Industrial Robots and Export Performance in Developing Economies

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Abstract

Industrial robots are typically viewed as technologies for labor-scarce advanced economies, and their relevance for developing countries is often questioned. Departing from this perspective, this paper examines how robot adoption affects export structure in 33 developing economies across 15 manufacturing industries between 2005 and 2020. The analysis combines bilateral industry-level trade data with information on industrial robots and complementary technologies. The empirical strategy employs PPML with an instrumental-variable controlfunction approach based on global industry-specific automation trends to address endogeneity. The results show that robot adoption increases exports in developing economies. A 1 percent increase in robot density raises total exports by 0.16 percent, final goods exports by 0.22 percent, and intermediate goods exports by 0.16 percent. The gains are concentrated in Asia and Central and Eastern Europe and are strongest in medium- and high-technology industries, particularly in final goods production. By contrast, low-technology industries experience weak or negative export effects from automation. Furthermore, the paper demonstrates that automation contributes more strongly to trade within the developing world. In South–South trade, robot adoption increases both intermediate- and final-goods exports. By contrast, in exports to high-income destinations, automation increases only intermediate exports. Overall, the findings suggest that automation contributes to export upgrading in developing economies, but that the gains depend on technological capabilities and regional production structures.