Sources of the changes in global industrial energy use, 1995-2009

Topic: Structural change and dynamics III
Author: Umed Temurshoev
Co-Authors: Luis Delgado sancho

In the period 1995-2009 global industrial gross energy use (IGEU) has increased by 145.8 million terajoules (TJ), which makes 28.4% of its 1995 level. Using data from the WIOD dataset (www.wiod.org) and full first-order structural decomposition analysis (SDA), we study the driving forces behind such changes at annual intervals. We find that at the world level the changes in per capita demand (consumption) volume have contributed most to the cumulative growth of IGEU (+2.21×108 TJ or +151.9%). Smaller positive contributions are found for population growth (+0.74×108 TJ or +51.0%) and changes in technology (+0.39×108 TJ or +26.6%). These effects were partly offset by changes in energy intensity (-1.82×108 TJ or -125.0%) and changes in the structure of demand (-0.07×108 TJ or -4.6%). However, not surprisingly these overall effects hide a lot of country-specific heterogeneities. For example, while the overall technology effect has positively contributed to the change in the world IGEU, its regional contributions are found to be both negative with the largest effects (in percentage of the overall technology effect) of -54.5% for USA, -14.3% for Russia, -11.3% for Japan; -6.2% for Italy, -4.8% for the UK and -3.8% for Australia, and positive with the largest effects of +98.2% for the rest of the world region, +73.1% for China, +11.8% for Taiwan, +4.4% for France, +4.3% for Germany, +4.1% for Spain, and +4.0% for Korea. To get further insights on such issues as substitution between energy products and country responsibility, we also analyze the sources of changes in global IGEU for different types of energy and region-specific final demands.