36 – The Contribution of Waste Economy to Circular Economy and Sustainability - A Quantitative Assessment for Austria

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The circular economy has emerged as a key concept to a sustainable economic paradigm. It rejects the prevailing linear "take-make-use-dispose" economy and proposes a system based on circular resource flows which avoid excess primary resource extraction and waste production. By disposal of given waste streams and by recycling of waste into secondary raw materials, the waste economy already fulfils an important environmental function today: the substitution of primary raw materials with secondary raw materials. Primary raw material production is energy-intensive and drives the emission of greenhouse gases. Circular material efficiency strategies such as recycling of materials already in circulation reduce waste and shrink resource and energy demand. It is thus considered as climate mitigation strategy. In addition, it creates local employment and added value. The waste economy has – under certain price and policy conditions - the potential to spur the development of sustainability innovations such as circular business models, waste processing technologies or waste collection systems. It may thus support the transition to a resource-efficient and low-carbon economic model. But resource price volatility of secondary resources resulting from altered market conditions, i.e. due to the Covid-19 pandemic, represents a stumbling block for long-term investments in CE-oriented business models.

Against this backdrop the paper presents a quantitative assessment of the Austrian waste economy in terms of employment, value added and CO_2 emissions by taking a broader perspective including effects of substitution of primary resources with secondary resources in relevant industries including resource price sensitivity analyses.

Using the macroeconomic model WIFO.DYNK (Dynamic New Keynesian), adapted to link monetary and physical waste stream data for Austria, a comprehensive economic analysis of the waste and resource economy is carried out. The dynamic macroeconomic one-region and multi-sector (62 industrial and service sectors) model WIFO.DYNK applies extended input-output tables based on IO tables of Statistics Austria. In contrast to static IO models, WIFO.DYNK accounts for technology and price-driven changes in input factors for the industrial sectors: capital, labour, energy, domestic and imported goods. Model input data - waste streams such as metals, minerals and organic wastes, investment and operating costs of processing plants, collection and transport activities, prices of materials and model results regarding aggregated and sectoral value added, employment and CO_2 emissions are presented. Indirect and induced economic impacts as well as resource substitution effects from the waste economy are reported. Conclusions regarding drivers and barriers for a circular waste economy are derived.

Biographical note

Ina Meyer is senior economist at the Austrian Institute of Economic Research (WIFO) specialized in the field of climate change and sustainable economics, energy-economic impact analyses, scenarios analyses as well as interdisciplinary and transdisciplinary research approaches. Her current research comprise policy- and application-oriented research in resource efficiency in national and international projects. Ina studied economics at the Free University of Berlin and received her doctorate degree from the University of Potsdam in close collaboration with the Potsdam Institute for Climate Impact Research (PIK).