# Essays on automation and labor markets

# Summary

The evolutionary dynamics of labor markets due to technology are an undeniable aspect of capitalism. Recent theoretical and empirical literature has particularly highlighted the impact of technological change on the demand for various types of workers and the resulting shifts in workforce composition. However, the evidence is less conclusive regarding the effects of technology on overall employment and, to some extent, inequality. Establishing a clear direction of employment adjustments is challenging, as its effects depend on specific technologies, historical contexts, and prevailing institutional factors.

This thesis addresses these issues by emphasizing the distinct roles of various technologies in shaping labor market outcomes. This is not only looking at automation in a broad sense, but also distinguishing between specific technologies. In doing so, it contributes to the literature on the topic by focusing on some aspects that have been underexplored.

First, the thesis explores whether atypical jobs can provide a buffer to potential negative effects of automation. The findings from a longitudinal analysis encompassing 24 European countries indicate a negative correlation between the probability of transitioning from standard to non-standard employment and automation risk. Additionally, there is an observed increase in the likelihood of falling into unemployment if automation risk increases, irrespective of the type of employment contract. Thus, these two findings question labor market flexibility's capacity to mitigate automation's negative impacts.

Second, the thesis examines the association between occupational exposure to robots and artificial intelligence (AI) and within-occupation inequality across 19 European countries. By recognizing the distinct functions of AI and robots and the task content of associated occupations, this chapter tests the hypothesis that occupations exposed to AI

exhibit broader wage dispersion, while those with greater exposure to robots show lower wage variability. Our econometric analysis supports this hypothesis, suggesting that this is due to varying levels of complementarity between workers' individual abilities and the task content of occupations related to robots and AI, respectively.

Third, the thesis explores how diffusion stages of different technologies life cycles influence employment and wages in the short-run in the period 1995–2017 in 163 NUTS-2 regions. The findings reveal significant short-term positive and negative effects of automation on employment within different phases of the technology life cycle, which are either compensated or moderated in the long-term impact. Notably, the negative impact of ICT investment on employment is more pronounced in the technology's mature phases, suggesting that firms require time to integrate technologies effectively before task routinization and worker substitution occur.

Overall, this thesis contributes to widening the understanding of the consequences of different technologies on labor markets. From a policy perspective, it offers insights into the need for timely and flexible policies capable of adapting to and accompanying the diffusion of technologies.