Using machine learning to estimate energy and CO2 extension vectors for WIOD 2016 database

Topic: Satellite accounts
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Significant attention has been devoted to the use of consumption-based accounting principle in the past few decades. Input–output analysis (IOA) has proved to be an ideal tool for this task. Nevertheless, the development of IO tables and in particular multi-regional input-output (MRIO) tables is a labor intensive and timely process. Many global input output databases (EORA, WIOD2013, EXIOBASE) come with the environmental extensions that permit analyses such as estimation of carbon and energy footprint. However, in some cases as for instance WIOD database released in 2016 does not contain such data.

The main aim of this study is to explore how machine learning techniques could be used to estimate energy and CO2 extensions vectors, that could later be used for the estimation of consumption and production based measures.

The data for this study comes from WIOD 2013 and from WIOD 2016 databases. WIOD2013 version is a system of MRIO tables, socioeconomic and environmental accounts. It coves 35 industries and 41 countries/regions, including 27 EU and 13 other major advanced and emerging economies, plus Rest of the World (ROW) region over the period 1995-2011 (environmental accounts only for 1995-2009). More recent WIOD2016 database provides data for 56 industries and 44 countries (28 EU, 15 other major countries and ROW region) for the period from 2000 to 2014. However, WIOD2016 only provides MRIO tables and socioeconomic accounts but does not provide environmental accounts.

This study uses WIOD 2013 data to train and test the model. Once the model is trained it is fitted with WIOD 2016 data in order to estimate energy and CO2 vectors.