様式８ Form8

学位論文内容の要旨
Dissertation Abstract

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The above should be written in Japanese (e.g., 博士（経済学 / 経営学）
Doctor of Philosophy (Economics / Business Administration))

学位論文題名

Effects of Technological Change on Employment and Trade in Developing Economies

(発展途上国における技術革新が雇用と貿易に与える影響の実証分析)

Abstract

Technology is a key driver of economic growth, particularly in lower- and middle-income countries, where innovation is critical for closing the gap with advanced economies. However, its economic implications in developing economies remain a subject of debate. While technological change enhances productivity, it also raises concerns about labor displacement. This issue is especially pressing in developing countries, which accounted for 86% of global unemployment in 2022 (ILO, 2022). Despite persistent unemployment, automation is advancing rapidly. The number of operational industrial robots worldwide rose from 1 million in 2010 to over 3 million in 2020, with much of this growth occurring in emerging economies (IFR, 2021). This paradox raises critical questions: how does innovation impact employment in developing countries, and why do these countries adopt automation technologies despite high unemployment? This thesis addresses these issues across three

chapters, examining how innovation and automation influence employment, trade performance, and export competitiveness in developing economies.

Chapter 2 investigates the employment effects of innovation in developing countries, focusing on product and process innovations. The study employs product and process innovation as key metrics and uses instrumental variable (IV) estimation to address endogeneity concerns. The findings reveal that product innovation significantly boosts employment growth, while the impact of process innovation remains limited. Moreover, the analysis highlights the critical role of market structure: firms operating in less competitive markets experience greater employment growth from innovation. These results suggest that the employment implications of innovation are strongly shaped by market conditions.

Chapter 3 shifts the focus to industrial automation by examining the effects of industrial robot adoption on export performance across 53 developed and developing economies from 2005 to 2020. Using global sector-specific robotization trends as an instrument for domestic robot adoption, the study demonstrates that industrial robots significantly enhance exports of intermediate goods in both advanced and developing economies. For high-income countries, robot adoption also increases exports of final goods. The findings remain robust after accounting for Chinese automation trends and highly robotized industries, underscoring the transformative role of robotics in global trade.

Chapter 4 complements the previous chapter by addressing two additional perspectives. First, it shifts the focus to export market share as a more structural measure of trade. Second, it combines the effects of industrial robotics, R&D investments, and ICT adoption on export market shares. Using panel data on 17 industries across developed and developing economies from 2005 to 2020, this chapter finds that home-country robot adoption significantly enhances export competitiveness, with larger effects observed in developing economies. R&D emerges as a consistent driver of export performance, emphasizing the value of broad-based innovation. South-South trade flows particularly

benefit from technology-intensive activities, while robot adoption has the strongest impact in high-tech and capital-intensive sectors. In contrast, R&D fosters competitiveness across a broader range of industries, underscoring its wide-ranging significance.

Chapter 5 synthesizes the key findings and discusses their policy implications. It also acknowledges the limitations and proposes avenues for future research.