

The Impacts of AI, Robots, and Globalization on Labor Markets: Analysis of a Quantitative General Equilibrium Trade Model *

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Abstract

We analyze the impact of robotics and AI on labor markets in the world economy, in which industries and countries are linked with each other through the global value chain (GVC). To this end, we build a multi-country, multi-product, multi-factor, general-equilibrium trade model, in which goods are produced from capital, intermediate inputs, and two types of tasks: one that can be performed either by low-skilled labor or robots, and the other by high-skilled workers or AI. We estimate model parameters and conduct the analysis, in which we simulate the counterfactual world economy in 2014 where robot-related technology and international trade costs are at their 1993 levels. Then, we compare the counterfactual economy with the actual 2014 economy, and find among others that the robot technology effect on labor markets is much smaller than the trade liberalization effect, although it is sizable in the industries that are most affected. Robot installation indeed affects low-skilled workers adversely in some countries, but affect them favorably in many other countries, suggesting that the productivity effect of robot installation is rather significant. In addition, robot installation increases the real wage rates for high-skilled labor, and hence increases the skill premium in all countries in our sample. We also conduct a counterfactual analysis, in which the robot task-productivity become ten times its 2014 level to assess future impacts of robots on labor markets, and also conduct a similar analysis for AI, and find that the impact of AI on the economy would be smaller than that of robotics.

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