

An attempt to assess the interdependence between prices and the structure of inputs on the basis of input-output tables expressed in constant and current prices

Topic: Inflation and Supply Chain Adaptation in Dynamic Interindustry Modelling

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Input-output tables make it possible to trace with high accuracy, on the one hand, changes in technological processes expressed in changes in the structure of real intermediate inputs, and on the other hand, the impact of price changes on these structures. Changes in the prices of intermediate products resulting from broadly understood changes on the supply side are transferred to production costs and, consequently, to the prices of final goods, according to the cost formula. Both producers and final consumers try to adapt to these changes by changing the structure of their purchases. Substitution mechanisms cause a decrease in the share of these intermediate inputs which prices relatively increase. The structure of consumption changes in a similar way.

From the point of view of price formation, the strength of the imbalance between demand and supply is decisive. A price shock may therefore have its source on both the demand and supply side. Input-output tables and models allow to assess the strength of the adjustment mechanisms and, consequently, the transfer of price impulses. The condition is that the data should be expressed both in current and constant prices.

Our motivation to try to take advantage of this opportunity stems from the dramatic events that have significantly changed the rules of the global economy in recent years, primarily the COVID-19 pandemic, as well as the war in Ukraine.

The method we used was to calculate price indices for individual industries on the basis of the input structure, both based on the Laspeyres formula and the Paasche formula. The difference in the obtained results indicates the direction in which the change in the real cost structure contributed to the change in the basic prices of individual products. The higher index calculated on the basis of the Laspeyres formula proves that the change in the structure of outlays contributed to the slowdown of inflation impulses - a rational substitution took place. A higher Paasche index means that changes on the real side forced price changes. In the next step, we supplemented this analysis with changes in the structure of final demand.

The availability of symmetrical tables expressed in fixed prices (prices from the previous year) is still very limited. That is why the study was conducted on the basis of data describing the Danish economy, published on the website of Statistics Denmark. The choice of Denmark as the subject of the study results also from the limitations of the availability of the latest statistical data, i.e. tables for the analyzed period reaching 2021. The Danish tables are symmetrical input-output tables presented according to the Danish Industry Classification (DB07), which is a version of the international nomenclatures NACE, Rev. 2, ISIC, Rev., at the level of 69 branches. In an EU-perspective there is a high degree of comparability with national accounts and input-output tables made by other countries.

The obtained results do not confirm the hypothesis about the substitution effect of expenditures towards the reduction of production costs. On the contrary, the results suggest that the causal

relation is the opposite: an increase in demand for intermediate products (or reduction of supply) causes their prices to rise. In the context of further considerations, a detailed analysis of individual cost items should be undertaken, which would allow indicating those that played the crucial role in shaping the overall indices.

This lack of data is one of the main reasons why empirical analyzes of changes in quantities are unpopular. In particular, there are no studies identifying the role of the price component. This article tries to fill that gap. The novelty of this article also lies in the fact that economic processes taking place during the pandemic are analyzed - the literature on this subject is quite rich, but it does not use the potential of input-output models, which is also due to common delays in the publication of data. It will be particularly interesting to use the method we tested next year, after publishing the tables for 2022, a year of high inflation.

Thanks to a unified methodology for creating IO tables, the described procedure can be applied universally. Necessary time series of IO tables expressed in previous year's prices will certainly become widely available, and the level of detail will almost certainly increase.

Pointing to the potential of input-output tables expressed in fixed prices was one of the motivations for writing this article. The authors hope that in this way they will encourage statistical offices to pay more attention to the construction of such tables.