

Electromobility 2035 - Effects on the economy and employment through electrification of the powertrain of passenger cars

Topic: Classical IO applications: Economic Structural Change and Dynamics

Author: Anke M. MOENNIG

The automotive industry is one of Germany's leading industries. Due to its high share of value added, its high export quota and its high direct and indirect number of employees, the automotive industry is regarded as systemically relevant and therefore receives a high degree of political, economic and social attention. The industry is currently in a phase of upheaval: suspected cartels, software manipulation, driving bans for diesel vehicles, the planned end of the combustion engine in France or Great Britain, e-quotas in China or EU fines for increased carbon dioxide emissions from 2020 (<95 grams of CO₂ per kilometre) and 2030 (35% less than 2020) are urging manufacturers to make changes and are currently promoting the development of battery-operated cars in particular.

The transformation process towards the electrification of powertrains is likely to have a major impact on the German economy in general and on the German labour market in particular. By applying an input-output-based, economic modelling approach and by combining it with scenario technique, this paper aims to quantify the effects of the electrification of the powertrain of passenger cars in Germany on employment. The macroeconomic input-output model IAB/INFORGE can describe in detail the labour market by differentiating employment by sectors, occupations and by requirement level. The bottom-up structure of the model allows formulating industry-specific assumptions. With the help of the scenario technique, a what-if analysis is started that distinguishes between two worlds with a strong electrification (electrical share will be 23 percent in 2035) and a less strong electrification (electrical share in passenger cars remains roughly at its current level) of the powertrain.

Compared to the baseline scenario, the shortrun results show a positive growth and employment effect, but in the long term a lower gross domestic product and employment level will have to be expected. While in the beginning the necessary additional investments of the automotive industry, the construction investments in the charging infrastructure and the re-equipment of the power grid will have a positive effect, in the long run the increasing import demand for electric cars and traction batteries will dominate. With the exception of training costs, the cost effects also have a negative impact on the economy as a whole, but are far less dominant. The positive effect from the change in fuel demand - electricity instead of mineral oil - also cushions the negative impulses. The productivity-related growth and employment impulses, which will only take effect in the long term, cushion the largely import-induced decline in economic momentum on the one hand, but on the other hand contribute to the relatively strong overall job loss.

Compared to other related studies, this paper applies a sophisticated approach to project likely employment effects in the long run. The focus lies on the effects on labour demand not only by sectors but also by occupations and requirement levels. Moreover, the bottom-up structure allows for sector specific assumptions.