Multinationals' technological transfer on right-sourcing strategies: an environmental assessment for the European Union

Topic: Special session: Environmental impact of global value chains reconfiguration
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Post-pandemic aspects and geopolitical context, combined with the climate emergency, are accelerating the restructuring of the global production chains. The European Union (EU) has been forced to react in recent years with clear examples that seek to improve the European Union's resilience in the international context through, for example, the Open Strategic Autonomy (Cagnin et al., 2021). This framework identifies technological, social, and environmental challenges as opportunities to encompass various policies to strengthen the EU's autonomy, resilience, and active role along global value chains. Multinational corporations must lead these international trade reconfiguration demands. Their influence along global production chains and ability to move investment flows internationally will be key in addressing the new economic, technological, and environmental challenges derived from these reshaping trends.
This paper aims to quantify the environmental impact of the target sectors' reshoring emerging trends of the EU's multinational operating abroad. To do so, first, we will propose a relocation proposal that will shorten global production chains, allocating the EU's multinational production in foreign countries among new EU and near-friends host countries. Second, to fulfill the EU's environmental goals, we will evaluate the impacts of technology transfers from parent companies to subsidiaries in environmental terms.
The methodological approach for the relocation process will be based on a source-shifting proposal (de Boer et al., 2019; Giammetti, 2020; Gilles et al., 2021) using an environmentally extended MRIO model based on the ICIO-AMNE database, which presents a depiction of the activities of multinational enterprises combined with the ICIO tables (Cadestin et al., 2018). The shifting proposal of EU multinationals' activity back to Europe will be based on the search for comparative advantages in labor costs under the EU-27 average. Once the relocation is solved and evaluated in environmental terms, the technological transfers will occur if the foreign multinational hosting sector's emissions multiplier is dirtier than the parent company country's domestic sector. The proposal is to substitute the emissions coefficient vectors to improve the environmental performance of the multinationals operating within the EU (Duan and Jiang, 2021; Steenbergen and Saurav, 2023; Wiebe, 2018).
Given the recent contributions of Dachs et al. (2019), Eurofound (2019), and GarcÃ-a-Alaminos (2023), the growing reshoring trends show some patterns: 1) It is concentrated in medium to high-tech industries and larger firms; 2) Manufacturing sectors presents higher propensities to reshore; 3) There is a need for firms to react fast and flexible to changing conditions. Given these patterns, multinational corporations fit the production profile to relocate globally. The sectors we will relocate will be Basic Metals, Computer, electronic and optical products, and Electrical equipment. All of them strategic sectors fro the energy transition in the EU.
Preliminary results for the case of the Electrical equipment sector show a global emissions reduction by -17 MtCO2, representing a -0.06% of global emissions and -0.7% of the EU producer footprint. However, within the EU borders, an emissions increase is expected to occur of 4.78 MtCO2 in the main new hosting countries. Beyond the EU, the producer footprint reduction is estimated at -22.14 MtCO2, occurring mainly in the former main suppliers' countries. This study will allow us to evaluate the sectoral incidence of emissions increases within the EU. For this first bulk of results, Poland's emissions increase accounts for -1.7 MtCO2, the highest producer-based increase within the EU. By sector, emissions are concentrated in the electricity and gas sectors for both domestic and foreign

multinational firms. In a forthcoming round of results in this paper, we will evaluate the emissions reduction expected if the technological transfer from parent companies occurs.

Regarding the policy recommendations, and given these preliminary results, we can say that a global restructuring of production in terms of production structures generates small emissions reductions. On the contrary, technological transfer in terms of changes in emission coefficients can significantly reduce the environmental impact of the reallocation trends within the EU. Then, policy recommendations will be oriented to reinforce the Energy Transition among all EU countries to ensure emissions reductions. The decarbonization of energy sectors is mandatory within the EU borders. Moreover, from EU companies' perspective, shorter global value chains (or regional value chains) allow for the relocation of energy-intensive stages in countries with lower-carbon energy mixes to reduce their carbon footprint.