Robots, Jobs, and Wages: A Tale of Triumph and Cataclysm

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Abstract

How does automation via industrial robots installation impact the demand for, and hence wages, of different worker groups in the economy? Would the effects become different over time and what lessons can be learned by developed and developing countries? This paper studies the implications of automation in an economy with an upstream robot-producing sector and two downstream robot-using agricultural and manufacturing sectors. Automation, induced by an increase in the stock of skilled labor, increases the production of robots. This yields external scale economies to skilled labor and hence raises their wage rate. Meanwhile the wage rate of unskilled labor falls because robots replace unskilled labor in the production of final goods. Over time, automation leads to an exit of nonproductive manufacturing firms (the decline of business dynamism) and expands output of the remaining firms. The business dynamism effect can further widen the wage (or income) disparity in the economy in the long run. These new theoretically findings are validated with a dataset on industrial robots for 50 economies in the period from 2007 to 2023, where it is confirmed that the density of industrial robots installed is a strong and significant driver of the earnings disparity in both the short run and the long run across countries regardless of their level of automation (robot adoption). Findings yield useful implications for public policies.

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