

Exploring labour market implications and transitional requirements of a net-zero economy

Topic: Input-Output Modelling: Employment policies

Author: Laura Wallenko

The green transition plays a crucial role for future labour markets, as fossil-fuel intensive industries will be downscaled and new climate-friendly provisioning systems will emerge, implying both job creation and destruction. The associated employment effects are highly influential for distributional outcomes as individual risk of unemployment depends on a person's occupation, skills and sector affiliation. In this study, we explore employment opportunities and risks of unemployment in a state of net-zero CO₂ emissions in Austria by 2050 at the economy-wide and household level. Specifically, we ask how the transition to climate neutrality in Austria affects labour demand across sectors and occupation types, and which household groups are affected by the changed labour market structure. While previous studies analysing the employment effects related to the green transition typically focus on single sectors or do not account for macroeconomic feedback effects, the novelty of our approach lies in providing a detailed analysis of labor market dynamics at the individual level embedded in a cross-sectoral consistent macroeconomic framework depicting the transition to net-zero CO₂ emissions.

We build our analysis on a low energy demand scenario that is characterized by a transition towards public provisioning systems and circularity, achieving net-zero CO₂ emissions in the key sectors buildings, transport, industry and energy. We use the Computable General Equilibrium (CGE) model WEGDYN-AT to explore the aggregate changes in sectoral labour demand that emerge in a state with net-zero CO₂ emissions in 2050 relative to a future baseline state without additional mitigation efforts. The CGE model WEGDYN-AT is built on an Input-Output table reflecting economic interdependencies in the Austrian economy and offers a high resolution in terms of sectors (n=81), energy technologies (n=20), and transport modes (n=6), making it a well suited tool to study the effects of ambitious emissions reduction. We then conduct a fine-grained post-processing of these results to gain insights into the composition of sectoral labour use in terms of occupations and socio-demographic characteristics of workers. From the Austrian Labour Force Survey we use annual datasets during the time period 2011-2023 containing information on labour force by occupation, economic sector, net labour income, gender and further-sociodemographic characteristics. We match the economic sector (NACE) categorisation of WEGDYN-AT to the 2nd and 3rd-digit level in the Labour Force Survey and relate it to persons employed according to the International Standard Classification of Occupations (ISCO) at the main group level. By integrating the time series of 2011-2023 we create a large dataset reflecting the average composition of ISCO occupations across sectors in Austria, and the associated socio-demographic characteristics of employees. This allows us to track the change in labour demand according to household-specific characteristics.

Our analysis indicates a strong increase in the demand for Plant and Machine Operators especially from the wood and transport sectors, as the latter gain strongly in relevance in a climate-neutral economy. In contrast, Service and Sales workers are demanded less as trading sectors lose priority. Across the remaining professions, net changes are minor, but nevertheless contain substantial reshuffling of jobs in some cases. Moreover, we observe a decrease in the demand for occupations provided by very low- and high-income earners, and an increase for all other groups suggesting that a more equal distribution of labour income could result if retraining programmes are implemented in a targeted way. Finally, we observe opposing effects in the demand change between genders, i.e., a net increase in occupations provided by male and a decrease for occupations by female employees, which results from the distinct gender-specific employment profiles. Specifically, men are strongly represented in the area of Plant and Machine Operation and Craft and Related Trades, while women are more frequently employed in Service and Sales. Conceptually, our fine-grained analysis

based on household micro data identifies household groups with good possibilities to find new jobs with similar tasks and those at higher risk of unemployment that require substantial retraining.