

Sense and sensitivity of structural decomposition analysis

Topic: Issues and examples of SDA

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In a number of years Structural Decomposition Analysis (SDA) has been an important tool for Statistics Denmark to break down the observed changes in especially physical variables like energy consumption or CO₂-emissions into the changes in their physical and economic determinants. Working with this methodology we have observed that some of the methodological choices to be made prior to using this method can affect the outcome and probably even the conclusions of the analysis. The purpose of this paper is to identify and measure the sensitivity of the analysis to a number of those choices and discuss the sensibility of the method in light of its sensitivity to various factors.

In the most cited article in this area Dietzenbacher and Los (1998) the authors addressed the question of sensitivity as well. They concentrated on the sensitivity to different solutions of the non-uniqueness problem and to the choice of aggregation level. This study looks at the same aspects but the list of factors to which the SDA may be sensitive is extended. The study is based on empirical evidence from various Danish SDA's carried out on a mixture of physical and economic variables.

An SDA requires that economic variables are represented in quantities rather than in current prices. It usually means that variables are measured in prices of a fixed base year. But in recent years variables measured in previous years prices have been introduced as well. The final type of quantity variables is fixed prices, chained values. This study carries out SDA's based on all three types of quantity variables and the sensitivity of the calculation to the choice between the methods is quantified. As it is normally not possible to apply simple summation rules to variables in fixed prices, chained values, the third type requires the development of special matrices. Thus, in this paper it is shown how input-output matrices and vectors can be compiled in fixed prices, chained values and then subsequently adjusted in such a way that they can be applied in input-output models just like traditional fixed price matrices.