Analysing the impact of technological change and automation on sectoral employment: An input-output approach

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This research analysed the impact of automation and technological progress on employment in various sectors across 43 countries from 2000 to 2014. The study used data from the World Input-Output Database (WIOD) to calculate vertically integrated labour productivity and vertically integrated capital-labour ratio as indexes to measure the effect of technical change and automation on the number of workers employed. The contribution of our research to literature is twofold. First, the vertically integrated labour productivity and the vertically integrated capital-labour ratio were calculated as indexes to measure technical progress and mechanisation, which overcome the limitation of traditional indicators such as the expenditures of research and development or the total factor productivity. On the other hand, we employ the Dynamic Common Correlated Effects Estimator Mean Group with instrumental variables (CCEEMG-IV), which is robust in the presence of cross-sectional dependence, slope heterogeneity, structural breaks, stationarity, and endogeneity. The sample was divided into advanced economies and emerging markets to observe if there were any differences related to the degree of development of the countries in the sample. Manufacturing and non-manufacturing sectors were distinguished to determine which industries are more vulnerable to technological change and automation. The sample was also decomposed into high and medium-high-tech intensity sectors, medium-tech intensity sectors, and medium-low- and low-tech intensity sectors to proxy the difference between skilled and unskilled labour. The results suggest that technological change and mechanisation may displace human labour, although the effect differs among countries, sectors and labour qualifications.