and stronger financial performance (Friede et al. 2015; Lee et al. 2016).[9] However, the potential influence of adopting ESG practices at CHQs on their affiliated offices in low-income economies has received comparatively less attention. To the best of our knowledge, this is the first study that addresses this issue.

The remainder of this paper is organized as follows. Section II presents our empirical analysis in which we explain the data and methodology. Section III provides the results and robustness checks. In Section IV, we discuss how the ESG practices of CHQs affect the labor productivity of their overseas affiliates. Section V concludes the paper.

II. Data and Empirical Design

A. Data

We integrated three datasets to investigate the relationship between the ESG policies of CHQs in Japan, the performance of their foreign affiliates in low-income countries, and the productivity and profitability indices of CHQs as proxies for their management expertise.

The first dataset consisted of ESG scores provided by LSEG Data & Analytics, a financial markets data and infrastructure division of the London Stock Exchange Group plc[5] (LSEG). According to LSEG Data & Analytics (2022), ESG scores are grounded in data-driven methodologies that consider the most significant industry metrics, while minimizing biases related to company size and transparency. The determination of these scores involves assessing industry-specific relative performance within the framework of established criteria and a comprehensive data model.[10] To compile ESG scores, specialists manually collect and audit

[9] Some studies argue that ESG investing does not necessarily yield a significant return difference between firms with high and low ESG scores (Auer and Schuhmacher, 2016; Halbritter and Dorfleitner, 2015).

[10] According to LSEG Data & Analytics (2022), the ESG scoring methodology has a number of key calculation principles: 1) Unique ESG magnitude (materiality) weightings have been included – as the importance of ESG factors differs across industries, each metric's materiality is mapped for each industry on a scale of 1 to 10; 2) Transparency stimulation – company disclosure is at the core of the methodology. With applied weighting, not reporting 'immaterial' data points does not greatly affect a company's score, whereas not reporting on 'highly material' data points will negatively affect a company's score; 3) ESG controversies overlay – Companies' actions against commitments are verified, to magnify the impact of significant controversies on the overall ESG scoring. The scoring methodology aims to address the market cap bias from which large companies suffer by introducing severity weights,

information from publicly available sources, including company websites, annual reports, and corporate social responsibility (CSR) reports. The credibility of these ESG scores in analyzing firms' ESG stances is noteworthy. These scores, along with their predecessors such as Thomson Reuters Asset 4, have gained widespread usage in prior studies.[11]

However, it is important to note that the ESG scores for listed Japanese firms primarily evaluate the CHQs and their group firms in Japan. LSEG ESG specialists capture ESG data from publicly available documents and/or reports published by listed firms' CHQs. If the CHQ is an MNC and therefore holds many overseas affiliates, the documents and/or reports of the CHQ should contain data on all overseas affiliates. In this case, specialists consider data from all overseas affiliates. However, most CHQs in Japanese listed firms have difficulty gathering ESG data from all overseas affiliates. For example, according to the Ministry of Economy, Trade and Industry (METI) (2023), 85% of the surveyed Japanese firms (a total of 200 firms) answered that there is "room for improvement" in terms of coordination between the department that oversees sustainability-related data and consolidated subsidiaries, including overseas affiliates.[12] Against this backdrop, ESG data on listed Japanese companies only reflect CHQs and their affiliated firms in Japan. For our analysis, we assumed that the ESG score of a listed Japanese company assesses the ESG position of the CHQ in Japan.

LSEG ESG scores are organized around three pillars: "Environmental," "Social," and "Governance" scores. Each pillar is further subdivided: "Environmental" encompasses "Emission," "Resource use," and "Innovation" scores; "Social" includes "Workforce," "Human rights," "Community," and "Product responsibility" scores; and "Governance" comprises "Management," "Shareholder," and "CSR Strategy" scores. Considering that each pillar may serve distinct functions for SDGs, we conducted a more comprehensive estimation by utilizing the detailed scores of each pillar, as outlined in Equation (3) in Section B. Note that the number of Japanese-listed companies with ESG scores from the fiscal years 2015-2019 were 400, 405, 413, 423, and 441, respectively.

The second dataset utilized was the Basic Survey of Overseas Business Activities

which ensure controversy scores are adjusted based on a company's size; 4) Industry and country benchmarks at the data point scoring level – to facilitate comparable analysis within peer groups; and 5) Percentile rank scoring methodology – to eliminate hidden layers of calculations. This methodology enables the production of a score between 0 and 100.

[11] See Ioannou and Serafeim (2012), Beiting et al. (2014), Eccles et al. (2014), Zhou et al. (2020), Irawan and Okimoto (2021), Okimoto and Takaoka (2024), and Wang et al. (2023).

[12] METI (2023) mentioned that the offices and consolidated subsidiaries that generate sustainability-related data have little interest in "sustainability," and as such their awareness of the need for sustainability-related data varies widely. Furthermore, despite the wide variety of sustainability-related data and the vast scope and volume of data, the data collection system within the corporate group, which serves as the basis for collaboration, has not yet been systematized. Also, some of the issues specific to overseas subsidiaries were identified, such as the need to redefine the definition of sustainability-related data as a corporate group because the same definition may not be applied to the collection of sustainability-related data from overseas subsidiaries due to differences in laws, regulations, and business practices.

(BSOBA).[13] This is an annual survey of foreign affiliates held by Japanese firms and conducted by the METI. This survey gathers fundamental information on Japanese firms' overseas business activities, including the number of Japanese firms with overseas operations, their sales (exports to Japan, sales to the country where the subsidiary is located, and exports to other regions such as North America, Asia, and Europe), foreign countries, profits and losses, employment figures, and the regions and countries in which they operate. To gauge the performance of foreign affiliates, we computed the labor productivity of each overseas subsidiary by dividing its foreign currency-based value-added by the number of regular foreign employees.[14]

Value-added is defined as $[Operating\ profits + Wages + Rent]/Exchange\ rate$.[15] Since the original figures of the BSOBA are denominated in Japanese yen, we converted them into local currency-denominated figures using the exchange rate. While labor productivity is typically measured as value-added per man-hour, we calculated productivity on a per-man basis owing to data limitations. Subsequently, we took the first difference in the natural logarithm of labor productivity to approximate its growth rate. Note that this growth rate is on a nominal rather than real basis; therefore, in the estimation, price changes in the product can be absorbed by time-by-country dummies and industry-by-country dummies to some extent. Additionally, for each foreign subsidiary, we calculated wages by dividing the total payroll by the number of regular foreign employees.[16] The wage growth rate was computed in the same manner as the labor productivity growth rate. In terms of employment growth rate, we calculated the first difference in the logarithm of the number of regular foreign employees.

The third dataset was the Basic Survey of Japanese Business Structure and Activities (BSJBSA), an annual survey conducted by the METI. This survey is designed to collect annual statistics from all Japanese firms meeting specific criteria, namely those with 50 or more regular employees and a capital of 30 million yen or higher (equivalent to approximately 0.3 million USD based on the average exchange rate in calendar year 2020, according to International Financial Statistics, which was 106.77 yen per US dollar). The BSJBSA encompasses all industries except the financial, insurance, and real estate sectors.[17] Approximately 30,000 firms respond to this

[13] In accordance with the Statistics Law in Japan, the statistics employed in this study are independently produced and processed. This is achieved by obtaining questionnaire information from the National Statistics Center, specifically from the Basic Survey of Overseas Business Activities and the Basic Survey of Corporate Activities. It is important to note that these statistics are different from those produced and published by the METI.
[14] The count of regular foreign employees is determined by subtracting the number of dispatchers from Japan from the total number of regular employees.
[15] Operating profits are defined as Sales minus Cost of goods sold minus Selling and general administrative expenses. Our definition of Value-added is that of the BSOBA, which mostly aligns with that of Morikawa (2010), the sum of the operating profits (total sales minus operating cost), rent, wage, depreciation and paid tax. However, due to data limitations in BSOBA, we could not include Depreciation in the calculation of Value-added.
[16] We assumed that the wage payments for the Japanese expatriates were accounted for in the CHQ's profit and loss statement.
[17] In the econometric analysis, industries highly correlated with oil prices, those closely linked to real estate development, and even media-related sectors that are challenging to measure in terms of productivity were excluded, despite their limited numbers.

survey annually. Utilizing the data from the BSJBSA, we calculated the growth rate of TFP for a Japanese CHQ using the nonparametric cost-share-based index number method, as detailed by Morikawa (2010, 2023).[18]

We merged the three aforementioned datasets (LSEG ESG scores, BSOBA, and BSJBSA) by establishing connections between a listed company with LSEG ESG scores and the BSJBSA CHQ. Additionally, we established links between the CHQ of the BSJBSA and its overseas subsidiaries of BSOBA, as illustrated in Figure 2. Low-income countries for our sample are defined as World Bank-designated developing countries in which Japanese foreign affiliates are located (see the countries listed in Table A1). It is worth noting that the majority of the foreign subsidiaries are wholly-owned, with the parent company holding 100% of its shares.

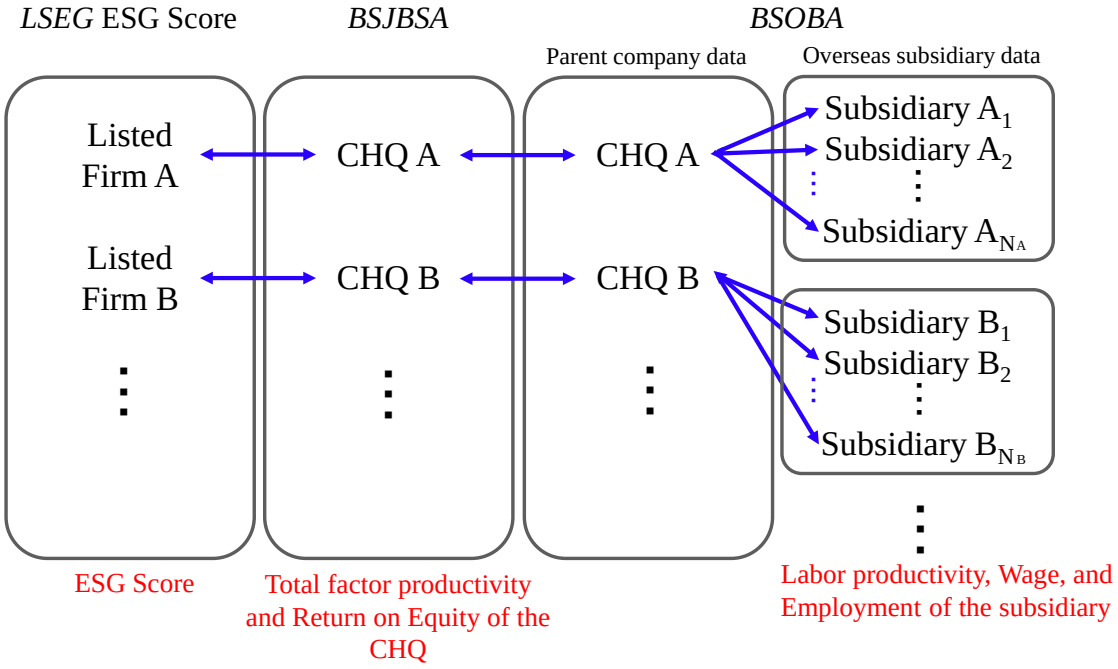

Figure 2 Matched dataset

Table 1 presents the summary statistics of the ESG scores, outcome variables for foreign subsidiaries in low-income countries, real TFP growth rate, and change in the ROE of their parent companies. Furthermore, Table 2 demonstrates the correlation matrix between each pillar score, the real TFP growth rate, and the change in the ROE, indicating strong correlations between overall ESG score with "Environmental," "Social," and "Governance," as well as between each of the three pillars with their respective detailed components. Notably, the detailed components exhibited weak correlations with each other. This enabled us to estimate the effects of these

[18] Refer to A3 in the appendix for the details on the calculation of real TFP growth rate.

detailed components simultaneously, addressing the challenge of multicollinearity, as demonstrated in Equations (2) and (3) in the following section. Figure 3 illustrates the sectoral distribution of Japanese foreign subsidiaries in low-income countries. Although the Manufacturing and Wholesale sectors have notable shares, Japanese foreign subsidiaries are widely distributed across various industries.

Table 1 Summary statistics and description of ESG scores

Panel A: Japanese overseas subsidiaries located in low-income countries FY2017–FY2020	Mean	SD	N
Growth rate of labor productivity	3.91	73.77	5,706
Growth rate of wage	6.29	56.82	6,382
Growth rate of employment	−0.47	39.28	9,923

Panel B: Japanese central headquarters located in Japan FY2016–FY2019	Description	Mean	SD	N
$\Delta\widetilde{ESG}$		−0.01	0.23	12,872
$\Delta\tilde{E}$	Environmental	0.02	0.24	12,872
$\Delta\tilde{E}$_Emmision	Emission strategy	0.02	0.36	12,872
$\Delta\tilde{E}$_Resource use	Resource use strategy	0.02	0.27	12,872
$\Delta\tilde{E}$_Innovation	Innovation stance to tackle environmental issues	0.02	0.31	12,872
$\Delta\tilde{S}$	Social	−0.01	0.32	12,872
$\Delta\tilde{S}$_Workforce	Welfare policy toward its employees	−0.02	0.44	12,872
$\Delta\tilde{S}$_Human right	Policy to respect human right	−0.02	0.58	12,872
$\Delta\tilde{S}$_Community	Local community and fair-trade policy	0.00	0.46	12,872
$\Delta\tilde{S}$_Product responsibility	Stance to take a responsibility to its products	0.04	0.37	12,872
$\Delta\tilde{G}$	Governance	−0.04	0.46	12,872
$\Delta\tilde{G}$_Management	Management strategy	−0.04	0.51	12,872
$\Delta\tilde{G}$_Shareholder	Policy regarding whether there are policies that put more weight on shareholders' opinions	−0.01	0.54	12,872
$\Delta\tilde{G}$_CSR strategy	Corporate social responsibility strategy	−0.02	0.31	12,872
ΔTFP	Growth rate of real TFP (demeaned)	−1.33	24.45	10,583
ΔROE	Change in ROE (demeaned)	−0.17	22.94	10,921

Notes. All ESG scores are standardized (Z-score normalized).

Table 2 Correlation matrix

	$\Delta\widetilde{ESG}$	$\Delta\tilde{E}$	$\Delta\tilde{S}$	$\Delta\tilde{G}$	ΔTFP	ΔROE
$\Delta\widetilde{ESG}$	1					
$\Delta\tilde{E}$	**0.50**	1				
$\Delta\tilde{S}$	**0.63**	0.03	1			
$\Delta\tilde{G}$	**0.62**	0.09	−0.02	1		
ΔTFP	0.05	0.12	−0.05	0.05	1	
ΔROE	0.03	−0.00	−0.03	0.10	−0.09	1

	$\Delta\tilde{E}$	$\Delta\tilde{E}$_Emmision	$\Delta\tilde{E}$_Resource use	$\Delta\tilde{E}$_Innovation	ΔTFP	ΔROE
$\Delta\tilde{E}$	1					
$\Delta\tilde{E}$_Emmision	**0.61**	1				
$\Delta\tilde{E}$_Resource use	**0.49**	0.13	1			
$\Delta\tilde{E}$_Innovation	**0.76**	0.20	0.07	1		
ΔTFP	0.12	0.21	0.00	0.04	1	
ΔROE	−0.00	0.02	0.01	−0.02	−0.09	1

	$\Delta\tilde{S}$	$\Delta\tilde{S}$_Workforce	$\Delta\tilde{S}$_Human right	$\Delta\tilde{S}$_Community	$\Delta\tilde{S}$_Product responsibility	ΔTFP	ΔROE
$\Delta\tilde{S}$	1						
$\Delta\tilde{S}$_Workforce	**0.51**	1					
$\Delta\tilde{S}$_Human right	**0.77**	0.14	1				
$\Delta\tilde{S}$_Community	**0.43**	−0.04	0.09	1			
$\Delta\tilde{S}$_Product responsibility	0.20	0.05	−0.04	0.04	1		
ΔTFP	−0.05	0.02	−0.01	−0.05	−0.05	1	
ΔROE	−0.03	−0.05	−0.02	0.01	−0.01	−0.09	1

	$\Delta\tilde{G}$	$\Delta\tilde{G}$_Management	$\Delta\tilde{G}$_Shareholder	$\Delta\tilde{G}$_CSR strategy	ΔTFP	ΔROE
$\Delta\tilde{G}$	1					
$\Delta\tilde{G}$_Management	**0.95**	1				
$\Delta\tilde{G}$_Shareholder	**0.34**	0.06	1			
$\Delta\tilde{G}$_CSR strategy	0.15	0.01	0.02	1		
ΔTFP	0.05	0.03	0.05	0.03	1	
ΔROE	0.10	0.12	−0.03	−0.00	−0.09	1

	ΔẼ_Emmision	ΔẼ_Resource use	ΔẼ_Innovation	ΔS̃_Workforce	ΔS̃_Humanright	ΔS̃_Community
ΔẼ_Emmision	1					
ΔẼ_Resource use	0.13	1				
ΔẼ_Innovation	0.20	0.07	1			
ΔS̃_Workforce	−0.02	0.01	0.08	1		
ΔS̃_Human right	−0.15	0.03	−0.01	0.14	1	
ΔS̃_Community	−0.08	0.06	−0.06	−0.04	0.09	1
ΔS̃_Product responsibility	0.22	0.23	0.05	0.05	−0.04	0.04
ΔG̃_Management	0.15	0.16	−0.01	0.00	−0.03	−0.07
ΔG̃_Shareholder	0.00	0.10	−0.03	−0.04	0.02	0.01
ΔG̃_CSR strategy	0.01	0.03	0.00	0.05	0.14	0.00
ΔTFP	0.21	0.00	0.04	0.02	−0.01	−0.05
ΔROE	0.02	0.01	−0.02	−0.05	−0.02	0.01

	ΔS̃_Product responsibility	ΔG̃_Management	ΔG̃_Shareholder	ΔG̃_CSRstrategy	ΔTFP	ΔROE
ΔẼ_Emmision						
ΔẼ_Resource use						
ΔẼ_Innovation						
ΔS̃_Workforce						
ΔS̃_Human right						
ΔS̃_Community						
ΔS̃_Product responsibility	1					
ΔG̃_Management	0.01	1				
ΔG̃_Shareholder	0.14	0.06	1			
ΔG̃_CSR strategy	−0.09	0.01	0.02	1		
ΔTFP	−0.05	0.03	0.05	0.03	1	
ΔROE	−0.01	0.12	−0.03	−0.00	−0.09	1

Notes. All ESG scores are standardized (Z-score normalized). Δ TFP and Δ ROE are demeaned. The periods span from fiscal year 2016 to fiscal year 2019. Bold numbers indicate that the correlation is greater than 0.3.

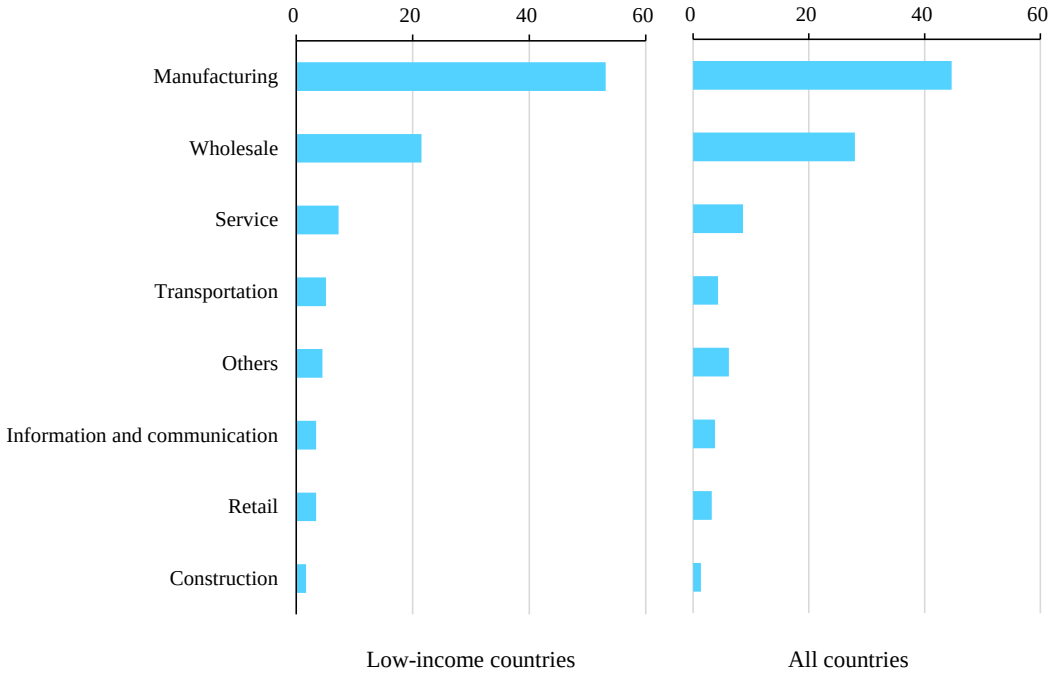

Figure 3 Sectoral distribution of Japanese overseas subsidiaries

Notes. "Low-income countries" indicates the sectoral distribution of Japanese overseas subsidiaries located in low-income countries. "All countries" indicates the sectoral distribution of all Japanese overseas subsidiaries.

B. Empirical Model

Considering the above, we ran the following regression models for overseas affiliates, f, belonging to a Japanese CHQ, h, operating in industry j in country c.

$$\Delta y_{fh,t} = \beta_{ESG}\Delta\widetilde{ESG}_{h,t-1} + \phi_t + \delta_c \times \phi_t + \gamma_j \times \delta_c + \theta_f + \Lambda' \boldsymbol{X}_{h,t-1} + \varepsilon_{fh,t} \qquad (1)$$

where $\Delta y_{fh,t}$ represents outcome variables such as the growth rate of labor productivity, wages, and local employment in the overseas subsidiary, f. $\widetilde{ESG}_{h,t-1}$ is the ESG score of the CHQ, h, which is standardized against the average of $ESG_{h,t-1}$ for all Japanese CHQs for each year.[19] $\Delta\widetilde{ESG}_{h,t-1}$ is the first difference in $\widetilde{ESG}_{h,t-1}$. ϕ_t is a dummy variable for each year. δ_c is a dummy variable for each low-income country. Thus, $\delta_c \times \phi_t$ controls for macroeconomic

[19] We standardized the ESG scores because they exhibited an upward trend even after taking the first difference. However, it is important to note that the estimation results showed minimal changes in terms of the signs and significance of most coefficients when using the first difference in the original ESG scores instead of the standardized ones.

shocks[20] specific to each developing country on the growth rate of the outcome variables. γ_j is a dummy variable for each industry, and $\gamma_j \times \delta_c$ controls for industry-by-country fixed effects. θ_f represents the fixed effect of an overseas subsidiary. $\boldsymbol{X}_{h,t-1}$ is a vector of controls related to a Japanese CHQ, such as its productivity (real TFP) and profitability (ROE); $\varepsilon_{fh,t}$ is a random disturbance term.

Equation (2) breaks down $\Delta\widetilde{ESG}_{h,t-1}$ into three pillars to assess each effect, along with the same control variables as in Equation (1).

$$\Delta y_{fh,t} = \beta_E \Delta\tilde{E}_{h,t-1} + \beta_S \Delta\tilde{S}_{h,t-1} + \beta_G \Delta\tilde{G}_{h,t-1} + \phi_t + \delta_c \times \phi_t + \gamma_j \times \delta_c + \theta_f + \Lambda' \boldsymbol{X}_{h,t-1} + \varepsilon_{fh,t} \quad (2)$$

Equation (3) decomposes the elements of each pillar as follows: "Environmental" is segmented into three components: "Emission reduction," "Resource use," and "Innovation" scores. "Social" is further divided into four components: "Workforce," "Human rights," "Community," and "Product responsibility" scores. "Governance" is subdivided into three components: "Management," "Shareholders," and "CSR strategy" scores. Detailed descriptions of each score can be found in Panel B of Table 1.

$$\begin{aligned}\Delta y_{fh,t} = \; & \beta_{E,1}\Delta\tilde{E}^{Emissions}_{h,t-1} + \beta_{E,2}\Delta\tilde{E}^{Resource\ use}_{h,t-1} + \beta_{E,3}\Delta\tilde{E}^{Innovation}_{h,t-1} \\ & + \beta_{S,1}\Delta\tilde{S}^{Workforce}_{h,t-1} + \beta_{S,2}\Delta\tilde{S}^{Human\ rights}_{h,t-1} + \beta_{S,3}\Delta\tilde{S}^{Community}_{h,t-1} + \beta_{S,4}\Delta\tilde{S}^{Product\ responsibility}_{h,t-1} \\ & + \beta_{G,1}\Delta\tilde{G}^{Management}_{h,t-1} + \beta_{G,2}\Delta\tilde{G}^{Shareholders}_{h,t-1} + \beta_{G,3}\Delta\tilde{G}^{CSR\ strategy}_{h,t-1} \\ & + \phi_t + \delta_c \times \phi_t + \gamma_j \times \delta_c + \theta_f + \Lambda' \boldsymbol{X}_{h,t-1} + \varepsilon_{fh,t} \end{aligned} \quad (3)$$

We estimated these three equations using firm-level data. To address potential endogeneity and reverse causality issues, we lagged the ESG scores and control variables related to a Japanese CHQ by one period (one-year lag), assuming that a change in the ESG practices of CHQs influences their foreign affiliates' performance in one year. Furthermore, we controlled for other external factors by incorporating overseas office time-invariant characteristics using the fixed effect, θ_f.

III. Estimation Results

A. Effects on Productivity

The results presented in Table 3 include the outcomes of Equation (1) and the four specifications derived from Equation (2) delineated in Columns (1) and (2)–(5). Each column shows the coefficients estimated by the subsidiary-level fixed effects model with robust standard errors.

[20] These shocks include omitted unobserved country-level shocks such as monetary and fiscal policies as well as regulatory changes.

Table 3 Effects of Japanese CHQs' ESG score on labor productivity of their foreign subsidiaries

Dependent variable: The growth rate of labor productivity in Japanese overseas subsidiaries

	(1)	(2)	(3)	(4)	(5)
$\Delta\widetilde{ESG}_{-1}$	9.051*				
	(5.021)				
$\Delta\widetilde{E}_{-1}$		3.749			3.511
		(4.415)			(4.479)
$\Delta\widetilde{S}_{-1}$			8.361**		8.305**
			(4.084)		(4.098)
$\Delta\widetilde{G}_{-1}$				0.511	0.134
				(2.763)	(2.799)
ΔTFP$_{-1}$ of Japanese CHQs	0.057	0.055	0.071	0.059	0.067
	(0.060)	(0.060)	(0.060)	(0.060)	(0.060)
ΔROE$_{-1}$ of Japanese CHQs	−0.006	−0.003	0.003	−0.004	0.003
	(0.055)	(0.056)	(0.057)	(0.056)	(0.056)
Observation	4,896	4,896	4,896	4,896	4,896
Adjusted R^2	0.031	0.031	0.032	0.031	0.032
Fixed effects					
Overseas subsidiary	✓	✓	✓	✓	✓
Country×Year	✓	✓	✓	✓	✓
Country×Industry	✓	✓	✓	✓	✓
Year	✓	✓	✓	✓	✓

Notes. Estimation results using the fixed effects model. Standard errors robust to clustering by foreign subsidiaries are reported in parentheses. The estimation period spans from fiscal years 2017 to 2020. Foreign subsidiaries located in low-income countries are the focus of the analysis. The intercept term is omitted. * p<0.10, ** p<0.05, *** p<0.01.

Column (1) indicates that ΔESG_{-1}, the one-year lag of the first difference in the standardized ESG score, has a significant positive impact on the productivity growth rate within Japanese overseas affiliates in low-income countries, albeit with slightly less significance. This coefficient of interest suggests that a one-point increase (equivalent to a one standard deviation increase) in the ESG score of a Japanese CHQ corresponds to a 9.1 percentage increase in the growth rate of its foreign subsidiary's labor productivity, holding all other factors constant. This substantial impact becomes more apparent when juxtaposed with the average growth rate of labor productivity, which stands at 3.91 during the sample period spanning the fiscal years 2017–2020.

Columns (2)–(5) present the outcomes of Equation (2), which breaks down $\Delta\widetilde{ESG}_{-1}$ into three pillars: $\Delta\tilde{E}_{-1}$,$\Delta\tilde{S}_{-1}$, and $\Delta\tilde{G}_{-1}$.[21] These pillars denote the one-year lag of the first difference in the standardized "Environmental," "Social," and "Governance" scores, respectively. Upon comparing Columns (2)–(5), it becomes evident that only $\Delta\tilde{S}_{-1}$ exhibits a statistically significant

[21] It is worth noting that, given the correlations across each pillar are less than 0.3, as indicated in Table 2, the multicollinearity issues in Column (5) of Table 3 and Column (1)–(4) of Table 4 seem inconsequential.

positive effect. This suggests that most of the significant positive coefficient of $\Delta\widetilde{ESG}_{-1}$ primarily stems from the impact of $\Delta\tilde{S}_{-1}$. Furthermore, the impact of $\Delta\tilde{S}_{-1}$ appears to be comparable to that of $\Delta\widetilde{ESG}_{-1}$.

In Columns (1)–(4) of Table 4, we deconstructed the three pillars into their ten constituent elements.[21] Consistent with the findings in Column (4) of Table 3, $\Delta\tilde{S}\_Community_{-1}$, one of three elements of $\Delta\tilde{S}_{-1}$, displays a significant positive coefficient. Conversely, none of the elements of $\Delta\tilde{E}_{-1}$ and $\Delta\tilde{G}_{-1}$ exhibit significant positive coefficients. Furthermore, the coefficient of interest indicates that a one-point improvement (equivalent to one standard deviation) of a Japanese CHQ's "Community" score corresponds to a noteworthy 13.7 percentage point increase in the growth rate of its foreign subsidiaries, all else being equal. This impact is substantial compared with the mean growth rate observed during the sample period. The "Community" score assesses a listed company's commitment to being civically responsible, protecting public health, and respecting business ethics, especially in the sense of fair competition, anti-bribery, anti-corruption, and community involvement. Therefore, Japanese overseas subsidiaries of the CHQ that engage in community-related activities can enhance their productivity in low-income countries, particularly those conducted in Japan.

In Column (4) of Table 4, the coefficient of $\Delta\tilde{G}\_Shareholder_{-1}$ reveals a modestly significant negative influence on the growth rate of labor productivity. In addition, the absolute value of the coefficient, 4.7, is not large compared with that of the coefficient of $\Delta\tilde{S}\_Community_{-1}$. The "Shareholder" score evaluates a listed company's effectiveness towards equal treatment of shareholders and the use of anti-takeover devices. Thus, Japanese overseas offices that prioritize shareholder interests may inadvertently hinder productivity in low-income countries.

Furthermore, all coefficients of "Environmental"-related practices are insignificant. These results indicate that promoting "Environmental" practices by Japanese CHQs does not result in a decrease in labor productivity among their overseas affiliates. This finding contradicts both the "pollution haven" and "pollution halo" hypotheses specifically in the context of ESG promotion by MNCs.[22]

It is worth noting that we obtained a statistically significant positive coefficient of $\Delta\tilde{S}\_Community_{-1}$ when estimating the same data by the Difference Generalized method of moments (Arellano and Bond, 1991), as illustrated in Table A1. The positive impact of "Community" on labor productivity is trustworthy. However, the Arellano-Bond estimator

[22] The coefficient of $\Delta\tilde{E}$_Emission$_{-1}$ becomes significantly negative when we estimated Equation (3) within the sample of manufacturing subsidiaries (the estimation results are available upon request). This finding indicates that if a CHQ strengthens an emission reduction policy, the productivity growth rate of its foreign offices in the manufacturing sector would decrease, which may support the "pollution halo" hypothesis. In contrast, the coefficient of $\Delta\tilde{S}$_Community$_{-1}$ remains significantly positive even in the case of the manufacturing subsidiaries.

revealed that the coefficient of $\Delta\tilde{G}\_Shareholder_{-1}$ becomes insignificant. Given the limited availability of panel data, employing the Difference GMM estimation would substantially diminish the sample size and would not be able to perform a two-step estimation. Hence, we opted for the fixed effects model as our preferred estimation method.

Table 4 Effects of Japanese CHQs' ESG score on labor productivity of their foreign subsidiaries: Detailed components of ESG score

Dependent variable: The growth rate of labor productivity in Japanese overseas subsidiaries

	(1)	(2)	(3)	(4)
$\Delta\tilde{E}$_Emission$_{-1}$	4.184			2.549
	(3.766)			(4.095)
$\Delta\tilde{E}$_Resource use$_{-1}$	−1.033			−6.222
	(4.700)			(5.116)
$\Delta\tilde{E}$_Innovation$_{-1}$	1.978			4.280
	(3.594)			(3.697)
$\Delta\tilde{S}$_Workforce$_{-1}$		6.248		6.067
		(3.937)		(4.134)
$\Delta\tilde{S}$_Human right$_{-1}$		−2.468		−2.012
		(2.034)		(2.117)
$\Delta\tilde{S}$_Community$_{-1}$		12.545***		13.697***
		(3.051)		(3.097)
$\Delta\tilde{S}$_Product responsibility$_{-1}$		2.597		4.249
		(3.069)		(3.321)
$\Delta\tilde{G}$_Management$_{-1}$			1.789	2.997
			(2.286)	(2.320)
$\Delta\tilde{G}$_Shareholder$_{-1}$			−3.630	−4.736*
			(2.724)	(2.820)
$\Delta\tilde{G}$_CSR Strategy$_{-1}$			−1.670	0.437
			(4.372)	(4.439)
ΔTFP$_{-1}$ of Japanese parent firm	0.047	0.070	0.057	0.060
	(0.062)	(0.060)	(0.060)	(0.062)
ΔROE$_{-1}$ of Japanese parent firm	−0.002	0.006	−0.005	0.008
	(0.056)	(0.056)	(0.055)	(0.054)
Observation	4,896	4,896	4,896	4,896
Adjusted R^2	0.031	0.037	0.031	0.038
Fixed effects				
Overseas subsidiary	✓	✓	✓	✓
Country×Year	✓	✓	✓	✓
Country×Industry	✓	✓	✓	✓
Year	✓	✓	✓	✓

Notes. Estimation results using the fixed effects model. Standard errors robust to clustering by foreign subsidiaries are reported in parentheses. The estimation period spans from fiscal years 2017 to 2020. Foreign subsidiaries located in low-income countries are the focus of the analysis. The intercept term is omitted. * p<0.10, ** p<0.05, *** p<0.01.

B. Effects on Wages

Table 5 presents the estimation results when wage growth rate serves as the outcome variable in Equation (2). Columns (1)–(3) reveal that none of $\Delta\widetilde{ESG}_{-1}$, $\Delta\tilde{E}_{-1}$, and $\Delta\tilde{S}_{-1}$ exhibit statistically significant estimates. In contrast, $\Delta\tilde{G}_{-1}$ demonstrates a significantly negative coefficient. This negative association maintains its significance even after controlling for all other detailed components of ESG scores. This finding implies that a one-point increase (equivalent to a one standard deviation) in the "Governance" score is associated with a decrease in the wage growth rate of local employees by approximately 5.4 percentage point, holding all other factors constant.

Table 5 Effects of Japanese CHQs' ESG score on wages of their foreign subsidiaries

Dependent variable: The growth rate of wage in Japanese overseas subsidiaries

	(1)	(2)	(3)	(4)	(5)
$\Delta\widetilde{ESG}_{-1}$	−2.296				
	(3.466)				
$\Delta\tilde{E}_{-1}$		0.466			1.561
		(3.611)			(3.776)
$\Delta\tilde{S}_{-1}$			3.497		3.752
			(2.524)		(2.546)
$\Delta\tilde{G}_{-1}$				−5.243**	−5.407**
				(2.379)	(2.451)
ΔTFP$_{-1}$ of Japanese parent firm	0.025	0.024	0.029	0.030	0.033
	(0.042)	(0.042)	(0.042)	(0.043)	(0.043)
ΔROE$_{-1}$ of Japanese parent firm	−0.053	−0.054	−0.052	−0.041	−0.038
	(0.068)	(0.068)	(0.068)	(0.069)	(0.069)
Observation	5,408	5,408	5,408	5,408	5,408
Adjusted R^2	0.007	0.007	0.007	0.009	0.009
Fixed effects					
Overseas subsidiary	✓	✓	✓	✓	✓
Country×Year	✓	✓	✓	✓	✓
Country×Industry	✓	✓	✓	✓	✓
Year	✓	✓	✓	✓	✓

Notes. Estimation results using the fixed effects model. Standard errors robust to clustering by foreign subsidiaries are reported in parentheses. The estimation period spans from fiscal years 2017 to 2020. Foreign subsidiaries located in low-income countries are the focus of the analysis. The intercept term is omitted. * p<0.10, ** p<0.05, *** p<0.01.

Table 6 presents a comprehensive breakdown of the results presented in Table 5, allowing for an exploration of the factors encompassed by $\Delta\tilde{G}_{-1}$ that contribute to a negative impact on wage growth rate. In Column (3) of Table 6, it becomes apparent that the primary driver of this adverse effect is $\Delta\tilde{G}\_Shareholder_{-1}$. In Column (4), the significance of the coefficient for $\Delta\tilde{G}\_Shareholder_{-1}$ persists when incorporating all detailed components of ESG scores in the

estimation. This finding aligns with those in the preceding section, suggesting that an increase in $\Delta\tilde{G}\_Shareholder_{-1}$ tends to exacerbate the labor productivity growth rate. Specifically, a local subsidiary held by a Japanese CHQ with a higher "Shareholder" score than other CHQs maintains a lower wage growth rate. Consequently, subsidiaries face challenges in hiring or retaining highly productive local employees, leading to a reduction in the labor productivity growth rate.

In both Columns (1) and (4), within the "Environment" scores, the coefficient of $\Delta\tilde{E}\_Resource\_use_{-1}$ exhibits a negative impact on wage growth, albeit with slightly less significance. The "Resource use" score reflects a company's performance and capacity to reduce the use of materials, energy, or water, and to find more eco-efficient solutions by improving supply chain management. Japanese CHQs may be compelled to make capital investments in an attempt to curtail resource use, involving initiatives such as recycling products and resources and developing high-value-added products, leading to escalating costs. Simultaneously, their overseas subsidiaries may have a heightened incentive to reduce labor costs.

Notably, both coefficients of $\Delta\tilde{E}\_Resource\ use_{-1}$ and $\Delta\tilde{G}\_Shareholder_{-1}$ maintain negative values that become insignificant when estimating the Arellano-Bond estimator, as shown in Table A2. However, since employing the difference GMM estimation would substantially diminish the sample size and does not allow us to perform a two-step estimation, we prefer the fixed effects model results to the Arellano and Bond estimators.

Table 6 Effects of Japanese CHQs' ESG score on wages of their foreign subsidiaries: Detailed components of ESG score

Dependent variable: The growth rate of wage in Japanese overseas subsidiaries

	(1)	(2)	(3)	(4)
$\Delta\tilde{E}$_Emission$_{-1}$	2.398			3.395
	(2.986)			(3.176)
$\Delta\tilde{E}$_Resource use$_{-1}$	−7.648*			−7.680*
	(4.214)			(4.560)
$\Delta\tilde{E}$_Innovation$_{-1}$	1.649			2.245
	(2.500)			(2.504)
$\Delta\tilde{S}$_Workforce$_{-1}$		0.542		0.988
		(2.757)		(2.876)
$\Delta\tilde{S}$_Human right$_{-1}$		0.221		0.902
		(1.622)		(1.555)
$\Delta\tilde{S}$_Community$_{-1}$		2.511		3.370
		(2.144)		(2.157)
$\Delta\tilde{S}$_Product responsibility$_{-1}$		1.234		2.119
		(2.684)		(2.777)
$\Delta\tilde{G}$_Management$_{-1}$			−3.128	−2.500
			(1.937)	(2.050)

$\Delta\widetilde{G}$_Shareholder$_{-1}$			−5.283***	−5.606***
			(2.034)	(2.099)
$\Delta\widetilde{G}$_CSR Strategy$_{-1}$			−0.387	0.391
			(2.863)	(2.800)
ΔTFP$_{-1}$ of Japanese parent firm	0.017	0.029	0.029	0.025
	(0.043)	(0.042)	(0.043)	(0.043)
ΔROE$_{-1}$ of Japanese parent firm	−0.049	−0.052	−0.041	−0.034
	(0.068)	(0.068)	(0.068)	(0.068)
Observation	5,408	5408	5,408	5,408
Adjusted R^2	0.008	0.007	0.010	0.011
Fixed effects				
Overseas subsidiary	✓	✓	✓	✓
Country×Year	✓	✓	✓	✓
Country×Industry	✓	✓	✓	✓
Year	✓	✓	✓	✓

Notes. Estimation results using the fixed effects model. Standard errors robust to clustering by foreign subsidiaries are reported in parentheses. The estimation period spans from fiscal years 2017 to 2020. Foreign subsidiaries located in low-income countries are the focus of the analysis. The intercept term is omitted. * p<0.10, ** p<0.05, *** p<0.01.

C. Effects on Employment

Table 7 shows the estimation results of Equations (1) and (2) when including the growth rate of employment of foreign subsidiaries in developing countries as the outcome variable. Columns (1)–(5) show that neither ESG nor any of its pillars have a significant impact on the growth rate.

Table 7 Effects of Japanese CHQs' ESG score on employment of their foreign subsidiaries

Dependent variable: The growth rate of employment in Japanese overseas subsidiaries

	(1)	(2)	(3)	(4)	(5)
$\Delta\widehat{ESG}_{-1}$	−0.609				
	(1.782)				
$\Delta\widetilde{E}_{-1}$		−2.345			−2.490
		(2.039)			(2.100)
$\Delta\widetilde{S}_{-1}$			−1.553		−1.583
			(1.340)		(1.350)
$\Delta\widetilde{G}_{-1}$				1.296	1.444
				(1.252)	(1.288)
ΔTFP$_{-1}$ of Japanese parent firm	−0.024	−0.021	−0.027	−0.026	−0.026
	(0.020)	(0.020)	(0.020)	(0.020)	(0.021)
ΔROE$_{-1}$ of Japanese parent firm	0.005	0.005	0.004	0.001	0.001
	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
Observation	8,374	8,374	8,374	8,374	8,374
Adjusted R^2	0.022	0.023	0.022	0.023	0.023

Fixed effects					
Overseas subsidiary	✓	✓	✓	✓	✓
Country×Year	✓	✓	✓	✓	✓
Country×Industry	✓	✓	✓	✓	✓
Year	✓	✓	✓	✓	✓

Notes. Estimation results using the fixed effects model. Standard errors robust to clustering by foreign subsidiaries are reported in parentheses. The estimation period spans from fiscal years 2017 to 2020. Foreign subsidiaries located in low-income countries are the focus of the analysis. The intercept term is omitted. * p<0.10, ** p<0.05, *** p<0.01.

Even after breaking down the ESG pillars into detailed components, as Columns (1)–(4) in Table 8 illustrate, none of the components have significant effects on the employment growth rate. Though the "Product responsibility" score has a significant negative effect in Column (2), the significance vanishes in Column (4), which includes each detailed ESG component.

Table 8 Effects of Japanese CHQs' ESG score on wages of their foreign subsidiaries: Detailed components of ESG score

Dependent variable: The growth rate of employment in Japanese overseas subsidiaries

	(1)	(2)	(3)	(4)
$\Delta\tilde{E}$_Emission$_{-1}$	−1.385			−1.182
	(1.781)			(1.825)
$\Delta\tilde{E}$_Resource use$_{-1}$	−0.219			0.232
	(2.338)			(2.551)
$\Delta\tilde{E}$_Innovation$_{-1}$	−0.527			−0.462
	(1.570)			(1.563)
$\Delta\tilde{S}$_Workforce$_{-1}$		−1.221		−1.399
		(1.255)		(1.319)
$\Delta\tilde{S}$_Human right$_{-1}$		0.438		0.335
		(0.793)		(0.786)
$\Delta\tilde{S}$_Community$_{-1}$		−1.918		−1.796
		(1.169)		(1.209)
$\Delta\tilde{S}$_Product responsibility$_{-1}$		−1.937*		−1.614
		(1.056)		(1.169)
$\Delta\tilde{G}$_Management$_{-1}$			1.458	1.550
			(1.012)	(1.111)
$\Delta\tilde{G}$_Shareholder$_{-1}$			−0.543	−0.431
			(1.080)	(1.093)
$\Delta\tilde{G}$_CSR Strategy$_{-1}$			−0.021	−0.208
			(1.595)	(1.598)
ΔTFP$_{-1}$ of Japanese parent firm	−0.019	−0.029	−0.025	−0.026
	(0.021)	(0.020)	(0.020)	(0.021)
ΔROE$_{-1}$ of Japanese parent firm	0.550	0.002	0.001	−0.002
	(0.029)	(0.029)	(0.028)	(0.028)

Observation	8,374	8,374	8,374	8,374
Adjusted R^2	0.022	0.023	0.023	0.023
Fixed effects				
Overseas subsidiary	✓	✓	✓	✓
Country×Year	✓	✓	✓	✓
Country×Industry	✓	✓	✓	✓
Year	✓	✓	✓	✓

Notes. Estimation results using the fixed effects model. Standard errors robust to clustering by foreign subsidiaries are reported in parentheses. The estimation period spans from fiscal years 2017 to 2020. Foreign subsidiaries located in low-income countries are the focus of the analysis. The intercept term is omitted. * p<0.10, ** p<0.05, *** p<0.01.

IV. Discussion

Our estimation results indicate that if a Japanese CHQ improves its "Community" score, its overseas offices in low-income countries are likely to attain higher labor productivity growth. A one-point (equivalent to one standard deviation) improvement in the standardized "Community" score corresponds to about a 13.7 percentage point increase in the annual labor productivity growth rate. This effect is considered economically significant when compared with the mean and standard deviation of labor productivity growth rate among foreign subsidiaries, which are 3.91 and 73.77 percentage points, respectively.

Why does the "Community" score have such a strong positive association with productivity? LSEG, the provider of ESG scores, demonstrates that the "Community" score is an indicator illustrating a listed company's commitment to being civically responsible, protecting public health, and respecting business ethics, especially in the sense of fair competition, anti-bribery, anti-corruption, and community involvement. The "Community" score is calculated as a synthetic index incorporating True/False judgments of a firm's policy regarding "Fair Competition," "Bribery and Corruption," "Business Ethics," "Community Involvement," "Improvement Tools Business Ethics," "Whistleblower Protection and Corporate Responsibility Awards," and monetary donation amounts. Considering this concept and methodology of the "Community" score, we propose two channels through which "Community" positively influences the productivity of foreign subsidiaries in low-income countries. The first is the influence of a firm's social capital on productivity. Based on the "Community" score methodology, a Japanese CHQ with a higher "Community score" is likely to possess a higher level of social capital. Bloom et al. (2012b) investigated the relationship between the social capital of MNCs and the productivity of their foreign subsidiaries, and found that MNCs with high social capital increase decentralized decision-making in their foreign affiliates. This decentralization results in the expansion of firm size, and the resulting scale effects contribute to improved productivity in foreign affiliates. Applying this line of reasoning to our study, if Japanese CHQs with higher social

capital effectively instill this business attitude toward their overseas affiliates, they are likely to engage in decentralized decision-making. This allows affiliates to better adapt to their local markets, leading to larger firms and improved productivity. To examine this reasoning, we re-estimated Equation (3) by incorporating relevant cross-terms, specifically, each ESG component multiplied by the share of sales (excluding those to Japan) compared with total sales. In Column (1) of Table 9 we retrieved the coefficient of only $\Delta\tilde{S}\_Community_{-1}$ for reference. However, Column (4) of Table 4 and Column (2) of Table 9 show coefficients of $\Delta\tilde{S}\_Community_{-1}$ and $\Delta\tilde{S}\_Community_{-1} \times \frac{Local\ Sales_{-1}+Third\text{-}country\ Export_{-1}}{Total\ Sales_{-1}}$. A significant positive coefficient of the cross-term suggests that foreign subsidiaries, which prioritize the global market over the Japanese market, can enhance their productivity when decentralized from Japanese CHQs with higher social capital. This finding provides supporting evidence for a channel linking a firm's social capital to productivity.

Table 9 Productivity enhancing effect of Japanese CHQ's "Community" score depending on scale opportunities of their foreign subsidiaries

Dependent variable: The growth rate of labor productivity in Japanese overseas subsidiaries

	(1)	(2)
$\Delta\tilde{S}\_Community_{-1}$	13.697***	0.997
	(3.097)	(6.025)
$\Delta\tilde{S}\_Community_{-1} \times \frac{\text{Local Sales}_{-1} + \text{Third-country Exports}_{-1}}{\text{Total Sales}_{-1}}$		0.191**
		(0.079)
Observation	4,896	3,646
Adjusted R^2	0.038	0.055
Fixed effects		
Overseas subsidiary	✓	✓
Country×Year	✓	✓
Country×Industry	✓	✓
Year	✓	✓

Notes. Estimation results using the fixed effects model. The coefficients of all components of ESG scores excluding Community score, CHQs' TFP and ROE, and the intercept term are omitted. Standard errors robust to clustering by foreign subsidiaries are reported in parentheses. The estimation period spans from fiscal years 2017 to 2020. Foreign subsidiaries located in low-income countries are the focus of the analysis. * p<0.10, ** p<0.05, *** p<0.01.

The second channel relates to firms preventing rent-seeking activities for productivity. The fewer overseas affiliates engaged in rent-seeking activities, the more assets they allocate to production, leading to higher productivity. On one hand, foreign subsidiaries situated in countries with less corrupt environments do not consider bribing authorities or trading partners; instead, they can focus on their production under a fair competition business culture. Conversely, overseas

affiliates in countries perceived to be highly corrupt might be tempted to engage in rent-seeking for their businesses. As illustrated by the corruption perception index (CPI) in Figure 4, most low-income countries have low CPIs, indicating a prevalent perception of corruption compared to middle-to-high-income countries. These circumstances may incentivize firms operating in low-income countries to engage in rent-seeking behavior for their business. However, such a business attitude can be detrimental to their productivity (Mauro, 1995; Mironov and Zhuravskaya, 2016; Gründler and Potrafke, 2019). Hence, a higher "Community" score of Japanese CHQs deters their foreign affiliates in low-income countries from rent-seeking, resulting in an improvement in their productivity.

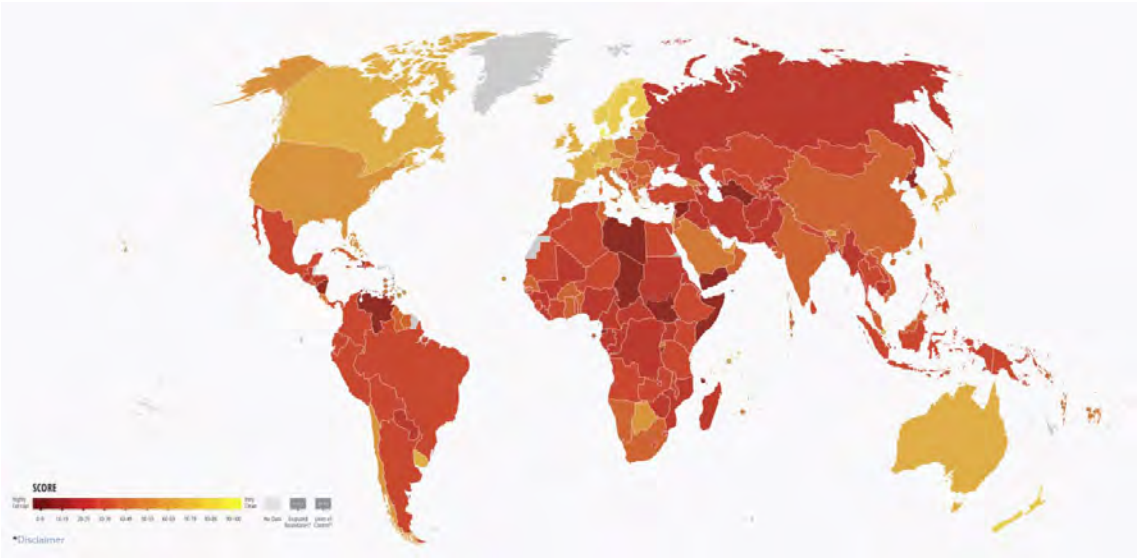

Figure 4 Corruption perception index

Source. Transparency International (https://www.transparency.org/en/cpi/2022).

In contrast, firms located in middle-to-high-income countries generally have less reliance on rent-seeking activities. As a result, the effect of the "Community" score on the productivity of the foreign affiliates in these countries tends to be weak. To examine this conjecture, we re-estimated Equation (3) by adding cross-terms. Specifically, each ESG component was multiplied by the CPI of the country where Japanese foreign affiliates are located, using the sample of all countries. Column (3) of Table 10 shows the estimated coefficients of $\Delta\tilde{S}\_Community_{-1}$ and $\Delta\tilde{S}\_Community_{-1} \times Corruption\ Perception\ Index_{-1}$, and the coefficient of the cross-term is significantly negative. Based on this estimation result, Figure 5 depicts the effects of Japanese CHQ's "Community" score on their overseas subsidiaries, conditional on CPI. The line with square markers in the graph indicates that in countries with a

higher CPI, the productivity-enhancing effect of the "Community" score tends to decline. In the same figure, the CPI of low-income countries (our primary focus) ranges from 10 to 60. Consequently, the effect on the productivity of foreign affiliates in these low-income countries becomes more pronounced than that of affiliates in middle-to-high-income countries. This finding aligns with the channels of firms' rent-seeking activities in terms of productivity.

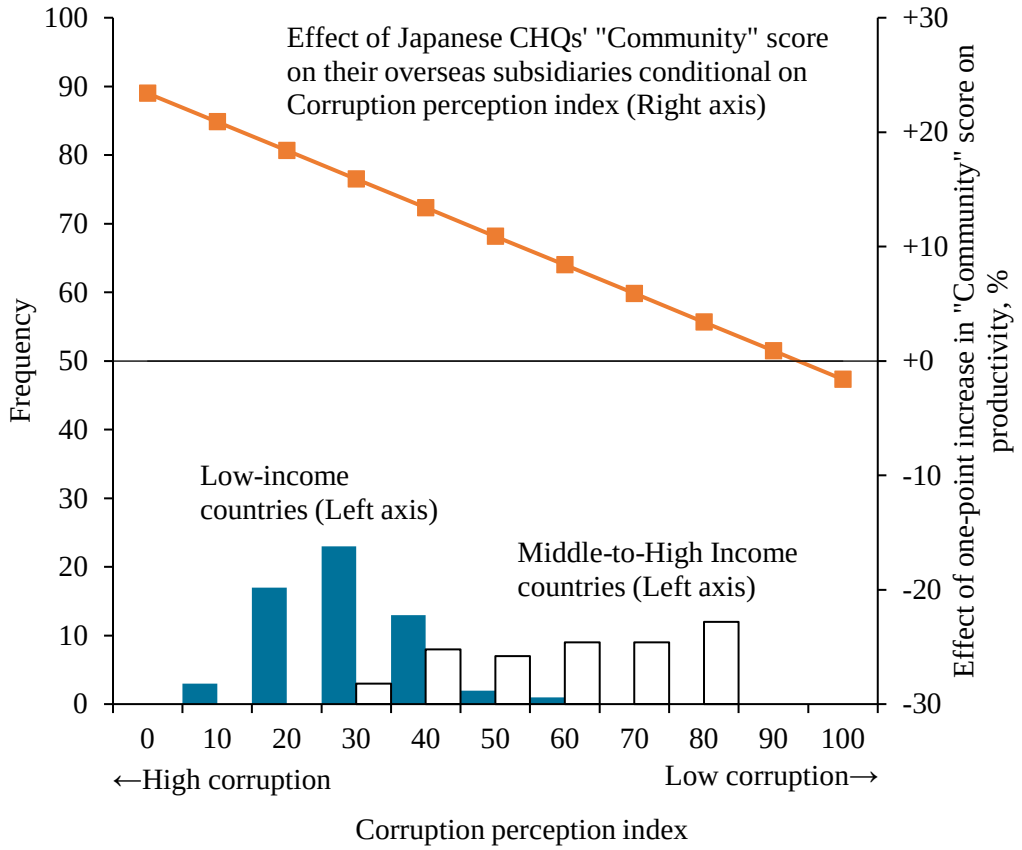

Figure 5 Corruptive environment and "Community" score's productivity enhancing effect

Notes. The square-marked line indicates the effect of Japanese CHQs "Community" score on their overseas subsidiaries, conditional on the corruption perception index, using the estimation result of Column (3) of Table 10. The blue bar depicts the distribution of low-income countries where Japanese foreign affiliates are located, while the white bar depicts the distribution of middle-to-high-income countries where Japanese foreign affiliates are located.

Table 10 Productivity enhancing effect of Japanese CHQ's "Community" score depending on corruption perception of countries their foreign subsidiaries locates

Dependent variable: The growth rate of labor productivity in Japanese overseas subsidiaries

	(1)	(2)	(3)	(4)
$\Delta\tilde{S}\_Community_{-1}$	13.697***	−2.841	23.399***	10.690
	(3.097)	(5.019)	(7.076)	(8.415)
$\Delta\tilde{S}\_Community_{-1} \times \frac{Local\ Sales_{-1} + Third-country\ Exports_{-1}}{Total\ Sales_{-1}}$		0.177***		0.208***
		(0.062)		(0.064)

$\Delta\tilde{S}$_Community$_{-1}$ × Corruption Perception Index$_{-1}$			−0.250**	−0.293**
			(0.118)	(0.142)
Sample	Low-income countries	All countries	All countries	All countries
Observation	4,896	7140	9,795	7,098
Adjusted R^2	0.038	0.044	0.029	0.047
Fixed effects				
Overseas subsidiary	✓	✓	✓	✓
Country×Year	✓	✓	✓	✓
Country×Industry	✓	✓	✓	✓
Year	✓	✓	✓	✓

Notes. Column (1) is the estimation results for Japanese foreign subsidiaries in the low-income countries, while Column (2) to (4) are those for Japanese foreign subsidiaries all over the world. The coefficients of all components of ESG scores other than Community score and TFP and ROE of Japanese CHQs are not shown. Standard errors robust to clustering by foreign subsidiaries are reported in parentheses. The estimation period spans from fiscal years 2017 to 2020. * p<0.10, ** p<0.05, *** p<0.01.

In terms of policy implications, our estimates underscore the substantial benefits of community-related stances at Japanese CHQs. Importantly, these initiatives do not merely transfer costs to foreign affiliates but instead contribute positively to the productivity of these firms. This finding provides supporting evidence that CHQs have a certain degree of direct control over policies related to fair competition, anti-corruption, and anti-bribery activities in their foreign subsidiaries. Therefore, MNCs are encouraged to place greater emphasis on the "Community" score within the ESG framework. This strategic focus not only aligns with the SDGs but also promises increased returns for MNCs.

This study has some limitations that warrant consideration. First, it is based exclusively on Japanese firms and their overseas affiliates. A comparative perspective reveals that MNCs from other high-income countries, particularly U.S. MNCs, often adopt distinct approaches to managing human resources or employment relationships in their overseas subsidiaries (Ferner et al., 2013). Consequently, the effects of ESG practices on labor productivity in foreign offices may differ for MNCs in other advanced countries apart from Japan. Future research that encompasses a broader spectrum of advanced-country MNCs could provide insights into the comparative impacts of "Community" practices on labor productivity.

Second, our focus was confined to firm-level analyses. To comprehensively gauge the macroeconomic impacts of MNCs' ESG practices on low-income economies, it is imperative to explore the potential spillover effects of MNCs' overseas subsidiaries on local firms. Investigating these spillover effects would shed light on the broader economic implications of ESG practices, especially in the context of fostering sustainable development in low-income economies. This avenue offers a promising direction for future research on the economic impacts of ESG initiatives.

V. Conclusion

This study investigated the impact of MNCs based in high-income countries on the performance of their overseas subsidiaries in low-income countries, with a specific focus on ESG aspects. This inquiry is significant in the context of the global initiative to achieve SDGs by 2030. To address this issue, we constructed unique matched data by combining the ESG scores of Japanese-listed companies with financial data from their CHQs in Japan and overseas subsidiaries in low-income economies. The estimation results revealed that improvements in the ESG scores of CHQs do not positively affect the growth rate of employment or the wages of overseas subsidiaries. However, there was a significant positive effect on labor productivity growth. Notably, enhancements in the "Community" score of the "Social" pillar demonstrated an economically meaningful positive impact.

The "Community" score encompasses fair competition, anti-bribery and anti-corruption measures, and engagement with the local community, which are closely associated with the level of social capital of firms. Accordingly, we argued that CHQs with social capital tend to decentralize decision-making in their foreign subsidiaries, allowing them to expand their firm size (scale) when facing global markets. Consequently, subsidiaries could enhance their productivity. Moreover, among low-income countries, where corruption and bribery are more prevalent than in middle-to-high-income countries, foreign subsidiaries of CHQs that adhere to fair competition and anti-bribery policies can utilize their assets for production, as opposed to engaging in rent-seeking activities. This discovery suggests that actively promoting "Community"-related initiatives by MNCs in high-income countries, as well as the preferential acceptance by governments in low-income countries of foreign direct investment from MNCs with such a stance, contributes to the economic growth of low-income countries.

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APPENDIX

A. *Variable Construction Procedures*

A1. *Constructing outcome variables using Basic Survey of Overseas Business Activities*

Labor productivity.

Labor productivity of overseas local subsidiaries = Nominal value added / (Number of permanent employees - Number of seconded employees from Japan)

Nominal value added = [(Sales − Cost of goods sold − Selling and general administrative expenses) + Total salaries + Rent] / Exchange rate

Exchange rate = Japanese Yen / Local currency

Growth rate of labor productivity = ∆ln(labor productivity) * 100

Employment.

Number of employees in overseas local subsidiaries = Number of permanent employees − Number of seconded employees from Japan

Growth rate of the number of employees = ∆ln(Wages of overseas local subsidiaries) * 100

Wage.

Wages of overseas local subsidiaries = Total salaries / Exchange rate / (Number of permanent employees − Number of seconded employees from Japan)

Growth rate of wage = ∆ln(number of employees) * 100

A2. *Constructing independent variables using LSEG (Refinitiv) ESG Score*

Standardized ESG Score.

$$\widetilde{\mathrm{ESG}}_{\mathrm{h,t-1}} = \frac{\mathrm{ESG\ Score}_{\mathrm{h,t-1}} - 1/\mathrm{n}\sum_{\mathrm{h}} \mathrm{ESG\ Score}_{\mathrm{h,t-1}}}{\sqrt{\mathrm{Var}(\mathrm{ESG\ Score}_{\mathrm{h,t-1}})}}$$

A3. *Constructing control variables using the Basic Survey of Japanese Business Structure and Activities*

TFP.[23]

Nominal value-added = Operating profits + depreciation + Wages + Welfare costs + Rent + Paid taxes[24]

Real value-added = Nominal value-added / Industry-Specific GDP deflator[25]

Capital input = Book value of tangible assets

[23] This method of calculating TFP is commonly employed in productivity studies and is referenced in Syverson's (2011) survey.

[24] The definition of value-added closely aligns with that of Morikawa (2010, 2023). Note that paid tax refers to non-income-based business taxes, such as fixed asset tax, automobile tax, and stamp duty that are incurred as part of business operations. It excludes corporate tax, resident tax, and income-based business tax.

[25] The industry-specific GDP deflator is sourced from the National GDP, compiled by the Cabinet Office in Japan.

Labor input = [Number of full-time employees + Number of part-time employees (working hours conversion for full-time employees[26])]*Industry-level working hours[27]

Cost share of labor (α) = Total payrolls / Nominal value-added

$\Delta \ln(\text{Real TFP}) = \Delta \ln(\text{Real Value-added}) - \alpha * \Delta \ln(\text{Labor input}) - (1 - \alpha) * \Delta \ln(\text{Capital input})$

ROE = Operation profits / Net assets

[26] This conversion of the number of part-time employees into the equivalent number of full-time employees is available in BSJBSA, considering the ratio of part-time to full-time employees' working hours.

[27] Since BSJBSA lacks information on working hour data for individual firms, industry-specific working hours are sourced from Labor force statistics, compiled by the Ministry of Internal Affairs and Communications in Japan.

Table A1 List of countries included in our analysis

Low-income countries	Middle-to-high-income countries
Algeria	Argentina
Angola	Australia
Bangladesh	Austria
Bolivia	Bahamas
Botswana	Bahrain
Brazil	Belgium
Bulgaria	Bermuda
Burkina Faso	Brunei
Cambodia	Canada
China	Canary islands
Colombia	Cayman islands
Cote d'Ivoire	Chile
Ecuador	Croatia
Egypt	Cyprus
El Salvador	Czechia
Ethiopia	Denmark
Fiji	Estonia
Ghana	Finland
Guatemala	France
India	Germany
Indonesia	Greece
Iran	Guam
Iraq	Hong Kong
Jamaica	Hungary
Kazakhstan	Ireland
Kenya	Israel
Laos	Italy
Lebanon	Korea, South
Liberia	Kuwait
Libya	Latvia
Malawi	Lithuania
Malaysia	Luxembourg
Mauritius	Macau
Mexico	Micronesia
Mongolia	Netherlands
Morocco	New Caledonia
Mozambique	New Zealand
Myanmar	Norway
Namibia	Oman
Nigeria	Panama
Pakistan	Poland
Paraguay	Portugal
Peru	Puerto Rico
Philippines	Qatar
Romania	Saudi Arabia
Russia	Singapore

Samoa	Slovakia
Serbia	Slovenia
South Africa	Solomon Islands
Sri Lanka	Spain
Tanzania	Sweden
Thailand	Switzerland
Tunisia	Taiwan
Turkey	Trinidad and Tobago
Uganda	United Arab Emirates
Ukraine	United Kingdom
Uzbekistan	United States of America
Venezuela	Uruguay
Vietnam	Virgin islands
Zambia	
Zimbabwe	

Notes. "Low-income countries" are the World Bank-designated developing countries where Japanese overseas subsidiaries are located. "Middle-to-high-income countries" are countries other than the low-income countries where Japanese overseas subsidiaries are located.

Table A2 Arellano-Bond estimator for the effects of Japanese CHQs' ESG score on outcomes of their foreign subsidiaries

	(1)	(2)	(3)
Dependent variable:	The growth rate of labor productivity	The growth rate of wage	The growth rate of employment
One−year lag of the dependent variable	−0.260***	−0.208***	−0.124*
	(0.046)	0.037	0.071
$\Delta\tilde{E}$_Emission$_{-1}$	−0.662	6.597	−2.519
	(5.407)	(4.117)	(2.462)
$\Delta\tilde{E}$_Resource use$_{-1}$	−1.706	−5.588	−0.292
	(6.052)	(5.766)	(3.086)
$\Delta\tilde{E}$_Innovation$_{-1}$	4.990	3.176	−4.216*
	(4.431)	(2.898)	(2.505)
$\Delta\tilde{S}$_Workforce$_{-1}$	9.106*	1.292	−1.261
	(4.979)	(3.361)	(1.735)
$\Delta\tilde{S}$_Human right$_{-1}$	−3.807	1.379	−1.337
	(2.448)	(1.864)	(1.094)
$\Delta\tilde{S}$_Community$_{-1}$	13.534***	2.985	−0.691
	(3.928)	(2.495)	(1.678)
$\Delta\tilde{S}$_Product responsibility$_{-1}$	−3.876	0.357	0.346
	(4.522)	(3.701)	(2.149)
$\Delta\tilde{G}$_Management$_{-1}$	5.121	−2.699	2.534
	(3.194)	(2.289)	(1.582)
$\Delta\tilde{G}$_Shareholder$_{-1}$	1.059	−4.167	−1.876
	(4.438)	(3.419)	(1.083)
$\Delta\tilde{G}$_CSR Strategy$_{-1}$	−3.812	3.455	−1.329
	(5.334)	(3.373)	(2.135)
ΔTFP of Japanese parent firm	0.165	0.102*	0.056
	(0.128)	(0.059)	(0.038)
ΔTFP$_{-1}$ of Japanese parent firm	0.416***	0.249*	0.040
	(0.158)	(0.132)	(0.062)
ΔROE of Japanese parent firm	0.051**	0.042**	−0.008
	(0.023)	(0.018)	(0.007)
ΔROE$_{-1}$ of Japanese parent firm	−1.712**	−1.363**	0.215
	(0.737)	(0.554)	(0.187)
Observation	1,973	2,236	3,471
Fixed effects			
Overseas subsidiary	✓	✓	✓
Country×Year	✓	✓	✓
Country×Industry	✓	✓	✓
Year	✓	✓	✓

Notes. Estimation results using the difference Generalized Method of Moments (Arellano and Bond, 1991). All components of the ESG score are treated as predetermined variables, while the real TFP growth rate and the ROE change of the CHQs are treated as endogenous variables. Standard errors robust to clustering by foreign subsidiaries are reported in parentheses. Note that a two-step estimator is not available because the matrix of the two-step estimator is not full rank. The estimation period spans from fiscal years 2017 to 2020, with a focus on foreign subsidiaries located in low-income countries. The intercept term is omitted. * p<0.10, ** p<0.05, *** p<0.01.