

**Long-term effects of early adverse labour market conditions:
A Causal Machine Learning approach**

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Abstract

This study estimates the long-term causal effects of completing education during adverse labour market conditions, measuring outcomes 35 years post-education to explore lifelong mechanisms. To achieve this, the study combines historical regional unemployment rates with detailed SHARE microdata for European cohorts completing education between 1960 and 1990 in a novel database. A systematic heterogeneity analysis is conducted by leveraging the Causal Forest, a causal machine learning estimator that allows estimates at various aggregation levels. Furthermore, the causal link is validated using an instrumental variable approach. The main findings reveal that a one-percentage-point increase in the unemployment rate at the time of completing education leads to a significant decline in earnings (-5.2%) and self-perceived health (-2.23%) after 35 years. The heterogeneity analysis uncovers that the results are primarily driven by less educated individuals and highlights a permanent disadvantage for women in labour market participation. This study also provides evidence that systematic divergence in life trajectories can be explained by job search and human capital models. Overall, the research suggests that the consequences of limited post-education opportunities can be permanent, underscoring the importance of identifying vulnerable groups for effective policy interventions.